



# Taxonomic study of the tribe Glyptini (Hymenoptera, Ichneumonidae, Banchinae) from Japan

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Doctoral thesis

**Taxonomic study of the tribe Glyptini  
(Hymenoptera, Ichneumonidae, Banchinae) from Japan**

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**[Unpublished for the purposes of Zoological Nomenclature (Art. 8.2, ICZN)]**

## ABSTRACT

Japanese species of the tribe Glyptini (Hymenoptera, Ichneumonidae, Banchinae) are revised. Total 109 species of eight genera of Glyptini are recognized from the Japanese Archipelago. The status of *Orientoglypta* Kuslitzky, 1973, is restored from the synonym or subgenus of the genus *Glyptopimpla* Morley, 1913, to a separate genus (**stat. rev.**) and three species previously classified into *Glyptopimpla*, *G. aditiae* Gupta, 2002, *G. lota* (Chiu, 1965) and *G. watanabei* (Momoi, 1963), are transferred to *Orientoglypta* (**comb. nov.**). The status of *Diblastomorpha* Förster, 1869, is restored from the synonym or subgenus of the genus *Glypta* Gravenhorst, 1829, to a separate genus (**stat. rev.**) with a single species *D. cylindrator* (Fabricius, 1787) (**comb. nov.**). The status of *Teleutaea nigricoxalis* (Uchida, 1928) is restored from the synonym of *T. sachalinensis* Uchida, 1928, to a separate species (**stat. rev.**). Two new species of the genus *Apophua* Morley, 1913, *A. elegans* **sp. nov.** and *A. yamato* **sp. nov.**, are described. Two new species of the genus *Glyptopimpla*, *G. kusigematii* **sp. nov.** and *G. momoi* **sp. nov.**, are described. Fifty-three new species of the genus *Glypta*, *G. aichiensis* **sp. nov.**, *G. aino* **sp. nov.**, *G. akahige* **sp. nov.**, *G. akiuensis* **sp. nov.**, *G. aomoriensis* **sp. nov.**, *G. biwakuboensis* **sp. nov.**, *G. cognata* **sp. nov.**, *G. daisensis* **sp. nov.**, *G. daisetsuzana* **sp. nov.**, *G. densepunctata* **sp. nov.**, *G. elegans* **sp. nov.**, *G. erythronota* **sp. nov.**, *G. ezoensis* **sp. nov.**, *G. flavitarsus* **sp. nov.**, *G. fujisana* **sp. nov.**, *G. hayachinensis* **sp. nov.**, *G. ichitai* **sp. nov.**, *G. iriei* **sp. nov.**, *G. japonica* **sp. nov.**, *G. karasawensis* **sp. nov.**, *G. kochai* **sp. nov.**, *G. konishii* **sp. nov.**, *G. kumaishiensis* **sp. nov.**, *G. kusigematii* **sp. nov.**, *G. kuro* **sp. nov.**, *G. kuslitzkyi* **sp. nov.**, *G. kyushuensis* **sp. nov.**, *G. maetoi* **sp. nov.**, *G. makiharai* **sp. nov.**, *G. mame* **sp. nov.**, *G. matsumotoi* **sp. nov.**, *G. minamikawai* **sp. nov.**, *G. murotai* **sp. nov.**, *G. nagasei* **sp. nov.**, *G. nakamurai* **sp. nov.**, *G. niigatensis* **sp. nov.**, *G. nipponica* **sp. nov.**, *G. onaga* **sp. nov.**, *G. shibetsuensis* **sp. nov.**, *G. shigaensis* **sp. nov.**, *G. shimizui* **sp. nov.**, *G. slenda* **sp. nov.**, *G. sudai* **sp. nov.**, *G. suwai* **sp. nov.**, *G. tomuraushiensis* **sp. nov.**, *G. touyaensis* **sp. nov.**, *G. uenaensis* **sp. nov.**, *G. yamagishii* **sp. nov.**, *G. yamamotoi* **sp. nov.**, *G. yamato* **sp. nov.**, *G. yashajinensis* **sp. nov.**, *G. yoshidai* **sp. nov.**, *G. zenibakoensis* **sp. nov.**, are described. Six synonyms are newly established, i.e., *Apophua genalis kasparyani* Kuslitzky, 2007 [= *A. maetoi* Momoi, 1988, **syn. nov.**], *Glypta chinensis* (Uchida, 1952) [= *G. lapponica* Holmgren, 1860, **syn. nov.**], *Glypta bisinuata* Momoi, 1963 [= *G. rufa* Uchida, 1928, **syn. nov.**], *Teleutaea corniculata* Momoi, 1978 [= *T. striata* (Gravenhorst, 1829), **syn. nov.**], *Teleutaea kasparyani* Kuslitzky, 1979 [= *T. diminuta* Momoi, 1978, **syn. nov.**], and *T. longiterebra* Kuslitzky, 1973 [= *T. nigricoxalis* (Uchida, 1928), **syn. nov.**]. The specific name of *Glypta triangularis* Momoi, 1963, is preoccupied by Schmiedeknecht (1935)

and thus I advocate new name, *G. sankaku* (**nom. nov.**). Ten species, *Diblastomorpha cylindrator*, *Glypta adachii* Uchida, 1928, *Glypta breviungulata* Kuslitzky, 1976, *Glypta extincta* Ratzeberg, 1852, *Glypta lapponica* Holmgren, 1860, *G. pedata* Desvignes, 1856, *Glypta rufata* Bridgman, 1887, *Glypta tamanukii* Uchida, 1928, *Teleutaea brischkei* (Holmgren, 1860), and *Teleutaea mishae* Kuslitzky, 1973, are newly recorded from Japan. The male of the genus *Townesion* Kasparyan, 1993, is described based on *T. japonicus* Kasparyan, 1999, for the first time. The host of the genus *Glyptopimpla* is first recorded on rearing *G. uchidai* (Momoi, 1963) from the tortricid moth, *Homoxopsis illotana*. Phylogenetic relationships among Japanese Glyptini are analysed based on the equally weighted parsimony of morphological characters. By the result of analyses, the monophyly of every genus except for *Glypta* is well supported, while the relationships among them are seldom supported by the strict consensus trees besides the sister-group relationship of the genera *Apophua* and *Teleutaea*. Distribution and host records of the Japanese genera and species are provided as well as updated keys to them.



## CONTENTS

### Chapter I GENERAL INTRODUCTION

<b>1. The family Ichneumonidae</b> .....	2
<b>2. The tribe Glyptini</b> .....	3
2.1. Phylogeny.....	3
2.2. Bionomics and diversity.....	3
2.3. Economic importance.....	5
2.4. Classification.....	6
<b>3. Aim of the present study</b> .....	8

### Chapter II MATERIALS AND METHODOLOGY

<b>1. Materials examined</b> .....	11
<b>2. Nomenclatural treatments in this thesis</b> .....	11
<b>3. Terminology</b> .....	11
3.1. Head.....	12
3.2. Mesosoma.....	12
3.3. Wings.....	14
3.4. Legs.....	14
3.5. Metasoma.....	15
3.6. Male terminalia.....	16
<b>4. Methods of morphological examination</b> .....	16
4.1. Morphological observation.....	16
4.2. Dissection of male terminalia.....	17
4.3. Measurements.....	17
<b>5. Phylogenetics</b> .....	19

### Chapter III TAXONOMY

<b>1. Introduction</b> .....	22
<b>2. Revision of Japanese Glyptini</b> .....	22
<b>3. Nomenclatural summary</b> .....	263

## **Chapter IV PHYLOGENY**

<b>1. Introduction</b> .....	268
1.1. Phylogenetic position of the Glyptini.....	268
1.2. Choice of taxa.....	268
1.3. Characters and character states.....	268
1.4. Cladistic analysis.....	274
<b>2. Results</b> .....	274
2.1. Monophyly and sister-group relationships of genera.....	274
2.2. Intrageneric relationships.....	274
<b>3. Discussion</b> .....	275

## **Chapter V GENERAL DISCUSSION AND CONCLUSION**

<b>1. Evaluation of morphological characters for classification</b> .....	277
<b>2. Species diversity and zoogeography</b> .....	278
2.1. Distribution pattern of each genus.....	278
2.2. Species diversity of Japanese Glyptini.....	279
2.3. Comparison with other regions.....	280
<b>3. Bionomics</b> .....	281
<b>4. Phylogenetic problems</b> .....	282
<b>5. Conclusion</b> .....	283
<b>ACKNOWLEDGEMENT</b> .....	284
<b>REFERENCES</b> .....	285
<b>Tables</b> .....	295
<b>Figures</b> .....	306

# **Chapter I**

## **GENERAL INTRODUCTION**

## 1. The family Ichneumonidae

The Ichneumonidae is the largest family of the order Hymenoptera, which is also one of the hugest animal groups in terrestrial biomes (LaSalle & Gauld, 1991). The ichneumonid wasps are common insects and are found in various terrestrial ecosystems, including temperate and tropical rainforests, grasslands, arctic tundra, and deserts. In Britain, where the composition of entomofauna is quite well known, the Ichneumonidae is the largest family of insects and constitutes ca. 7 % of the total insect species (Gauld, 1991). If the same proportion is applied throughout the world, and if the largest estimate of its total insect species richness is realistic, this family could contain a million plus species in the world (Gauld, 1991). Most of them are parasitoids on holometaborous insects, spiders, or other arthropods (Wahl, 1993). This biological aspect of the Ichneumonidae is important to human beings because not a few of them perform ecological functions as natural enemies of many pest insects (e.g., Gauld, 1991).

Parasitoid wasps including Ichneumonidae constitute a key component of terrestrial ecosystems due to their species richness and ecological importance (LaSalle & Gauld, 1991). They are virtually essential for maintaining the diversity of other animals and plants, being involved in a vast number of trophic interactions and having a regulatory effect on arthropod populations (e.g., Santos & Quicke, 2011). In spite of their ecological importance, the true diversity of Ichneumonidae is not well known even in developed countries. Its faunas, excluding those of Europe and North America, are poorly known and thus many undescribed species are still present. Townes (1969) calculated that there would be 60,000 species of ichneumonids worldwide, but most researchers now regard this as an underestimate. Gauld and his collaborators investigated tropical fauna of ichneumonids in Costa Rica and published four monographs (Gauld, 1991, 1997, 2000; Gauld *et al.*, 2002). Although the species richness of ichneumonids is considered to be somewhat declined from temperate to tropical regions (Townes, 1969; Owen & Owen, 1974; Janzen, 1981; Askew & Shaw, 1986; Gauld, 1986; Noyes, 1989; Askew, 1990; Skillen *et al.*, 2000; Santos & Quicke, 2011), Gauld and others have well demonstrated that the huge biodiversity of ichneumonids is present in the tropics of Costa Rica. In the last (fourth) monograph, they calculated that there would be over 100,000 species of ichneumonids all over the world (Gauld *et al.*, 2002). In the last two decades, insect biodiversity informatics has been rapidly advanced and many biodiversity databases have been provided. Yu and Horstmann sorted nearly all literature on ichneumonids and published the world catalogue of Ichneumonidae in 1997. Later, they compiled two update versions of the

world catalogue, including the sister family Braconidae (Yu *et al.*, 2005, 2012). According to the latest version, 1,579 genera and 24,281 species (including fossil species) of Ichneumonidae have been described from the world.

In Japan, 405 genera and 1,550 extant species of the Ichneumonidae have been recorded (Yu *et al.*, 2012), but this number must be at most less than 50 % of true species richness according to five active Japanese taxonomists (Kusigemati, Konishi, Matsumoto, Yoshida and Watanabe, unpublished data). This makes it difficult to improve the inventory and biological researches on this ecologically and economically important group of insects in Japan and other Asian countries.

In this study, I focus on the tribe Glyptini of the ichneumonid subfamily Banchinae for the taxonomic research to clarify the Japanese species and their phylogeny, because this taxon has been poorly studied in spite of its high species richness and its ecological importance as natural enemies of lepidopteran pests.

## **2. The tribe Glyptini**

### 2.1. Phylogeny

The family Ichneumonidae is a clearly definable monophyletic group (Sharkey & Wahl, 1992). The subfamily Banchinae (including the subfamily Townesioninae) can be also defined as a monophyletic group after phylogenetic analyses based on morphological and molecular characters (Quicke *et al.*, 2009).

The tribe Glyptini is one of three tribes of the subfamily Banchinae (Table 1), containing 14 genera and 577 species in the world (Yu *et al.*, 2012). Wahl (1988) suggested that this tribe was a sister clade of the tribes Atrophini + Banchini. The Glyptini can be presumed to be a monophyletic group well defined by a conspicuous autapomorphy, i.e., a pair of oblique grooves of metasomal tergites (Townes, 1970b; Wahl, 1988). According to Short (1978) and Wahl (1988), however, the larvae of Glyptini have no derived states and presumably represent the ground plan of the Banchinae (Wahl, 1988). Nevertheless, phylogenetic relationships among genera of the tribe Glyptini remain unsolved.

### 2.2. Bionomics and diversity

All ichneumonids kill their hosts by parasitism (Townes, 1972). The major biological strategies of ichneumonids can be classified by the combination of koinobiosis or

idiobiosis and ectoparasitism or endoparasitism (Gauld, 1988). Koinobionts that emerge from the host's pupa after being oviposited in early instar larvae tend to have a large number of small microlecithal eggs, whilst idiobionts attacking pupae usually have a few large eggs (Price, 1972). Among the four combinations (koinobiosis + ectoparasitism, koinobiosis + endoparasitism, idiobiosis + ectoparasitism, and idiobiosis + endoparasitism), koinobiont ectoparasitism occurs only in a few groups, e.g., the subfamily Tryphoninae and the *Polysphincta* group of the subfamily Pimplinae (Gauld, 1988). The other three strategies occur in various groups and the koinobiont endoparasitism, having narrow host range, is the most common strategy of the Ichneumonidae, including the tribe Glyptini. This strategy necessarily involves a close interaction between parasitoid larva and its host (Gauld, 1988). The parasitoid eggs and larvae exist in a living organism, which has the immune-defensive system capable of encapsulating foreign bodies (Salt, 1964). Thus a major evolutionary barrier that endoparasitoids have to overcome is the physiological defence system of the hosts. Koinobiont endoparasitoids have indeed evolved a variety of mechanisms to circumvent the host defences (Salt, 1968; Vinson & Iwantsch, 1980; Guzo & Stoltz, 1987), but these mechanisms usually work well against only a very narrow range of hosts (Salt, 1975; Vinson & Stoltz, 1986). Thus, in general, the host range of endoparasitic koinobionts is narrow and their number of species is enormous correspondingly (Gauld, 1988).

The tribe Glyptini (and also the which subfamily Banchinae) is one of major groups of solitary koinobiont endoparasitoids of the larvae of holometabolous insects, especially of the family Tortricidae (Lepidoptera). The oviposition is mainly done to a single host larva and the emergence is mainly taken from the host in the prepupal or pupal stage (Allen, 1962; Hedlin, 1960; Kamijo, 1973). Many glyptines parasitize the host larvae concealed in soft plant-tissues such as buds or rolled-leaves. Their flexible and soft ovipositor shafts seem to be more or less unsuited for the oviposition into the inside of hard stem or wood. Probably by this reason, their hosts are mainly composed of tortricid larvae within soft plant-tissues.

In the six genera of Glyptini in Japan, the hosts of *Apophua*, *Cephaloglypta*, *Glypta* and *Teleutaeta* were recorded whereas no host is known for *Glyptopimpla* and *Townesion* (Table 2). As in many other koinobiont endoparasitoids, e.g., the genera *Diadegma* and *Melalophacharops* of the subfamily Campopleginae (Momoi, 1973; Kusigemati, 1987), the host range of glyptines is narrow and usually confined to a single host genus for each parasitoid species (Momoi, 1965, 1966; Nakaya, 2009), but the host preference among parasitoid genera has been poorly discussed.

Santos & Qucike (2011) reviewed the worldwide patterns of ichneumonid species diversity. As mentioned above, the latitudinal trends of the species richness of Ichneumonidae are still argued. Some authors found that the observed latitudinal trends of species richness varied with the dichotomy between idiobionts and koinobionts (e.g., Gauld, 1986; Askew & Shaw, 1986; Askew, 1990; Hawkins, 1990) and, in fact, it was shown that koinobiont's species richness decreased towards the tropics at least in the North and South American continents, while idiobiont's richness did not or did less severely (Gauld, 1986; Askew & Shaw, 1986; Askew, 1990). Therefore, we can predict that the koinobiont's richness of temperate zones would be larger than the tropics also in other regions. The tribe Glyptini, as a large group of koinobiont endoparasitoids, must be a good target for testing the hypothesis that the koinobiont's species richness decreases from temperate to tropical regions in Asia.

### 2.3. Economic importance

There is little dispute that parasitic Hymenoptera is an important group of possible biocontrol agents against pest insects (LaSalle & Gauld, 1991). The parasitoid wasps including ichneumonids have already played a major role in many biocontrol projects against insect pests of coniferous forests (Turnock *et al.*, 1976) and broadleaf forests (Waters *et al.*, 1976). Ichneumonids can be used as indigenous or introduced natural enemies combined with other control measures such as chemical pesticides, pheromones, and resistant cultivars in the Integrated Pest Management (IPM) (e.g., Gupta, 1983). Many ichneumonids prefer moist habitats (forests and orchards) to dry habitats (crop fields) (Townes, 1969) and thus their ability will be more expected for the control of forest or orchard pests, whereas not a few ichneumonids have been successfully used to control pests in crop fields and pastures as well (Radcliffe & Flanders, 1998). For example in Japan, one of serious crop pests, the alfalfa weevil, *Hypera postica* (Gyllenhal) (Curculionidae), is successfully controlled by an introduced campoplegine wasp, *Bethyplectes anurus* (Thomson) (Shoubu *et al.*, 2005).

Most species of Glyptini are parasitoids of lepidopterous larvae and thus known as important natural enemies of forest and agricultural pests. For example, a serious pest of conifers, *Choristoneura diversana* (Hübner), is dominantly parasitized by a glyptine *Cephaloglypta murinanae* (Bauer) and its percentage parasitism is up to about 30 % (Kamijo, 1973). This species has been introduced into Canada as a biocontrol agent against forest tortricids (Carlson, 1979). In agriculture, two species of *Glypta*, *G. haesitator* Gravenhorst and *G. rufiscutellaris* Cresson, have been used for

the biological control of a pea pest, *Cydia nigricana* Fabricius (Bertlett *et al.*, 1978; Carlson, 1979; Ingram, 1983). The latter species, *G. rufiscutellaris*, is also studied as a biocontrol agent against the oriental fruit moth (= peach moth), *Grapholita molesta* (Busck) (Bertlett *et al.*, 1978).

In Japan, about 70 % of the land area is covered with forests (FAO, 2010) and this value is relatively high among developed countries. The forests, not only natural forests but also plantations, give us a huge amount of ecosystem services (Millennium Ecosystem Assessment, 2005). Although the sustainable forest management is required in Japan, the information about forest ecosystem components is still poor. Forests are sometimes seriously damaged by lepidopterous pests including tortricid moths (e.g., Kamijo, 1973; Kosibowicz *et al.*, 2014). Therefore, the understanding of Glyptini, which includes important natural enemies of tortricids, possibly contributes to the future forest pest management.

#### 2.4. Classification

The tribe Glyptini was established by Cushman & Rohwer (1920). Its taxonomic status has been relatively stable after Townes (1970b), who reviewed the tribes and genera of Banchinae. After his work, the tribes Neorhacodini and Stilbopini were elevated to the rank of subfamily (Table 1) (Townes, 1971; Townes & Townes, 1973, 1978; Wahl, 1988). In Glyptini, however, no substantive changes have been proposed since his work, except for the descriptions of the following additional genera, *Australogypta* Gauld, 1997, *Avnia* Gupta, 2002, *Townesion* Kasparyan, 1993, and *Valdiviglypta* Broad, Notton, Sääksjärvi & Veijalainen, 2011 (Table 2).

In Japan, the taxonomic history of the tribe Glyptini is as below. Until now, total six genera and 43 species have been recorded from Japan.

Ashmead (1906) described *Hemiephialtes glyptus*. This is the first record of the species of Glyptini from Japan. Number of species recorded from Japan = 1

Uchida (1928) described *Glypta bipunctoria* var. *tobensis*, *G. rufa*, *G. sapporensis*, *Hoplitophrys brischkei* var. *nigricoxalis*, *Hoplitophrys brischkei* var. *japonicus*, and *Teleutaea sachalinensis*, and also recorded the nominotypical variety of *Glypta bipunctoria*. 1 + 7 = 8

Uchida (1932a) described *Glypta kikuchii*. 8 + 1 = 9



Uchida (1932b) described *Glypta cymolomiaae*. 9 + 1 = 10

Momoi (1963) preliminarily reviewed the tribe including all Japanese species except for *Glypta kikuchii* and described *Cephaloglypta laricis*, *Glypta aquilonia* and *G. stena* (Group A), *Glypta bisinuata*, *G. breviterebra*, *G. maruyamensis*, *G. media*, *G. parva* and *G. triangularis* (Group B), *Glypta iwatai*, *G. macrofossa*, *G. uchidai* and *Glypta watanabei* (Group C), *Teleutaea minamikawai*, and *Teleutaea uchidai*. *Hemiephialtes* and *Hoplitophrys* were synonymized under *Glypta* and *Teleutaea*, respectively. *Glypta bipunctoria*, *G. bipunctoria* var. *tobensis* and *G. sapporensis* were classified into Group A. Other species of *Glypta* were classified into Group B. *Teleutaea brischkei* was split into five forms A-E. 10 + 15 = 25

Momoi (1965) changed the taxonomic status of *Glypta bipunctoria* var. *tobensis* to a separate species, *tobensis*. Group A of *Glypta* in Momoi (1963) and *tobensis* were transferred from *Glypta* to *Apophua*, and Group C of *Glypta* in Momoi (1963) was transferred from *Glypta* to the newly established genus, *Zygoglypta*. Group B of *Glypta* in Momoi (1963) was retained to be *Glypta*. Name of *Glypta parva* had been preoccupied by Cresson (1870) and thus new name *Glypta acares* was proposed.

Momoi (1966) described *Glypta kamijoi*. 25 + 1 = 26

Townes, Momoi & Townes (1965) synonymized *Teleutaea uchidai* under *Hoplitophrys brischkei* var. *japonicus*. 26 - 1 = 25

Momoi (1970) changed the generic treatment of *Glypta kikuchii* to *Apophua* and described *Glypta annulata*, *G. densa*, and *G. tumur*. 25 + 3 = 28

Kuslitzky (1973) reviewed the genera *Cephaloglypta*, *Teleutaea* and *Zygoglypta* in USSR, split *Zygoglypta* into two subgenera, *Zygoglypta* (including *iwatai*, *macrofossa* and *uchidai*) and *Orientoglypta* (including *watanabei*), and synonymized *Hoplitophrys brischkei* var. *japonicus* under *Teleutaea ussuriensis*.

Kuslitzky (1974) synonymized *Glypta sapporensis* (= *Apophua sapporensis*) under *Ichneumon evanescens* (= *Apophua evanescens*).

Momoi (1978) described *Apophua honmai*, *A. maetai*, *A. sugaharai*, *Teleutaea corniculata*, *T. diminuta*, *T. nigra*, and *Zygoglypta babai*, synonymized *Cephaloglypta laricis* under *C. murinanae*, and recorded *Teleutaea longiterebra* and *T. orientalis*. *Teleutaea brischkei* was removed from Japanese fauna.  $28 + 9 - 1 = 36$

Kasparyan (1999) described *Townesion japonica* under the subfamily Townesioninae, which had been proposed by Kasparyan (1993).

Gauld & Wahl (2000) synonymized Townesioninae under Glyptini.  $36 + 1 = 37$

Gupta (2002) synonymized *Zygoglypta* and *Orientoglypta* under *Glyptopimpla*.

Kuslitzky (2007) and Kasparyan *et al.* (2012) recorded *Glypta biauriculata*, *G. clypeata*, *G. delicatula*, *G. kasparyani*, *G. kunashirica* and *G. parvicaudata* from South Chishima Islands.  $37 + 6 = 43$

### 3. Aim of the present study

The tribe Glyptini is one of major groups of koinobiont wasps in Japan and its taxonomic research will contribute to the understanding of the “anomalous diversity” (Santos & Quicke, 2011) of Asian ichneumonids. In addition, as mentioned in the section of “Economic importance”, the Glyptini contains important or potentially important natural enemies of forest and orchard pests. For biological control in IPM, the following three points are essential: (1) the identification of natural enemies can be exactly performed by useful manuals, (2) the distribution of biocontrol agents and their relatives is well known, and (3) the biological information of biocontrol agents, target pests and their host plants has been enough accumulated. However, the diversity of Glyptini is only a little known in Japan and its biological and zoogeographical data are very poor except for a few species. Although total 43 species of the Glyptini have been recorded from Japan, I come to find over 60 unrecorded or undescribed species, some of which must have been confused with recorded Japanese species. Therefore, for the future studies of basic and applied entomology concerning parasitoid diversity in East

Asia, the classification of Glyptini with practical identification keys is necessary.

In the present study, I revise the Japanese genera and species of the Glyptini for more precise understanding of species richness and provide the identification keys to all the Japanese genera and species. Host records and distribution data are also updated. Furthermore, phylogenetic relationships among the genera of Glyptini are estimated on morphological characters and the biological and zoogeographical traits are discussed based on the phylogeny.

## **Chapter II**

# **MATERIALS AND METHODOLOGY**

## **1. Materials examined**

In this study, the dried specimens deposited in the following collections were examined:

**AEI**, American Entomological Institute, Gainesville, Florida, USA

**FCMNH**, Fukui City Museum of Natural History, Fukui, Japan

**KPMNH**, Kanagawa Prefectural Museum of Natural History, Odawara, Kanagawa, Japan

**KU**, Laboratory of Entomology, Kagoshima University, Kagoshima, Japan

**MNHAH**, Museum of Nature and Human Activities, Sanda, Hyogo, Japan

**MU**, Meijo University, Nagoya, Aichi, Japan

**NHM**, Natural History Museum, London, UK

**NIAES**, National Institute for Agro-Environmental Sciences, Tsukuba, Ibaragi, Japan

**NSMT**, National Museum of Nature and Science, Tsukuba, Ibaragi, Japan

**OMNH**, Osaka Museum of Natural History, Osaka, Japan

**SEHU**, Systematic Entomology, Hokkaido University, Sapporo, Japan

**SMNH**, Swedish Museum of Natural History, Stockholm, Sweden

**TPM**, Tochigi Prefectural Museum, Utsunomiya, Japan

**TUA**, Laboratory of Entomology, Tokyo University of Agriculture, Atsugi, Kanagawa, Japan

**ZIS**, Zoological Institute, Russian Academy of Sciences, St-Petersburg, Russia

The distribution of each species is shown by maps (Figs. 1015-1044), for which the names of major islands are indicated in Fig. 1014.

## **2. Nomenclatural treatments in this thesis**

Since this is a doctoral thesis, all the nomenclatural treatments provided here are “not” valid on the International Code of Zoological Nomenclature (Art. 8.2, ICZN).

## **3. Terminology**

Morphological terminology mainly follows that established by Gauld (1991) and Gauld *et al.* (2002). Snodgrass (1941) and Eady (1968) are also referred to for the description of male genitalia and microsculpture, respectively. The following abbreviations are used in morphological description: basal width of mandible (BWM), length of malar space

(MSL), segment of antennal flagellum (F), ocello-ocular line (OOL), postocellar line (POL), ocellus diameter (OD), segment of tarsus (TS), and metasomal tegite (T). The following abbreviations are used for material data: holotype (HT), female (F), male (M), light trap (or came to light) (LT), and Malaise trap (MsT). The symbol “\*” in the distribution indicates a new record.

Major morphological terms used in this study are mainly based on the explanations proposed by Gauld (1991) as below.

### 3.1. Head (Figs. 1-4, 15, 35, 168)

The CLYPEUS and the FACE are parts of the frontal aspect of head below the lower margin of antennal sockets, which are usually separated by a SUPRACLYPEAL SUTURE, running through the ANTERIOR TENTRIAL PITS (= clypeal fovea) (Figs. 2, 4). The SUBOCULAR SULCUS is a sharply impressed groove extending from the eye margin to the socket of the mandible, which is present only in *Townesion* within Japanese Glyptini (Fig. 15). The FRONS is a part of frontal aspect of head above the lower margin of antennal sockets, sometimes having special structures (e.g., horn, convexity, concavity) (Figs. 2, 3). On the lower and posterior parts of the head, two carinae, the OCCIPITAL CARINA (its lower part is called genal carina by some authors) and the HYPOSTOMAL CARINA (= oral carina) may be discerned (Figs. 3, 168). The former generally continues around the head, dorsally separating the VERTEX from an internal OCCIPUT, while the latter is close to the socket of the mandible. The vertex has three OCELLI (sg. ocellus), i.e., a MEDIAN OCELLUS and two LATERAL OCELLI, and the area around them is called INTEROCELLAR AREA (Figs. 2, 3). About OOL and POL, see “4.3. Measurements” below. The GENA (= temple) is an area between vertex and clypeus, the lower part of which between eye and base of mandible is called the MALAR SPACE (= cheek) (Fig. 4). The area around eye is called the ORBIT and this area is sometimes having different colouration from face, frons, vertex and gena (Fig. 35). The antenna comprises a basal goblet-shaped SCAPE, a cylindrical PEDICEL, a rather indistinct anellus or ring-like part, and a multisegmented FLAGELLUM (Fig. 4). The each segment of flagellum is called the FLAGELLOMERE. The MAXILLA and the LABIUM have a pair of the MAXILLARY PALPI (five segments) and the LABIAL PALPI (four segments) (Fig. 4), respectively.

### 3.2. Mesosoma (Figs. 1, 5, 6)

The definitive insect thorax is composed of three segments, but in the apocrite Hymenoptera the first abdominal segment (the PROPODEUM) is intimately fused with the thorax and this fused component is called the MESOSOMA (= alitrunk) (Fig. 5). The EPOMIA is a sharp ridge on the pronotum, which usually runs parallel to the anterior margin and then dorsally turns abruptly away from the margin towards the front end of the notaulus (Fig. 5). The area of pronotum along anterior margin is called the COLLAR and its dorsal border is usually defined by the epomia (Fig. 5). The area of pronotum posterior to epomia is called the LATERAL AREA OF PRONOTUM in this study (Fig. 5). The NOTAULI (sg. notaulus) (Fig. 5) are a pair of impressions on the mesoscutum, which extend backwards from the anterior margin and separate the MEDIAN LOBE OF MESOSCUTUM and the LATERAL LOBES OF MESOSCUTUM. The EPICNEMIUM (= prepectus) is a lower anterior part of mesothorax and its posterior border is usually defined by the EPICNEMIAL CARINA (= prepectal carina) (Fig. 5). The STERNAULUS is a broad, shallow and often foveolate groove extending from the lower corner of the epicnemial carina (Fig. 5). The SCUTOSCUTELLAR GROOVE is the impression in front of the scutellum. It is the border between mesoscutum and scutellum and generally crossed laterally by ridges which may extend posteriorly forming the LATERAL LONGITUDINAL CARINAE OF THE SCUTELLUM, which are usually and largely absent posteriorly in Japanese Glyptini. The broad, flat area between the scutellum and the area basalis is the POSTSCUTELLUM (Fig. 5). The posterior margins of mesonotum and metanotum excluding the scutellum and the postscutellum are called the AXILLAE (sg. axilla; = axillary trough) (Fig. 5). The SUBALAR PROMINENCE (= subtegular ridge) is a more or less strongly convex area below the articulation of the fore wing (Fig. 5). The SPECULUM is a weakly convex and usually smooth area in the posterior part of mesopleuron before the MESOPLEURAL SUTURE. The EPISTERNAL SCROBE (= mesopleural fovea) is a small pit-like impression below the speculum (Fig. 5). The POSTERIOR TRANSVERSE CARINA OF MESOSTERNUM (= postpectal carina) is present immediately before the mid coxae but it is largely absent in Japanese Glyptini. The SUBMETAPLEURAL CARINA is a longitudinal ridge present the border of lateral and ventral aspects of the lower division of metapleuron and its anterior part is always strongly produced in Banchinae (Fig. 5). The propodeum is frequently divided into a number of areas by the raised carinae. Their number and shape are taxonomically useful, and the complete set in Glyptini is shown in Figs. 5 and 6. The PLEURAL CARINA is always present in Japanese Glyptini and it is the border between the propodeum and the LOWER DIVISION OF METAPLEURON (Figs. 5, 6). The ANTERIOR

TRANSVERSE CARINA is usually present in Japanese Glyptini but sometimes absent or reduced, its section between the LATEROMEDIAN LONGITUDINAL CARINAE is called the MEDIAN SECTION, and the left and right outer sections of the carinae are called the LATERAL SECTION (= costula) in this study (Fig. 6). The POSTERIOR TRANSVERSE CARINA is usually present in Japanese Glyptini (Figs. 5, 6). The lateromedian longitudinal carina is usually absent in posterior part beyond posterior transverse carina (Fig. 6). The LATERAL LONGITUDINAL CARINA is usually present partly in Japanese Glyptini (Fig. 6). The carinae except for the pleural carina and posterior transverse carina are sometimes reduced as trace-like carinae in Japanese Glyptini, and thus the condition of visible or invisible may depend on lighting. The AREA SUPEROMEDIA (= areola) is a central section of the propodeum (Fig. 6) and sometimes united into a single area with the AREA BASALIS (= basal area) (e.g., Fig. 650). The AREA SPIRACLARIS (= first pleural area) and the AREA LATERALIS (= second pleural area) are always partly united into a single area in Japanese Glyptini and this area has a pair of the PROPODEAL SPIRACLES. The AREA EXTERNA (= first lateral area) and the AREA DENTIPARA (= second lateral area) separated by the lateral section of anterior transverse carina are sometimes partly united into a single area (Fig. 6). The AREA POSTERO (= petiolar area) and the AREA POSTERO-EXTERNA (= third lateral area) are always partly united into a single area in Japanese Glyptini (Fig. 6). All areas touching laterally are sometimes united into a single area by the reduction of carinae.

### 3.3. Wings (Figs. 1, 7, 8)

The system of wing venation and the names of the cells adopted here are shown in Figs. 7 and 8. The AREOLET is the small cell bordered laterally by veins  $2rs-m$  and  $3rs-m$  (Fig. 8). The BULLA (pl. bullae) is an unpigmented section of a vein that is traversed by a fold line (Fig. 8). Although, the wing venation is rather stable in Glyptini, the following four points (1–3: fore wing, 4 : hind wing) are frequently used in the classification of Ichneumonidae: (1) the position of the junction of vein  $Cu1$  and vein  $cu-a$  and the junction of vein  $Rs+M$  and vein  $M+Cu$  (= the condition of “Nervulus”), (2) the position of the base of vein  $Rs+2r$  on the pterostigma (= stigma), (3) the position of the base of vein  $2m-cu$  on the areolet, and (4) the fraction of the abscissa of vein  $Cu1$  between vein  $M$  and vein  $cu-a$  (= the condition of “Nervellus”).

### 3.4. Legs (Figs. 1, 22, 301, 459, 617, 625)



Legs of Glyptini lack any special structures but are standard ones of the Ichneumonidae. Each leg consists of the COXA (pl. coxae), the TROCHANTER (pl. trochanters), the TROCHANTELLUS (pl. trochantelli), the FEMUR (pl. femora), the TIBIA (pl. tibiae), and the TARSUS (pl. tarsi) (Fig. 617). The fore coxa is sometimes curved outward (e.g., Fig. 618) or is convex above the socket of trochanter (e.g., Fig. 303) in some species of Glyptini. The TIBIAL SPUR is a sharply pointed projection at the apex of tibia, and its number is one in the fore leg (Figs. 301, 617) and two in the mid and hind legs (Fig. 22) in Glyptini. The CLAWS (= tarsal claws) are usually pectinate in Glyptini (Fig. 625). The AROLIUM is a pad-like structure between claws (Fig. 625). The subbasal area of hind tibia having a conspicuous black marking is called the SUBBASAL (BLACK) BAND in this study (e.g., Fig. 459).

### 3.5. Metasoma (Figs. 1, 6, 7, 53, 768)

The third and most posterior division of the ichneumonid body, morphologically the second and following abdominal segments, is called the METASOMA (= gaster). The numbering of metasomal segments starts at the first one articulating with the propodeum, which is the second true abdominal segment. The first segment is sometimes slender anteriorly (the slender part being called the PETIOLE) and broadened posteriorly into the POSTPETIOLE, while the border is not clearly defined in Glyptini. A dorsal sclerite of a body segment, specifically for the metasoma, is called the TERGAUM (pl. terga) and a sclerotized subdivision of a tergum bounded by groove, or membranous lines or areas is called the TERGITE (T). The lateral part of an metasomal tergum that is marked by a crease or groove, or is even completely detached from the main dorsal part of the tergum, is called the LATEROTERGITE. The ventral division of a body segment, usually referring to the segments of the metasoma, is called the STERNUM (pl. sterna) and the sclerotized subdivision of a sternum bounded by grooves or by membranous lines or areas, is called the STERNITE (S). T1 may bear a pair of lateral pits, the GLYMMA, which are always present in Glyptini (Fig. 7). The transverse impression anterolaterally on T2 is called the GASTROCOELUS (pl. gasterocoeli). It includes the surface area with specialized sculpture, the THYRIDIUM (pl. thyridia). T2-T4 or T5 sometimes have more or less separated, lateral semi-membranous parts, the LATEROTERGITES. In Glyptini, T2-T3, T4 or T5 have a pair of the OBLIQUE GROOVES, which run from the median anterior to the postero-lateral area (Fig. 53). Female ichneumonids generally have an easily discernible

OVIPOSITOR, at rest which is enclosed in the OVIPOSITOR SHEATH (Fig. 1). The ovipositor itself is composed of an upper and a pair of lower VALVES. The upper valve may have a distinct depression, the DORSAL SUBAPICAL NOTCH (Fig. 768), near its apex, or alternatively it may have a crest, the NODUS, in a similar position. In Glyptini, most species have the dorsal subapical notch but lack nodus. The most posterior sternite is called the SUBGENITAL PLATE.

### 3.6. Male terminalia (Figs. 14, 273, 275-277)

Male terminalia contains two major components, the SUBGENITAL PLATE (= eighth metasomal sternites) and the GENITALIA. The genitalia consist of three sclerotized parts, the cupsule-like unit composed of the PARAMERE (= gonosquama) and the VOLSELLA, the tubular AEDEAGUS, and the BASAL RING (= gonocardo) (Fig. 14). The two formers are both pair structures while the basal ring is a single ring. The paramere is a large and well-developed, sclerotized cupsule, located at the most outside (Figs. 14, 275, 277). The volsella is a clasping organ enclosed by paramere and is divided into three parts, a basal part, the BASIBOLSELLA (= lamina volsellaris), an immovable apical part joined with basivolsella, the CUSPIS (= distivolsella and cuspis volsellaris), and movable apical part separated from other parts, the DIGITUS (= gonolacinia and digitus volsellaris) (Fig. 277). The apical part of volsella is sometimes bended inward. The apical part of the inner surface of paramere is sometimes with a conspicuous pad-like structure (e.g., *Netelia*), which is absent in Japanese species of Glyptini. The aedeagus consists of two parts, the apical PENIS VALVE (= lamina aedeagalis) and the basal BASAL APODEME OF AEDEAGUS (= apodema aedeagalis) (Fig. 276). The subgenital plate usually has a median basal projection, the APODEMA STERNALIS (= median apodeme) (Fig. 273). The shape of subgenital plate may be more or less deformed by the pressure between slide glass and cover glass.

## 4. Methods of morphological examination

### 4.1. Morphological observation

Stereoscopic microscopes (Olympus SZ60 and Nikon SMZ800) and light microscopes (Olympus BX41 and CH2) were used for observation and line drawing of morphological structures. Photographs were taken with digital cameras (Nikon D700 and RICOH CX-1). Line drawing was conducted with graphite H pencils or “Sakura

Pigma” using ocular micrometer. Digital images were edited using the graphic software Adobe Photoshop® CS3.

#### 4.2. Dissection of male terminalia

Dissection of male terminalia was conducted by the following methods (see Fig. 14):

- 1) A dried specimen was put into hot water (about 90°C) and placed at room temperature for about three hours.
- 2) Posterior part of metasoma with terminalia after T7 and S6 was severed from the body by tweezers.
- 3) It was treated in 10 % KOH at room temperature for one day and washed in distilled water for 10 min.
- 4) The parts excluding subgenital plate and genitalia were removed using tweezers.
- 5) Subgenital plate was separated.
- 6) Basal ring was separated from other parts of terminalia.
- 7) Both parameres were separated and aedeagus was picked up.

Observed genitalia was preserved in a glycerine tube (Polyethylene Genitalia Vials #1133C: BioQuip Products Inc.), attached to the pin of specimen. For the species with only a single or a few male specimens, I did not dissect male terminalia.

#### 4.3. Measurements

Morphological measurement mainly follows that established by Townes (1969), with a few modifications in face, as described below.

**Body length:** this was measured by each 0.5 mm step by the maximum distance on the line from the anterior extremity of head (excluding antennae) to the posterior end of metasoma (excluding ovipositor and ovipositor sheath).

**Head:** the length was measured by the distance on the line from the anterior extremity of face to the posterior end of gena in dorsal view and the width was measured by the distance between anterior ends of gena in dorsal view (Fig. 3).

**Clypeus:** the length was measured by the distance on the midline from the supraclypeal

suture to the lower edge of clypeus and the width was measured by the minimum distance between its extreme corners at the upper sockets of the mandibles (Fig. 2).

**Face:** the length was measured by the distance on the midline from the transverse line through each lower margin of antennal sockets to the supraclypeal suture and the width (= maximum width in Glyptini) was measured by the transverse line through each lower margin of antennal sockets between eyes (Fig. 2).

**F1:** the length was measured by the distance from the basal ring-like part to the apex along lower margin in lateral view (Fig. 4).

**F2:** the length was measured by the distance from the base to the apex (Fig. 4).

**OD:** this was measured by the length of any lateral ocellus (Fig. 3).

**OOL:** this was measured by the minimum distance between left lateral ocellus and eye (Fig. 3).

**POL:** this was measured by the minimum distance between lateral ocelli (Fig. 3).

**MSL:** this was measured by the distance from the lower edge of eye to mandibular socket (Fig. 4).

**BWM:** this was measured by the distance between upper and lower sockets of mandible (Fig. 4).

**Wing:** the length of fore wing was measured by the distance from the basal sclerite to the apex. The length of each vein was measured by the distance from the center of juncture to the center of the next.

**Hind femur:** the length was measured by the distance in anterior aspect (= outer aspect in lateral view) from the base to the apex and the depth was measured by the maximum width (usually near mid point) (Fig. 194).

**Hind TS:** the length was measured by the distance from the base to the apex along the ventral margin in lateral view.

**T1:** the length was measured by the distance on the midline from the center of the insertion area of the extensor tendon of T1 (the extensor tendon inserts on the midline on the dorsal side, near the base of the tergite) to the extreme apex and the width was measured by the maximum width (near apex in Glyptini).

**Ovipositor sheath:** the length was measured by the distance from the base to the apex. When it could not be measured directly, the length of the exposed part of ovipositor was measured instead (Figs. 10-14).

**Subgenital plate:** the length was measured by the distance on the median line from the base of subgenital plate to its most posterior margin.

## 5. Phylogenetics

In the classification of Ichneumonidae after serial studies by Townes (1969, 1970a,b, 1971), the phylogenetic analyses based on morphological characters were performed for several major taxa, e.g., Ophioninae (Gauld, 1985), Anomaloninae (Gauld, 1986), Mesochorinae (Wahl, 1993), Xoridinae (Wahl, 1997), Pimpliforms subfamilies (Wahl & Gauld, 1998), Ichneumoninae (*Callajoppa* genus-group) (Sime & Wahl, 2002), and Pimplinae (Gauld & Dubois, 2006).

Within the subfamily Banchinae, Wahl (1988) suggested that the tribe Glyptini was the sister clade of the tribes Atrophini + Banchini. The Glyptini is most probably a well defined monophyletic group by a conspicuous autapomorphy, i.e., a pair of oblique grooves on metasomal tergites (Townes, 1970b; Wahl, 1988). According to Short (1978) and Wahl (1988), however, the larvae of the Glyptini show no derived states and presumably represent the ground plan of the Banchinae (Wahl, 1988). Recently, Quicke *et al.* (2009) showed some alternative phylogenetic trees of major groups of ichneumonids based on the molecular and morphological data. However, no strict consensus tree was demonstrated for the phylogenetic relationships of the tribe Glyptini.

Phylogenetics has become popular after Hennig's theoretical work on taxonomy (Hennig, 1950; Dupuis, 1984; Miah, 1998). Although Hennig's phylogenetic methodology was manual and based on small morphological data, the phylogenetic analyses on large morphological data are usually difficult due to undetectable evolutionary parallelism and homoplasy (Gauld, 1985). Therefore, recent phylogenetic analyses are usually performed by computer-based algorithms.

These days, two major principles are applied for the estimation of phylogenetic trees based on large morphological data. (1) The maximum parsimony (MP) is a non-parametric statistical method for constructing phylogenetic trees. In this method the most preferred phylogenetic tree has the least evolutionary changes to explain observed data (hence maximally parsimonious) (Fitch, 1971). Although some problems of this method are known (e.g., the long branch attraction), this is the most popular method for the phylogenetic analysis based on morphological data. (2) The maximum-likelihood (ML) estimates the statistical parameters of several evolutionary models to compare (Aldrich, 1997). In this study, I adopt the MP method because it is widely used in the recent phylogenetic studies based on morphological data of insects (e.g., Gauld & Dubois, 2006; Quicke *et al.*, 2009; Mita & Konishi, 2011).

I used the computer software, PAUP v4b10 (Swofford, 2003), which is one of most popular softwares for the MP analysis based on morphological data. It had been used in most recent phylogenetic studies of parasitoid wasps (e.g., Gauld & Dubois, 2006; Mita & Konishi, 2011). The procedure of analysis in detail, including the choice of taxa and characters, will be described in Chapter IV.

# **Chapter III**

## **TAXONOMY**

## 1. Introduction

Although total 43 species of Glyptini had been recorded from Japan (Yu et al., 2012), I found over 60 unrecorded or undescribed species from Japan, some of which had been confused with previously recorded Japanese species. In addition, their biological or zoogeographical data were also almost unknown except for a few species (Townes *et al.*, 1965).

In this chapter, I revise the Japanese member of Glyptini based on comprehensive morphological comparisons. All the genera and species of the Glyptini from Japan are described along with the distribution data, bionomics, and taxonomic remarks. Keys to the tribes, genera and species from Japan are also provided for practical identification.

All about material depository, methods of morphological examination, terminology and measurements were described in Chapter II.

## 2. Revision of Japanese Glyptini

Superfamily **Ichneumonoidea** Latreille, 1802

Family **Ichneumonidae** Latreille, 1802

The superfamily Ichneumonoidea, which consists of two families Ichneumonidae and Braconidae, can be easily distinguished from other superfamilies of Hymenoptera by the following combination of character states: veins *C* (costa) and *Sc* (subcostal) of fore wing fused into a single vein (separated from each other in many other superfamilies); and antenna usually with more than 16 segments (with less than 16 segments in many other superfamilies).

The family Ichneumonidae is distinguished from the family Braconidae by the following combination of character states: vein  $1/R_s+1R_1$  of fore wing absent (usually present in Braconidae); vein  $2m-cu$  of fore wing usually present (absent in Braconidae); T2 and T3 separated from each other (usually fused in Braconidae); and the apex of mandible always touched and more or less overlapped each other (occasionally distant from each other in Braconidae).

Subfamily **Banchinae** Wesmael, 1845

This subfamily is separable from other ichneumonid subfamilies by the following



combination of character states: mesoscutum without transverse striations or rugae; metanotum not produced into a hook laterally; submetapleural carina produced anteriorly (Fig. 5); the areolet present or absent, if present, neither it is regularly rhombic nor pentagonal (Fig. 8); spiracles of T1 usually in front of the midpoint of segment (Figs. 7, 271); female subgenital plate usually large and triangular in profile, not extended posteriorly beyond the apex of metasoma, nearly always with a median notch; and the ovipositor often longer than hind tibia and nearly always with a distinct subapical notch (Figs. 1, 768).

Three tribes are known and all of them are distributed in Japan. They can be discriminated by the following key.

### Key to the tribes of the subfamily Banchinae

1. Metasomal T2-T3 each with a pair of oblique grooves from a basal median part to lateral sides of apex (Figs. 25, 53, 271). Hind wing with a part of 1-*cu* between *M* and *cu-a* as long as *cu-a* or distinctly longer than *cu-a* (Fig. 9). Ovipositor usually longer than hind tibia (Fig. 1).....Glyptini
- Metasomal T2-T3 without oblique grooves. Hind wing with a part of 1-*cu* between *M* and *cu-a* various in length. Ovipositor various in length.....2
- 2(1). Hind wing with a part of 1-*cu* between *M* and *cu-a* more or less longer than *cu-a*. Areolet sometimes absent. Apical part of metasoma not compressed laterally. Ovipositor short to very long, sometimes longer than hind tibia.....Atrophini (= Lissonotini of Townes)
- Hind wing with a part of 1-*cu* between *M* and *cu-a* distinctly shorter than *cu-a*. Areolet present. Apical part of metasoma compressed laterally. Ovipositor very short to short, nearly always shorter than hind tibia.....Banchini

### Tribe **Glyptini** Cushman & Rohwer, 1920

**Diagnosis.** This tribe is easily distinguished from other tribes of Banchinae by an autapomorphy, i.e., a pair of oblique grooves on each metasomal tergite (at least T2 and T3) (Figs. 25, 53, 271). Similar oblique grooves are recognized in Lycorininae and some groups of Pimplinae, but Glyptini can be distinguished from them by the metanotum not produced into a hook laterally (produced in Lycorininae) (Fig. 5), the propodeum without a median longitudinal concavity (present in some Pimplinae) (Fig. 6), the metasomal T2-T4 without a pair of conspicuous semicircular convexity (present in

some Pimplinae), and the ovipositor without nodus (present in some Pimplinae) and nearly always with a distinct subapical notch dorsally (absent in Lycorininae and Pimplinae) (Fig. 768)

Short (1978) described the larval morphology of four genera of Glyptini, *Glypta*, *Australogypta*, *Cephalogypta* and *Apophua*. According to his study, they share the following character states in common: the part of hypostoma posterior to hypostomal spur longer than hypostomal spur; epistoma incomplete; and the number of setae on prelabium less than ten.

**Distribution.** Worldwide (excluding the polar regions).

**Remarks.** I have recognized eight genera from Japan, which can be distinguished from each other as shown in the following key.

#### **Key to Japanese genera of the tribe Glyptini (♀♂)**

1. Areolet present (vein *3rs-m* at least partly present) (Figs. 8, 32, 93, 187-193).....2
- Areolet absent (vein *3rs-m* completely absent) (Fig. 1).....5
- 2(1). Mesosoma globe-like (Figs. 30, 34, 37). Metasoma apparently composed of four tergites (T1-T4 exposed) (Figs. 25, 30, 34, 37). Posterior margin of T4 with two pairs of spines produced backwards (Figs. 26, 30, 34). Base of metasoma and hind coxa distant from each other (Figs. 30, 34).....*Townesion*
- Mesosoma more or less elongated (Figs. 87, 89, 129-132). Metasoma apparently composed of five or more tergites, T1-T7 exposed (Figs. 53, 87, 89, 122-132). Posterior margin of T4 without spines (Figs. 87, 89, 129-132). Base of metasoma and hind coxa closed or slightly distant from each other (Figs. 87, 89, 129-132).....3
- 3(2). Ventral margin of clypeus with a median notch (Fig. 43). Antennal socket usually with a dorsal tubercle (Figs. 40,41, 43-48, 50, 51).....*Teleutaea*
- Ventral margin of clypeus without a median notch (Figs. 133-139). Antennal socket always without a dorsal tubercle (Figs. 147-153).....*Glyptopimpla* s. lat. .4
- 4(3). Frons largely smooth, punctate only in dorsal 0.3 (Figs. 140-145). Occipital carina broadly absent dorsally and its lower end connected with hypostomal carina far from base of mandible or erased (Figs. 161-166, 168-173). Vein *3rs-m* of fore wing long (Figs. 187-193). Inner margin of paramere concave at base (Figs. 239, 232, 234, 236, 238, 240).....*Glyptopimpla* s. str.
- Frons largely punctate except for area above antennal sockets (Fig. 146). Occipital carina complete dorsally (but weaker than lateral part) and its lower end connected with hypostomal carina closed base of mandible (Figs. 167, 174). Vein *3rs-m* of fore

- wing short (Fig. 194). Inner margin of paramere not concave (Fig. 242).  
 .....*Orientoglypta*
- 5(1). Occiput with three longitudinal tubercles (Fig. 265). Ventral margin of clypeus with a median notch (Fig. 264). A pair of oblique grooves on metasomal tergite weak (Fig. 272). Body largely mat.....*Cephaloglypta*
- . Occiput without tubercles (Figs. 3, 384, 404-421). Ventral margin of clypeus without median notch (Figs. 2, 4, 605), excluding *Glypta rufa* Uchida (Figs. 601, 604). A pair of oblique grooves on metasomal tergite usually strong in T2 and T3. Body usually polish with punctures (Figs. 325-335, 395, 517, 542).....6
- 6(5). Fore tibial spur longer than half length of fore TS1 (Fig. 301). T1-T3, sometimes with a median longitudinal keel (Figs. 279, 280, 287, 325-327, 334, 335). Frons simple (cf. Fig. 3).....*Apophua*
- . Fore tibial spur shorter than half length of fore TS1 (Figs. 615, 617). T1-T3, without median longitudinal keel (Figs. 395, 696-749). Frons simple or sometimes with produced crease and/or horn(s) (Figs. 382-384, 404-421).....*Glypta* s. lat. 7
- 7(6). Frons rugose, usually with a pair of tubercle-like horns (Figs. 382-385). Propodeal spiracle elongated (Figs. 393, 394). Tarsal claw elongated and its apex twisted (Figs. 390-392).....*Diblastomorpha*
- . Frons variously sculptured, sometimes with a transverse crease above antennal sockets, while sometimes turns to a pair of crease-like horns (Figs. 404-421). Propodeal spiracle round (Fig. 614). Tarsal claw not elongated and twisted (Figs. 623-625).....*Glypta* s. str.

#### Genus *Townesion* Kasparyan, 1993

*Townesion* Kasparyan, 1993: 157.

Type species: *Townesion ussuriensis* Kasparyan, 1993, by original designation.

**Description.** Body polished, punctate, covered with long silver setae, its length 6.0–8.0 mm. Black with some yellow markings (Figs. 30, 33, 34, 37).

Head. Clypeus flat in lateral view (Fig. 16), with a slight median transverse ridge (Fig. 15), smooth except for rugose-punctate dorsally. Lower margin of clypeus margined (Fig. 15), convex in anterior view (Fig. 15). Supraclypeal suture absent (Fig. 15). Face slightly convex medially (Fig. 16), covered with dense punctures, more or less transversely striated by coalescent punctures. Anterior tentorial pit visible and small (Figs. 15, 16). Frons slightly convex, sparsely punctate except for narrow area above antennal

socket. Upper part of occipital carina complete medially (Figs. 17, 18). Lower part of occipital carina complete, its lower end connected hypostomal carina far above base of mandible (Fig. 18). Vertex sparsely punctate. Gena finely and sparsely punctate, its dorsal profile almost straight (Fig. 17). Occiput short dorsally (Fig. 18), not concave. Subocular groove present (Figs. 15, 16). Mandible rather strongly narrowed apically (Fig. 19), its basal area flat. Ventral margin of mandible without flange (Fig. 19).

Mesosoma, globe-like (Figs. 30, 34, 37), punctate. Collar short. Epomia absent. Mesoscutum with a transverse suture posteriorly. Notaulus absent. Scutellum wide and large (Fig. 33). Scuto-scutellar groove with some longitudinal partitions. Axillary tongue almost absent. Sternaulus absent. Epicnemial carina present laterally but short. Mesopleural with a large speculum, without distinct concavity including episternal scrobe. Mesepimeron apparently absent. All carinae of propodeum absent except for each lateral end of posterior transverse carina partly and obscurely present. Propodeal spiracle elongate. Fore wing length 5.5–6.5 mm, its apical part clouded (Figs. 30, 32, 34). Junction of vein *Cu1* and vein *cu-a* far distant from junction of vein *Rs+M* and vein *M+Cu* (Fig. 32). Areolet present, receiving *2m-cu* at outer angle (Fig. 32). Stigma receiving vein *Rs+M* basal 0.3 (Fig. 32). Vein *2m-cu* with two bullae (Fig. 32). Hind wing with abscissa of vein *Cu1* of between vein *M* and vein *cu-a* 1.2–3.3 times as long as *cu-a*. Vein *Cu1* present, nebulous. Fore coxa not twisted, without ridge (Fig. 20). Fore tibial spur shorter than half length of fore TS1 (Fig. 21). Hind tibial spur longer than half length of hind TS1 (Fig. 22). Tarsal claw longer than arolium (Fig. 23), nearly entirely pectinate (teeth arisen at inner side), apex not twisted (Figs. 23, 24).

Metasoma, attached high on propodeum, far from base of hind coxa (Figs. 30, 34, 37). T1-T4 covered with large and dense punctures (Fig. 33), these punctures partly longitudinally striated by coalescent punctures. T1 with a pair of small spiracle, basal lateral angulations, median dorsal carinae, dorso-lateral carinae and ventro-lateral carinae (Figs. 25, 33). Area of T1 under ventro-lateral carina very wide, strongly turned under underneath. T2 with a pair of conspicuous oblique grooves (Figs. 25, 33). T3 sometimes with a pair of slight and oblique concavities (Fig. 25). T4 without concavity and groove (Fig. 25), its posterior margin with two pairs of spines directed posteriorly (Figs. 26, 30). T5-T7 reduced and retracted with ovipositor under T4 (Figs. 30, 34, 37). Ovipositor short, ca. 0.3 times as long as hind tibia. Apical part of upper valve of ovipositor without subapical dorsal notch.

**Distribution.** Eastern Palaearctic region (Japan and Russian Far East).

**Bionomics.** Host unknown.

**Remarks.** *Townesion* is a small genus of the tribe Glyptini, having only two described

species from the Far East Asia, i.e., *T. ussuriensis* Kasparyan, 1993 (label of holotype: Fig. 39) and *T. japonicus* Kasparyan, 1999 (label of holotype: Fig. 36) (Yu *et al.*, 2012). This genus is rare and both species were described only on female holotypes.

*Townesion* and its closely related genus *Sachtlebenia* Townes, 1963, from China, Taiwan and Vietnam share many unique character states (Gauld & Wahl, 2000). Thus, although Townes (1970b) had classified the latter genus in the tribe Glyptini, Kasparyan (1993) proposed a new subfamily Townesioninae for *Townesion* and *Sachtlebenia*. After that, Gauld & Wahl (2000) conducted a morphological comparison including these genera and related subfamilies and consequently adopted the classification given by Townes (1970b), but their taxonomic status is still open to argument (e.g., Kasparyan, 2007). Until this study, males had not been described for the genera, whereas male structure can provide more taxonomic information.

This genus and *Sachtlebenia* are easily distinguished from all other ichneumonids by the combination of following character states: subocular groove present (Figs. 15, 22); metasoma attached high on propodeum, far from base of hind coxa (Figs. 30, 34, 37); and T5-T7 reduced and retracted with ovipositor under T4 (Figs. 30, 34, 37). This genus is easily distinguished from *Sachtlebenia* by the posterior margin of T4 with two pairs of spines (Figs. 26, 30) (with a pair of spines in *Sachtlebenia*).

#### **Key to the species of the genus *Townesion***

1. Mesopleuron without yellow spots (Fig. 34), or with only a small spot below subalar prominence (Fig. 30). Mesoscutum and scutellum entirely black in both sexes. Fore wing ca. 6.5 mm (female) or 5.5–6.0 mm (male) long. Apex of ovipositor gradually narrowed into a very fine needle. Japan (Hokkaido, Honshu and Shikoku).....*T. japonicus* Kasparyan, 1999
- . Anterior half of mesopleuron with a large yellow spot (Fig. 37). Mesoscutum and scutellum with yellow markings (Fig. 37). Fore wing ca. 5.5 mm long. Apex of ovipositor blunt, its upper flap apically not formed to be a thin needle. Male unknown. Russian Far East (Primorsk Terr.)..... *T. ussuriensis* Kasparyan, 1993

***Townesion japonicus* Kasparyan, 1999**  
(Figs. 15–35)

*Townesion japonicus* Kasparyan, 1999: 362.

**Description. Male** (n=4). Body robust, its length 7.0–7.5 mm.

Head 0.5–0.6 times as long as wide. Clypeus 0.5–0.6 times as long as wide. Face 0.5–0.6 times as long as wide. MSL 0.8 times as long as BWM. Frons densely punctate except for area above each antennal socket. OOD 1.0–1.6 times as long as OD. IOD 2.2–2.8 times as long as OD. Antenna with 32–35 flagellomeres. F1 1.3–1.5 times as long as F2.

Mesosoma. Lateral area of pronotum punctate except for ventral rugae. Fore wing length 5.5–6.0 mm. Hind femur 3.8–4.0 times as long as maximum depth in lateral view. Hind TS1 2.3–2.5 times as long as TS2.

Metasoma. T1 1.1 times as long as wide, its median dorsal carina complete (Fig. 25, 33). T2 0.7 times as long as wide. Subgenital plate with a long apodema sternalis, anterior margin round laterally and straight medially, and lateral posterior angle produced (Fig. 27). Apex of paramere short, slightly beyond apex of volsella (Figs. 28, 29), apical margin round. Inner margin of paramere not concave near basal inner angle (Fig. 28). Apical part of digitus strongly bend ventrally. Aedeagus more or less straight, its penis valve ca. 2.5 times as long as basal apodeme.

Colouration. Body (excluding wings and legs) (Figs. 30, 31, 33) black except for: clypeus, face, orbit, malar space, spot of upper margin of pronotum, small spot of mesopleuron below subalar prominence, anterior and posterior angles of T1, posterior margin of T2 and T3, membranous part of sternite yellow; antenna yellowish-brown ventrally to blackish-brown dorsally; base of metasomal sternite tinged with yellowish-brown. Wings hyaline, apical part of fore wing clouded anteriorly (Fig. 32). Fore and mid legs black except for each anterior aspect largely yellow. Hind leg (Figs. 22, 30) black except for: coxa largely yellow ventrally, trochantellus, apical marking of anterior aspect of femur, small marking of antero-ventral aspect of tibia, tibial spurs yellow to brownish-yellow. Following yellow parts sometimes more or less reduced in size: vertical orbit, genal orbit, spot of upper margin of pronotum, small spot of mesopleuron below subalar prominence, anterior and posterior angles of T1, median part of posterior margin of T3, hind tibia.

**Female** (n=2). Similar to male, but face black with yellow orbits and a median yellow spot (Fig. 35); yellow areas of fore and mid legs smaller than male; and hind coxa, femur and tibia without yellow area (apex of hind tibia tinged with reddish-brown) (Fig. 21).

**Specimens examined.** JAPAN: 1M, Hokkaido Pref., Chitose City, Tarumaesan, 24. vii. 1997, R. Matsumoto leg. (OMNH); 1M, Mt. Tarumaesan, 21–26. vii. 1998, K. Konishi

leg. (MsT) (NIAES); 1F (holotype), Iwate Pref., Mt. Hayachine, 1000m alt., 8–15. viii. 1989, H. Makihara & M. Sharkey leg. (AEI); 1M, Fukui Pref., Oono City, Arashi, 8. viii. 1982, T. Murota leg. (KPMNH); 1M, Fukui Pref., Izumi Vil., Misaka-dani, 10. viii. 1982, T. Murota leg. (KPMNH); 1F, Tokushima Pref., Mt. Tsurugi, 16. vii. 1971, I. Hiura leg. (OMNH).

**Distribution** (Fig. 1015). Japan (Hokkaido\*, Honshu and Shikoku\*).

**Bionomics.** Unknown.

**Remarks.** I determined male specimens above as this species by the colouration of mesoscutum and scutellum. According to Kasparyan (1999, 2007), two described species of *Townesion* can be separated by the shape of ovipositor, the body size, the number of antennal segments, and the body colouration, but the latter three characters are variable within *T. japonicas* and thus his key to species may be not useful. They can be distinguished from each other by the above key updated after Kasparyan (2007).

### **Discussion about *Townesion***

The sexual dimorphism of *T. japonicus* is distinct as follows: body size of males smaller than females; and face entirely yellow in male (Fig. 31), but black with yellow inner orbits and a small median yellow spot in female (Figs. 35, 38). Such a colour pattern of sexual dimorphism is often found in other genera and species of Banchinae.

*Townesion* and *Sachtlebenia* share many peculiar character states in common (Kasparyan, 1993). Gauld & Wahl (2000) suggested nine synapomorphies for the genera. In spite of unique external morphology such as posterior margin of T4 with two pairs of spines directed posteriorly, no marked character state is found for the male genitalia of *Townesion*. The male genitalia with a non-projected base of inner margin of paramere is very similar to that observed in *Cephaloglypta* and *Teleutaea* of the Glyptini (Kuslitzky, 1973).

Although *T. japonica* and *T. ussuriensis* can be separated by the above key, the difference between them is slight. Thus, we should find and examine additional specimens, especially of *T. ussuriensis*, to confirm specific discrimination of them.

### **Genus *Teleutaea* Förster, 1869**

*Teleutaea* Förster, 1869: 164.

Type species: *Lissonota striata* Gravenhorst, 1829, designated by Schmiedeknecht, 1888.

*Hoplitophrys* Förster, 1869: 164.

Type species: *Glypta brischkei* Holmgren, 1860, designated by Schmiedeknecht, 1888.

**Redescription based on Japanese species.** Body punctate, covered with silver setae, its length 8.0–18.0 mm.

Head. Clypeus convex in lateral view (Fig. 45), its lower margin strongly concave medially in anterior view (Fig. 43). Face weakly convex medially in lateral view (Fig. 45). Frons concave, flat or slightly convex, largely smooth. Upper part of occipital carina complete (Figs. 40-42, 44, 46-51). Lower part of occipital carina complete, its lower end connected to hypostomal carina far above base of mandible. Vertex and gena finely punctate. Occiput not concave, smooth. Subocular groove absent. Basal area of mandible flat. Ventral margin of mandible with a very narrow flange basally.

Mesosoma. Epomia present (Figs. 74, 79, 83, 88, 90, 95, 101, 105, 110, 114, 118). Epicnemial carina present (Figs. 76, 81, 85, 88, 92, 97, 103, 107, 112, 115, 120) (absent in a Russian species, *T. acarinata* Kuslitzky, 1973). Speculum present (Figs. 76, 81, 85, 88, 92, 97, 103, 107, 112, 115, 120). Sternaulus apparently absent, defined as very shallow concavity. Posterior transverse carina of mesosternum absent. Pleural carina of propodeum weak, sometimes partly obscured. Posterior transverse carina of propodeum at least partly present. Other carinae of propodeum absent. Propodeal spiracle round or slightly elongate. Fore wing length 6.0–11.5 mm. Junction of vein *Cu1* and vein *Cu-a* slightly to strongly distant from junction of vein *Rs+M* and vein *M+Cu* (Figs. 8, 93). Areolet present, with a short stalk varying in length intraspecifically, receiving *2m-cu* before outer angle (slightly beyond) (Figs. 8, 93). Pterostigma receiving vein *Rs+M* medially or slightly basad (Figs. 8, 93). Vein *2m-cu* with two bullae, these very close to each other and sometimes united into one large bulla (Figs. 8, 93). Hind wing with abscissa of vein *Cu1* between *M* and *cu-a* 0.8–1.2 times as long as *cu-a* (Fig. 9). *Cu1* present, nebulous (Fig. 9). Fore coxa not twisted, without ridge. Fore tibial spur shorter than half length of fore TS1. Tarsal claw slightly longer than arolium, apex not twisted, pectinate from base to near apex (teeth arising on inner side), teeth short.

Metasomal tergites largely parallel-sided in dorsal view, width of T5 only slightly less than T2-T4 (Fig. 53). Median dorsal carina of T1 complete basally (Fig. 53). Dorsolateral carina of T1 present, usually complete (Fig. 52), sometimes incomplete near spiracle. Oblique grooves on T2-T4 (and sometimes also T5) present (Fig. 53). Exposed part of T5 0.7–0.8 times as long as T4 (Figs. 87, 89, 109). Ovipositor longer



than hind tibia (Figs. 87, 89). Apical part of upper valve of ovipositor without a distinct dorsal tubercle before notch.

Male subgenital plate with an apodema sternalis slightly projecting to barely projecting (Figs. 54-57), its length less than 0.3 times of maximum length. Posterior margin of subgenital plate convex to nearly straight (Figs. 54-57). Apex of paramere strongly projecting beyond apex of aedeagus, apical margin weakly pointed (Figs. 58-65, 70-73). Aedeagus weakly curved, its basal apodeme ca. 0.5 times total length of aedeagus (Figs. 66-69).

Sexual dimorphism. Punctuation on body of males sparser than females. Colouration of males more or less paler than females.

**Distribution.** Palaearctic, Oriental and Neotropical regions.

**Bionomics.** Parasitoids of the Tortricidae and other lepidopterous families.

**Remarks.** The genus *Teleutaea* comprises 20 described species from the Eastern Palaearctic (16 spp.), Oriental (5), Western Palaearctic (2), and Neotropical (1) regions (Yu *et al.*, 2012). The species are known as koinobiont endoparasitoids of lepidopterous larvae, especially of leaf rollers (e.g., Tortricidae) (Yu *et al.*, 2012), including some important natural enemies of forest pests (Momoi, 1963, 1978; Momoi *et al.*, 1975).

*Teleutaea* most resembles *Glyptopimpla* Morley, 1913, in having a fore wing areolet and a largely smooth frons, but it can be easily distinguished by the medially strongly concave lower margin of the clypeus (not concave in *Glyptopimpla*) and the exposed part of T5 0.7–0.8 times as long as T4 (ca. 0.5 times in *Glyptopimpla*). Also, the shape of male paramere (strongly produced posteriorly) is unique in the tribe Glyptini.

### Key to Japanese species of the genus *Teleutaea*

1. Mesopleuron with a large yellow spot (Figs. 85, 87, 88, 115). T5 with or without a pair of oblique grooves.....2
- Mesopleuron without yellow spot (Figs. 76, 81, 92, 97, 103, 107, 112, 120). T5 without oblique grooves (Fig. 53).....4
- 2(1). T5 without oblique grooves (Fig. 53). Frons concave (Fig. 44). Antennal socket with a large dorsal tubercle (Figs. 43-45)..... *T. mishae* Kuslitzky, 1973  
(specimens from northern Japan and Russia)
- T5 with a pair of oblique grooves. Frons flat. Antennal socket without a dorsal projection or with a small dorsal projection (Figs. 42, 50).....3
- 3(2). Scutellum with a pair of longitudinal yellow stripes or with a U-shaped yellow

- spot (Fig. 84). Propodeum entirely black. Antennal socket without a dorsal tubercle (Fig. 42). Dorsolateral carina of T1 incomplete. Large species: body length 12.5–18.0 mm.....*T. minamikawai* Momoi, 1963
- . Scutellum entirely yellow (Fig. 117). Propodeum with yellow markings posteriorly (Fig. 117). Antennal socket apparently simple but with a small dorsal tubercle (Fig. 50). Dorsolateral carina of T1 complete. Small species: body length 11.5–12.5 mm..... *T. striata* (Gravenhorst, 1829) (= *T. corniculata* Momoi, 1978 **syn. nov.**)
- 4(1). Antennal socket without a dorsal tubercle (Fig. 49). Palpi of female brown (Fig. 110).....*T. sachalinensis* Uchida, 1928
- . Antennal socket with a dorsal tubercle (Figs. 40, 43-48, 51). Palpi of female yellow (Fig. 74).....5
- 5(4). Pronotum without a yellow band along dorsal margin, only tinged with yellow at dorsal posterior angle (Figs. 74, 95). Scutellum black or slightly tinged with yellow laterally (Figs. 75, 95). Frons not strongly concave (Fig. 40, 41, 46).....6
- . Pronotum with a yellow band along dorsal margin (Figs. 79, 87-90, 101, 105, ), or sometimes divided into two rather large spots at upper end of epomia and at dorsal posterior angle (*T. diminuta* and *T. ussuriensis*) (Fig. 118). Scutellum with conspicuous yellow marking(s) (Figs. 80, 91, 102, 106, 119), or sometimes entirely black (*T. diminuta*). Frons sometimes strongly concave.....8
- 6(5). Dorsal tubercle of antennal socket small (Fig. 41), distinctly shorter than distance between median ocellus and apex of tubercle.....*T. diminuta* Momoi, 1978  
(= *T. kasparyani* Kuslitzky, 1979 **syn. nov.**) (a few specimens)
- . Dorsal tubercle of antennal socket large (Figs. 40, 46), nearly equal to distance between median ocellus and apex of tubercle.....7
- 7(6). Hind leg yellowish-brown with darkened areas, at least median part of femur yellowish-brown (Figs. 77, 78). Scutellum and mesopleuron relatively densely punctate in female (Figs. 75, 76).....*T. brischkei* (Holmgren, 1860)
- . Hind leg blackish-brown to black except for part of trochanter (Figs. 98, 99). Scutellum and mesopleuron relatively sparsely punctate in female (Figs. 96, 97).....*T. nigra* Momoi, 1978
- 8(5). Frons with a pair of small projections adjacent to each dorsal tubercle of antennal socket (Fig. 51). .....*T. ussuriensis* (Golovisnin, 1928)
- . Frons without projections, but always having dorsal tubercles of antennal socket (Figs. 41, 43-45, 47, 48).....9
- 9(8). Frons flat (Fig. 41) (sometimes with a small oblique impression above antennal socket). Dorsal tubercle of antennal socket small (Fig. 41), distinctly shorter than

- distance between median ocellus and apex of tubercle. Hind coxa reddish-brown to yellowish-brown, without a distinct yellow basal patch dorsally (Fig. 82). Small species: body length 9.0–10.0 mm.....*T. diminuta* Momoi, 1978  
 (= *T. kasparyani* Kuslitzky, 1979 **syn. nov.**) (most specimens)
- Frons concave (Figs. 44, 47, 48). Dorsal tubercle of antennal socket large (Figs. 44, 47, 48). Hind coxa blackish-brown, reddish-brown or yellowish-brown, with a distinct yellow basal patch dorsally (Figs. 94, 104, 108). Large species: body length 11.0–15.5 mm.....10
- 10(9). Postscutellum yellow in female (Fig. 106). Ovipositor sheath slightly shorter than (ca. 0.9 times as long as) fore wing. Scape of male completely black. Apex of T2 and T3 narrowly white in all females. Blue reflection of metasoma strong (Fig. 109).....*T. orientalis* Kuslitzky, 1973
- Postscutellum black (Figs. 91, 102). Ovipositor sheath more than 1.0 times as long as fore wing. Scape of male black with a ventral yellow marking (Fig. 100). Apex of T2 and T3 almost black in some females. Blue reflection of metasoma moderate to weak.....11
- 11(10). Ovipositor sheath ca. 1.5 times as long as fore wing. T1 of male 1.8–1.9 times as long as maximum width. Hind coxa predominantly dark brown in male.....*T. nigricoxalis* (Uchida, 1928) **stat. rev.**  
 (= *T. longiterebra* Kuslitzky, 1973 **syn. nov.**)
- Ovipositor sheath ca. 1.2 times as long as fore wing. T1 of male 1.5–1.6 times as long as maximum width. Hind coxa predominantly pale reddish-brown in male..... *T. mishae* Kuslitzky, 1973  
 (specimens from northern and central Japan)

***Teleutaea brischkei*** (Holmgren, 1860)  
 (Figs. 40, 74-78)

*Glypta brischkei* Holmgren, 1860: 37.

*Teleutaea brischkei* form A: Momoi, 1963: 103.

**Description. Female** (n=4). Body length 9.0–11.0 mm.

Head 0.6–0.7 times as long as wide. Clypeus 0.6–0.7 times as long as wide. Face 0.6 times as long as wide. Frons slightly concave, without small lateral tooth adjacent to antennal socket. Antennal socket prolonged and tuberculate on upper side (Fig. 40). MSL 0.8–0.9 times as long as BWM. OOL 1.2–1.8 times as long as OD. POL

1.0–1.4 times as long as OD. Antenna with 43–45 flagellomeres. F1 1.7–1.9 times as long as F2.

**Mesosoma.** Pronotum, mesoscutum, scutellum, mesopleuron, metapleuron and propodeum densely punctate (Figs. 74–76). *Epomia strong* (Fig. 74). Epicnemial carina distinct. Pleural carina of propodeum weak, partly obsolete. Posterior transverse carina of propodeum weak but complete. Fore wing length 6.0–7.5 mm. Hind femur 6.8–7.0 times as long as maximum depth in lateral view. Hind TS1 2.3–2.5 times as long as TS2.

**Metasoma** densely punctate. T1 1.7–1.8 times as long as maximum width, its dorsolateral carina complete or sometimes narrowly obsolete behind spiracle. T2 1.4–1.5 times as long as maximum width. T2–T4 each with a pair of oblique groove. T5 without oblique groove. Ovipositor sheath 2.0 times as long as hind tibia.

**Colouration** (Figs. 74–78). Body (excluding wings and legs) black, except for: clypeus except for dorsal margin, mandible except for tip, palpi, apical margin of T4–T6 whitish-yellow to yellow; antenna partly brown to reddish-brown; tegula, hind margins of each axilla, upper part of mesepimeron, apex of anterior projection of submetapleural carina, apical margins of T2 and T3, membranous parts of sternites, posterior margin of subgenital plate brownish-yellow to reddish-brown; ovipositor reddish-brown. Subalar prominence sometimes tinged with brownish-yellow. Scutellum rarely with a pair of small reddish spots laterally. Wings hyaline; veins and pterostigma brown except for yellow wing base. Legs yellowish-brown to brown, trochanters and apex of hind tibia more or less darkened.

**Male** (n=2). Similar to female. Face 0.7 times as long as width. MSL 0.6 times as long as BWM. OOL 1.0 times as long as OD. POL 0.8 times as long as OD. F1 2.0 times as long as F2. Hind femur 6.3 times as long as maximum depth in lateral view. Hind TS1 2.0 times as long as TS2. Malar space tinged with yellow near base of mandible. Ventral surface of scape, pedicel and F1 tinged with yellow. Pronotum yellow on dorsal and ventral margins. Propleuron yellow posteriorly. Scutellum with a pair of small yellow spots laterally. Tegula and subalar prominence yellow. Legs paler than female, largely yellowish-brown.

**Specimens examined.** JAPAN: 2F, Hokkaido Pref., Kamishihoro Town, Oketo-rindo, 26. vii. 1997, R. Matsumoto leg. (OMNH). RUSSIA: 1F, “М. Пожига, 125 км ЮВ, Дальнереч, ельник.” 23. vii. 1983, Kasparyan leg. (det. Kuslitzky) (ZIS); 1F1M, “ст. Дачная, 32 км, S Иркутска”, 10. viii. 1976, Kasparyan leg. (det. Kuslitzky) (ZIS). GERMANY: 1M, Steiermark 700 m, 28. vi. 1950, Admont leg. (det. Heinrich) (AEI)

**Distribution** (Fig. 1016). Japan\* (Hokkaido); widely distributed in the Palearctic

region.

**Bionomics.** Unknown in Japan. Momoi (1963) and Kamijo (1973) reported some hosts for “*T. brischkei*” sensu Momoi (1963) but their host records may have based on misidentification of other species of *Teleutaea*.

**Remarks.** This species is very similar to *T. nigra*, but can be distinguished by the yellowish-brown hind leg with darkened areas (blackish-brown to black except for part of trochanter in *T. nigra*) and the densely punctate scutellum and mesopleuron of females (sparsely punctate in *T. nigra*).

*Teleutaea diminuta* Momoi, 1978

(Figs. 41, 79-82)

*Teleutaea brischkei* form D: Momoi, 1963: 103. Misident.

*Teleutaea diminuta* Momoi, 1978: 5.

*Teleutaea kasparyani* Kuslitzky, 1979: 134. **syn. nov.**

**Description. Female** (n=54). Body length 8.0–10.0 mm.

Head 0.6–0.7 times as long as wide. Clypeus 0.7–0.8 times as long as wide. Face 0.6 times as long as wide. Frons slightly concave, without small lateral tooth adjacent to antennal socket. Antennal socket prolonged and weakly tuberculate on upper side (Fig. 41). MSL 1.0 times as long as BWM. OOL 1.2–1.6 times as long as OD. POL 1.0–1.4 times as long as OD. Antenna with 40–42 flagellomeres. F1 1.9–2.0 times as long as F2.

Mesosoma. Pronotum, mesoscutum, scutellum, mesopleuron, metapleuron and propodeum densely punctate (Figs. 79-81). Epomia strong (Fig. 79). Epicnemial carina distinct (Fig. 81). Pleural carina of propodeum weak, partly obsolete. Posterior transverse carina of propodeum weak. Fore wing length 6.0–7.0 mm. Hind femur 6.7–7.0 times as long as maximum depth in lateral view. Hind TS1 2.5–2.6 times as long as TS2.

Metasoma densely punctate. T1 1.6–1.7 times as long as maximum width, its dorsolateral carina complete or narrowly incomplete behind spiracle. T2 1.3 (1.6 in male) times as long as maximum width. T2-T4 each with a pair of oblique groove, grooves weak on T4. T5 without grooves. Ovipositor sheath 2.4–2.5 times as long as hind tibia.

Colouration (Figs. 79-82). Body (excluding wings and legs) black, except for: clypeus except for dorsal margin, mandible except for tip, malar space near base of

mandible, palpi, small spot near dorsal end of epomia and postero dorsal corner of pronotum, tegula, lateral longitudinal stripe of scutellum, subalar prominence, posterior margins of T3-T6, membranous parts of sternites, posterior margin of subgenital plate whitish-yellow to yellow; antenna partly blackish-brown; upper part of mesepimeron, hind margins of each axilla, posterior end of metapleuron, apex of anterior projection of submetapleural carina, ovipositor yellowish-brown to reddish-brown. Posterior margins of T1-T3 sometimes narrowly tinged with yellow. Anterior yellow spot of propodeum and yellow stripe of scutellum sometimes united into posterior spot (as dorsal margin of pronotum can be entirely yellow) or rarely reduced. Wings hyaline. Veins and pterostigma brown except for yellow wing base. Legs reddish-brown to brown except for: hind coxa, trochanter, trochantellus, both apices of femur, tibia, tibial spurs tinged with blackish-brown; hind tarsus blackish-brown.

**Male** (n=12). Similar to female. MSL 0.7 times as long as BWM. T1 2.0 times as long as maximum width. Ventral surface of scape yellow anteriorly. Ventral surface of pedicel yellow. Fore and mid legs yellow. Brown area of hind leg paler than female.

**Specimens examined.** JAPAN 1F (holotype of *T. diminuta*), Hokkaido Pref., Rebun, 1. viii. 1958, K. Kamijo leg. (MNHAH); 1M (paratype of *T. diminuta*), Hokkaido Pref., Rebun, 29. vii. 1955, K. Hattori leg. (MNHAH); 1F, Hokkaido Pref., Sapporo City, Kannon-zawa (Stream side) (GPS: N 42–58/ E 141–15), 7. viii. –13. ix. 2002, T. Yoshida leg. (MsT) (KPMNH); 1F, same locality and collector, 13. ix. 2002 (KPMNH); 2F2M, Hokkaido Pref., Akkeshi Town, Bekanbeshi marsh, 1–31. viii. 2003, R. Matsumoto leg. (MsT) (OMNH); 1F, ditto, 12. vii. - 1. viii. 2003, R. Matsumoto leg. (MsT) (OMNH); 6F5M, Hokkaido Pref., Kamishihoro Town, Oketo-rindo, 26. vii. 1997, R. Matsumoto leg. (OMNH); 18F1M, Hokkaido Pref., Kamishihoro Town, Oketo-rindo, 6. viii. 1997, R. Matsumoto leg. (OMNH); 2F, Hokkaido Pref., Ashoro Town, Kamishibetsu, 10. viii. 1996, T. Tachi leg. (OMNH); 1M, Hokkaido Pref., Shibechea Town, Gojikkoku, 14. viii. 1996, T. Tachi leg. (OMNH); 1F, Hokkaido Pref., Ashoro Town, Meaken, 31. vii. 1997, R. Matsumoto leg. (OMNH); 2F (holotype and paratype of *T. kasparyani*), Hokkaido Pref., Shikotan Is., Krabozavodsk, 14. viii. 1973, Kasparyan leg. (ZIS); 1M, Kunashiri Is., Tretvyakovo, 5. viii. 1973, Kasparyan leg. (ZIS); 1M, Iwate Pref., Mt. Hayachine, 400m alt., 19–25. vii. 1989, H. Makihara & M. Sharkey leg. (MsT) (NIAES); 7F, Fukushima Pref., Hinoemata Vil., Mikawa, 4. ix. 2004, H. Makihara leg. (MsT) (TPM); 6F, same locality and collector, 8. x. 2004 (MsT) (TPM); 3F, Tochigi Pref., Kuriyama, Kinunuma, 4. ix. 2004, H. Makihara leg. (MsT) (TPM); 1F, same locality and collector, 8. x. 2004 (MsT) (TPM); 1F, Nagano Pref., Shiga-kogen, 26–27. vii. 1961, J. Minamikawa leg. (NIAES); 1F, Nagano Pref.,

Shimotakai-gun, Yamanouchi Town, Nagaike, 22. viii. 2007, K. Watanabe leg. (KPMNH).

**Distribution** (Fig. 1016). Japan (Rebun Is., Kunashiri Is., Shikotan Is., Hokkaido\* and Honshu); China, Russian Far East.

**Bionomics.** Unknown.

**Remarks.** I have examined the types of *T. diminuta* and *T. kasparyani* and concluded that they are the same species. This is one of the smallest species of *Teleutaea* and can be distinguished from other Japanese species by the small tubercle of the antennal socket and by the colour pattern (see above key to species).

*Teleutaea minamikawai* Momoi, 1963

(Figs. 42, 54, 58, 59, 66, 70, 83-86)

*Teleutaea minamikawai* Momoi, 1963: 100.

**Description. Female** (n=11). Body length 11.0–18.0 mm.

Head 0.7 times as long as wide. Clypeus 0.7–0.8 times as long as wide. Face 0.5–0.6 times as long as wide. Frons flat, without small lateral tooth adjacent to antennal socket (Fig. 42). Antennal socket slightly prolonged and without tubercle on upper side (Fig. 42). MSL 0.7–1.0 times as long as BWM. OOL 1.8–2.0 times as long as OD. POL 1.4–1.8 times as long as OD. Antenna with 48–51 flagellomeres. F1 2.0–2.2 times as long as F2.

Mesosoma. Pronotum, mesoscutum, scutellum, mesopleuron, metapleuron and propodeum densely punctate (Figs. 83-85). Epomia strong (Fig. 83). Epicnemial carina distinct (Fig. 85). Pleural carina of propodeum weak, partly obsolete. Posterior transverse carina of propodeum weak, partly narrowly obsolete. Fore wing length 8.0–11.5 mm. Hind femur 6.5–6.8 times as long as maximum depth in lateral view. Hind TS1 2.3–2.5 times as long as TS2.

Metasoma densely punctate. T1 1.3–1.4 times as long as maximum width, its dorsolateral carina complete. T2 1.3–1.4 times as long as maximum wide. T2–T4 each with a pair of oblique grooves. T5 with a pair of weak oblique grooves. Ovipositor sheath 2.6–2.7 times as long as hind tibia.

Colouration (Figs. 83-86). Body (excluding wings and legs) black with weak to strong blue reflection, except for: clypeus, mandible except for tip, malar space near base of mandible, palpi, anterior and ventral spot of collar, dorsal margin of pronotum, tegula, lateral longitudinal stripe of scutellum, subalar prominence, large spot of

mesopleuron, hind margins of each axilla, postscutellum, posterior end of metapleuron, posterior median spots of T2 and T3, posterior margins of T4-T6, membranous parts of sternites, posterior margin of subgenital plate whitish-yellow to yellow; antenna partly blackish-brown; upper part of mesepimeron, apex of anterior projection of submetapleural carina, ovipositor reddish-brown. Wings hyaline. Veins and pterostigma dark brown except for yellow wing base. Fore and mid legs reddish-brown to brown except for large part of coxae, dorsal part of trochanters and trochantelli yellow. Hind leg dark brown except for: base of coxa, dorsal surface of trochanter and apex of trochantellus yellow; apex of femur and base of tibia narrowly yellow to whitish-yellow. Median parts of hind coxa and femur more or less paler than other area.

**Male** (n=4). Similar to female. OOL 1.4–1.6 times as long as OD. Hind femur 6.3–6.6 times as long as maximum depth in lateral view. T1 1.5 times as long as maximum width. T2 1.3–1.4 times as long as maximum width. Fore and mid legs yellow. Posterior median spot of T1 yellow.

**Specimens examined.** JAPAN: 1M, Tokyo Pref., Mizuho, ix. 1989, K. Kunimi leg. (NIAES); 1F, Kanagawa Pref., Yokosuka City, Nagasawa, 5. iv. 2006, H. Nagase leg. (KPMNH); 1F, Chiba Pref., Kimitsu, Seiwa, Mt. Kanouzan, 21. vi. 1960, H. Suda leg. (KPMNH); 1F1M, Chiba Pref., Ichikawa City, Kounodai, 11. vii. 2003, H. Suda leg. (KPMNH); 1F, Chiba Pref., Ichikawa City, Nakakokubun, 16. vii. 2003, H. Suda leg. (KPMNH); 1F (paratype), Shizuoka Pref., Kanaya, 15. v. 1960, J. Minamikawa leg. (SEHU); 1F, Shizuoka Pref., Fujieda, 22. iii. 2004, T. Tsuru leg. (TUA); 1F, Fukui Pref., Mikuni Town, Oshima Island, 11. ix. 1982, H. Kurokawa leg. (KPMNH); 1F (holotype), Ehime Pref., Matsuyama City, Tarumi, 25. v. 1956, S. Ueda leg. (MNHAH); 1M, Saga Pref., Tara Town, Taradake, 20. v. 2001, T. Yamauchi leg. (KPMNH); 1F, Kagoshima Pref., Yoshimatsu Town, Kurinodake, 15. v. 1997, R. Matsumoto leg. (OMNH); 1F, Nagasaki Pref., Obama Town, Unzen, 10. xii. 1995, R. Matsumoto leg. (OMNH); 1M, Nagasaki Pref., Takagi Town, Todoroki-kyo, 28. vii. 1997, T. Tachi leg. (OMNH); 1F, no data about locality and collector, 4. viii. 1992 (OMNH).

**Distribution** (Fig. 1016). Japan (Honshu, Shikoku, Kyushu\* and Amamioshima Is.); Russian Far East.

**Bionomics.** The following tortricid hosts have been reported: *Homona magnanima* Diakonoff (Momoi, 1963; Minamikawa, 1969; Momoi *et al.*, 1975); *Adoxophyes orana* (Fischer von Röslerstam) and *Choristoneura longicellana* (Walsingham) (Momoi *et al.*, 1975).

**Remarks.** This species can be easily distinguished from other Japanese *Teleutaeta* by the large yellow spot on the mesopleuron, the black propodeum, and the complete



dorsolateral carina of T1.

*Teleutaea mishae* Kuslitzky, 1973

(Figs. 43-45, 52, 53, 87-94)

*Teleutaea mishae* Kuslitzky, 1973: 890.

*Teleutaea longiterebrae*: Watanabe *et al.*, 2012: 20. In part, misident.

**Description. Female** (n=9). Body length 11.0–13.0 mm.

Head 0.7 times as long as wide. Clypeus 0.6–0.7 times as long as wide. Face 0.6 times as long as wide. Frons strongly concave, without small lateral tooth adjacent to antennal socket (Figs. 43-45). Antennal socket prolonged and with large tubercle on upper side (Figs. 43-45). MSL 0.8–1.0 times as long as BWM. OOL 1.0–1.4 times as long as OD. POL 1.2–1.4 times as long as OD. Antenna with 44–46 flagellomeres. F1 2.0 times as long as F2.

Mesosoma. Pronotum, mesoscutum, scutellum, mesopleuron, metapleuron and propodeum punctate (Figs. 88, 90-92). Epomia strong (Figs. 88, 90). Epicnemial carina distinct (Figs. 88, 90). Pleural carina of propodeum weak, partly obsolete in paratype. Posterior transverse carina of propodeum complete. Fore wing length 8.5–9.0 mm. Hind femur 7.2–8.3 times as long as maximum depth in lateral view. Hind TS1 2.1–2.4 times as long as TS2.

Metasoma densely punctate (Fig. 53). T1 1.5–1.6 times as long as maximum width, its dorsolateral carina complete (Fig. 52). T2 1.3–1.4 times as long as maximum width. T2-T4 each with a pair of oblique grooves (Fig. 53). T5 without grooves (Fig. 53). Ovipositor sheath 2.6–3.0 times as long as hind tibia.

Colouration (Figs. 87-94). Body (excluding wings and legs) black with weak blue reflection, except for: clypeus, mandible except for tip, malar space near base of mandible, palpi, dorsal margin of pronotum, lateral longitudinal stripe or U-shaped stripe of scutellum, subalar prominence, lower posterior part of mesopleuron, posterior margins of T4-T6, membranous parts of sternites, posterior margin of subgenital plate whitish-yellow to yellow; tegula, hind margins of each axilla, posterior end of metapleuron, upper part of mesepimeron, apex of anterior projection of submetapleural carina, ovipositor reddish-brown. Yellow spot of mesopleuron more or less distinct in specimens from northern localions but indistinct or sometimes absent in southern localions. Wings hyaline. Veins and pterostigma dark brown except for yellow wing base. Fore and mid legs reddish-brown with large yellow spot of coxae and small

yellow area of trochanters and trochantelli. Hind leg reddish-brown to dark brown except for: dorsal yellow spot of coxa, posterior part of trochanter, trochantellus yellow; base of tibia sometimes narrowly yellow.

**Male** (n=9). Similar to female. MSL 0.5 times as long as BWM. POL 0.8–1.2 times as long as OD. Antenna with 43–48 flagellomeres. Hind femur 6.4–6.5 times as long as maximum depth in lateral view. Ventral surface of scape yellow anteriorly. Malar space yellow. Ventral surface of pedicel yellow. Legs paler than female. Face sometimes with yellow area.

**Specimens examined.** JAPAN: 1F, Hokkaido Pref., Kumaishi, Kenichi-gawa, Iwafuchi-zawa, 10-20. x. 1995, Y. Ito and T. Ito leg. (MsT) (NIAES); 1M, Hokkaido Pref., Eniwa, Izari, Ichankoppe-zawa, 21–31. vii. 1995, T. Ito leg. (MsT) (NIAES); 1M, Hokkaido Pref., Sapporo City, Misumai, Kannonzawa, 4-17. vii. 1993, N. Kuhara leg. (MsT) (NIAES); 1F, same data except for 30. vii. – 12. viii. 1993 (NIAES); 1M, Hokkaido Pref., Mt. Tarumaesan, 21–26. vii. 1998, K. Konishi leg. (MsT) (NIAES); 1F1M, Hokkaido Pref., Kamishihoro Town, Oketo-rindo, 26. vii. 1997, R. Matsumoto leg. (OMNH); 1F, same locality, 6. viii. 1997, R. Matsumoto leg. (OMNH); 1M, Hokkaido Pref., Higashikawa Town, Asahidake 800m, 10. viii. 1994, R. Matsumoto leg. (OMNH); 1M, Hokkaido Pref., Chitose City, Tarumae-san, 24. vii. 1997, R. Matsumoto leg. (OMNH); 1F, Aomori Pref., Aomori City, Moyatouge, 8-15. viii. 1992, T. Ichita leg. (NIAES); 1F, Fukushima Pref., Hinoemata Vil., Mikawa, 8. x. 2004 (MsT) (TPM); 1F, Nagano Pref., Saku City, Kasuga, Okawara-toge, 2090m alt. (GPS: N36.112/ E138.320), 26. viii. 2011, S. Fujie leg. (KPMNH); 1F, Aichi Pref., Mt. Sanage, 4-10. ix. 1992, T. Kanbe (MsT) (NIAES); 1M, Fukui Pref., Imajo, Hachibuse-yama, 6. vii. 1981, T. Murota leg. (KPMNH); 1M, Kagoshima Pref., Yakushima Is., Arakawa, 28. vi. – 29. vii. 2007, T. Yamauchi leg. (KPMNH). RUSSIA: 1F (holotype), Maritime territory, 19. viii. 1969, Kashcheyev leg. [on obverse] Sinancha, habitat, stone pine and broadleaved forest, [middle reaches of M. Ussuriyka River] (LT, 22:00-23:00) (ZIS); 1M (paratype), Maritime territory, Roshchino village, Krasnoarmeysk district, 15. vii. 1968, Sinchilina leg. (ZIS).

**Distribution** (Fig. 1017). Japan (Shikotan Is., Hokkaido\*, Honshu\* and Yakushima Is.\*); Russian Far East.

**Bionomics.** A tortricid host was reported from Russia in the original description: *Archips piceana* Linnaeus (Kuslitzky, 1973).

**Remarks.** This species resembles *T. nigricoxalis* and *T. orientalis* in the states of the frons and antennal socket, but it can be distinguished by the length of the ovipositor sheath 3.3 times as long as hind tibia (3.8–4.3 in *T. nigricoxalis* and 2.6 in *T. orientalis*)

and slightly longer than fore wing (ca. 1.5 times as long as fore wing in *T. nigricoxalis* and slightly shorter in *T. orientalis*), the black scutellum and apex of T2 and T3 (yellow in female of *T. orientalis*), and T1 of males 1.5–1.6 times as long as its maximum width (1.8–1.9 times in *nigricoxalis*).

Females show an intraspecific variation in colour pattern, apparently related to the latitude. The yellow mesopleuron spot is absent / indistinct (southern localities) or distinct (northern localities), the yellow stripe of scutellum is separated (southern) or posteriorly united and U-shaped (northern); and legs are not darkened (southern) or darkened (northern) (Figs. 87-91).

***Teleutaea nigra*** Momoi, 1978

(Figs. 46, 95-99)

*Teleutaea brischkei* form B: Momoi, 1963: 103. Misident.

*Teleutaea nigra* Momoi, 1978: 4.

**Description. Female** (n=3). Body length 10.0–11.5 mm.

Head 0.6–0.7 times as long as wide. Clypeus 0.7 times as long as wide. Face 0.7 times as long as wide. Frons slightly concave, without small lateral tooth adjacent to antennal socket (Fig. 46). Antennal socket prolonged and tuberculate on upper side (Fig. 46). MSL 0.8 times as long as BWM. OOL 1.4–1.6 times as long as OD. POL 1.0 times as long as OD. Antenna with 42–46 flagellomeres. F1 1.8–1.9 times as long as F2.

Mesosoma. Pronotum, mesoscutum, scutellum, mesopleuron, metapleuron and propodeum punctate (Figs. 95-97). Epomia strong (Fig. 95). Epicnemial carina distinct (Fig. 97). Pleural carina of propodeum weak, partly obsolete. Posterior transverse carina of propodeum weak but complete. Fore wing length 7.5–8.5 mm. Hind femur 6.2–7.0 times as long as maximum depth in lateral view. Hind TS1 2.3–2.5 times as long as TS2.

Metasoma densely punctate. T1 1.5–1.8 times as long as maximum width, its dorsolateral carina complete. T2 1.3–1.4 times as long as maximum width. T2-T4 each with a pair of oblique groove. T5 without grooves. Ovipositor sheath 1.9–2.0 times as long as hind tibia.

Colouration (Figs. 95-99). Body (excluding wings and legs) black, except for: clypeus except for dorsal margin, mandible except for tip, palpi, apical margins of T4-T6, membranous parts of sternites, posterior margin of subgenital plate whitish-yellow to yellow; antenna partly brown to reddish-brown; tegula, subalar

prominence, hind margins of each axilla, upper part of mesepimeron, apex of anterior projection of submetapleural carina, ovipositor reddish-brown. Scutellum rarely with a pair of small reddish spot laterally. Wings hyaline; veins and pterostigma brown except for yellow wing base. Fore and mid legs yellowish-brown to brown. Hind leg dark brown, sometimes trochanters partly tinged with yellow.

**Male.** Not described here, although see male specimens deposited in OMNH and MNHAH.

**Specimens examined.** JAPAN: 1M, Hokkaido Pref., Nukabira, 14. vii. 1959, S. Momoi leg. (MNHAH); 1M, Hokkaido Pref., Oketo Town, Oketo-rindo, 26. vii. 1997, R. Matsumoto leg. (OMNH); 1F (holotype), Ehime Pref., Saragamine, 10. vii. 1955, S. Ueda leg. (MNHAH); 1F, Tokushima Pref., Ichiu Vil., Mt. Tsurugisan, 900m alt., 17. x. 1980, K. Maeto leg. (NIAES); 1F, Fukuoka Pref., Mt. Hikosan, 9. vii. 1981, K. Maeto leg. (NIAES).

**Distribution** (Fig. 1017). Japan (Hokkaido, Honshu, Shikoku and Kyushu). Endemic to Japan.

**Bionomics.** Unknown.

**Remarks.** This species is very similar to *T. brischkei* except for the colouration of the hind leg, but it can be distinguished as shown in Remarks under *T. brischkei*. However, the colour differences between them are very similar to the intraspecific variations of *T. mishae* (see Remarks under *T. mishae*). Therefore, it is necessary to examine more specimens to separate *T. brischkei* and *T. nigra* with confidence.

***Teleutaea nigricoxalis* (Uchida, 1928) stat. rev.**

(Figs. 47, 100-104)

*Hoplitophrys brischkei* var. *nigricoxalis* Uchida, 1928: 69.

*Teleutaea brischkei* form E: Momoi, 1963: 103. In part, misident.

*Teleutaea longiterebra* Kuslitzky, 1973: 891. **syn. nov.**

**Description. Female** (n=16). Body length 12.5–13.5 mm.

Head 0.7 times as long as wide. Clypeus 0.7 times as long as wide. Face 0.5–0.6 (0.7 in male) times as long as wide. Frons strongly concave, without small lateral tooth adjacent to antennal socket (Fig. 47). Antennal socket prolonged and with large tubercle on upper side (Fig. 47). MSL 1.0 times as long as BWM. OOL 1.4 times as long as OD. POL 1.0–1.4 times as long as OD. Antenna with 49–50 flagellomeres. F1 2.0 times as long as F2.

Mesosoma. Pronotum, mesoscutum, scutellum, mesopleuron, metapleuron and propodeum punctate (Figs. 101-103). Epomia strong (Fig. 101). Epicnemial carina distinct (Fig. 103). Pleural carina of propodeum weak, partly obsolete. Posterior transverse carina of propodeum complete. Fore wing length 9.0–10.0 mm. Hind femur 7.1–7.5 times as long as maximum depth in lateral view. Hind TS1 2.1–2.4 times as long as TS2.

Metasoma densely punctate. T1 1.5 times as long as maximum width, its dorsolateral carina complete. T2 1.3 times as long as maximum width. T2-T4 each with a pair of oblique grooves. T5 without grooves. Ovipositor sheath 3.8–4.3 times as long as hind tibia.

Colouration (Figs. 101-104). Body (excluding wings and legs) black with weak blue reflection, except for: clypeus, mandible except for tip, malar space near base of mandible, palpi, dorsal margin of pronotum, tegula, lateral longitudinal stripe of scutellum (sometimes both stripes united posteriorly as 'U' shape), subalar prominence, posterior median small spot of T3 (sometimes also on T2), posterior margins of T4-T6, membranous parts of sternites, posterior margin of subgenital plate whitish-yellow to yellow; hind margins of each axilla, posterior end of metapleuron, upper part of mesepimeron, apex of anterior projection of submetapleural carina, ovipositor reddish-brown. Wings hyaline. Veins and pterostigma dark brown except for yellow wing base. Fore and mid legs reddish-brown with large yellow spot of coxae and small yellow area of trochanters and trochantelli. Hind leg dark brown except for: dorsal yellow spot of coxa, posterior part of trochanter, trochantellus yellow.

**Male** (n=11). Similar to female. Body length 11.5–13.0 mm. MSL 0.5–0.6 times as long as BWM. OOL 0.8–1.2 times as long as OD. POL 0.8–1.0 times as long as OD. Antenna with 45–50 flagellomeres. F1 1.9–2.0 times as long as F2. Hind femur 6.6–7.2 times as long as maximum depth in lateral view. T1 1.8–1.9 times as long as maximum width. T2 1.4–1.5 times as long as maximum width. Ventral surface of scape yellow anteriorly. Ventral surface of pedicel yellow (Fig. 100). Legs paler than female.

**Specimens examined.** JAPAN: 1F, Hokkaido Pref., Wakkanai, 16. viii. 1984, O. Tadauchi leg. (NIAES); 9F10M, Hokkaido Pref., Kamishihoro Town, Oketo-rindo, 26. vii. 1997, R. Matsumoto leg. (OMNH); 1F, Nagano Pref., Hongou Vil., Asama to Misuzuko, 30. viii. 1962, H. Suda leg. (KPMNH); 1F, Nagano Pref., Shimashima-dani, 3. viii. 1995, N. Takahashi leg. (OMNH); 1F, Nagano Pref., Shimashimadani, 14. x. 1982, T. Goto leg. (NIAES); 1F, Fukuoka Pref., Mt. Hikosan, 20–21. x. 1983, M. Chujo leg. (LT) (NIAES). RUSSIA: 1F (lectotype of *Hoplitophrys brischkei* var. *nigricoxalis* and paratype of *T. longiterebra*), “Saghalien Matsumura” “Type Matsumura” “H.

nigricoxalis sp. nov.” [“Sakhalin: Ichinosawa; Furumaki; Ohtani” in Townes *et al.* (1965)] (SEHU); 1F (holotype of *T. longiterebra*), novo-Aleksandrovs, Sakhalin, 29. viii. 1965, Pilipyuk leg. (ZIS); 1M (paratype of *T. longiterebra*), S. Sakhalin, Ozersk forest, forbs, 9. viii. 1957, Polyakova leg. (ZIS).

**Distribution** (Fig. 1018). Japan (Rebun Is., Hokkaido, Honshu\* and Kyushu\*); Russian Far East.

**Bionomics.** Unknown.

**Remarks.** Townes *et al.* (1965) designated the lectotype of *Hoplitophrys brischkei* var. *nigricoxalis* from its syntype series and also synonymized this species under *T. sachalinensis*. However, this synonymy must have been based on the misidentification of *T. sachalinensis* because they are easily separable by the presence (*T. nigricoxalis*) or absence (*T. sachalinensis*) of a dorsal tubercle of the antennal sockets. Kuslitzky (1973) also mentioned this problem but did not resolve it. I have examined the types of *H. brischkei* var. *nigricoxalis* and *T. longiterebra* and recognized that they are the same species. The designation of the lectotype by Townes *et al.* (1965) is valid and thus *Hoplitophrys brischkei* var. *nigricoxalis* is the valid name and *T. longiterebra* is newly synonymized under *nigricoxalis*.

The female of this species can be easily distinguished from other Japanese *Teleutaea* by the very long ovipositor, whereas the male is sometimes confused with *T. mishae* and *T. orientalis*. The differences between them are shown in the above key to the species.

***Teleutaea orientalis*** Kuslitzky, 1973  
(Figs. 48, 55, 60, 61, 67, 71, 105-109)

*Teleutaea brischkei* form C: Momoi, 1963: 103. Misident.

*Teleutaea brischkei* form E: Momoi, 1963: 103. In part, misident.

*Teleutaea orientalis* Kuslitzky, 1973: 890.

**Description. Female** (n=7). Body length 11.5–15.0 mm.

Head 0.7 times as long as wide. Clypeus 0.7 times as long as wide. Face 0.6 times as long as wide. Frons strongly concave, without small lateral tooth adjacent to antennal socket (Fig. 48). Antennal socket prolonged and with large tubercle on upper side (Fig. 48). MSL 0.7–0.8 times as long as BWM. OOL 1.4–1.6 times as long as OD. POL 1.0–1.4 times as long as OD. Antenna with 46–48 flagellomeres. F1 1.7–1.8 times as long as F2.

Mesosoma. Pronotum, mesoscutum, scutellum, mesopleuron, metapleuron and propodeum punctate (Figs. 105-107). *Epomia strong* (Fig. 105). Epicnemial carina distinct (Fig. 107). Pleural carina of propodeum weak, partly obsolete. Posterior transverse carina of propodeum complete. Fore wing length 8.0–10.5 mm. Hind femur 6.8–7.0 times as long as maximum depth in lateral view. Hind TS1 2.2–2.4 times as long as TS2.

Metasoma densely punctate (Fig. 109). T1 1.4–1.5 (1.6–1.7 in male) times as long as maximum width, its dorsolateral carina complete or sometimes narrowly absent behind spiracle. T2 1.2–1.3 (1.5 in male) times as long as maximum width. T2-T4 each with a pair of oblique grooves. T5 without grooves. Ovipositor sheath 2.6 times as long as hind tibia.

Colouration (Figs. 105-109). Body (excluding wings and legs) black with strong blue reflection, except for: clypeus, mandible except for tip, malar space near base of mandible, palpi, dorsal margin of pronotum, postero-ventral corner of pronotum, mesopleuron and metapleuron, lateral longitudinal stripe of scutellum (sometimes both stripes united posteriorly as 'U' shape), subalar prominence, upper part of mesepimeron, postscutellum, hind margins of each axilla, posterior margins of T2-T6 (T2 and T3 absent laterally), membranous parts of sternites, posterior margin of subgenital plate whitish-yellow to yellow; tegula, posterior end of metapleuron, apex of anterior projection of submetapleural carina, ovipositor reddish-brown. Wings hyaline. Veins and pterostigma dark brown except for yellow wing base. Fore and mid legs reddish-brown with large yellow spot of coxae and small yellow area of trochanters and trochantelli. Hind leg reddish-brown except for: dorsal yellow spot of coxa, posterior part of trochanter and trochantellus yellow. Ventral surface of coxa, trochanter and trochantellus except for yellow area, tibia except for pale base, tibial spurs and tarsus tinged with brown to dark brown.

**Male** (n=6). Similar to female. Head 0.6 times as long as wide. Clypeus 0.6–0.7 times as long as wide. Face 0.6–0.7 times as long as wide. MSL 1.0 times as long as BWM. OOL 1.2 times as long as OD. F1 2.0 times as long as F2. T1 1.6–1.7 times as long as maximum width. T2 1.5 times as long as maximum width. Ventral surface of pedicel with small yellow spot. Postscutellum black, sometimes tinged with dark reddish-yellow. Legs more or less paler than female.

**Specimens examined.** JAPAN: 1M, Hokkaido Pref., Mt. Tarumae-san, 21–26. vii. 1998, K. Konishi leg. (MsT) (NIAES); 1M, Hokkaido Pref., Kamishihoro Town, Oketo-rindo, 26. vii. 1997, R. Matsumoto leg. (OMNH); 1F, Hokkaido Pref., Yubari City, O-yubari, 28. ix. - 12. x. 2007, S. Ueda leg. (MsT) (OMNH); 1F, Fukushima Pref., Hinoemata Vil.,

Mikawa, 4. ix. 2004, H. Makihara leg. (MsT) (TPM); 1M, Tochigi Pref., Kuriyama, Kinunuma, 19. vii. 2004, H. Makihara leg. (MsT) (TPM); 1F, Kanagawa Pref., Hadano City, Mizunashi-gawa, about 600m alt., 11. vii. 1993, H. Miyatani leg. (KPMNH); 1M, Kanagawa Pref., Atsugi City, Mt. Ooyama, 1252m alt., 15. vii. 1999, M. Yamamoto leg. (KPMNH); 1M, Yamanashi Pref., Ashiyasu Vil., Kitasawa-toge, 20. vii. 1997, R. Matsumoto leg. (OMNH); 1 ex., Nagano Pref., Outaki Vil., Mt. Ontakesan, Hakkaisan, 1660–1700m alt., 7. viii. 2010, K. Watanabe leg. (TUA); 1F, Kyoto Pref., Oe Town, Oeyama, 12. viii. 2000, R. Matsumoto leg. (OMNH). RUSSIA: 1F (holotype), Khabarovsk territory, M. Khekhtsir Range, forest, 25. vii. 1966, Kasparyan leg. (ZIS).

**Distribution** (Fig. 1018). Japan (Hokkaido, Honshu and Shikoku); China, Russian Far East.

**Bionomics.** The following tortricid hosts were recorded: *Archips capsigeranus* (Kennel) (Momoi, 1963, 1978) and *Ptycholoma lecheana* (Linnaeus) (Momoi, 1978).

**Remarks.** This species resembles *T. mishae* and *T. nigricoxalis* in head structure, but it can be easily distinguished from them (see Remarks under *T. mishae*).

#### *Teleutaea sachalinensis* Uchida, 1928

(Figs. 49, 110-113)

*Teleutaea sachalinensis* Uchida, 1928: 68.

**Description. Female** (n=5). Body length 8.0–11.0 mm.

Head 0.6–0.7 times as long as wide. Clypeus 0.7 times as long as wide. Face 0.6 times as long as wide. Frons flat, without small lateral tooth adjacent to antennal socket (Fig. 49). Antennal socket not prolonged and without tubercle on upper side (Fig. 49). MSL 0.9–1.0 times as long as BW. OOL 1.0–1.2 times as long as OD. POL 1.0–1.4 times as long as OD. Antenna with 41–42 flagellomeres. F1 1.8–1.9 times as long as F2.

Mesosoma. Pronotum, mesoscutum, scutellum, mesopleuron, metapleuron and propodeum densely punctate (Figs. 110-112). Epomia weak (Fig. 110). Epicnemial carina distinct (Fig. 112). Pleural carina of propodeum weak, partly obsolete. Posterior transverse carina of propodeum weak but complete. Fore wing length 7.0–8.5 mm. Hind femur 6.9 times as long as maximum depth in lateral view. Hind TS1 2.2–2.5 times as long as TS2.

Metasoma densely punctate. T1 1.3 times as long as maximum width, its dorsolateral carina complete. T2 1.1–1.3 times as long as maximum width. T2-T4 each



with a pair of oblique grooves but weak, obscure on T4. T5 without grooves. Ovipositor sheath 2.4–2.6 times as long as hind tibia.

Colouration (Figs. 110-113). Body (excluding wings and legs) black, except for: palpi brown; mandible except for tip, anterior spot of collar, dorsal margin of pronotum, lateral longitudinal stripe of scutellum, subalar prominence, apical margins of T4-T6, membranous parts of sternites, posterior margin of subgenital plate whitish-yellow to yellow; antenna partly blackish-brown; clypeus except for dorsal margin, tegula, hind margins of each axilla, upper part of mesepimeron, apex of anterior projection of submetapleural carina, ovipositor reddish-brown. Wings hyaline. Veins and pterostigma brown except for yellow wing base. Fore and mid legs reddish-brown to brown except for dorso-lateral spot of coxae and trochanters. Hind leg dark brown except for: trochantellus yellow; apex of trochanter and femur, and base of tibia and TS1 narrowly yellow to whitish-yellow.

**Male** (n=1). Similar to female. Clypeus 0.8 times as long as wide. Face 0.6 times as long as wide. MSL 0.6 times as long as BWM. OOL 0.8 times as long as OD. F1 2.0 times as long as F2. T1 1.5 times as long as maximum wide. T2. Clypeus and palpi yellow. Malar space tinged with yellow near base of mandible. Ventral surface of scape and pedicel yellow. Legs paler than female, largely yellowish-brown. Fore and mid coxae, trochanters and trochantelli whitish-yellow.

**Specimens examined.** JAPAN: 1F, Hokkaido Pref., Bibai, 21. vi. 1971, S. Momoi leg. (KPMNH); 1M, Rishiri Is., 15. vii. 1968, H. Takizawa leg. (KU); 1F, Hokkaido Pref., Kamishihoro Town, Oketo-rindo, 26. Jul. 1997, R. Matsumoto leg. (OMNH); 1F, Hokkaido Pref., Mt. Daisetsu, Asahidake, 9. vii. 1970, H. Hasegawa leg. (NIAES); 1F, Tochigi Pref., Kuriyama, Kinunuma, 4. ix. 2004, H. Makihara leg. (MsT) (TPM). RUSSIA: 1F (holotype) “Saghalien Matsumura” “Type Matsumura” “川上 30/vii. 24” (= Kawakami, 30. vii. 1924) (SEHU).

**Distribution** (Fig. 1018). Japan (Rishiri Is.\*, Hokkaido and Honshu\*); China, Russian Far East.

**Bionomics.** A tortricid host has been recorded: *Lozotaenia coniferana* (Issiki) (Momoi, 1963).

**Remarks.** Although Townes *et al.* (1965) synonymized *Hoplitophrys brischkei* var. *nigricoxalis* under *T. sachalinensis*, this treatment was obviously based on the misidentification (see Remarks under *T. nigricoxalis*). This species can be easily distinguished from other Japanese species by the simple antennal socket, the brown female palpi, and the black mesopleuron.

*Teleutaea striata* (Gravenhorst, 1829)

(Figs. 50, 56, 62, 63, 68, 72, 114-117)

*Lissonota striata* Gravenhorst, 1829: 70.

*Teleutaea corniculata* Momoi, 1978: 7. **syn. nov.**

**Description. Female** (n=7). Body length 10.5–11.5 mm.

Head 0.6–0.7 times as long as wide. Clypeus 0.7–0.8 times as long as wide. Face 0.5–0.6 times as long as wide. Frons flat, without small lateral tooth adjacent to antennal socket (Fig. 50). Antennal socket prolonged and slightly tuberculate on upper side (Fig. 50). MSL 0.8–0.9 times as long as BWM. OOL 1.8 times as long as OD. POL 1.0–1.4 times as long as OD. Antenna with 43–45 flagellomeres. F1 2.0 times as long as F2.

Mesosoma. Pronotum, mesoscutum, scutellum, mesopleuron, metapleuron and propodeum punctate (Figs. 114, 115). Epomia strong (Fig. 114). Epicnemial carina distinct (Fig. 115). Pleural carina of propodeum weak, partly obsolete. Posterior transverse carina of propodeum weak, partly obsolete (Fig. 117). Fore wing length 7.0–7.5 mm. Hind femur 6.5–6.8 times as long as maximum depth in lateral view. Hind TS1 2.5–2.6 times as long as TS2.

Metasoma densely punctate, with slight blue reflection. T1 1.6 times as long as maximum width, its dorsolateral carina incomplete behind spiracle. T2 1.4–1.5 times as long as maximum width. T2–T4 each with a pair of oblique grooves. T5 with a pair of weak oblique grooves. Ovipositor sheath 2.3–2.5 times as long as hind tibia.

Colouration (Figs. 114-117). Body (excluding wings and legs) black with weak blue reflection, except for: clypeus except for dorsal margin, mandible except for tip, malar space near base of mandible, palpi, anterior and ventral spots of collar, dorsal margin of pronotum, tegula, scutellum, subalar prominence, large spot of mesopleuron, upper part of mesepimeron, hind margins of each axilla, postscutellum, posterior end of metapleuron, transverse stripe of propodeum, posterior median spots of T1 and T2, posterior margins of T3-T6, membranous parts of sternites, posterior margin of subgenital plate whitish-yellow to yellow; antenna sometimes partly blackish-brown, ventral surface of scape and pedicel tinged with yellow; apex of anterior projection of submetapleural carina, ovipositor reddish-brown. Posterior yellow spots or margins of T1-T3 sometimes tinged with brown. Wings hyaline. Veins and pterostigma brown except for yellow wing base. Fore and mid legs reddish-brown to brown except for: coxae yellow, trochanters and trochantelli more or less tinged with yellow. Hind coxa

and trochanter reddish-brown to blackish-brown with dorsal yellow spot. Hind trochantellus yellow. Hind femur reddish-brown with both apices blackish-brown. Hind tibia and tarsus blackish-brown with whitish-yellow base, brown ventral surface of tibia and tibial spurs.

**Male** (n=4). Similar to female. MSL 0.6 times as long as BWM. OOL 1.2–1.4 times as long as OD. Hind femur 6.1–6.3 times as long as maximum depth in lateral view. Hind TS1 2.2–2.3 times as long as TS2. T1 1.5–1.6 times as long as maximum width. Ventral surface of scape yellow anteriorly. Ventral surface of pedicel yellow. Fore and mid legs yellow. Brown area of hind leg paler than female, largely yellow on femur and tibia.

**Specimens examined.** JAPAN: 1M (paratype of *T. corniculata*), Hokkaido Pref., Bibai, 15 (em. from Tortricidae sp.). vi. 1963, K. Kamijo leg. (MNHAH); 1M, Hokkaido Pref., Akan Town, Oakan, 29. vii. 1997, R. Matsumoto leg. (OMNH); 2F, Hokkaido Pref., Kamishihoro Town, Oketo-rindo, 26. vii. 1997, R. Matsumoto leg. (OMNH); 1M, Hokkaido Pref., Sapporo City, Jozankei, 16. viii. 1994, R. Matsumoto leg. (OMNH); 1F (holotype of *T. corniculata*), Aomori Pref., Gonohe, 22. vi. 1960, Toshima *et al.* leg. (MNHAH); 1F, Tochigi Pref., Nasushiobara City, Shimotokura, 29. x. 2009, E. Katayama leg. (KPMNH); 1F, Kagoshima Pref., Sata Town, Sata-misaki, 13. viii. 1963, H. Tanaka leg. (KU); 1F, Kagoshima Pref., Yakushima Is., Miyanoura, 8. v. 1972, K. Hashimoto leg. (KU). POLAND: 1M, Sepólno, 14. vii. 1932 (det. Heinrich and Townes) (AEI). GERMANY: 1F, Hahnoheide, Trittau, Bez Hambg, viii. 1945, G. Heinrich leg. (det. Heinrich and Townes) (AEI).

**Distribution** (Fig. 1019). Japan (Hokkaido, Honshu, Shikoku, Kyushu\* and Yakushima Is.\*); widely distributed in the Palaearctic region.

**Bionomics.** In Japan, the following hosts have been recorded: *Brenthis daphne* (Denis & Schiffermüller) (Nymphalidae) (Momoi, 1963); *Lycaena phlaeas daimio* (Matsumura) (Lycaenidae) (Momoi, 1978); *Adoxophyes orana* and *Archips breviplicanus* Walsingham (Tortricidae) (Nakaya, 2009). The butterflies are rare host records of *Teleutaeta* and in the Glyptini. I examined the specimen bred from *L. phlaeas daimio* in MNHAH, but not the specimen bred from *B. daphne* in any collection. Both butterflies are different in bionomics from tortricids, main hosts of *Teleutaeta*, i.e., they inhabit open fields, especially grasslands (tortricids and *Teleutaeta* usually inhabit forest edge or forest inside) and the butterfly larvae do not live in concealed conditions (tortricid larvae are usually concealed in plant tissues) (Fukuda *et al.*, 1983, 1984). Therefore, these host records of butterflies should be reconfirmed.

**Remarks.** Although this species has been distinguished from *T. corniculata* by the length of ovipositor and the structure of antennal socket (Momoi, 1978), the difference

in the former character is slight. For the latter character, Momoi (1978) mentioned that the tubercle was present (*corniculata*) or absent (*striata*), but I have recognized that the tubercle is present not only in *T. corniculata* but also in *T. striata*. Therefore, I synonymize *T. corniculata* under *T. striata*.

This species can be easily distinguished from other Japanese species by the entirely yellow scutellum, the large yellow mesopluron spot, the transverse yellow stripe of the propodeum, and the dorsolateral carina of T1 more or less absent behind the spiracles.

***Teleutaea ussuriensis*** (Golovisnin, 1928)

(Figs. 51, 57, 64, 65, 69, 73, 118-121)

*Hoplitophrys ussuriensis* Golovisnin, 1928: 226.

*Hoplitophrys brischkei* var. *japonicus* Uchida, 1928: 69.

*Teleutaea uchidai* Momoi, 1963: 103.

**Description. Female** (n=44). Body length 10.5–13.5 mm.

Head 0.6–0.7 times as long as wide. Clypeus 0.7 times as long as wide. Face 0.6 times as long as wide. Frons strongly concave, with small lateral tooth adjacent to antennal socket (Fig. 51). Antennal socket prolonged and with rather large tubercle on upper side (Fig. 51). MSL 0.9–1.0 times as long as BWM. OOL 1.6 times as long as OD. POL 1.0–1.2 times as long as OD. Antenna with 45–48 flagellomeres. F1 2.0 times as long as F2.

Mesosoma. Pronotum, mesoscutum, scutellum, mesopleuron, metapleuron and propodeum densely punctate (Figs. 118-120). Epomia strong (Fig. 118). Epicnemial carina distinct (Fig. 120). Pleural carina of propodeum weak, partly obsolete. Posterior transverse carina of propodeum complete. Fore wing length 7.5–10.0 mm. Hind femur 6.9–7.1 times as long as maximum depth in lateral view. Hind TS1 2.4–2.6 times as long as TS2.

Metasoma densely punctate. T1 1.5 times as long as maximum width, its dorsolateral carina complete or usually narrowly absent behind spiracle. T2 1.3 times as long as maximum width. T2-T4 each with a pair of oblique grooves. T5 without grooves. Ovipositor sheath 2.3 times as long as hind tibia.

Colouration (Figs. 118-121). Body (excluding wings and legs) black with strong blue reflection, except for: clypeus except for dorsal margin, mandible except for tip, malar space near base of mandible, palpi, small spot near dorsal end of epomia and

postero dorsal corner of pronotum, lateral longitudinal stripe of scutellum (sometimes both stripes united posteriorly and 'U'-shaped), tegula, subalar prominence, upper part of mesepimeron, hind margins of each axilla, posterior margins of T4-T6, membranous parts of sternites, posterior margin of subgenital plate whitish-yellow to yellow; posterior apex of propleuron, postero-ventral corner of pronotum, mesopleuron and metapleuron, apex of anterior projection of submetapleural carina, ovipositor reddish-brown. Wings hyaline. Veins and pterostigma brown except for yellow wing base. Fore and mid legs reddish-brown with large yellow spot of coxae and small yellow area of trochanters and trochantelli. Hind leg reddish-brown except for: dorsal yellow spot of coxa, posterior part of trochanter and trochantellus, base of tibia yellow. Trochanter and trochantellus except for yellow area, ventral surface of femur, tibia except for base, tibial spurs and tarsus tinged with blackish-brown.

**Male** (n=55). Similar to female. Face 0.7 times as long as wide. MSL 0.7 times as long as BWM. OOL 1.0–1.4 times as long as OD. POL 0.8–1.2 times as long as OD. Hind femur 6.5–7.0 times as long as maximum depth in lateral view. Hind TS1 2.2–2.5 times as long as TS2. T1 1.5–1.7 times as long as maximum width. T2 1.3–1.4 times as long as maximum width. Ventral surface of scape with yellow area anteriorly. Ventral surface of pedicel yellow. Ventro-lateral margin of collar with narrow yellow area. Legs more or less paler than female.

**Specimens examined.** JAPAN: 1F1M, Hokkaido Pref., Shari Town, Nukamappu-gawa, 13. vii.–17. x. 2001, K. Uesugi leg. (MsT) (KPMNH); 1F (lectotype of *Hoplitophrys brischkei* var. *japonicus*), Hokkaido Pref., Sapporo, 13. ix. 1924, T. Uchida leg. (SEHU); 8F6M, Hokkaido Pref., Kamishihoro Town, Oketo-rindo, 26. vii. 1997, R. Matsumoto leg. (OMNH); 5F9M, same locality, 6. viii. 1997, R. Matsumoto leg. (OMNH); 3M, Hokkaido Pref., Eniwa City, Soranuma, 22. vii. 1996, M. Sueyoshi leg. (OMNH); 1F5M, Hokkaido Pref., Rausu Town, Rausudake, 27. vii. 1997, R. Matsumoto leg. (OMNH); 1F, Hokkaido Pref., Nagae Town, 24. viii. 1994, R. Matsumoto leg. (OMNH); 2F, Hokkaido Pref., Kamishihoro Town, Mitsumata, 4. viii. 1997, R. Matsumoto leg. (OMNH); 1F2M, Hokkaido Pref., Hidaka Town, Penkenushi, 24. vii. 1997, R. Matsumoto leg. (OMNH); 3F1M, Hokkaido Pref., Ashoro Town, Kamishibetsu, 10-17. viii. 1996, T. Tachi leg. (OMNH); 1M, Hokkaido Pref., Shumarinai Lake, 7. viii. 1996, T. Tachi leg. (OMNH); 1M, Hokkaido Pref., Sapporo City, Hitsujigaoka (GPS: N 43–00/ E 141–24), 2–9. vii. 2003, K. Konishi leg. (MsT) (KPMNH); 1F, same locality and collector, 30. vii.–6. viii. 2003 (MsT) (SEHU); 1F, same locality and collector, 20–27. viii. 2003 (MsT) (SEHU); 1F, same locality and collector, 17–25. ix. 2003 (MsT) (SEHU); 1M, same locality and collector, 5–12. vii.

2007 (MsT) (TUA); 1M, same locality and collector, 19–26. vii. 2007 (MsT) (KPMNH); 1F, same locality and collector, 6–13. ix. 2007 (MsT) (SEHU); 1F, same locality and collector, 20–27. ix. 2007 (MsT) (SEHU); 1F, same locality and collector, 4–11. x. 2007 (MsT) (SEHU); 1F, Hokkaido Pref., Muroran City, Rakusan, 6. viii. 2003, T. Yoshida leg. (TUA); 1M, same locality, 16. vii. 2007, T. Yoshida leg. (KPMNH); 1M, Hokkaido Pref., Utanobori Town, Omagari (GPS: N 44–39/ E 142–35), 14–15. viii. 2003, T. Yoshida leg. (KPMNH); 1F, Hokkaido Pref., Sapporo City, Hyakumatsu-zawa (GPS: N 42–58/ E 141–12), 18. viii. 2007, T. Yoshida leg. (KPMNH); 1M, Hokkaido Pref., Hakodate City, Miharashi park, 4. vii. 2005, H. Suda leg. (KPMNH); 1F, same locality and collector, 28. viii. 2005 (KPMNH); 1F, Yamagata Pref., Nagai City, 7. viii. 2008, M. Gunji leg. (TUA); 1M, Fukushima Pref., Hinoemata Vil., 22. vii. 1996, T. Tachi leg. (OMNH); 1F, Fukushima Pref., Hinoemata Vil., Mikawa, 4. ix. 2004, H. Makihara leg. (MsT) (TPM); 8F, same locality and collector, 8. x. 2004 (MsT) (TPM); 5M, Tochigi Pref., Kuriyama, Kinunuma, 19. vii. 2004, H. Makihara leg. (MsT) (TPM); 2M, same locality and collector, 1. viii. 2004 (MsT) (TPM); 5M, same locality and collector, 14. viii. 2004 (MsT) (TPM); 1F, Niigata Pref., Asahi Vil., Hachimoriyama, 25. vii. 1998, T. Tachi leg. (OMNH); 2M, Nagano Pref., Arashi Vil., Hachimoriyama, 16. vii. 1997, R. Matsumoto leg. (OMNH); 1M, Nagano Pref., Azumi Vil., Shimashimadani, 15. vii. 1997, R. Matsumoto leg. (OMNH); 1M, Yamanashi Pref., Sudama Town, Mizugakiyama, 18. vii. 1997, R. Matsumoto leg. (OMNH); 1M, Yamanashi Pref., Ashiyasu Vil., Hirogawara, 14. vii. 1996, T. Tachi leg. (OMNH); 1M, Yamanashi Pref., Sutama Town, Sawaraike, 11. vii. 1996, T. Tachi leg. (OMNH); 1F (holotype of *T. uchidai*), Hyogo Pref., Sasayama, Tamba, 11. x. 1952, K. Ikeda leg. (SEHU); 1M, Ehime Pref., Oda Town, 5. vi. 1998, E. Yamamoto leg. (OMNH); 1M, “Shimadaka”, 12. viii. 1995, N. Takahashi leg. (OMNH).

**Distribution** (Fig. 1019). Japan (Hokkaido, Honshu and Shikoku); China, Russian Far East.

**Bionomics.** A tortricid host has been recorded: *Olethreutes electana* (Kennel) (Momoi, 1969).

**Remarks.** This species can be easily distinguished from other Japanese *Teleutaeta* by the strongly concave frons with a small lateral tooth adjacent to the antennal socket. This is the most common species of *Teleutaeta* in northern Japan.

### **Discussion about *Teleutaeta***

A total of 10 Japanese species of *Teleutaeta* are recognized. The results of my study

show that a rich species diversity of *Teleutaea* is present in Japan, while all of the species, with the exception of *T. nigra*, are also found in the Russian Far East. Japanese *Teleutaea* can be classified into four morphological groups. The *striata* group (*T. minamikawai* and *T. striata*) is characterized by T5 with a pair of oblique grooves and a weak or absent antennal socket tubercle. The *sachalinensis* group (a single species, *T. sachalinensis*) is characterized by the brown palpi and the simple antennal socket. The *brischkei* group (*T. brischkei*, *T. diminuta*, and *T. nigra*) is characterized by the strong antennal socket tubercle but the frons not strongly concave, the hind coxa without a distinct basal yellow patch dorsally, and their relatively small size. The *orientalis* group (*T. mishae*, *T. nigricoxalis*, *T. orientalis*, and *T. ussuriensis*) is characterized by the strong to very strong antennal socket tubercle and strongly concave frons. The *brischkei* and *striata* groups are widely distributed from Europe to Far East Asia while the other two groups are restricted to Far East Asia. This pattern of species distribution, i.e., having richly represented species groups endemic to Far East Asia as well as those of a wide distribution in Eurasia in a single genus, is also reported for the ichneumonid genus *Stilbops* Förster (Watanabe & Maeto, 2012a). Both of these genera contain many common forest inhabitants in Far East Asia. Probably common biogeographical reasons for such a high rate of speciation in Far East Asia should be sought.

#### Genus *Glyptopimpla* Morley, 1913 s. lat.

#### **Taxonomic problems of *Glyptopimpla* and its subgenera**

The genus *Glyptopimpla* is a medium-sized taxon of the tribe Glyptini, previously containing 12 described species (Yu *et al.*, 2012), i.e., *G. babai* (Momoi, 1978), *G. iwatai* (Momoi, 1963), *G. macrofossa* (Momoi, 1963), *G. uchidai* (Momoi, 1963), and *G. watanabei* (Momoi, 1963) from the Eastern Palaearctic region (Momoi, 1963, 1978; Kuslitzky, 1973; Gupta, 2002); *G. aditiae* Gupta, 2002, *G. anooshkae* Gupta, 2002, *G. avniae* Gupta, 2002, *G. lota* (Chiu, 1965), *G. prima* Morley, 1913, and *G. shromilae* Gupta, 2002 from the Oriental region (Morley, 1913; Chiu, 1965; Gupta, 2002); and *G. minor* (Seyrig, 1935) from the Afrotropical region (Seyrig, 1935; Gupta, 2002). No reliable host records had been given to *Glyptopimpla* until this study.

Many present members of *Glyptopimpla* had been treated under the genus *Zygoglypta* Momoi, 1965, until Gupta (2002). *Zygoglypta* was divided into two subgenera, *Zygoglypta* and *Orientoglypta* Kuslitzky, 1973, by Kuslitzky (1973). The latter subgenus contained a single Palaearctic species, *Z. (O.) watanabei* Momoi, and

was separated from *Zygoglypta* by many features (Kuslitzky, 1973). Gupta (2002) synonymized these subgenera under the genus *Glyptopimpla*. He provided reasonable morphological evidence for the synonym of *Zygoglypta* with *Glyptopimpla*, but not for the synonym of *Orientoglypta*. The morphological character states for *Orientoglypta* proposed by Kuslitzky (1973) seem to be peculiar in the Glyptini, and thus the taxonomic position of *Orientoglypta* should be considered again.

In this study, I revise the Japanese species of *Glyptopimpla* s. lat., record a host insect of the genus for the first time, and reconsider the taxonomic status of *Orientoglypta*.

I have recognized seven species of *Glyptopimpla* s. lat. (including *G. (O.) watanabei*) from Japan, with two new species from the Ryukyu Islands. By the observation of adult morphology, I recognize the distinct differences between *Glyptopimpla* s. str. and *Orientoglypta* as shown in Table 3. The strongly produced inner margin of paramere (Table 3, #8; Figs. 230, 232, 234, 236, 238, 240) is a stable and important character state, which clearly separates *Glyptopimpla* s. str. from *Orientoglypta*. On the other hand, the lower end of occipital carina is an important character in generic classification of Ichneumonidae (e.g., Banchinae and Campopleginae in Townes, 1970b). The joint of occipital carina and hypostomal carina is distant from mandibular base in *Glyptopimpla* s. str. whereas it is closed to mandibular base in *Orientoglypta* (Table 3, #4; Figs. 161-163, 165-170, 172-174). Although the occipital carina is effaced ventrally in *G. macrofossa*, the lower apex of occipital carina of this species runs toward the hypostomal carina distant from mandibular base (Figs. 164, 171). Therefore, based on these two morphological characters and some other differences described below, the genus *Orientoglypta* **stat. rev.** is undoubtedly separable from the genus *Glyptopimpla* s. str.

#### Genus *Glyptopimpla* Morley, 1913 **s. str.**

*Glyptopimpla* Morley, 1913: 209; Gupta, 2002: 221.

Type species: *Glyptopimpla prima* Morley, 1913, by original designation.

*Zygoglypta* Momoi, 1965: 79.

Type species: *Glypta uchidai* Momoi, 1963, by original designation. Synonymized by Gupta (2002).

*Zygoglypta (Zygoglypta)* Momoi, 1965: 79; Yu & Horstmann, 1997: 108.

**Description based on Japanese species.** Body length 5.5–8.0 mm.



Head polished, covered with punctures. Clypeus weakly convex in lateral view, its apical margin convex in anterior view (Figs. 133-138). Clypeal suture weak. Frons largely smooth, punctate less than upper 0.3 (Figs. 140-145). Base of mandible weakly convex. Occipital carina broadly obsolete in upper part (except for complete in *G. prima*), its lower end connected with hypostomal carina distant from base of mandible (or effaced in *G. macrofossa*) (Figs. 161-166, 168-173). Occiput vertically sloping beyond eyes (Figs. 154-159).

Mesosoma polished. Upper end of epomia approaches upper margin of pronotum (Figs. 179-185). Notaulus weak. Upper end of epicnemial carina extending at or beyond of half height of mesopleuron. Mesopleural suture distinct. Sternaulus extending half of length between epicnemial carina and base of mid coxa. Anterior projection of submetapleural carina strongly produced, sometimes partly angulated (Figs. 208-214). Propodeal spiracle circular. Fore tibial spur shorter than 0.5 times of fore basitarsus. Tarsal claws pectinate. Fore wing: length 4.0–6.8 mm. Areolet present, oblique, outer side partly opened, vein *3rs-m* not shorter than 0.5 times of vein *2rs-m*, upper angle with short petiole (Figs. 187-192). Junction of vein *Cu1* and vein *Cu-a* distant from junction of vein *Rs+M* and vein *M+Cu*, or opposite. Vein *Rs+2* arisen near middle of stigma. Vein *Rs* almost straight. *2m-cu* with two bullae, sometimes united into one long bulla. Hind wing: vein *M+Cu* gently curved. Lengths of abscissa of vein *Cu1* between vein *M* and vein *Cu-a* as long as, or longer than vein *Cu-a*.

Metasoma polished. T1 without basal triangular projection laterally, its dorsolateral carina extended near apex (Figs. 222-227), its median dorsal carina complete or partly obsolete on posterior part (Figs. 215-220). Exposed part of T5 of female about 0.5 times as long as exposed part of T4 (Figs. 129, 131). T6-T8 partly hidden under precedent tergite (Figs. 129, 131). Upper valve of ovipositor with dorsal subapical notch. Ovipositor sheath 1.3–2.2 times as long as hind tibia. Male subgenital plate with a long apodema sternalis, anterior margin round laterally and straight medially, and lateral posterior angle obtusely produced (Figs. 243, 246, 249, 252, 255, 258). Apex of paramere of male genitalia weakly projected (Figs. 229-249). Inner margin of paramere strongly concave near basal inner angle (Figs. 230, 232, 234, 236, 238, 240). Digitus gently curved (Figs. 244, 247, 250, 253, 256, 259). Aedeagus more or less curved, its penis valve ca. 2.0 times as long as basal apodeme (Figs. 245, 248, 251, 254, 257, 260).

Colouration. Scutellum with white or yellow spot (Figs. 122-127). Metasomal tergites with posterior white or yellow bands or spots, clearly defining the posterior border of each tergum (Figs. 122-127).

Sexual dimorphism. Punctures on metasoma and metasoma of female usually denser than male. Propodeal carinae of male stronger than female. T1 of female broader than female. Colouration of legs of male paler than female.

**Distribution.** Eastern Palaearctic, Oriental and Ethiopian regions.

**Bionomics.** Parasitoids of the family Tortricidae.

**Remarks.** This genus resembles *Teleutaeta* and *Orientoglypta* in having an areolet. It can be easily separated from them by the combination of the following characters states (see Table 3): apical margin of clypeus rounded (Figs. 133-138); frons largely smooth, punctate less than upper 0.3 (Figs. 140-145); occipital carina joining hypostomal carina distant from mandibular base (exceptionally absent in *G. macrofossa*) and upper part usually broadly obsolete (Figs. 161-166, 168-173); exposed part of T5 of female about 0.5 times as long as exposed part of T4; apex of paramere only weakly projected (Figs. 229-249); inner margin of paramere strongly concave near basal inner angle, which is strongly projected (Figs. 230, 232, 234, 236, 238, 240); scutellum with a white or yellow spot (Figs. 122-127); and yellow or white bands (or spots) on metasomal tergites clearly defining each posterior border (Figs. 122-127).

Here, I record *G. uchidai* Momoi as a parasitoid of a tortricid moth, *Homoxopsis illotana* (Kennel). This is the first host record for the genus *Glyptopimpla*.

### Key to Japanese species of the genus *Glyptopimpla*

1. Anterior tentorial pit distinctly enlarged (Figs. 133, 136).....2
- Anterior tentorial pit not enlarged (Figs. 134, 135, 137, 138).....3
- 2(1). Frons with median small convexity (Fig. 154). Interocellar area with a distinct pit (Fig. 147). Lower part of occipital carina complete (Figs. 161, 168). Median dorsal carina on T1 obsolete in posterior half (Fig. 215). Area between each anterior tentorial pit black.....*G. babai* (Momoi, 1978)
- Frons entirely flat (Fig. 157). Interocellar area without a pit (Fig. 150). Lower part of occipital carina broadly effaced (Figs. 164, 171). Median dorsal carina on T1 extended near apex (Fig. 218). Area between each anterior tentorial pit yellow or white.....*G. macrofossa* (Momoi, 1963)
- 3(1). Median ocellus strongly elevated in lateral view (Fig. 159). Median dorsal carina on T1 obsolete in posterior half (Fig. 220). T2 without lateral longitudinal keels (Figs. 220, 227). T1 of female with broad yellow bands (Fig. 127). Body robust.....*G. uchidai* (Momoi, 1963)
- Median ocellus not elevated in lateral view (Figs. 155, 156, 158). Median dorsal carina

- on T1 extended near apex (Figs. 216, 217, 219). T2 (and sometimes T3) with a pair of lateral longitudinal keels (Figs. 216, 217, 219, 223, 224, 226). T1 of female without yellow bands (Figs. 123, 124, 127). Body slender. ....4
- 4(3). T1-T4 without posterior white bands (Fig. 123). T3 with a pair of weak lateral longitudinal keel in female (Figs. 216, 213), without keels in male. Main lands of Japan and Russian Far East. ....*G. iwatai* (Momoi, 1963)
- T2-T4 each with a posterior white bands (Figs. 124, 127). T3 with lateral longitudinal keel in both sexes (Figs. 217, 219, 224, 226). Ryukyus.....5
- 5(4). Mesosoma densely punctate, punctures on lateral lobes of mesoscutum separated by less than 1.0 (usually 0.5) times their diameter (Figs. 175, 177). Basal section of median dorsal carina on propodeum absent (Fig. 203). White bands on T2 and T3 weakly narrowed medially (Fig. 124). Okinawajima Is. ....*G. kusigematii* **sp. nov.**
- Mesosoma moderately punctate, punctures on lateral lobes of mesoscutum separated by 0.4–2.0 (usually 1.0) times their diameter (Fig. 176, 178). Basal section of median dorsal carina on propodeum present, connecting the lateral section of anterior transverse carina (Fig. 205). White bands on T2 and T3 strongly narrowed medially (Fig. 126). Amamioshima Is. and Tokunoshima Is.....*G. momoi* **sp. nov.**

***Glyptopimpla babai*** (Momoi, 1978)

(Figs. 122, 133, 140, 147, 154, 161, 168, 179, 187, 194, 201, 208, 215, 222, 229, 230, 243-245)

*Zygoglypta babai* Momoi, 1978: 13.

*Zygoglypta (Zygoglypta) babai*: Yu & Horstmann, 1997: 108.

*Glyptopimpla babai*: Kuslitzky, 2002: 223.

**Description. Female** (n=7). Body slender, its length 5.5–7.0 mm.

Head 0.6 times as long as wide. Clypeus 0.6 times as long as wide. Anterior tentorial pit large (Fig. 133). Face weakly convex medially and slightly convex above anterior tentorial pit, 0.6 times as long as wide. MSL 0.8 times as long as BWM. Frons flat, with median convexity (Fig. 154), largely smooth, sparsely punctate upper 0.3 (Fig. 140). OOD 1.1–1.3 times as long as OD; IOD 1.0–1.3 times as long as OD; interocellar area with distinct pit (Fig. 147). Vertex and gena finely punctate. Lower part of occipital carina complete (Figs. 161, 168). Antenna with 34–37 flagellomeres. F1 1.6–1.7 times as long as F2.

Mesosoma moderately punctate, punctures on lateral lobes of mesoscutum

(excluding near notaulus) separated by 0.3–1.8 (usually 1.0) times their diameter. Lateral area of pronotum largely smooth in lower part (Fig. 179). Anterior projection of submetapleural carina rounded at posterior angle (Fig. 208). Posterior transverse carina and pleural carina of propodeum complete (Figs. 201, 208). Anterior transverse carina of propodeum absent except for lateral section slightly present (Figs. 201, 208). Fore wing length 4.5–5.5 mm. Hind femur 5.4–5.5 times as long as maximum depth in lateral view. Hind tibia 8.6–8.7 times as long as maximum depth in lateral view. Hind basitarsus 2.4–2.6 times as long as second tarsal segment.

Metasoma. T1-T4 densely punctate except for anterior part of T1 (Fig. 215). T1 1.3 times as long as maximum width, its median dorsal carina obsolete posteriorly (Fig. 215). T2 0.8–0.9 times as long as maximum width. T2 and T3 without a pair of short lateral longitudinal keels (Figs. 215, 222). Ovipositor sheath 2.2–2.3 times as long as hind tibia.

Colouration (Figs. 122, 179, 194). Body (excluding wings and legs) black, except for: lower 0.6 of clypeus, mandible except tip, palpi, whitish-yellow to yellow; antenna brown; upper margin of pronotum, tegula, apex of scutellum, hind margins of each axilla, upper part of mesepimeron, small spot of postscutellum, whitish-yellow to yellow; anterior projection of submetapleural carina, brownish-yellow; apical bands of T1-T7, membranous part of sternites, apical half of subgenital plate, whitish-yellow to yellow; remainder of sternites, including subgenital plate, brown; ovipositor reddish-brown. Wings hyaline; veins and stigma brown except for yellow wing base. Legs reddish-brown, except for: fore and mid coxae and trochanters, hind trochanter, basal half of hind trochantellus, apex of hind femur, base of hind tibia, whitish-yellow; subbasal spots and apices of mid and hind tibiae, apices of hind TS1-TS4, hind TS5, dark brown.

Variation. Lower surfaces of scape and pedicel sometimes tinged with yellow. Whitish-yellow spot on upper margin of pronotum sometimes interrupted in middle. Subtegular ridge sometimes tinged with yellow. White apex of hind femur sometimes obscure. Posterior whitish-yellow band on T1 sometimes reduced, with only small spots near postero-lateral corner.

**Male** (n=2). Similar to female. OOD 0.9–1.0 times as long as OD; IOD 0.8–1.0 times as long as OD; F1 1.5–1.6 times as long as F2. Hind femur 5.4–5.6 times as long as maximum depth in lateral view; hind tibia 8.1–8.6 times as long as maximum depth in lateral view. Whitish-yellow areas on mesosoma and legs paler than female.

**Specimens examined.** JAPAN: 1F, Hokkaido Pref., Nakasatsunai, 8. viii. 1969, H. Torikura leg. (KU); 1F, Hokkaido Pref., Sapporo City, Hitsujigaoka (GPS: N 43–00/ E

141–24), 19–26. vii. 2007, K. Konishi leg. (MsT) (AEI); 1M, Iwate Pref., Mt. Hayachine, 29. viii. 1966, K. Kusigemati leg. (KU); 1M, Iwate Pref., Mt. Hayachine (400m alt.), 11–19. vii. 1989, H. Makihara & M. Sharkey leg. (MsT) (NIAES); 1F (holotype), Niigata Pref. Kurokawa, 2. vii. 1961, K. Baba leg. (MNHAH); 1F, Tokyo Pref., Hachioji City, Mt. Takao, Hikage-sawa, 21. vi. 1977, S. Tachikawa *et al.* leg. (TUA); 1F, Yamanashi Pref., Koushu City, Katsunuma Town, near Ootaki-fudo (720–1000 m alt.) (GPS: N 35–40–10/ E 138–47–7), 4. viii. 2008, K. Watanabe leg. (KPMNH); 1F, Gifu Pref., Kani, Katabira, 3–9. ix. 2004, K. Yamagishi (MsT) (MU); 1F, Ishikawa Pref., Hakusan, Sannomiya, 6–18. ix. 2009, H. Fukutomi (MsT) (MU).

**Distribution** (Fig. 1020). Japan (Hokkaido\* and Honshu).

**Bionomics.** Host is unknown. Adult wasps were collected in early to mid-summer. The specimen from Yamanashi Prefecture was collected in a deciduous broadleaf forest of low mountains.

**Remarks.** This species most resembles *G. macrofossa*, but it can be easily distinguished by the complete lower part of occipital carina (incomplete in *G. macrofossa*), the distinct pit on interocellar area (without this pit in *G. macrofossa*), the short median dorsal carina on T1 (long and complete in *G. macrofossa*), and the colouration of clypeus.

***Glyptopimpla iwatai*** (Momoi, 1963)

(Figs. 123, 134, 141, 148, 155, 162, 169, 180, 188, 195, 202, 209, 216, 223, 231, 232, 246–248)

*Glypta iwatai* Momoi, 1963: 112.

*Zygolypta iwatai*: Momoi, 1965: 80.

*Zygolypta* (*Zygolypta*) *iwatai*: Yu & Horstmann, 1997: 108; Kuslitzky, 2007: 449.

*Glyptopimpla iwatai*: Gupta, 2002: 223.

**Description. Female** (n=97). Body. Slender, its length 6.5–8.0 mm.

Head 0.6–0.7 times as long as wide. Clypeus 0.5–0.6 times as wide. Anterior tentorial pit small (Fig. 134). Face weakly convex medially, 0.7 times as long as wide. MSL 0.7–0.8 times as long as BWM. Frons flat (Fig. 155), largely smooth, sparsely punctate upper 0.3 (Fig. 141). OOD 0.9–1.2 times as long as OD; IOD 1.0–1.3 times as long as OD; interocellar area without pit (Fig. 148). Vertex and gena finely punctate. Lower part of occipital carina complete (Figs. 162, 169). Antenna with 37–39 flagellomeres. F1 1.8–2.1 times as long as F2.

Mesosoma moderately punctate, punctures on lateral lobes of mesoscutum (excluding near notaulus) separated by more than 1.2 times (usually 1.9) their diameter. Lateral area of pronotum largely smooth in lower part (Fig. 180). Anterior projection of submetapleural carina weakly angulate at posterior angle (Fig. 209). Posterior transverse carina and pleural carina of propodeum complete (Figs. 202, 209). Anterior transverse carina on propodeum medially incomplete (Figs. 202, 209). Lateromedian longitudinal carina on propodeum sometimes obsoletely present (Figs. 202, 209). Fore wing length 5.5–6.5 mm. Hind femur 5.0–5.4 times as long as maximum depth in lateral view. Hind tibia 7.8–8.2 times as long as maximum depth in lateral view. Hind TS1 2.2–2.4 times as long as TS2.

Metasoma. T1-T4 densely punctate except for base of T1 (Fig. 216). T1 1.4–1.6 times as long as maximum width, its median dorsal carina extend to near apex (Fig. 216). T2 0.9–1.1 times as long as maximum width. T2 and T3 with a pair of short lateral longitudinal keels, it on T3 weak (Figs. 216, 223). Ovipositor sheath 2.0 times as long as hind tibia.

Colouration (Figs. 123, 180, 195). Body (excluding wings and legs) black, except for: clypeus, mandible except tip, palpi, whitish-yellow to yellow; upper margin of pronotum, upper and lower ends of collar, tegula, apex of scutellum, subtegular ridge, upper part of mesepimeron, postscutellum, whitish-yellow to yellow; hind margins of each axilla, anterior projection of submetapleural carina, brownish-yellow; posterior bands of T4-T7, membranous part of sternites, apical half of subgenital plate, whitish-yellow to yellow; remainder of sternites, including subgenital plate, brown; ovipositor reddish-brown. Wings hyaline; veins and stigma (center area paler) brown except for yellow wing base. Legs reddish-brown, except for: fore and mid coxae and trochanters, hind trochanter, lower side of hind trochantellus, apex of hind femur, base of hind tibia, whitish-yellow; basal and apical (except for white apex) spots of hind femur, subbasal and apical parts of hind tibiae, hind tarsus except for base of segment II to IV, dark brown.

Variation. Antenna sometimes tinged with dark brown. Hind margins of each axilla sometimes yellow. Apical margin of T1-T3 sometimes tinged with dark red.

**Male** (n=25). Similar to female. Body length 7.0–8.0 mm. MSL 0.6 times as long as BWM; face 0.7 times as long as wide; OOD 0.7–0.9 times as long as OD; F1 1.4–1.7 times as long as F2. Fore wing length 6.0–7.0 mm. Hind femur 5.3–6.1 times as long as maximum depth in lateral view; hind tibia 8.4–8.7 times as long as maximum depth in lateral view; hind basitarsus 2.0–2.2 times as long as second tarsal segment. T1 1.5–1.6 times as long as maximum width; T2 1.0–1.2 times as long as maximum width;

sublateral longitudinal keels weak on T2 and absent on T3. Colouration similar to female, except for: posterior part of propleuron yellow and apical band of T4 narrower than female. Variation: posterior lower angles of meso- and metapleuron sometimes tinged with yellowish-brown to yellow; apical yellow band of T4 sometimes absent.

**Specimens examined.** JAPAN: 1M, Hokkaido Pref., Rishiri, 4. viii. 1958, K. Kamijo leg. (MNHAH); 2M, Hokkaido Pref., Kamishihoro Town, Nukabira, 600m alt., 30 vi. 1980, H. Takemoto leg. (NIAES); 1M, same date, 1. vii. 1980, H. Takemoto leg. (NIAES); 2F, Hokkaido Pref., Kamikawa, Asahi Vil., Shin-Okushibetsu, 19–21. viii. 1981, Y. Shono leg. (NIAES); 2F, Hokkaido Pref., Sapporo City, Jozankei, 350m alt., 21–29. viii. 1989, K. Maeto and M. Sharkey leg., (MsT) (NIAES); 1F, same locality, 29. viii. – 12. ix. 1989, K. Maeto and M. Sharkey leg., (MsT) (NIAES); 3F, Hokkaido Pref., Ashoro Town, Meaken, 31. vii. 1997, R. Matsumoto leg. (OMNH); 1M, Hokkaido Pref., Eniwa City, Soranuma, 22. vii. 1996, M. Sueyoshi leg. (OMNH); 1M, Hokkaido Pref., Rausu Town, Rausudake, 27. vii. 1997, R. Matsumoto leg. (OMNH); 4F2M, Hokkaido Pref., Kamishihoro Town, Oketo-rindo, 26. vii. 1997, R. Matsumoto leg. (OMNH); 1F, Hokkaido Pref., Higashikawa Town, Asahidake 600m, 9. viii. 1994, R. Matsumoto leg. (OMNH); 1F, Hokkaido Pref., Ashoro Town, Kamishibetsu, 17. viii. 1996, T. Tachi leg. (OMNH); 4F3M, Hokkaido Pref., Kamishihoro Town, Oketo-rindo, 6. viii. 1997, R. Matsumoto leg. (OMNH); 1F, Hokkaido Pref., Utanobori Town, Omagari (GPS. N 44–39/ E 142–35), 14–15. viii. 2003, T. Yoshida leg. (TUA); 1F, Aomori Pref., Aomori City, Johgakura, 15. ix. 1992, T. Ichita leg. (NIAES); 1F (holotype), Tochigi Pref., Oku-Nikko, 13. ix. 1957, S. Momoi leg. (MNHAH); 3F, Tochigi Pref., Kuriyama village, Kinunuma, 1. viii. 2004, H. Makihara leg. (MsT) (TPM); 3F, Tochigi Pref., Kuriyama village, Kinunuma, 14. viii. 2004, H. Makihara leg. (MsT) (TPM); 2F, Tochigi Pref., Kuriyama village, Kinunuma, 8. x. 2004, H. Makihara leg. (MsT) (TPM); 1M, Gunma Pref., Katasina village, Mt. Hotaka-san, 1. viii. 2008, K. Watanabe leg. (TUA); 1F, Nagano Pref., Sarukura-Hakuba, 15–16. ix. 1966, J. Minamikawa leg. (NIAES); 1F, Nagano Pref., Shimashima-dani, 1000–1300m alt., 27. vii. 1980, K. Maeto leg. (NIAES); 1F, Nagano Pref., Norikura-kogen, 1800m alt., 31. vii. 1980, K. Maeto leg. (NIAES); 1F, Nagano Pref., Shimashima-dani, 14. x. 1982, T. Goto leg. (NIAES); 1F 2M, Nagano Pref., Outaki Vil., Mt. Ontake-san, Tanohara, about 1800m alt., 8. viii. 2007, K. Watanabe leg. (AEI); 14F8M, same date, 9. viii. 2007, K. Watanabe leg. (KPMNH); 1F2M, Nagano Pref., Azumi Vil., 15. vii. 1997, R. Matsumoto leg. (OMNH); 1F, Yamanashi Pref., Minami-Alps, Mt. Kitadake, 28. viii. 1980, T. Goto leg. (NIAES); 1F, Shizuoka Pref., Honkawane Vil., Mt. Yamainu-dan, 1200–1400m alt., (GPS. N 35–7–48/ E 138–2–19), 14. vi. 2008, K. Watanabe leg. (TUA); 1F, Gifu Pref.,

Hirayu, 12. x. 1982, K. Konishi leg. (NIAES); 1F, Hiroshima Pref., Togauchi Town, Sandankyo, 2. vi. 1983, K. Konishi leg. (NIAES); 1F, Hyogo Pref., Sekinomiya Town, Mt., Hyonoson, 1. vi. 1983, K. Konishi leg. (NIAES); 1F, Tottori Pref., Mt. Daisen, Y. Yoneda leg. (NIAES); 1M, Hiroshima Pref., Geikoku Town, Kakezuyama, 17. vii. 1998, R. Matsumoto leg. (OMNH); 1F, Tokushima Pref., Mt. Koutsusan, 9. vi. 1985, K. Oohara leg. (NIAES); 1M, Ehime Pref., Mts. Odamiyama, Mt. Mizunashi-yama, 4. ix. 1994, E. Yamamoto leg., (LT) (NIAES); 2F, Ehime Pref., Hojo City, Takanawa-san, 26. ix. 1999, R. Matsumoto leg. (OMNH); 1F, Fukuoka Pref., Soeda Town, Hikosan, 13. vii. 1995, T. Tachi leg. (OMNH); 1F, Oita Pref., Kokonoe, Yutsubo, 5. x. 1996, R. Matsumoto leg. (OMNH); 35F, Oita Pref., Shonai Town, Asono, 10. x. 1995, R. Matsumoto leg. (OMNH); 1F, Oita Pref., Shonai Town, Oike, 9. x. 1995, Y. Higashiura.

**Distribution** (Fig. 1021). Japan (Hokkaido, Rishiri Is., Honshu, Shikoku and Kyushu\*); Russian Far East.

**Bionomics.** Host is unknown. Adult wasps were collected in June to October and were collected in various forests, especially in deciduous broad-leaved forests.

**Remarks.** This species seems closely related to *G. momoi* and *G. kusigematii* by the short lateral longitudinal keels on T2 (and usually on T3) and can be distinguished by the following character states: the mesosoma moderately punctate, punctures on lateral lobes of mesoscutum separated by 0.4–2.0 (usually 1.0) times their diameter (dense, less than 1.0 (usually 0.5) times in *G. kusigematii*), the anterior part of lateromedian longitudinal carina absent or obsolete in female (distinctly present in *G. momoi*), the short lateral longitudinal keels on T3 absent in male (present in *G. kusigematii* and *G. momoi*), and the entirely black T2-T4 (with conspicuous white bands on T2-T4 in *G. kusigematii* and *G. momoi*).

***Glyptopimpla kusigematii* sp. nov.**

(Figs. 124, 129, 130, 135, 142, 149, 156, 163, 170, 175, 177, 181, 189, 196, 203, 210, 217, 224, 233, 234, 249-251)

**Description. Female** (n=2). Body slender, its length 7.5 mm.

Head 0.7 times as long as wide. Clypeus 0.6 times as wide. Anterior tentorial pit small (Fig. 135). Face weakly convex medially, 0.7 times as long. MSL 0.7 times as long as BWM. Frons flat (Fig. 156), largely smooth, sparsely punctate upper 0.3 (Fig. 142). OOD 1.0 times as long as OD; IOD 1.0 times as long as OD; interocellar area without pit (Fig. 149). Vertex and gena finely punctate. Lower part of occipital carina complete (Figs. 163, 170). Antenna with 40 flagellomeres. F1 1.7–1.8 (HT: 1.8) times as



long as F2.

Mesosoma densely punctate (Figs. 175, 177), punctures on lateral lobes of mesoscutum separated by less than 1.0 (usually 0.5) times their diameter. Lateral area of pronotum largely smooth in lower part (Fig. 181). Anterior projection of submetapleural carina rounded at posterior angle weakly angulate (Fig. 210). Posterior transverse carina and pleural carina of propodeum complete (Figs. 203, 210). Anterior transverse carina on propodeum medially incomplete (Figs. 203, 210). Fore wing length 5.0 mm. Hind femur 5.4 times as long as maximum depth. Hind tibia 8.4–8.6 (HT: 8.6) times as long as maximum width. Hind TS1 2.3 times as long as TS2.

Metasoma. T1-T4 densely punctate except for base of T1 (Fig. 217). T1 1.5 times as long as maximum width, its median dorsal carina extend to near apex (Fig. 217). T2 1.1–1.2 (HT: 1.2) times as long as maximum width. T2 and T3 with a pair of short lateral longitudinal keels (Figs. 217, 224). Ovipositor sheath 1.9–2.0 (HT: 2.0) times as long as hind tibia.

Colouration (Figs. 124, 129, 175, 177, 181, 196). Body (excluding wings and legs) black, except for: clypeus, mandible except tip, palpi, lower surfaces of scape and pedicel, whitish-yellow; antenna except for lower surfaces of scape and pedicel, brown. Mesosoma black: upper margin and ventrolateral spot, anterior upper spot of pronotum, posterior part of propleuron, tegula, apex of scutellum, hind margins of each axilla, subategular ridge, upper part of mesepimeron, postscutellum, whitish-yellow; anterior projection of submetapleural carina, brownish-yellow. Wings hyaline; veins and stigma brown except for yellow wing base. Legs reddish-brown, except for: fore and mid coxae and trochanters, hind coxa except for brown apex; hind trochanter, base of hind trochantellus, apex of hind femur, base of hind tibia, whitish-yellow; upper surface and apex of hind tibia except for white base, hind tarsus except for yellow base, dark brown. Metasoma black: apical bands of T1-T7, membranous part of sternites, apical half of subgenital plate, whitish-yellow; sclerotized part of sternites, basal part of subgenital plate, brown; ovipositor reddish-brown.

Variation. Apical white band of T1 sometimes obscured. Posterior margins of metapleuron and propodeum more or less tinged with brownish-yellow.

**Male** (n=2). Similar to female (Fig. 130). Body length 6.0–7.5 mm. OOD 0.9–1.2 times as long as OD; IOD 0.8–1.1 times as long as OD; F1 1.6–1.9 times as long as F2. Fore wing length 4.5–5.0 mm. Hind femur 4.9–5.4 times as long as maximum depth in lateral view; hind basitarsus 1.9–2.0 times as long as second tarsal segment. T1 1.6–1.7 times as long as maximum width. Colouration similar to female except for basal segments of flagellum, legs and posterior band of T1 paler than female.

**Specimens examined.** JAPAN: [Holotype] F, Okinawa Pref., Kunigami village, Uka, 22. xi. 2001, H. Irei & H. Makihara leg. (MsT) (KPMNH). [Paratypes] 2M, Okinawa Pref., Nakijin, Uebaru, 2.v. 1991, M. Hayashi leg. (NIAES); 1F, Okinawa Pref., Kunigami village, Oku, 15. v. 2003, H. Makihara leg. (MsT) (TPM).

**Distribution** (Fig. 1021). Japan (Ryukyu: Okinawajima Is.).

**Bionomics.** Unknown.

**Etymology.** This species is named after Emeritus Prof. Kanetoshi Kusigemati of Kagoshima University, for his contribution to ichneumonology.

**Remarks.** This species most resembles *G. momoi*, but it can be distinguished from it by the mesosoma covered with dense punctures, these on lateral lobes of mesoscutum separated by less than 1.0 (usually 0.5) times their diameter (moderately punctate in *G. momoi*, punctures on lateral lobes of mesoscutum separated by 0.4–2.0 (usually 1.0) times their diameter), the basal section of median dorsal carina on propodeum absent (present in *G. momoi*), and the white bands on T2 and T3 weakly narrowed medially (strongly narrowed medially in *G. momoi*). This species and *G. momoi* resemble *G. aviniae* and *G. prima* in body colouration, especially in T2 to T4 with posterior yellow spots or bands. However, they can be distinguished by the occipital carina distinctly erased (not distinctly erased in *G. prima*), the tubercle on mesopleuron absent (present just opposite the lower corner of pronotum in *G. prima*), the propodeum without posterior yellow area (with posterior yellow area in *G. aviniae*), and the black metapleuron (largely yellow in *G. aviniae*).

***Glyptopimpla macrofossa*** (Momoi, 1963)

(Figs. 125, 136, 143, 150, 157, 164, 171, 182, 183, 190, 197, 204, 211, 218, 225, 235, 236, 252-254)

*Glypta macrofossa* Momoi, 1963: 110.

*Zygoglypta macrofossa*: Momoi, 1965: 80.

*Zygoglypta* (*Zygoglypta*) *macrofossa*: Yu & Horstmann, 1997: 108; Kuslitzky, 2007: 449.

*Glyptopimpla macrofossa*: Gupta, 2002: 223.

**Description. Female** (n=69). Body. Slender, its length 6.5–8.0 mm.

Head 0.6–0.7 times as long as wide. Clypeus 0.5–0.6 times as wide. Anterior tentorial pit large (Fig. 136). Face weakly convex medially and strongly convex above anterior tentorial pit (Figs. 136, 157), 0.7 times as long as wide. MSL 0.8–1.0 times as

long as BWM. Frons flat (Fig. 157), largely smooth, sparsely punctate upper 0.3 (Fig. 143). OOD 1.0–1.4 times as long as OD; IOD 1.0–1.6 times as long as OD; interocellar area without pit (Fig. 150). Vertex and gena finely punctate. Lower part of occipital carina broadly effused (Figs. 164, 171). Antenna with 34–36 flagellomeres. F1 1.9–2.0 times as long as F2.

Mesosoma moderately punctate, punctures on lateral lobes of mesoscutum (excluding near notaulus) separated by 0.8–2.0 (usually 1.0) times their diameter. Lateral area of pronotum largely smooth in lower part (Figs. 182, 183). Anterior projection of submetapleural carina weakly angulate at posterior angle (Fig. 211). Posterior transverse carina and pleural carina of propodeum complete (Figs. 204, 211). Anterior transverse carina on propodeum medially incomplete (Figs. 204, 211). Fore wing length 5.0–6.0 mm. Hind femur 5.2–5.7 times as long as maximum depth in lateral view. Hind tibia 8.4–8.7 times as long as maximum depth in lateral view. Hind TS1 2.1–2.4 times as long as TS2.

Metasoma. T1-T4 densely punctate except for anterior part of T1 (Fig. 218). T1 1.4–1.6 times as long as maximum width, its median dorsal carina extend to near apex (Fig. 218). T2 0.9–1.1 times as long as maximum width. T2 and T3 without a pair of short lateral longitudinal keels (Figs. 218, 225). Ovipositor sheath 2.0 times as long as hind tibia.

Colouration (Figs. 125, 182, 183, 197). Body (excluding wings and legs) black, except for: clypeus except for along anterior tentorial pit, mandible except tip, palpi, lower surfaces of scape and pedicel, whitish-yellow to yellow; antenna except for lower surfaces of scape and pedicel, brown; upper margin and lower spot of pronotum, tegula, apex of scutellum, hind margins of each axilla, subategular ridge, upper part of mesepimeron, postscutellum, whitish-yellow to yellow; anterior projection of submetapleural carina, brownish-yellow; apicolateral spot of T1, apical bands of T2-T7, membranous part of sternites, apical half of subgenital plate, whitish-yellow to yellow; remainder of sternites, including subgenital plate, brown; ovipositor reddish-brown. Wings hyaline; veins and stigma brown except for yellow wing base. Legs reddish-brown, except for: fore and mid coxae and trochanters, hind trochanter, basal half of hind trochantellus, apex of hind femur, base of hind tibia, whitish-yellow; subbasal spots and apices of mid and hind tibiae, apices of first to fourth hind tarsal segment, fifth hind tarsal segment, dark brown.

Variation. Basal segments of flagellum sometimes tinged with yellowish-brown. Yellow stripe on upper margin of pronotum usually reduced anteriorly (always present near tegula). Yellow spot on T1 sometimes reduce. In specimens collected from

Miyakejima Island (Izu Islands), yellow spot on mesosoma noticeably enlarged as: upper and lower margins of pronotum with broad yellow stripe (Fig. 182); scutellum largely yellow; mesopleuron and metapleuron sometimes partly tinged with reddish-yellow.

**Male** (n=15). Similar to female. Body length 7.0–8.5 mm. OOD 0.8–1.0 times as long as OD; antenna with 35–38 flagellomeres; F1 1.5–1.8 times as long as F2. Hind femur 5.1–5.7 times as long as maximum width in lateral view; hind tibia 8.4–8.9 times as long as maximum width in lateral view; hind basitarsus 2.0 times as long as second tarsal segment. T1 1.4–1.6 times as long as maximum wide. Colouration similar to female, paler than female; yellow stripe on upper margin of pronotum enlarged anteriorly; lower margin of pronotum with whitish-yellow spot; propleuron whitish-yellow except for base; fore and mid legs almost whitish-yellow; hind femur, tibia and tarsus largely whitish-yellow (largely reddish-brown in female). Variation: posterior lower angle of meso- and metapleuron sometimes tinged with yellowish-brown to yellow; yellow spot of T1 sometimes reduced. In specimens collected from Miyakejima Island (Izu Islands), yellow spot on mesosoma noticeably enlarged as: pronotum and scutellum almost yellow; mesopleuron and metapleuron with large yellow spots.

**Specimens examined.** JAPAN:1F, Hokkaido Pref., Toyotomi, 10. viii. 1965, K. Kusigemati leg. (KU); 1F; Hokkaido Pref., Horonobe, Kamitoikan, Iwananosawa, 25. viii. – 14. ix. 1993, M. Inoue, (MsT) (NIAES); 1F (holotype), Hokkaido Pref., Sapporo City, Mt. Maruyama, 16. vii. 1955, S. Momoi leg. (MNHAH); 1F, same locality, 7. viii. 2001, T. Yoshida leg. (TUA); 4F, Hokkaido Pref., Sapporo City, Hitsujigaoka (GPS: N 43–00/ E 141–24), 23–30. vii. 2003, K. Konishi leg. (MsT) (NIAES); 4 F, same data except for collected at 30. vii. – 6. viii. 2003 (NIAES); 1F, same data except for collected at 6–13. viii. 2003 (NIAES); 1F, same data except for collected at 12–19. iv. 2007 (NIAES); 1F, same data except for collected at 5–12. vii. 2007 (AED); 1F, same data except for collected at 26. vii. – 2. viii. 2007 (AED); 3F, Hokkaido Pref., Ashoro Town, Meaken, 31. vii. 1997, R. Matsumoto leg. (OMNH); 2F, Hokkaido Pref., Akkeshi Town, Bekanbeshi marsh, 30. viii. 2003, R. Matsumoto leg. (MsT) (OMNH); 1F, ditto, 1–31. viii. 2003, R. Matsumoto leg. (MsT) (OMNH); 1F, Hokkaido Pref., Ashoro Town, Kamishibetsu, 17. viii. 1996, T. Tachi leg. (OMNH); 1F, same locality and collector, 10. viii. 1996 (OMNH); 1F, Hokkaido Pref., Shiretoko pen., Okepepu rindo, 13. viii. 1996, T. Tachi leg. (OMNH); 1F, Hokkaido Pref., Hidaka Town, Penkenushi, 24. vii. 1997, R. Matsumoto leg. (OMNH); 1F, Aomori Pref., Aomori City, Tashirotai, 30. viii. – 14. ix. 1997, T. Ichita leg, (Trap) (NIAES); 1F, Iwate Pref., Hiraniwa, 27. viii. 1966, K. Kusigemati leg. (KU); 1M, Iwate Pref., Mt. Hayachine, 400m alt., 25. vii. – 2. viii. 1989,

M. Sharkey and H. Makihara leg. (MsT) (NIAES); 1F, Tochigi Pref., Yaita, 28. vii. – 11. viii. 1989, K. Konishi leg. (MsT) (NIAES); 1M, Tochigi Pref., Yaita, 30. vi. – 15. vii. 1989, K. Konishi leg. (MsT) (NIAES); 2M, Tokyo Pref., Inagi Town, 23. v. 1967, S. Katsuya leg. (NIAES.); 2F, Tokyo Pref., Hachioji City, Mt. Takao, 21. vii. 1968, J. Minamikawa leg. (NIAES); 1F, Tokyo Pref., Inagi Town, 16. v. 1967, S. Katsuya leg. (NIAES.); 1F1M, Tokyo Pref., Miyakejima Is., Tsubota-rindo, 30. vii. 2008, H. Makihara leg. (KPMNH); 12F 3M, Tokyo Pref., Miyakejima Is., Igadani, 25. viii. 2008, H. Makihara leg. (NIAES); 2F, Kanagawa Pref., Atsugi City, Naka-Ogino, 9. v. 2007, K. Watanabe leg. (KPMNH); 1F, Kanagawa Pref., Hadano City, Mt. Koubou-yama, 14. v. 2007, K. Watanabe leg. (TUA); 1F, Kanagawa Pref., Atsugi City, Naka-Ogino, 60–120m alt., (GPS. N 35–29–4/ E 139–19–12), 8. v. 2008, H. Katahira leg. (TUA); 1M, Yamanashi Pref., Nirasaki City, Sawaraike, 11. vii. 1996, T. Tachi leg. (OMNH); 1F, Nagano Pref., Shiga-Kogen, 26–27. vii. 1961, J. Minamikawa leg. (NIAES); 2F, Nagano Pref., Yamanouchi Town, Nagaike, 22. viii. 2007, K. Watanabe leg. (KPMNH); 1M, Mie Pref., Taiki Town, Nishiki, 29. v. – 3. vi. 2007, M. Nakaseko leg. (MsT) (MU); 1F, same data except for collected at 29. v. – 5. viii. 2007 (MU); 1F, Kyoto Pref., Kyoto City, Hanase-toge, 23. viii. 1999, R. Matsumoto leg. (OMNH); 1F, Hyogo Pref., Sekinomiya Town, Mt., Hyonoson, 1. vi. 1983, K. Konishi leg. (NIAES); 1M, Ehime Pref., Saijyo City, Mt. Ibukiyama, 13. viii. 1998, R. Matsumoto leg. (OMNH); 1M, Ehime Pref., Omogo Vil., Tsuchigoya, 14. vii. 1998, R. Matsumoto leg. (OMNH); 1M (paratype), Fukuoka Pref., Mt. Hiko-san, 26. v. 1956, S. Momoi leg. (MNHAH); 2F, Miyazaki Pref., Mt. Osuzu, 21. v. 1966, K. Kusigemati leg. (KU); 5F, Kagoshima Pref., Mt. Takekuma-yama, 27. viii. 1970, K. Kusigemati leg. (KU); 3F1M, Kagoshima Pref., Mt. Arase-yama, 22. v. 1978, K. Kusigemati leg. (KU); 3F2M, Kagoshima Pref., Mt. Arase-yama, 23. v. 1978, K. Kusigemati leg. (KU).

**Distribution** (Fig. 1020). Japan (Hokkaido, Honshu, Izu oshima Is., Miyakejima Is.\*, Shikoku and Kyushu); Russian Far East.

**Bionomics.** Host is unknown. Adult wasps were collected in May to September and were collected in various forests, especially in deciduous broad-leaved forests.

**Remarks.** This species resembles *G. babai* in the large anterior tentorial pit and the colouration, but it can be easily distinguished by the entirely flat frons (with small but conspicuous convexity in *G. babai*), the simple ocellar area (with a conspicuous pit in *G. babai*), and the colouration of clypeus (completely yellow in *G. babai* but yellow with black areas along anterior tentorial pits in *G. macrofossa*).

***Glyptopimpla momoi* sp. nov.**

(Figs. 126, 131, 132, 137, 144, 151, 158, 165, 172, 176, 178, 184, 191, 198, 205, 213, 219, 226, 237, 238, 255-257)

*Zygoglypta iwatai* Momoi, 1970: 372. Misident.

*Glyptopimpla iwatai*: Gupta, 2002: 223. In part, misident.

**Description. Female** (n=12). Body. Slender, its length 7.0–7.5 (HT: 7.5) mm.

Head 0.6–0.7 times as long as wide. Clypeus 0.5–0.6 times as wide. Anterior tentorial pit small (Fig. 137). Face weakly convex medially, 0.8 times as long. MSL 0.6 times as long as BWM. Frons flat (Fig. 158), largely smooth, sparsely punctate upper 0.3 (Fig. 144). OOD 0.9–1.0 (HT: 1.0) times as long as OD; IOD 1.0–1.2 (HT: 1.2) times as long as OD; interocellar area without pit (Fig. 151). Vertex and gena finely punctate. Lower part of occipital carina complete (Figs. 165, 172). Antenna with 38–40 (HT: 40) flagellomeres. F1 1.8–2.0 (HT: 1.8) times as long as F2.

Mesosoma moderately punctate (Figs. 176, 178), punctures on lateral lobes of mesoscutum (excluding near notaulus) separated by 0.4–2.0 (usually 1.0) times their diameter. Lateral area of pronotum largely smooth in lower part (Fig. 184). Anterior projection of submetapleural carina weakly angulate at posterior angle (Fig. 212). Posterior transverse carina and pleural carina of propodeum complete (Figs. 205, 212). Anterior transverse carina on propodeum medially incomplete (Figs. 205, 212). Lateromedian longitudinal carina on propodeum sometimes obsoletely present (Figs. 205, 212). Fore wing length 4.5–5.5 (HT: 5.5) mm. Hind femur 5.3–5.6 (HT: 5.3) times as long as maximum depth in lateral view. Hind tibia 8.5–9.2 (HT: 8.5) times as long as maximum depth in lateral view. Hind TS1 2.2–2.3 (HT: 2.2) times as long as TS2.

Metasoma. T1-T4 densely punctate except for base of T1 (Fig. 219). T1 1.4–1.6 (HT: 1.6) times as long as maximum width, its median dorsal carina extend to near apex (Fig. 219). T2 1.0 times as long as maximum width. T2 and T3 with a pair of short lateral longitudinal keels (Figs. 219, 226). Ovipositor sheath 2.0 times as long as hind tibia.

Colouration (Figs. 126, 131, 176, 178, 184, 197). Body (excluding wings and legs) black, except for: clypeus, mandible except tip, palpi, scape and pedicel except for lower surface, whitish-yellow; antenna except for yellow areas of scape and pedicel, brown; upper margin of pronotum, collar, propleuron except for base, tegula, apex of scutellum, hind margins of each axilla, subategular ridge, upper part of mesepimeron, postscutellum, posterior lower angles of meso- and metapleuron, whitish-yellow; anterior projection of submetapleural carina, brownish-yellow; apical bands of T2-T7

(T2 and T3 broadly interrupted middle), membranous part of sternites, apical half of subgenital plate, whitish-yellow; remainder of sternites, including subgenital plate, brown; ovipositor reddish-brown. Wings hyaline; veins and stigma brown except for yellow wing base. Legs reddish-brown, except for: fore and mid coxae and trochanters, hind coxa except for brown apex, hind trochanter, base of hind trochantellus, apex of hind femur, base of hind tibia, whitish-yellow; upper surface and apex of hind tibia except for white base, hind tarsus except for yellow base, dark brown.

**Male** (n=22). Similar to female (Fig. 132). Body length 6.5–9.0 mm. MSL 0.5–0.6 times as long as BWM; length of clypeus 0.6 times as width; OOD 0.7–1.0 times as OD; antenna with 37–39 flagellomeres; F1 1.6–1.8 times as F2. Fore wing length 4.5–6.0 mm. Hind basitarsus 2.0–2.4 times as long as second tarsal segment. T1 1.5–1.7 times as long as maximum width; T2 1.0–1.3 times as long as maximum width. Colouration similar to female except for: propleuron entirely yellow; base of F1 tinged yellow; lower division of metapleuron sometimes tinged with brown; legs paler than female; apical spots on T2 and T3 smaller than female; apical band of T4 broadly interrupted middle.

**Specimens examined.** JAPAN: [Holotype] F, Kagoshima Pref., Tokunoshima- Is., Amagi Town, Mt Yamatogusuku-yama, 180-200m alt., (GPS. N 27–48–51/ E 128–55–11), 17. v. 2008, K. Watanabe leg. (KPMNH). [Paratypes] 1M (identified as *Z. iwatai* by Momoi, 1970), Kagoshima Pref., Amamioshima Is., 6. vi. 1966, K. Kusigemati leg. (MNHAH); 1M, Kagoshima Pref., Amamioshima Is., Naze, 1. v. 1996, R. Matsumoto leg. (OMNH); 3F, Kagoshima Pref., Amamioshima Is., Mt. Yui (400 m), 13. xi. – 27. xii. 2000, T. Muroi & Y. Maeda leg. (MsT) (MU); 2F, same data except for collected at 15. v. – 21. vi. 2001 (MU); 1F, same data except for collected at 21. vi. – 5. viii. 2001 (MU); 2F, same data except for collected at 28. x. – 10. xii. 2001 (MU); 1M, Kagoshima Pref., Tokunoshima Is., Mikyo, 29. iv. 1996, R. Matsumoto leg. (OMNH); 3M, Kagoshima Pref., Tokunoshima Is., Inokawadake, 30. iv. 1996, R. Matsumoto leg. (OMNH); 1F (metasoma lack) 3M, Kagoshima Pref., Tokunoshima-Is., Amagi Town, Amagi, 25. v. 2007, K. Watanabe leg. (KPMNH); 2M, Kagoshima Pref., Tokunoshima-Is., Amagi Town, Mt. Yamatogusuku-yama, 26. v. 2007, K. Watanabe leg. (TUA); 2M, same date, 30. v. 2007, K. Watanabe leg. (NIAES); 1M, same date, 31. v. 2007, K. Watanabe leg. (AED); 1F, Kagoshima Pref., Tokunoshima-Is., Mt. Amagi-dake, Tete-rindo, 31. v. 2007, M. Gunji leg. (NIAES); 1M, same date as holotype (KPMNH); 1M, Kagoshima Pref., Tokunoshima-Is., San, Mt. Amagi-dake, 340–380m alt., (GPS. N 27–51–31/ E 128–55–56), 18. v. 2008, K. Watanabe leg. (TUA); 1F5M, Kagoshima Pref., Tokunoshima-Is., Kedoku, about 140m alt., (GPS. N 27–50–22/ E 128–56–47), 20.

v. 2008, K. Watanabe leg. (KPMNH); 1F, same date, 22. v. 2008, K. Watanabe leg. (AEI); 1M, Kagoshima Pref., Tokunoshima-Is., Amagi Town, Mt Yamatogusuku-yama, 180–200m alt., (GPS. N 27–48–51/ E 128–55–11), 23. v. 2008, K. Watanabe leg. (TUA).

**Distribution** (Fig. 1021). Japan (Ryukyu: Amamioshima Is. and Tokunoshima Is.).

**Bionomics.** Host is unknown. Adult wasps were collected in moist evergreen forests.

**Etymology.** This species is named after the late Prof. Setsuya Momoi of Kobe University for his contribution to ichneumonology.

**Remarks.** The male specimen from Amamioshima Is., determined as *G. iwatai* by Momoi (1970), belongs to this species. This species resembles *G. iwatai* and *G. kusigematii*, but it can be easily distinguished from them (see Remarks under *G. iwatai* and *G. kusigematii*).

***Glyptopimpla uchidai*** (Momoi, 1963)

(Figs. 127, 138, 145, 152, 159, 166, 173, 185, 192, 199, 206, 214, 220, 227, 239, 240, 258-260)

*Glypta uchidai* Momoi, 1963: 111.

*Zygoglypta uchidai*: Momoi, 1965: 79.

*Zygoglypta* (*Zygoglypta*) *uchidai*: Yu & Horstmann, 1997: 108; Kuslitzky, 2007: 449.

*Glyptopimpla uchidai*: Gupta, 2002: 224.

**Description. Female** (n=21). Body. Robust, its length 7.0–8.0 mm.

Head 0.6 times as long as wide. Clypeus 0.5–0.6 times as wide. Anterior tentorial pit small (Fig. 138). Face weakly convex medially, 0.6–0.7 times as long. MSL 0.8–0.9 times as long as BW. Frons flat (Fig. 159), largely smooth, sparsely punctate upper 0.3 (Fig. 145). Median ocellus strongly elevated in lateral view (Fig. 159). OOD 1.2 times as long as OD; IOD 1.0–1.5 times as long as OD; interocellar area without pit (Fig. 152). Vertex and gena finely punctate. Lower part of occipital carina complete (Figs. 166, 173). Antenna with 33–35 flagellomeres. F1 1.4–1.9 times as long as F2.

Mesosoma moderately punctate. Punctures on lateral lobes of mesoscutum (excluding near notaulus) separated by 0.9–2.0 (usually 1.0) times their diameter. Lateral area of pronotum largely smooth in lower part (Fig. 185). Anterior projection of submetapleural carina weakly angulate at posterior angle (Fig. 213). Posterior transverse carina and pleural carina on propodeum complete (Figs. 206, 213). Anterior transverse carina on propodeum medially incomplete (Figs. 206, 213). Lateral longitudinal carina



on propodeum sometimes obsolete present (Figs. 206, 213). Fore wing length 6.0–6.5 mm. Hind femur 4.6–5.1 times as long as maximum depth in lateral view. Hind tibia 8.4–9.1 times as long as maximum depth in lateral view. Hind TS1 2.0 times as long as TS2.

Metasoma. T1-T4 densely punctate except for base of T1 (Fig. 220). T1 1.2–1.3 times as long as maximum width, its median dorsal carina obsolete posteriorly (Fig. 220). T2 0.8–0.9 times as long as maximum width. T2 and T3 without a pair of short lateral longitudinal keels (Figs. 220, 227). Ovipositor sheath 1.3 times as long as hind tibia.

Colouration (Figs. 127, 185, 198). Body (excluding wings and legs) black, except for: clypeus, mandible except tip, palpi, scape and pedicel except for lower surface, whitish-yellow; antenna except for yellow areas of scape and pedicel, brown; upper margin of pronotum, posterior end of propleuron, tegula, scutellum, hind margins of each axilla, subategular ridge, upper part of mesepimeron, postscutellum, posterior lower angle of meso- and metapleuron, posterior 0.3 of propodeum, yellow; anterior projection of submetapleural carina brownish-yellow; posterior broad bands of T1-T7 (T2-T5 narrowly notched middle), membranous part of sternites, apical half of subgenital plate, whitish-yellow; remainder of sternites, including subgenital plate, brown; ovipositor yellowish-brown. Wings hyaline; veins and stigma brown except for yellow wing base. Legs yellowish-brown, except for: fore and mid coxae and trochanters, base of hind coxa, hind trochanter, base of hind trochantellus, apex of hind femur, base of hind tibia, whitish-yellow; apex of hind coxa, hind tibia except for white base, hind tarsus except for yellow base, dark brown.

Variation. Lower part of collar sometimes yellow. Mesepimeron and metapleuron usually largely yellow. Yellow part of propodeum sometimes enlarged. Median part of hind tibia sometimes slightly tinged with pale brown.

**Male** (n=12). Similar to female. Body length 7.0–8.5 mm; MSL 0.6 times as long as BWM; OOD 0.8–1.0 times as long as OD; IOD 0.9–1.2 times as long as OD; antenna with 35–37 flagellomeres; F1 1.6 times as long as F2. Fore wing length 5.0–6.0 mm. Hind femur 4.6–5.6 times as long as maximum depth in lateral view; hind basitarsus 2.1 times as long as second tarsal segment. T1 1.3–1.4 times as long as maximum width; T2 1.0–1.1 times as long as maximum width. Colouration not similar to female, differs as: antenna paler than female; scutellum with large black area; postscutellum black; legs yellow except for subbasal and apical brown areas of tibia and brown tarsus; apical bands on T1-T7 reduced (absent in T1, narrower than female in T2-T7) and its reddish-brown. Variation: apical bands of T2-T7 sometimes partly obscured.

**Specimens examined.** JAPAN [Hokkaido] 1F2M (holotype and paratype), Sapporo City, Maruyama, 16. vii. 1955, S. Momoi leg. (1F1M, SEHU; 1M, MNHAH); 1M, Sapporo City, 21. vii. 1964, K. Kusigemati leg. (KU); 2F1M, Sapporo City, 24. vii. 1964, K. Kusigemati leg. (KU); 1F, Sapporo City, 20. vii. 1965, K. Kusigemati leg. (KU); 2F, Sapporo City, 27. viii. 1965, K. Kusigemati leg. (KU); 5M, Sapporo City, 23. vii. 1966, K. Kusigemati leg. (KU); 4F, Sapporo City, 23. vii. 1968, K. Kusigemati leg. (KU); 2F, Kumaishi, kenichi-gawa, Iwafuchi-zawa, 11–21. ix. 1995, Y. Ito & T. Ito leg., (MsT) (NIAES); 4F1M, Hokkaido University, 2. vi. 1996, M. Matsuda leg., em. from *Homonopsis illotana* (Kennel, 1901) on *Acer mono* Maxim. (KPMNH); 1F, Hokkaido Pref., Akkeshi Town, Bekanbeshi marsh, 1-31. viii. 2003, R. Matsumoto leg. (MsT) (OMNH); 1F, Hokkaido Pref., Sapporo City, Miyanomori, 8. viii. 2000, K. Uesugi leg. (MsT) (OMNH); 1F, Sapporo City, Hitsujigaoka (GPS: N 43–00/ E 141–24), 9–16. viii. 2007, K. Konishi leg. (MsT) (AEI). [Honshu] 1F, Aomori Pref., Takko Town, Miroku-rindo, 24. vii. 1994, T. Ichita leg., (NIAES); 1F, Mie Pref., Taiki Town, Nishiki, 1–7. v. 2007, M. Nakaseko leg. (MsT) (MU); 1M, Shiga Pref., Kutsuki village, Arakawa, 4. v. 1997, no collector name, em. from *Himatolabus cupreus* (Roelofs, 1874) on *Fagus japonica* Maxim.; 1M, Ehime Pref., Saijyo City, Ibukiyama, 13. viii. 1998, R. Matsumoto leg. (OMNH).

**Distribution** (Fig. 1020). Japan (Hokkaido, Honshu\* and Shikoku\*); Russian Far East.

**Bionomics.** A tortricid moth, *Homoxopsis illotana* (Kennel), is recorded here as a host of the genus *Glyptopimpla* for the first time. A leaf rolling weevil, *Himatolabus cupreus* (Roelofs), is perhaps a misidentified host because its nest sometimes contains secondary lived lepidopterous larvae. Adult wasps were collected in June to September.

**Remarks.** This species is distinguished from other Japanese species by the characteristic body colour, the dense puncture on mesoscutum, and the structure of tergites as shown in the key. By the convexity of frons, this species seems more or less related to *G. shlomirae* Gupta, 2002, from India and Bhutan (female unknown). However, this species can be easily distinguished by the short median dorsal carina on T1 (the carina is complete in *G. shlomirae*) and the indistinct narrow apical band of T1-T4 (the band is distinct and broad in *G. shlomirae*).

Genus *Orientoglypta* Kuslitzky, 1973 **stat. rev.**

*Zygglypta* (*Orientoglypta*) Kuslitzky, 1973: 895; Yu & Horstmann, 1997: 108.

Type species: *Glypta watanabei* Momoi, 1963, by original designation.

**Description based on Japanese species.** Body. Length 5.5-9.5 mm.

Head polished, covered with punctures. Clypeus weakly convex in lateral view, its margin convex in anterior view (Figs. 139, 160). Clypeal suture weak. Frons slightly convex, punctate except for smooth area above antennal socket (Figs. 146, 160). Base of mandible weakly convex. Occipital carina complete on upper part, its lower end reaching base of mandible (Figs. 167, 174). Occiput gently sloping beyond eyes (Fig. 160).

Mesosoma polished. Upper end of epomia approaches upper margin of pronotum (Fig. 186). Notaulus weakly present. Upper end of epicnemial carina at or beyond of half height of mesopleuron. Sternaulus extending half of length between epicnemial carina and base of mid coxa. Anterior projection of submetapleural carina strongly produced (Fig. 214). Propodeal spiracle circular (Fig. 214). Fore tibial spur shorter than 0.5 times of fore basitarsus. Tarsal claws pectinate. Fore wing: length 4.0–8.0 mm. Areolet present, outer side broadly opened, vein *3rs-m* short or nearly absent except for base (Fig. 193). Junction of vein *Cu1* and vein *Cu-a* distant from junction of vein *Rs+M* and vein *M+Cu*. Vein *Rs+2* arisen near middle of stigma. Vein *Rs* almost straight. *2m-cu* with two bullae and each bulla sometimes united into one long bulla. Hind wing: vein *M+Cu* gently curved. Lengths of abscissa of vein *Cu1* between vein *M* and vein *Cu-a* longer than vein *Cu-a*.

Metasoma polished. T1 without basal triangular projection laterally, its dorsolateral and median dorsal carinae complete (Figs. 221, 228). Exposed part of T5 of female about 0.5 times as long as exposed part of T4. T6-T8 partly hidden under hidden under precedent tergite. Upper valve of ovipositor with dorsal subapical notch. Ovipositor sheath 1.5–1.9 times as long as hind tibia. Male subgenital plate transversely elongated, with a long apodema sternalis, anterior margin round laterally and straight medially, and lateral posterior angle obtusely produced (Fig. 261). Apex of paramere of male genitalia weakly projected (Figs. 241, 242). Inner margin of paramere not concave near basal inner angle (Fig. 242). Digitus gently curved (Fig. 262). Aedeagus more or less curved, its penis valve ca. 1.5 times as long as basal apodeme (Fig. 263).

Colouration (Fig. 128). Scutellum black. Metasomal tergites usually with posterior red bands, its border more or less obsolete (Fig. 128), or without band.

Pattern of sexual dimorphism similar to *Glyptopimpla*.

**Distribution.** Eastern Palaearctic and Oriental regions.

**Bionomics.** Host unknown.

**Remarks.** *Orientoglypta* can be distinguished from the genus *Glypta* by the *3rs-m* of fore wing partly present (absent in *Glypta*), the epomia relatively long (usually short in

*Glypta*), and the median dorsal carina of T1 complete (absent posteriorly in many species of *Glypta*). This genus also resembles *Glyptopimpla* and *Teleutaea*, but it can be easily distinguished from them by many points (see Remarks under *Glyptopimpla* and Table 3).

Judged from the descriptions given by Gupta (2002), *Glyptopimpla aditiae* Gupta, 2002 from India and *Glyptopimpla lota* (Chiu, 1965) from Taiwan also have the character states of *Orientoglypta*, and thus here I transfer these species from *Glyptopimpla* to *Orientoglypta* (**comb. nov.**).

***Orientoglypta watanabei* (Momoi, 1963) comb. nov.**

(Figs. 128, 139, 146, 153, 160, 167, 174, 186, 193, 200, 207, 215, 221, 228, 241, 242, 261-263)

*Glypta watanabei* Momoi, 1963: 110.

*Zyglypta watanabei*: Momoi, 1965: 80.

*Zyglypta (Orientoglypta) watanabei*: Yu & Horstmann, 1997: 108; Kuslitzky, 2007: 449.

*Glyptopimpla watanabei*: Gupta, 2002: 224.

**Description. Female** (n=125). Body slender, its length 5.5–7.0 mm.

Head 0.7 times as long as wide; clypeus 0.5–0.6 times as wide. Anterior tentorial pit small (Fig. 139). Face weakly convex medially, 0.7 times as long. MSL 0.7–0.8 times as long as BWM. Frons slightly convex, narrowly smooth above antennal sockets, punctate upper 0.7 (Figs. 146, 160). OOD 1.4–1.8 times as long as OD; IOD 1.1–1.4 times as long as OD; interocellar area without pit (Fig. 153). Vertex and gena finely punctate. Antenna with 34–37 flagellomeres. F1 2.0–2.1 times as long as F2.

Mesosoma punctate. Lateral area of pronotum largely smooth in lower part (Fig. 186). Anterior projection of submetapleural carina rounded (Fig. 214). Posterior transverse carina, pleural carina and anterior transverse carina of propodeum complete (Figs. 207, 214). Lateromedian longitudinal carina on propodeum present, its section between anterior and posterior transverse carinae of propodeum sometimes weak (Figs. 207, 214). Lateral longitudinal carina on propodeum partly present (Figs. 207, 214). Fore wing length 4.0–5.0 mm. Hind femur 4.9–5.7 times as long as maximum depth in lateral view. Hind tibia 8.8–9.1 times as long as maximum depth in lateral view. Hind basitarsus 2.2–2.4 times as long as second tarsal segment.

Metasoma. T1 sparsely punctate except posterior part (Fig. 221). T2-T4

densely punctate (Fig. 221). T1 1.5–1.7 times as long as maximum width, median dorsal carina present, and inner area of these carinae smooth basally (Fig. 221). T2 1.0 times as long as maximum width. T2 and T3 without a pair of short lateral longitudinal keels (Figs. 221, 228). Ovipositor sheath 1.9 times as long as hind tibia.

Colouration (Figs. 128, 186, 199). Body (excluding wings and legs) black, except for: clypeus, mandible except tip, palpi, scape and pedicel except for outer brown spot, whitish-yellow; antenna except for yellow area of scape and pedicel, brown; small spot of pronotum before tegula, tegula, upper part of mesepimeron, whitish-yellow; apical bands of T2-T7 (T4-T7 more or less narrow), membranous part of sternites, apical half of subgenital plate, whitish-yellow; remainder of sternites, including subgenital plate, brown; ovipositor yellowish-brown. Wings hyaline; veins and stigma brown except for yellow wing base. Legs reddish-brown, except for: fore and mid coxae and trochanters, base of hind tibia, whitish-yellow; hind trochanter and trochantellus, each apex of hind femur, subbasal spot and apex of hind tibia, dark brown.

Variation. Antenna sometimes tinged with yellowish-brown. Metasoma sometimes tinged with brown. Apical part of each tergite sometimes broadly tinged with reddish-brown.

**Male** (n=105). Similar to female. Body length 6.0–8.0 mm. Head 0.6–0.7 times as long as wide; MSL 0.6–0.7 times as long as BWM; face 0.8 times as long as wide; OOD 1.1–1.4 times as OD; IOD 0.9–1.0 times as OD; F1 1.6–1.7 times as F2. Fore wing length 5.5–6.5 mm. Carinae of propodeum stronger than female. Hind femur 5.4–5.8 times as long as maximum depth in lateral view; hind tibia 8.4–9.4 times as long as maximum depth in lateral view; hind basitarsus 2.0–2.1 times as long as second tarsal segment. T1 1.7–2.2 times as long as maximum width; length of T2 1.1–1.2 times as long as maximum width; punctures on mesosoma and metasoma finer and sparser than female. Colouration similar to female, except for: antenna and legs paler than female; posterior part of collar with white spot; propleuron white except for base. Variation: white spot on collar sometimes enlarged; metasomal tergites sometimes tinged with brown.

**Specimens examined.** JAPAN: 1M (paratype), Hokkaido Pref., Rishiri, 3. viii. 1958, S. Takagi leg. (MNHAH); 1F (holotype), same locality, 5. viii. 1958, K. Kamijo leg. (MNHAH); 1M, Hokkaido Pref., Apei, 27. vi. 1967, K. Kusigemati leg. (KU); 1M, Hokkaido Pref., Touya, 9. vii. 1967, K. Kusigemati leg. (KU); 1M, Hokkaido Pref., Shimamatsu, 19. viii. 1967, K. Kusigemati leg. (KU); 1M, Hokkaido Pref., Tomakomai City, Hokkaido Univ. Exp. Forest, 18–20. vi. 1980, K. Maeto leg. (NIAES); 2M, same date, H. Takemoto leg. (NIAES); 1F; Hokkaido Pref., Horonobe, Kamitoikan,

Iwananosawa, 26. vi. – 12. vii. 1993, M. Inoue, (MsT) (NIAES); 1F, Hokkaido Pref., Horonobe Town, Kamitoikan, Iwananosawa, 26. vi. – 12. vii. 1993, M. Inoue leg. (MsT) (NIAES); 3F4M, Hokkaido Pref., Shibetsu Town, Motosakimui-river (at hatchery), 13 – 23. viii. 1996, H. Kamei et al. leg., (MsT) (NIAES); 1F, Hokkaido Pref., Ashoro Town, Meaken, 31. vii. 1997, R. Matsumoto leg. (OMNH); 1F, Hokkaido Pref., Eniwa City, Soranuma, 22. vii. 1996, M. Sueyoshi leg. (OMNH); 1M, Hokkaido Pref., Otaru City, Otamoi, 21. vii. 1996, M. Sueyoshi leg. (OMNH); 1F, Hokkaido Pref., Sapporo City, Hyakumatsu-zawa, 28. vii. 1996, M. Sueyoshi leg. (OMNH); 4F4M, Hokkaido Pref., Akkeshi Town, Bekanbeshi marsh, 1-31. viii. 2003, R. Matsumoto leg. (MsT) (OMNH); 1M, Hokkaido Pref., Sarufutsu Vil., 5. viii. 1996, T. Tachi leg. (OMNH); 1F, Hokkaido Pref., Shiretoko pen., Okepepu rindo, 13. viii. 1996, T. Tachi leg. (OMNH); 1F, Hokkaido Pref., Ishikarihamma, 18. viii. 1996, T. Tachi leg. (OMNH); 1F2M, Hokkaido Pref., Shibecha Town, Gojikkoku, 14. viii. 1996, T. Tachi leg. (OMNH); 2F, Hokkaido Pref., Oketo Town, Oketo-rindo, 6. viii. 1997, R. Matsumoto leg. (OMNH); 1F, Hokkaido Pref., Eniwa City, Moizari-gawa, 3–21. ix. 2001, T. Ohkawara & T. Ito leg. (MsT) (TUA); 1M, Hokkaido Pref., Sapporo City, Kannon-zawa, 7. vii. 2001, T. Yoshida leg. (TUA); 1F, Hokkaido Pref., Muroran City, Mt. Washibetsu-dake, 28. vii. 2002, T. Yoshida leg. (TUA); 1F, Hokkaido Pref., Sapporo City, Kannon-zawa, 7. viii. 2002, T. Yoshida leg. (TUA); 20F1M, Hokkaido Pref., Sapporo City, Kannon-zawa (Stream-side), (GPS: N 42–58/ E 141–15), 7. viii. – 13. ix. 2002, T. Yoshida leg., (MsT) (KPMNH); 1M, Hokkaido Pref., Noboribetsu City, Kozan Town, 28. vii. 2002, T. Yoshida leg. (KPMNH); 1M, Hokkaido Pref., Noboribetsu City, Kozan Town (GPS: N 42–28/ E 141–02), 30. vi. – 15. vii. 2002, T. Yoshida leg. (KPMNH); 1M, Hokkaido Pref., Sapporo City, Kannon-zawa, 26. vi. 2002, T. Yoshida leg. (KPMNH); 1M, Hokkaido Pref., Sapporo City, Hitsujigaoka (GPS: N 43–00/ E 141–24), 11–18. vi. 2003, K. Konishi leg. (MsT) (NIAES); 5M, same data except for collected at 18–25. vi. 2003 (NIAES); 3M, same data except for collected at 25. vi. – 2. vii. 2003 (AEI); 7M, same data except for collected at 2–9. vii. 2003 (NIAES); 8M, same data except for collected at 9–16. vii. 2003 (NIAES); 7M, same data except for collected at 16–23. vii. 2003 (NIAES); 6F3M, same data except for collected at 23–30. vii. 2003 (AEI); 3F, same data except for collected at 30. vii. – 6. viii. 2003 (NIAES); 2M, same data except for collected at 13–20. viii. 2003 (NIAES); 1F, same data except for collected at 27. viii. – 3. ix. 2003 (NIAES); 4F3M, Hokkaido Pref., Muroran City, Rakusan (GPS: N 42–21/ E 141–01), 6. viii. 2003 (TUA); 2M, Hokkaido Pref., Sapporo City, Mt. Maruyama (GPS: N 42–02/ E 141–18), 28. vi. 2003, T. Yoshida leg. (TUA); 3M, Hokkaido Pref., Minamifurano Town, Kanayama (GPS: N 43–07/ E 142–24), 2–3.

vii. 2003, T. Yoshida leg. (KPMNH); 1F, Hokkaido Pref., Utanobori Town, Omagari (GPS: N 44–39/ E 142–35), 14–15. viii. 2003, T. Yoshida leg. (TUA); 1M, Hokkaido Pref., Muroran City, Mt. Sokuryo-zan (GPS: N 42–19/ E 140–57), 16. viii. 2006, T. Yoshida leg. (TUA); 1F, same data except for collected at 12–19. iv. 2007 (NIAES); 1M, same data except for collected at 21–28. vi. 2007 (NIAES); 1M, same data except for collected at 28. vi. – 5. vii. 2007 (NIAES); 1M, same data except for collected at 5–12. vii. 2007 (NIAES); 2M1F, same data except for collected at 19–26. vii. 2007 (NIAES); 1M1F, same data except for collected at 26. vii. – 2. viii. 2007 (NIAES); 1F, Hokkaido Pref., Noboribetsu City, Mt. Fumba-yama (GPS: N 42–27/ E 141–11), 12. viii. 2007, T. Yoshida leg. (KPMNH); 1M, Hokkaido Pref., Muroran City, Rakusan (GPS: N 42–21/ E 141–01), 16. vii. 2007, T. Yoshida leg. (KPMNH); 19F1M, same data except for collected at 21–28. vii. 2008 (TUA); 3M, same data except for collected at 26. vi. – 3. viii. 2009 (NIAES); 1M, Aomori Pref., Aomori City, Nanamagari, 18–25. vii 1992, T. Ichita leg., (Yellow glue trap) (NIAES); 1M, Aomori Pref., Aomori City, Sukayu, 25. vii. 1998, T. Ichita leg. (NIAES); 2F2M, Miyagi Pref., Akiu, Futakuchi-kyokoku, 12. vii. 1985, K. Konishi leg., (LT) (NIAES); 2F, Fukushima Pref., Hinoemata village, Mikawa, 8. x. 2004, H. Makihara leg. (MsT) (TPM); 1F, Fukushima Pref., Hinoemata village, 1–14. viii. 2004, H. Makihara leg. (MsT) (TUA); 1M, Niigata Pref., Sado Island, Kanaishiraho, Hakuundai to Mt. Myokenzan (GPS: N 38–5/ E 138–20), 4. viii. 2009, K. Watanabe leg. (KPMNH); 8M, Tochigi Pref., Yaita, 30. vi. to 15. vii. 1989, K. Konishi leg., (MsT) (NIAES); 2F, same place, 11–22. viii. 1989, K. Konishi leg., (MsT) (NIAES); 1F, same place, 28. vii. – 11. viii. 1989, K. Konishi leg., (MsT) (NIAES); 1M, Tochigi Pref., Nasushiobara City, Shiobara, Dodaira, 1100m alt., 4–11 vii 2008, T. Matsumura leg., (MsT) (TUA); 5F1M, Nagano Pref., Shiga-Kogen, 26–27 vii 1961, J. Minamikawa leg. (NIAES); 7F, Nagano Pref., Shimashima-dani, 1000–1300m alt., 28. vii. 1980, K. Maeto leg. (NIAES); 6F, same date, H. Takemoto leg. (NIAES); 4F1M, Nagano Pref., Azumi Vil., Shimashima-dani, 15. vii. 1997, R. Matsumoto leg. (OMNH); 2M, Nagano Pref., Outaki Vil., Mt. Ontake-san, Tanohara, about 1800m alt., 17. vii. 2007, K. Watanabe leg. (KPMNH); 2M, same place, 9. viii. 2007, K. Watanabe leg. (KPMNH); 1F, Yamanashi Pref., Minami-Alps, Mt. Kitadake, 28. viii. 1980, T. Goto leg. (NIAES); 1F1M, Yamanashi Pref., Hokuto City, Masutomi, Biwakubo-sawa, 7. viii. 2007, K. Watanabe leg. (KPMNH); 1F, same date, T. Ban leg. (KPMNH); 1F1M, Yamanashi Pref., Koushu City, Yamagisawa-toge, 1480–1580m alt., (GPS. N 35–46–44/ E 138–48–10), 5. viii. 2008, K. Watanabe leg. (TUA); 1F, Yamanashi Pref., Sutama Town, Mizugakiyama, 15. vii. 1996, R. Matsumoto leg. (OMNH); 2F, same locality and collector, 18. vii. 1997 (OMNH); 1F, Yamanashi Pref., Sutama Town, Ochiai, 16. vii.

1996, T. Tachi leg. (OMNH); 1F1M, Yamanashi Pref., Ashiyasu Vil., South-alps rindo, 13-14. vii. 1996, T. Tachi leg. (OMNH); 1F, Yamanashi Pref., Yamato Vil., Yunosawa toge, 18. vii. 1996, T. Tachi leg. (OMNH); 1F, Shizuoka Pref., Mt. Fuji, 2. viii. 1959, J. Minamikawa leg. (NIAES); 1M, Shizuoka Pref., Izu City, Mt. Amagi-san, 3. vi. 2007, H. Katahira leg. (TUA); 1M, Shizuoka Pref., Honkawane Vil., Mt. Yamainu-dan, 1200–1400m alt., (GPS. N 35–7–48/ E 138–2–19), 14. vi. 2008, K. Watanabe leg. (KPMNH); 1M, Hyogo Pref., Sekinomiya Town, Mt., Hyonoson, 1. vi. 1983, K. Konishi leg. (NIAES); 1M, Tottori Pref., Mt., Daisen, 24. vi. 1978, Y. Yoneda leg. (NIAES); 1F, Okayama Pref., Nimi-shi, Ashidachi, 27. vii. 1993, R. Matsumoto leg. (OMNH); 1M, Ehime Pref., Mts. Odamiyama, Mt. Mizunashi-yama, 26. vi. 1995, E. Yamamoto leg., (LT) (NIAES); 1F1M, Ehime Pref., Omogo Vil., Tsuchigoya, 12-14. vii. 1998, R. Matsumoto leg. (OMNH); 1M, Fukuoka Pref., Fukuoka City, Sefuriyama, 29. vi. 1997, R. Matsumoto leg. (OMNH); 1M, Oita Pref., Mts. Kuju, Mt. Daisen, 19. vii. 1978, K. Setoya leg. (NIAES); 1M, Nagasaki Pref., Tsushima Is., Senbyomakiyama, 1. vi. 1996, R. Matsumoto leg. (OMNH).

**Distribution** (Fig. 1022). Japan (Hokkaido, Rishiri Is., Honshu, Sado Is.\*, Shikoku and Kyushu\*); Russian Far East.

**Bionomics.** Host is unknown. Adult wasps were collected from mid-June to early September in Malaise traps in Sapporo, Hokkaido, indicating that this species is multivoltine.

**Remarks.** This species resembles *O. aditiae* and *O. lota*, but it can be distinguished by the following character states: MSL 0.6-0.7 times as long as BWM in male (0.4 times as long as BWM in *O. lota*); occipital carina roundly arched in upper part (strongly angled in upper part in *O. lota*); propodeum with all carinae (with only a posterior transverse carina in *O. aditiae*); ovipositor sheath 1.9 times as long as hind tibia (1.75 in *O. lota*); and the posterior yellow area of metasomal tergites present (absent in *O. aditiae*).

### **Discussion about *Glyptopimpla* and *Orientoglypta***

The present study supports that both *Glyptopimpla* and *Orientoglypta* are distinct genera. Some character states of *Glyptopimpla*, the occipital carina effaced on upper part (Figs. 161-166, 168-173) and the inner margin of paramere strongly produced mesad (Figs. 230, 232, 234, 236, 238, 240), suggest that *Glyptopimpla* relates to *Apophua*. On one hand, the morphological states of *Orientoglypta* are somewhat far from those of *Glyptopimpla*, suggesting that *Orientoglypta* is not especially close to *Glyptopimpla*. Rather, *Orientoglypta* may be closed to *Glypta* because they can be distinguished from



each other by only three features, the long (*Orientoglypta*) or short (*Glypta*) epomia, the partly present (*Orientoglypta*) or completely absent (*Glypta*) areolet, and the median dorsal carina of T1 complete (*Orientoglypta*) or absent posteriorly (many species of *Glypta*), while whereas the first character states is also applied to the separation of *Glypta* and *Zaglyptomorpha*. The monophyly of *Orientoglypta* should be reconsidered in further study.

The interspecific comparison of *Glyptopimpla* provides some phylogenetic suggestions. A pit on ocellar area in *G. babai*, absence of lower part of occipital carina in *G. macrofossa*, and strongly convex base of anterior ocellus in *G. uchidai* are probably autapomorphy for each species. The enlarged anterior tentorial pit in *G. babai* and *G. macrofossa* is probably synapomorphy for them. The most interesting, probable synapomorphy shared by *iwatai*, *kusigematii* and *momoii* is the presence of lateral short longitudinal keels on T2-T3. These species could be closely related each other and their distribution seems allopatric, namely *G. iwatai* in Russian Far East and the northern islands of Japan (Hokkaido to Kyushu), *G. momoii* in the North Ryukyus (Amami Is. and Tokunoshima Is.), and *G. kusigematii* in the Central Ryukyus (Okinawajima Is.). Nevertheless, the condition of metasomal keels has not been described for other Oriental species, and thus additional observation must be necessary for further zoogeographical discussion.

#### Genus *Cephaloglypta* Obrtel, 1956

*Cephaloglypta* Obrtel, 1956: 139.

Type species: *Cephaloglypta excavata* Obrtel, 1956 (= *Glypta murinanae* Bauer, 1941), by original designation.

**Description.** Body densely and finely punctate, covered with silver setae, its length 6.5-9.0 mm.

Head. Clypeus slightly convex in lateral view (Fig. 266), its lower margin weakly concave medially in anterior view (Fig. 264). Face slightly convex medially (Fig. 264), mat. Frons slightly convex, punctate except for narrow area above antennal socket. MSL longer than BWM. Upper part of occipital carina broadly obscured medially (Fig. 265). Lower part of occipital carina absent ventrally (Fig. 267). Vertex and gena finely, sparsely punctate. Occiput strongly and deeply concave, with three median longitudinal tubercles (Fig. 265). Subocular groove absent (Fig. 264). Basal area of mandible flat. Ventral margin of mandible with narrow flange on base (Fig. 268).

Mesosoma. Epomia present (Fig. 1). Epicnemial carina absent (Figs. 1, 269). Sternaulus present anteriorly, extended less than half length of mesopleuron (Fig. 1). Posterior transverse carina of mesosternum absent (Fig. 271). All carinae of propodeum largely absent except for pleural carina partly present (Figs. 1, 271). Propodeal spiracle rounded (Fig. 271). Fore wing length 6.0-7.0 mm. Junction of vein *Cu1* and vein *Cu-a* opposite to or slightly distant from junction of vein *Rs+M* and vein *M+Cu* (Fig. 1). Areolet absent (Fig. 1). Stigma receiving vein *Rs+M* medially (Fig. 1). Vein *2m-cu* with one large bullae (Fig. 1). Hind wing with abscissa of vein *Cu1* of between vein *M* and vein *cu-a* 2.5–3.3 times as long as *cu-a*. *Cu1* present, nebulous (Fig. 8). Fore coxa not twisted, without ridge. Fore tibial spur shorter than half length of fore TS1 (Fig. 270). Tarsal claw longer than arolium, pectinate near apex, apex not twisted.

Metasoma. Lateral sides of metasomal tergites more or less curved in dorsal view, width of T5 distinctly shorter than T2-T4. Dorsolateral carina of T1 incomplete near spiracle (Fig. 271). Oblique groove on T2 and T3 weak (Fig. 272). Ovipositor longer than hind tibia (Fig. 1). Apical part of upper valve of ovipositor without a distinct dorsal tubercle before notch. Male subgenital plate pentagonal, apodema sternalis long (Fig. 273). Apex of paramere projected slightly beyond apex of aedeagus, apical margin round (Figs. 274, 275, 277). Basal apodeme of aedeagus 0.3-0.4 times as total length of aedeagus (Fig. 276). Digitus straight basal 0.6 (Fig. 277).

**Distribution.** Palaearctic and Nearctic (introduced) regions.

**Bionomics.** Parasitoids of the family Tortricidae.

**Remarks.** This genus is unique in the Glyptini and can be easily distinguished from other Japanese genera by the characteristic concavity of occiput. This genus contains only a species, *C. murinanae*, redescribed below.

*Cephaloglypta murinanae* (Bauer, 1941)

(Figs. 1, 264-277)

*Glypta murinanae* Bauer, 1941: 594

*Cephaloglypta laricis* Momoi, 1963: 104.

**Description based on Japanese specimens. Female** (n=4). Body robust, its length 6.5-9.0 mm.

Head 0.6 times as long as wide. Clypeus 0.7-0.8 times as long as wide, mat, its upper 0.4 sparsely punctate. Face 0.4 times as long as wide. Frons with median longitudinal shallow concavity. MSL 1.3-1.7 times as long as BWM. OOD 1.2-1.4 times

as long as OD. IOD 1.4-1.6 times as long as OD. Antenna with 32 flagellomeres. F1 1.8-2.0 times as long as F2.

**Mesosoma.** Lateral area of pronotum entirely mat. Mesopleuron without conspicuous speculum. All carinae of propodeum absent except for pleural carina partly present. Posterior transverse carina of propodeum sometimes slightly restricted by slight ridge. Fore wing length 6.0-7.0 mm. Hind femur 5.2-5.4 times as long as maximum depth in lateral view. Hind TS1 2.5-2.7 times as long as TS2.

**Metasoma.** Punctures on T1-T3 partly, slightly striated by coalescent punctures. T1 0.8-1.0 times as long as wide, its median dorsal carina present only at base. T2 0.6-0.7 times as long as wide. Ovipositor sheath 1.2-1.4 times as long as hind tibia. Apex of paramere of male genitalia weakly projected. Inner margin of paramere not concave near basal inner angle.

**Colouration.** Body (excluding wings and legs) black, except for: lower 0.6 of clypeus, palpi, malar space around mandible, dark yellow; mandible except tip yellow; antenna dark brown dorsally, yellowish-brown ventrally; upper margin of pronotum, median and posterior parts of collar, tegula yellow; subtegular ridge, hind margins of each axilla, upper part of mesepimeron reddish-brown; membranous part of sternites, apex of subgenital plate, yellowish-brown to yellow; ovipositor reddish-brown. Wings hyaline; veins and stigma brown except for yellow wing base. Fore and mid legs brownish-yellow, partly tinged with whitish-yellow. Hind leg reddish-brown, except for: apical 0.6-0.8 of tibia, TS1-TS5 excluding apex, blackish-brown; trochanter, trochantellus, base of hind tibia, apex of TS1-TS5, tarsal claw, whitish-yellow to brownish-yellow. Body sometimes tinged with reddish-brown. Face sometimes tinged with reddish-brown below antennal sockets. Subtegular ridge sometimes tinged with yellow. Hind femur usually tinged with dark brown. Yellow area of hind tibia sometimes enlarged. Hind tarsus sometimes more or less darkened. Posterior margin of metasomal tergites sometimes tinged with red. Sclerotized part of sternites including subgenital plate sometimes tinged blackish-brown.

**Male** (n=8). Similar to female. Clypeus 0.6 times as long as wide. Face 0.4-0.5 times as long as wide. MSL 1.1-1.5 times as long as BWM. OOD 0.7-0.8 times as long as OD. IOD 0.8-1.2 times as long as OD. Antenna with 34-35 flagellomeres. Hind femur 5.4-5.6 times as long as maximum depth in lateral view. Clypeus yellow with brown spot medially. Face yellow, sometimes with brown spot medially. Malar space largely yellow. Ventral surface of antenna yellowish-brown to yellow. Hind coxa darker than female.

**Specimens examined.** JAPAN: 1M, Asahikawa, 12. vii. 1971, S. Momoi leg.

(KPMNH); 1M, Ashibetsu, 6. vii. 1971, S. Momoi leg. (KPMNH); 1F, same locality and collector, 10. vii. 1971 (KPMNH); 1F, Bibai, 30. vii. 1971, K. Kamijo leg. (KPMNH); 1M, same locality and collector, 1971 (KPMNH); 1M, Sapporo City, Misumai, Kannon-zawa, 16-27. vii. 1992, N. Kuhara leg., (MsT) (NIAES); 1M, same locality and collector, 27. vii.-11. viii. 1992, (MsT) (NIAES); 2M, same locality and collector, 17-30. vii. 1993 (MsT) (NIAES); 1M, Sapporo City, Kannon-zawa, 7. vii. 2001, T. Yoshida leg. (KPMNH); 1F, Yamanashi Pref., Koushu City, Yamato Town, Tano, about 900m alt., (GPS: N 35-39-8/ E 138-48-58), 5. viii. 2008, K. Watanabe leg. (KPMNH); 1F, Nagano Pref., Kawakami, Azusayama, 10. viii. 1985, K. Hara leg. (NIAES).

**Distribution** (Fig. 1023). Japan (Hokkaido and Honshu); widely distributed in the Palaearctic region. Also introduced into the Nearctic region for biological control (Carlson, 1979).

**Bionomics.** This species is an important natural enemy of lepidopterous forest pests. In Japan, the following tortricid hosts were recorded: *Archips fuscocupreanus* Walsingham, *Choristoneura diversana* (Hübner), and *Ptycholomoides aeriferana* (Herrich-Schäffer) (Momoi, 1963; Kamijo, 1973; Nakaya, 2009). More detailed bionomics was described by Kamijo (1973).

**Remarks.** This species is easily distinguished from any other ichneumonids by the characteristic concavity of occiput (Fig. 265).

### Genus *Apophua* Morley, 1913

*Apophua* Morley, 1913: 213.

Type species: *Apophua carinata* Morley, 1913, by original designation.

**Description based on Japanese species.** Body polished, punctate, covered with silver setae, its length 9.0–9.5 mm.

Head. Clypeus slightly convex in lateral view, always almost yellow, its lower margin convex in anterior view. Face slightly convex medially, covered with dense punctures, more or less transversely striated by coalescent punctures. Frons flat to slightly convex, densely punctate except for narrow area above antennal socket, with pair of longitudinal keel between antennal sockets. Upper part of occipital carina obscured medially. Lower part of occipital carina complete, distinctly sinuate beyond lower margin of eye, its lower end connected hypostomal carina at base of mandible. Vertex and gena finely punctate. Occiput not concave, smooth except for dorsal part

finely punctate. Subocular groove absent. Basal area of mandible convex. Ventral margin of mandible with narrow flange on base.

Mesosoma densely punctate. Epomia present (Fig. 5). Sternaulus present anteriorly, extended less than half length of mesopleuron (Fig. 5). Posterior transverse carina of propodeum present (Fig. 5), usually complete, sometimes obscured medially. Pleural carina complete (Fig. 5). Propodeal spiracle rounded (Fig. 5). Fore wing length 7.0–9.0 mm. Junction of vein *Cu*1 and vein *cu-a* distant from junction of vein *Rs+M* and vein *M+Cu*. Areolet absent. Stigma receiving vein *Rs+M* medially. Hind wing with abscissa of vein *Cu*1 of between vein *M* and vein *cu-a* 2.5–3.3 times as long as *cu-a*. Fore tibial spur longer than half length of fore TS1 (Fig. 301). Tarsal claw longer than arolium, pectinate near apex, apex not twisted.

Metasoma. Lateral sides of metasomal tergites largely parallel in dorsal view (Figs. 278-289, 325-335), width of T5 only slightly shorter than T2-T4. Dorsolateral carina of T1 complete. Ovipositor sheath longer than hind tibia (Figs. 299, 300). Apical part of upper valve of ovipositor without a distinct dorsal tubercle before notch. Apex of paramere short, slightly beyond apex of volsella, apical margin round (Figs. 347-358, 363, 366, 369, 372, 375, 378, 381). Inner margin of paramere concave near basal inner angle (Figs. 347, 349, 351, 355, 357, 359) or slightly concave (Fig. 353). Apical part of digitus strongly bend ventrally (Figs. 363, 366, 369, 372, 375, 378, 381). Aedeagus more or less curved (Figs. 362, 365, 368, 371, 374, 377, 380).

Sexual dimorphism. Body punctures of male sparser than female. Propodeal carina of male usually stronger than female. Ventral surface of flagellum of male paler than female, usually more or less tinged with brown.

**Distribution.** Australasian, Ethiopian, Palaearctic, Nearctic and Oriental regions.

**Bionomics.** Parasitoids of the Tortricidae and other lepidopterous families.

**Remarks.** *Apophua* is a middle-sized of the Glyptini and contains 36 described species from the Afrotropical (13 spp.), Eastern Palaearctic (10), Oriental (10), Western Palaearctic (5), Nearctic (2) and Australian (2) regions (Yu *et al.*, 2012). Some species are known as koinobiont endoparasitoids of lepidopterous larvae, especially of leaf rollers (e.g., Tortricidae), including some important natural enemies of forest pests (Kamijo, 1973; Momoi *et al.*, 1975).

This genus resembles *Glypta*, but it can be easily distinguished from the latter by the long fore tibial spur (longer than half length of fore TS1 in *Apophua* but shorter than that in *Glypta*). The generic position (*Glypta* or *Apophua*) of a species, *rufa* Uchida, 1928, had been controversial, whereas Kuslitzky (2007) transferred it from *Apophua* to *Glypta*. I have re-examined the type specimen of this species and accepted his

treatment.

**Key to Japanese species of the genus *Apophua***

(The males of *aquilonia* and *yamato* are unknown)

1. T1-T3 each with a strong median longitudinal carina (Figs. 280, 327, 338). Base and posterior margin of T1 and posterior margin of all other tergites yellow (Figs. 280, 299, 338). Face strongly transversely striated by coalescent punctures. Upper margin of pronotum with a conspicuous yellow stripe (Fig. 299). Scutellum with a yellow marking (Fig. 280). Hind coxa reddish-brown (Figs. 299, 316). Hind femur and tibia completely blackish-brown (Figs. 299, 316)..... *A. elegans* **sp. nov.**
- T1-T3 each with a weak and partly indistinct median longitudinal carina, or without it (Figs. 278, 279, 281-289, 325, 326, 328-335, 336, 337, 339-346). Face weakly transversely striated by coalescent punctures. Hind leg largely yellowish-brown (Figs. 314, 315, 317-322) or nearly entirely blackish-brown (Figs. 300, 323, 324).....2
- 2(1). Pronotum largely yellow laterally (Fig. 294). Mesopleuron black with a large yellowish marking (Fig. 294). T1-T3 each with a yellow posterior margin (Figs. 283, 294). Ovipositor very long, its sheath 3.0–3.7 times as long as hind tibia. Subgenital plate with a short apodema sternalis, and its anterior margin convex (Fig. 370). Inner margin of paramere slightly concave (Fig. 353)..... *A. kikuchii* Uchida, 1928
- Pronotum largely black laterally, yellow area at most present dorsally (Figs. 290-293, 295-298, 300). T1-T3 usually without yellow band (Figs. 278, 279, 281, 282, 284-289). Mesopleuron without large yellow marking (Figs. 290-293, 295-298, 300). Ovipositor not very long, its sheath shorter than 2.5 times as long as hind tibia. Subgenital plate with a long apodema sternalis, and its anterior margin slightly concave (Figs. 361, 364, 367, 373, 376, 379). Inner margin of paramere strongly concave (Figs. 347, 349, 351, 355, 357, 359).....3
- 3(2). T2 longer than wide, its length 1.1–1.3 times as long as maximum wide (Figs. 281, 328, 339). Metasomal tergites almost smooth (more or less punctate in male but sparser than other species), strongly shiny by strong blue reflection (Figs. 281, 339). Epicnemial carina absent laterally. Propodeal carinae weak, usually absent (only restricted by slight convexity) except for posterior transverse carina and pleural carina. Yellow area on pronotum restricted near postero-lateral corner (Fig. 292). Median dorsal carina of T1 largely absent posteriorly (Fig. 328).  
..... *A. evanescens* (Ratzeburg, 1848)
- T2 shorter than 1.1 times as long as maximum width, usually square or transverse

- (Figs. 278, 279, 282, 284-287, 289, 325, 326, 329, 331-337, 340, 342-346). Metasomal tergites more or less punctate, weakly to rather strongly shiny (Figs. 278, 279, 282, 284-287, 289, 336, 337, 340, 342-346). Epicnemial carina present laterally (Fig. 5) or absent in *A. aquilonia*. Propodeal carinae except for posterior transverse carina and pleural carina absent to present. Median dorsal carina of T1 various, usually nearly complete (Fig. 326, 329, 332-335).....4
- 4(3). Epicnemial carina absent laterally. Fore coxa with a ridge (Figs. 302, 303). Scutellum black (Fig. 278). Median dorsal carina on T1 present only near base (Figs. 278, 325)..... *A. aquilonia* (Momoi, 1963)
- . Epicnemial carina present laterally (Fig. 5). Scutellum usually with a yellow marking (Figs. 279, 282, 284-288). Median dorsal carina on T1 well developed (Figs. 326, 329, 332-335), or if largely obsolete (Fig. 331, 335), T1-T3 reddish brown (Figs. 284, 342) or hind leg largely blackish-brown (Fig. 324).....5
- 5(4). Hind femur and tibia blackish brown in lateral view (Figs. 323, 324). Hind coxa largely blackish brown (Figs. 323, 324). Upper margin of pronotum and scutellum yellow (Figs. 298, 300). Metasomal tergite black (Figs. 287-289, 298, 300).....6
- . Hind femur and tibia reddish brown to brown in lateral view (Figs. 315, 318, 320-322). Hind coxa reddish brown (Fig. 315, 318, 320-322). Upper margin of pronotum and scutellum yellow (Figs. 291, 295, 297) or sometimes largely black (Fig. 296). Metasomal tergite sometimes partly tinged with red (Figs. 295, 342).....7
- 6(5). Ovipositor long, its sheath 2.9–3.0 times as long as hind tibia. Hind coxa with a yellow marking dorsally (Fig. 323). Median dorsal carina of T1 at least present basal 0.6 (Fig. 334)..... *A. tobensis* (Uchida, 1928)
- . Ovipositor short, its sheath 1.9–2.0 times as long as hind tibia. Hind coxa without yellow marking dorsally (Fig. 324). Median dorsal carina of T1 largely obsolete posteriorly, distinct area shorter than basal 0.5 (Fig. 335)..... *A. yamato* **sp. nov.**
- 7(5). Median dorsal carina of T1 shorter than 0.5 times of T1 (Figs. 284, 331). T1-T3 entirely (female) or partly (male: as posterior broad band) tinged with yellowish-red (Figs. 295, 342). Length of T2 distinctly shorter than wide (Figs. 331, 342). Upper margin of pronotum with a yellow stripe (Fig. 295)..... *A. maetai* Momoi, 1978  
(=*A. genalis kasparyani* Kuslitzky, 2007 **syn. nov.**)
- . Median dorsal carina of T1 nearly complete, usually longer than 0.8 times of T1 (Figs. 326, 329, 332, 333). T1-T3 entirely black (Fig. 279, 282, 285, 286), or in male of *sugawarai* with a yellow posterior band, or if tinged reddish-brown, yellow area on upper margin of pronotum sometimes restricted to small spot before tegula (Fig. 296).  
.....8

- 8(7). Posterior margin of all tergites (in male) or T4 and following all tergites (in female) each with a conspicuous yellow or white band (Figs. 286, 297). Propodeum usually with a yellowish area posteriorly (Fig. 286). Upper margin of pronotum with a yellow stripe (Fig. 297). Surface of tergites with blue reflection (Figs. 286, 297, 344)..... *A. sugaharai* Momoi, 1978
- . Posterior margin of T4 and following tergites always without white or yellow band (Figs. 279, 282, 285, 291, 293, 296). Propodeum without yellow area (Figs. 279, 282, 285).....9
- 9(8). Small species, its body length 6.5–10.5 mm (usually less than 9.0 mm). Yellow area on upper margin of pronotum always restricted as small spot on posterior angle (Fig. 296). Anterior half of scutellum black (Fig. 285). T2 square, its length 1.0 times as long as maximum wide (Figs. 285, 332)..... *A. stena* Momoi, 1963
- . Large species, its body length 8.5–11.0 mm. Yellow area of pronotum always large and broad, present along its upper margin (Figs. 291, 293). Anterior half of scutellum usually yellow laterally (Fig. 279).....10
- 10(9). Robust species. T1-T3 each usually with a median longitudinal keel (Figs. 279, 326). T1 1.2–1.4 times as long as maximum width (Fig. 326). T2 usually wide, its length 0.9-1.0 (both sexes) times as long as maximum width (Figs. 279, 326). Surface of tergites without blue reflection or with slight blue reflection (Figs. 279, 337). ..... *A. bipunctoria* (Thunberg, 1822)
- . Slender species. T1-T3 usually without median longitudinal keel except for bases of T2 and T3 (Figs. 282, 329). T1 1.6–1.9 times as long as maximum width (Fig. 329). T2 usually slender, its length 1.0–1.1 (female) (Figs. 279, 329) or 1.3 (male) times as long as maximum width. Surface of tergites with strong blue reflection (Figs. 282, 340)..... *A. honmai* Momoi, 1978

***Apophua aquilonia*** (Momoi, 1963)

(Figs. 278, 290, 302, 303, 314, 325, 336)

*Glypta aquilonia* Momoi, 1963: 107.

*Apophua aquilonia*: Townes, Momoi & Townes, 1965: 208; Yu & Horstmann, 1997: 93.

**Description. Female** (n=5). Body robust, its length 9.0–9.5 mm.

Head 0.6 times as long as wide. Clypeus 0.8–0.9 times as long as wide, its upper 0.5 sparsely punctate. Face 0.6 times as long as wide. MSL 0.9–1.0 times as long as BWM. OOD 1.6–1.8 times as long as OD. IOD 1.2 times as long as OD. Antenna



with 41–43 flagellomeres. F1 2.0 times as long as F2.

**Mesosoma.** Lateral area of pronotum largely smooth ventral half. Epicnemial carina absent laterally. Mesopleuron with a small speculum. Anterior transverse carina absent. Posterior transverse carina of propodeum usually completely present, or sometimes absent. Lateral longitudinal carina of propodeum absent. Lateromedian longitudinal carina of propodeum largely absent, sometimes present basally. Fore wing length 7.0 mm, with vein *2m-cu* with two bullae. Hind wing with *Cu1* present, nebulous. Fore coxa with a distinct ridge (Figs. 302, 303). Hind femur 6.0–6.2 times as long as maximum depth in lateral view. Hind TS1 2.5 times as long as TS2.

**Metasoma punctate.** Punctures on T1–T4 slightly longitudinally striated by coalescent punctures. T1 1.4 times as long as maximum wide, its median dorsal carina present ca. basal 0.5, short median longitudinal keel sometimes present posteriorly (Fig. 325). T2 0.9–1.0 times as long as maximum wide (Figs. 278, 325). T2 and T3 with short median longitudinal keel except for near each apex (Fig. 325). T4 sometimes with short median longitudinal keel basally. Ovipositor sheath 2.1–2.2 times as long as hind tibia.

**Colouration** (Figs. 278, 290, 314, 336). Body weakly polished by dark blue reflection. Head black except for: clypeus, mandible excluding tip yellow; palpi yellowish-brown; antenna sometimes tinged with dark brown. Mesosoma black except for: small spot before tegula on pronotum, tegula, hind margins of each axilla yellow. Wings hyaline with veins and stigma brown except for yellow wing base. Legs yellowish-brown except for: hind coxa and femur reddish-brown; base and apex of hind femur, hind tibia, tibial spur and tarsus brown to dark brown; base of hind tibia more or less paler than other part; apex of hind coxa sometimes darkened. Metasoma black except for: membranous area of sternites, apex of subgenital plate whitish-yellow. Ovipositor reddish-brown. Body sometimes tinged with reddish-brown.

**Male.** Unknown.

**Specimens examined.** JAPAN: 1F (holotype), Hokkaido Pref., Sapporo, Maruyama, 15. vii. 1955, S. Takagi leg. (SEHU); 1F, Hokkaido Pref., Sapporo, 23. vii. 1966, K. Kusigemati leg. (KU); 1F, Hokkaido Pref., Mt. Soranuma, 30. viii. 1967, K. Kusigemati leg. (KU); 1F, Tokyo Pref., Mt. Takao, Hikagesawa, 8. vi. 1976, S. Tachikawa, T. Kamio and M. Satake leg. (KPMNH); 1F, Kanagawa Pref., Hakone Town, Sengokubaraoohara, Shisseikaen, 1. vi. 2000 (LT), I. Waki leg. (NIAES).

**Distribution** (Fig. 1024). Japan (Hokkaido and Honshu\*).

**Bionomics.** Unknown.

**Remarks.** This species can be easily distinguished from other Japanese species by the following combination of character states: epicnemial carina absent laterally, scutellum

black, fore coxa with a distinct ridge (Figs. 302, 303), and the median dorsal carina of T1 present less than basal 0.5 (Fig. 325). This species resembles *A. genalis* (Moller, 1883) from Eurasia, but it can be distinguished from the latter by the short MSL 0.9–1.0 times as long as BWM (ca. 1.5 times as long as BWM in *A. genalis*).

***Apophua bipunctoria*** (Thunberg, 1822)

(Figs. 5, 7, 279, 291, 304, 315, 326, 337, 347, 348, 361-363)

*Ichneumon bipunctorius* Thunberg, 1822: 281.

*Glypta bipunctoria*: Uchida, 1928: 75; Momoi, 1963: 108.

*Apophua bipunctoria*: Townes, Momoi & Townes, 1965: 208; Yu & Horstmann, 1997: 93.

See Yu *et al.* (2012) for other synonymies.

**Description. Female** (n=55). Body robust, its length 8.0–10.0 mm.

Head 0.6 times as long as wide. Clypeus 0.8 times as long as wide, its upper 0.5 punctate. Face 0.6 times as long as wide. MSL 0.7 times as long as BWM. OOD 1.4 times as long as OD. IOD 1.4–1.6 times as long as OD. Antenna with 44–49 flagellomeres. F1 2.0 times as long as F2.

Mesosoma. Lateral area of pronotum largely smooth ventral half. Epicnemial carina present laterally (Fig. 5). Mesopleuron with a large speculum. Anterior transverse carina of propodeum complete on lateral section. Posterior transverse carina of propodeum complete. Lateral longitudinal carina of propodeum usually present, its median section sometimes partly absent. Lateromedian longitudinal carina of propodeum usually indistinct except for base, sometimes median section restricted by weak ridge. Fore wing length 6.5–8.5 mm, with vein *2m-cu* with two bullae. Hind wing with *Cu1* present, nebulous. Fore coxa without ridge (Fig. 304). Hind femur 6.0–6.4 times as long as maximum depth in lateral view. Hind TS1 2.3–2.5 times as long as TS2.

Metasoma punctate. Punctures on T1 to basal 0.5 of T4 slightly longitudinally striated by coalescent punctures. T1 1.2–1.3 times as long as maximum wide, its median dorsal carina nearly completely present, short median longitudinal keel sometimes present posteriorly (Fig. 326). T2 0.9–1.0 times as long as maximum wide. T2 and T3 with short median longitudinal keel except for posterior part (Fig. 326). Ovipositor sheath 2.1–2.4 times as long as hind tibia.

Colouration (Figs. 279, 291, 315, 337). Body weakly polished by dark blue

reflection. Head black except for: clypeus, mandible excluding tip, malar space along mandible, ventral surfaces of scape and pedicel yellow; palpi yellowish-brown; antenna sometimes tinged with dark brown except for yellow area. Mesosoma black except for: upper margin of pronotum excluding median part, tegula, scutellum excluding basal spot, postscutellum, hind margins of each axilla yellow. Wings hyaline with veins and stigma brown except for yellow wing base. Fore and mid legs yellowish-brown, except for apex of mid TS5, apex of claws dark brown. Hind leg reddish-brown except for: base and apex of femur, tibia except for base, tarsus including claws dark brown; base and median area of tibia, tibial spur whitish-yellow. Metasoma black except for: membranous area of sternites, apex of subgenital plate whitish-yellow. Ovipositor reddish-brown. Black area of body sometimes more or less tinged dark blue. Mesosoma and metasoma sometimes partly tinged with red. Black area of hind tibia varied from entirely black to broadly whitish-yellow. Subtegular ridge sometimes tinged with yellow.

**Male** (n=14). Similar to female. OOD 1.2–1.4 times as long as OD; IOD 1.0–1.6 times as long as OD; MSL 0.5 times BWM; T1 1.4 times as wide; median dorsal carina of T1 shorter than female (ca. basal 0.6 present). Subgenital plate with a long apodema sternalis, anterior margin slightly concave (Fig. 361). Inner margin of paramere strongly concave near basal inner angle (Fig. 347). Penis valve of aedeagus ca. 1.8 times as long as basal apodeme (Fig. 362).

**Specimens examined.** JAPAN: 1M, Hokkaido Pref., Mt. Soranuma, 4. viii. 1967, K. Kusigemati leg. (KU); 1F, Hokkaido Pref., Sapporo City, Nakamura Town (43–08 N/141–25 E), 13. viii. 2006, T. Yoshida leg. (TUA); 1F, Hokkaido Pref., Sapporo City, Jozankei (350m alt.), 12–21. ix. 1989 (MsT.), K. Maeto and M. Sharkey leg. (NIAES); 1F, Hokkaido Pref., Sapporo, 23. vii. 1968, K. Kusigemati leg. (KU); 1M, Hokkaido Pref., Ebetsu City, Nopporo, 17. vii. 1980, K. Maeto leg. (NIAES); 1M, Hokkaido Pref., Mt. Daisetsu, 29. vii. 1967, K. Kusigemati leg. (KU); 1F, Hokkaido Pref., Kamuikotan, 8. viii. 1964, K. Kusigemati leg. (KU); 1M, Hokkaido Pref., Rebun Is., 25. vii. 1951, M. Konishi leg. (KU); 1F, Hokkaido Pref., Kamishihoro Town, Oketo-rindo, 6. viii. 1997, R. Matsumoto leg. (OMNH); 1F, Hokkaido Pref., Kamishihoro Town, Tokachimitsumata, 25. vii. 1997, R. Matsumoto leg. (OMNH); 1F, Hokkaido Pref., Rankoshi Town, Yumoto, 14. viii. 1994, R. Matsumoto leg. (OMNH); 1F, Hokkaido Pref., Shimarinai Lake, 7. viii. 1996, T. Tachi leg. (OMNH); 2F, Hokkaido Pref., Shibeche Town, Gojikkoku, 3. viii. 1997, R. Matsumoto leg. (OMNH); 1F, Fukushima Pref., Hinoemata Vil., Mikawa, 4. ix. 2004 (MsT.), H. Makihara leg. (TPM); 1F, same locality and collector, 8. x. 2004 (MsT.) (TPM); 1F, Niigata Pref., Muikamachi City,

Kakenoue, 20. ix. 1997, S. Sakurai leg. (NIAES); 1F, Niigata Pref., Sado Is., Kanaishiraho, Hakuundai to Mt. Myoukenzan, K. Tokiwa leg. (TUA); 2F, ditto excluding K. Watanabe leg. (KPMNH); 1F, Tochigi Pref., Yaita, 11–22. viii. 1989 (MsT.), K. Konishi leg. (NIAES); 1F, Ibaraki Pref., Tsuchiura City, Shishizuka-oike, 21–28. viii. 1989 (MsT.), K. Konishi leg. (NIAES); 5F, same locality, 11–19. ix. 1989 (MsT.), K. Konishi and M. Sharkey leg. (NIAES); 3F, same locality, 19. ix. – 2. x. 1989 (MsT.), K. Konishi leg. (NIAES); 2F, same locality, 2–16. x. 1989, K. Konishi and M. Sharkey leg. (NIAES); 1F, Saitama Pref., Minano, 29. vi. 1975, T. Nambu leg. (NIAES); 1F, Saitama Pref., Yoshida Town, Kakkaku, 4. viii. 1989, T. Nambu leg. (NIAES); 1F, Saitama Pref., Ogawa, Sengenzan, 11. x. 1992, T. Nambu leg. (NIAES); 2F, Tokyo Pref., Mt. Takao, 21. ix. 1969, J. Minamikawa leg. (NIAES); 1F, same locality and collector, 15. ix. 1971 (NIAES); 1F, same locality (host: *Hoshinoa* (= *Choristoneura longicellonus* Waisiugham), 11. vi. 1970, M. Nakamura leg. (NIAES); 1F, Tokyo Pref., Mt. Takao, Hikagesawa, 9. vii. 1975, S. Tachikawa, S. Mochida and K. Tanaka leg. (TUA); 1F, Kanagawa Pref., Fujino Town, Mt. Jinbayama (35–39–9 N/ 139–9–55 E: 700–830m alt.), 13. ix. 2009, K. Watanabe leg. (KPMNH); 1F, Kanagawa Pref., Kawasaki City, Ikutaryokuchi, 18. viii. 1999, I. Waki leg. (NSMT); 1M, Shizuoka Pref., East Izu, Mt. Iwamura, 14. vi. 1967, T. Maenami leg. (NIAES); 1F, Shizuoka Pref., Umegashima, Abetoge, 22. ix. 1957, J. Minamikawa leg. (NIAES); 1F, Shizuoka Pref., Kanaya, Fukuyo, 13. vii. 1958, J. Minamikawa leg. (NIAES); 1F, Nagano Pref., Yamanouchi Town, Nagaike, 22. viii. 2007, K. Watanabe (KPMNH); 1F, Osaka Pref., Ibaraki City, Shimootowa, 10. vi. 1999, R. Matsumoto leg. (OMNH); 1F, Nara Pref., Yamatokoriyama Town, Yatacho, 7. x. 2001, R. Matsumoto leg. (OMNH); 1F, Nara Pref., Ikoma City, Higashi-ikoma, 4. ix. 2006, R. Matsumoto leg. (OMNH); 1F, Hyogo Pref., Asago City, Santo Town, 5. viii. 2007, Y. Kawakami leg. (OMNH); 1M, Tokushima Pref., Mima City, Waki Town (host: *Choristoneura longicellana* (Walsingham)), 6. vi. 1970, S. Yukinari leg. (NIAES); 3F2M, Nagasaki (NIAES); 1F, Fukuoka Pref., Shingu Town, Ainoshima, 15. v. 1993, R. Matsumoto leg. (OMNH); 2F, Nagasaki Pref., Tsushima Is., Kamigata Town, Senbyomakiyama, 21. vi. 2001, R. Matsumoto leg. (OMNH); 1M, Nagasaki Pref., Tsushima Is., Kamigata Town, Senbyomakiyama, 26. v. 1998, R. Matsumoto leg. (OMNH); 2M, Nagasaki Pref., Tsushima Is., Kamigata Town, Senbyomakiyama, 1. vi. 1996, R. Matsumoto leg. (OMNH); 1F, Kagoshima Pref., Mt. Eboshidake, 11. ix. 1969, J. Yukawa leg. (KU); 1M, Kagoshima Pref., Toso, 30. ix. 1970, K. Kusigemati leg. (KU); 1F, Kagoshima Pref., Mt. Kaimondake, 28. iv. 1966, K. Kusigemati leg. (KU); 1M, Kagoshima Pref., Takachihonome, 28. v. 1975, T. Shiba leg. (KU); 1F, Ohshima Vil., Ohshima, 12. x.

1993, R. Matsumoto leg. (OMNH). NEDERLAND: 1M, Tegelen, Teunissen, 24. vi. 1942 (“homotype *Glypta flavolineata* Grav. H. K. Townes’ 64”) (AEI). DANMARK: 1F, Rønne, 1–5. viii. 1937 (“homotype *Ichneumon bipunctoria* Thbg. Rom’ 38”) (AEI).

**Distribution** (Fig. 1024). Japan (Hokkaido, Rebun Is.\*, Honshu, Sado Is.\*, Shikoku and Kyushu); widely distributed in the Palaearctic region.

**Bionomics.** A tortricid moth, *Choristoneura longicellana* (Walsingham), is recorded here as a host of this species for the first time. The following tortricid hosts were also recorded in Japan: *Ptycholoma lecheanum circumclusanum* (Christoph) (Momoi *et al.*, 1975) and *Acleris askoldana* (Christoph) (Nakaya, 2009).

**Remarks.** In Japan, this species has been confused with *A. honmai*, but it can be distinguished from the latter by the median longitudinal keel of T1-T3 largely present (present only in the base of T2 and T3 in *honmai*), the T1 1.2–1.4 times as long as maximum width (1.6–1.9 times in *honmai*), and the T2 usually wide, its length 0.9–1.0 times as long as maximum width (1.3 times in male of *honmai*). This species is also similar to *A. tobensis* and *A. yamato*. except for the colouration of hind leg, i.e., largely yellow (*A. bipunctoria*) and largely black (*A. tobensis* and *A. yamato*), but they can be distinguished from each other by the length of ovipositor (see Table 4).

#### ***Apophua elegans* sp. nov.**

(Figs. 280, 299, 305, 316, 327, 338)

**Description. Female** (n=6). Body robust, its length 9.5–11.5 mm.

Head 0.6 times as long as wide. Clypeus 0.7–0.8 (HT: 0.7) times as long as wide, its upper 0.3 punctate. Face 0.6 times as long as wide, its striation strong. MSL 0.8–1.0 (HT: 1.0) times as long as BWM. Punctures on frons transversely striated by coalescent punctures above smooth area. OOD 1.8–2.0 (HT: 1.8) times as long as OD. IOD 1.2–1.6 (HT: 1.6) times as long as OD. Antenna with 43–46 (HT: 46) flagellomeres. F1 2.0 times as long as F2.

Mesosoma. Lateral area of pronotum largely smooth ventral 0.5. Epicnemial carina present laterally. Mesopleuron with a large speculum. Anterior transverse carina of propodeum complete. Posterior transverse carina of propodeum complete. Lateral longitudinal carina of propodeum complete. Lateromedian longitudinal carina of propodeum complete, sometimes median section weak. Fore wing length 7.5–9.0 (HT: 8.0) mm, with vein *2m-cu* with two bullae. Hind wing with *Cu1* present, nebulous. Fore coxa without ridge (Fig. 305). Hind femur 5.8–6.0 (HT: 5.8) times as long as maximum depth in lateral view. Hind TS1 2.5 times as long as TS2.

*Metasoma punctate*. Punctures on T1 to basal 0.5 of T4 slightly longitudinally striated by coalescent punctures. T1 1.4 times as long as maximum wide, its median dorsal carina nearly completely present, strong median longitudinal keel present ca. posterior 0.5 (Figs. 280, 327). T2 1.0 times as long as maximum wide (Figs. 280, 327). T2-T4 with strong median longitudinal keel except for each apex (Figs. 280, 327, 338). Ovipositor sheath 2.3–2.5 (HT: 2.4) times as long as hind tibia.

Colouration (Figs. 280, 299, 316, 338). Head black except for: clypeus, mandible excluding tip yellow; palpi yellowish-brown; antenna sometimes tinged with dark brown. Mesosoma black except for: upper margin of pronotum excluding median part, tegula, scutellum sometimes excluding pair of lateral basal spot, hind margins of each axilla yellow. Wings hyaline with veins and stigma brown except for yellow wing base. Fore and mid legs reddish-brown except for: coxae, trochanters and trochantelli yellowish-white; mid tarsus more or less tinged with brown. Hind leg dark brown to black except for: coxa, trochanter, trochantellus and base of femur, reddish-brown. Metasoma black except for: base of T1, posterior margin of T1 to T7, membranous area of sternites, apex of subgenital plate whitish-yellow; yellow area of T1 sometimes reduced; posterior white band of T2 and T3 sometimes narrowed. Ovipositor reddish-brown.

**Male.** Unknown.

**Type series.** JAPAN: [Holotype] F, Kagoshima Pref., Amamioshima Is., Mt. Yuidake (natural forests: 180–200m alt.) (MsT), 27. July. 2004, H. Makihara leg. (KPMNH). [Paratypes] 1F, Kagoshima Pref., Satamisaki, 17. v. 1966, K. Kusigemati leg. (KU); 1F, Kagoshima Pref., Amamioshima Is., Shinmura, 16. v. 1953, T. Shiraki leg. (NIAES); 1F, Kagoshima Pref., Amamioshima Is., 28. vi. 1959, K. Kamiyo leg. (KU); 1F, Kagoshima Pref., Amamioshima Is., Hatsuno, 29. iv. 1977, H. Takizawa leg. (KU); 1F, Okinawa Pref., Okinawajima Is., Benoki, 7. iv. 1979, K. Kusigemati leg. (KU).

**Distribution** (Fig. 1024). Japan (South Kyushu, Amamioshima Is. and Okinawajima Is.).

**Etymology.** This species is named after the Latin term “*elegans*”, which originates from its elegant body colouration.

**Bionomics.** Unknown.

**Remarks.** This species most resembles *A. formosana* Cushman, 1933, from Taiwan in having a strong and long median longitudinal keel on T1 to T3, but it can be distinguished from the latter by the posterior transverse carina of propodeum complete (incomplete in *A. formosana*) and hind femur dark brown to black (Fig. 316) (largely reddish-brown in *A. formosana*).

***Apophua evanescens*** (Ratzeburg, 1848)

(Figs. 281, 292, 306, 317, 328, 339, 349, 350, 364-366)

*Glypta evanescens* Ratzeburg, 1848: 103; Yu & Horstmann, 1997: 94.

*Glypta sapporensis* Uchida, 1928: 74; Momoi, 1963: 108.

*Apophua sapporensis*: Townes, Momoi & Townes, 1965: 209

See Yu et al. (2012) for other synonymies.

**Description. Female** (n=67). Body slender, its length 7.0–11.0 mm.

Head 0.6 times as long as wide. Clypeus 0.8 times as long as wide, its upper 0.5–0.6 punctate. Face 0.6 times as long as wide. MSL 0.7 times as long as BWM. OOD 1.4 times as long as OD. IOD 1.2–1.4 times as long as OD. Antenna with 45–47 flagellomeres. F1 2.0 times as long as F2.

Mesosoma. Lateral area of pronotum largely smooth ventral 0.2. Epicnemial carina absent laterally. Mesopleuron with a large speculum. Anterior transverse carina of propodeum absent to weakly restricted on lateral section. Posterior transverse carina of propodeum complete. Lateral longitudinal carina of propodeum usually partly weakly present by weak ridge, or absent. Lateromedian longitudinal carina of propodeum usually indistinct except for base, sometimes basal and median sections restricted by weak ridge. Fore wing length 6.5–8.5 mm, with vein *2m-cu* with two bullae. Hind wing with *Cu1* present, nebulous. Fore coxa without ridge (Fig. 306). Hind femur 6.4–6.7 times as long as maximum depth in lateral view. Hind TS1 2.5 times as long as TS2.

Metasoma almost smooth (only sockets of setae present), shiny by strong reflection (Figs. 281, 292, 339). T1 1.6–1.8 times as long as maximum wide, its median dorsal carina present on basal 0.6–0.7, short median longitudinal keel always absent (Fig. 328). T2 1.1–1.3 times as long as maximum wide, with indistinct, short median longitudinal keel at base (Figs. 328, 339). Ovipositor sheath 2.1–2.4 times as long as hind tibia.

Colouration (Figs. 281, 292, 317, 339). Body strongly polished by dark blue reflection. Head black narrow ventral spot on apex of pedicel, palpi yellow; antenna sometimes tinged with dark brown except for ventral yellow spot of pedicel. Mesosoma black except for: small spot before tegula on pronotum, tegula, scutellum excluding basal spot, hind margins of each axilla yellow; postscutellum yellow to reddish-brown. Wings hyaline with veins and stigma brown except for yellow wing base. Fore and mid legs yellowish-brown, except for fore and mid coxae, trochanters and trochantelli

somewhat paler than other area. Hind leg reddish-brown except for: apical part of coxa, dorsal surface of trochanter, trochantellus, base and apex of femur, tibia excluding base, anterior surface of femur and tibia, tarsus including claws dark brown; base of tibia, ventral surface on basal 0.6–0.7 of tibia and tibial spur yellowish-brown. Metasoma black except for: membranous area of sternites, apex of subgenital plate whitish-yellow. Ovipositor reddish-brown. Mesosoma and metasoma sometimes partly tinged with red. Subtegular ridge sometimes tinged with yellow. Yellow area on postscutellum sometimes darkened. Size of paler area of hind tibia sometimes more or less varied.

**Male** (n=29). Similar to female. IOD 1.0–1.4 times as long as OD; antenna with 44–45 flagellomeres. T1 1.8–1.9 times as long as maximum wide; hind TS1 2.3 times as TS2. Subgenital plate with a long apodema sternalis, anterior margin slightly concave (Fig. 364). Inner margin of paramere strongly concave near basal inner angle (Fig. 349). Penis valve of aedeagus ca. 2.0 times as long as basal apodeme (Fig. 365). Face tinged with yellow ventrally. Ventral surface of scape and pedicel yellow.

**Specimens examined.** JAPAN: 1F, Hokkaido Pref., Esan, Mt. Esan, 15. ix. 2004, H. Suda leg. (KPMNH); 1F, Hokkaido Pref., Esashi Town, 15. viii. 2002, T. Yoshida leg. (KPMNH); 2F1M, Hokkaido Pref., Toyotomi, 10. viii. 1965, K. Kusigemati leg. (KU); 1M, Hokkaido Pref., Jyozankei, 2. viii. 1965, K. Kusigemati leg. (KU); 1M, Hokkaido Pref., Mt. Yubari, 10. viii. 1966, K. Kusigemati leg. (KU); 2F, Hokkaido Pref., Sapporo, 13. vii. 1964, K. Kusigemati leg. (KU); 1M, same locality and collector, 17. vii. 1964 (KU); 1F, same locality and collector, 24. vii. 1964 (KU); 1F1M, same locality and collector, 20. vii. 1965 (KU); 1F, same locality and collector, 23. vii. 1966 (KU); 1M, same locality and collector, 11. vii. 1967 (KU); 1F, same locality and collector, 8. ix. 1967 (KU); 1F, same locality and collector, 23. vii. 1968 (KU); 1F, Hokkaido Pref., Sapporo, Arashi pass, 31. vii. 1990, N. Kuhara leg. (NIAES); 1M, Hokkaido Pref., Eniwa City, Ichankoppe-zawa (MsT.), 21–31. vii. 1995, T. Ito leg. (NIAES); 1M, same locality (300m alt.) (MsT.), 19–26. vii. 1997, T. Ito & A. Ohkawa leg. (NIAES); 1M, Hokkaido Pref., Mt. Tarumae-san (MsT.), 18–21. vii. 1998, K. Konishi leg. (NIAES); 6M, same locality and collector (MsT.); 21–26. vii. 1998 (NIAES); 1M, Hokkaido Pref., Ashoro, Kyushu University Forests (MsT.), 12. vii. 1984, O. Tadauchi leg. (NIAES); 2F, Hokkaido Pref., Kumaishi, Kenichi-gawa, Iwafuchi-zawa (MsT.); 10–20. x. 1995, Y. & T. Ito leg. (NIAES); 1F, Hokkaido Pref., Tomakomai City, Uenae river (25m alt.), 19. vii. 1990, N. Kuhara leg. (NIAES); 1F, Hokkaido Pref., Ashoro Town, Kamishibetsu, 10. viii. 1996, T. Tachi leg. (OMNH); 1F, Hokkaido Pref., Kamishihoro Town, Oketo-rindo, 26. vii. 1997, R. Matsumoto leg. (OMNH); 1F, Hokkaido Pref., Kaminokuni Town, Hiyama, 18. viii. 1994, R. Matsumoto leg.



(OMNH); 1F, Hokkaido Pref., Shibecha Town, Gojikkoku, 14. viii. 1996, T. Tachi leg. (OMNH); 1F, Aomori Pref., Kuroishi City, Nishounai, 3. ix. 1992, T. Ichita leg. (NIAES); 1M, Aomori Pref., Aomori City, Moyasawa, 2. viii. 1992, T. Ichita leg. (NIAES); 1F, same locality and collector, 11. vii. 1992 (NIAES); 1F, Aomori Pref., Aomori City, Yokouchi-Yaegiku (Yellow glue trap), 30. x. – 14. ix. 1992, T. Ichita leg. (NIAES); 1M, Yamagata Pref., Mt. Akakuzure-yama, 24. vii. 1993, K. Konishi leg. (NIAES); 1F, Fukushima Pref., Shiozawa, Mt. Adatara, 13. x. 1990, A. Nagatomi leg. (NIAES); 1M, Fukushima Pref., Hibarako Lake (LT.); 9. vii. 1985, K. Konishi leg. (NIAES); 1F, Fukushima Pref., Hinoemata Vil., Mikawa (MsT.); 4. ix. 2004, H. Makihara (TPM); 1F, Tochigi Pref., Yaita (MsT.), 30. vi. – 15. vii. 1989, K. Konishi leg. (NIAES); 1F, same locality and collector (MsT.), 15–28. vii. 1989 (NIAES); 2F, same locality and collector (MsT.), 28. vii. – 11. viii. 1989 (NIAES); 1F, same locality and collector (MsT.), 11–22. viii. 1989 (NIAES); 1F, same locality and collector (MsT.), 22. viii. – 8. ix. 1989 (NIAES); 1F, Tochigi Pref., Siobara, Akagawa rindo, 11. vii. 2000, H. Takizawa leg. (TPM); 1F, Tochigi Pref., Nasu, Yumoto, 18. x. 2000, T. Nakamura leg. (TPM); 1F, Tochigi Pref., Kuriyama Vil., Kinunuma (MsT.), 8. x. 2004, H. Makihara leg. (TPM); 1F, Tochigi Pref., Nikko City, Tamozawa (MsT.), 15–27. x. 2008, T. Nakamura leg. (TPM); 1F, Gunma Pref., Tanigawadake, 9. viii. 1966, J. Minamikawa leg. (NIAES); 2F, Ibaraki Pref., Kita-ibaraki, Ogawa Forest Reserve (MsT.), 9–25. vii. 1996, K. Maeto leg. (NIAES); 2F, same locality and collector (MsT.), 25. vii. – 6. viii. 1996 (NIAES); 1F, Saitama Pref., Ogawa, Aoyama, Sengenzan, 9. x. 1993, T. Nambu leg. (NIAES); 1M, Saitama Pref., Ootaki, Nakatu, 9. ix. 1990, Y. Yamaguchi leg. (NIAES); 1F, Niigata Pref., Sado Is., Kanaishiraho, Hakuundai to Mt. Myoukenzan (38–5–20 N/138–20–15: 830–1000m alt.), K. Watanabe leg. (KPMNH); 1F, Tokyo Pref., Okutama Town, Hikawa, TUA forests, 30. vi. 2007, K. Watanabe leg. (TUA); 1F, Tokyo Pref., Mt. Takao, 10. xi. 1963, J. Minamikawa leg. (NIAES); 1M, Kanagawa Pref., Mts. Tanzawa, Hinokiboramaru (LT.), 10–11. vii. 2004, H. Miyadani leg. (KPMNH); 1F, Kanagawa Pref., Atsugi City, Mt. Ooyama (1252m alt.), 9. ix. 1999, M. Yamamoto leg. (KPMNH); 1F, Yamanashi Pref., Kawaguchiko Town, Mt. Tenjyoyama, 26. ix. 1989, H. Suda leg. (KPMNH); 1M, Nagano Pref., Azumi Vil., Shimashima-dani, 15. vii. 1997, R. Matsumoto leg. (OMNH); 1F, Aichi Pref., Shitara, Uradani (Beech forest: 900m alt.) (MsT.), 4–10. vii. 1994, K. Yamagishi leg. (NIAES); 1F, same locality and collector (Beech forest: 900m alt.), 19–25. ix. 1994 (NIAES); 1F, same locality and collector (Beech forest: 900m alt.) (MsT.), 26. ix. – 2. x. 1994 (NIAES); 1F, same locality and collector (Beech forest: 900m alt.), 3–9. x. 1994 (NIAES); 1F, Kyoto Pref., Hanase-toge, 23. vii. 1989, H. Ohishi; 1F, Osaka Pref., Izumi, Mt. Katsuragi (em. from *Pandemis*

*cinnamoneana*), 15. v. 1993, Y. S. Bae leg. (NIAES); 1F, Tottori Pref., Daisen Town, Daisen, 8. vii. 1994, R. Matsumoto leg. (OMNH); 1F, Tottori Pref., Daisen Town, Yokotemichi, 15. x. 2001, R. Matsumoto leg. (OMNH); 1M, Okayama Pref., Kanba, 8. vi. 1947, J. Minamikawa leg. (NIAES); 1F, Okayama Pref., Kamisaibara Vil., Onbara, 15. vii. 1996, R. Matsumoto leg. (OMNH); 1F, Hiroshima Pref., Geihoku Town, Kakezuyama, 17. vii. 1998, R. Matsumoto leg. (OMNH); 1F, Tokushima Pref., Ichii Vil., Mt. Tsurugisan (1400m alt.), 16. x. 1980, K. Maeto leg. (NIAES); 1F, Kochi Pref., Hongawa Vil., Teragawa, 12. vii. 1991, I. Yamashita leg. (NIAES); 2M, same locality and collector (LT.), 20. vii. 2000, I. Yamashita leg. (NIAES); 1M, Kochi Pref., Mt. Kajigamori, 13. vii. 1997, I. Yamashita leg. (NIAES); 6F, Ehime Pref., Omogo Town, Tsuchigoya, 14-15. vii. 1998, R. Matsumoto leg. (OMNH); 1F, Fukuoka Pref., Mt. Hiko, 24-26. x. 1979, K. Maeto leg. (NIAES); 1F, Fukuoka Pref., Maebaru Town, Raizan, 16. ix. 1993, R. Matsumoto leg. (OMNH); 1M, Fukuoka Pref., Fukuoka City, Sefuriyama, 18. vi. 1997, R. Matsumoto leg. (OMNH); 1F, Kumamoto Pref., Gokano-sho, Momiki, 20. vii. 1966, R. Ooishi leg. (KU); 1M, Kagoshima Pref., Yakushima Is., Kosugidani, 28. vi. 1965, H. Shima leg. (KU). GERMANY: 1M, Allgäu, Osterach-Tal 1100 m, 1. viii. 1949 (det. Heinrich) (AEI). FINLAND: 1F, Helsinki, 14. viii. 1968, H. & M. Townes (det. Heinrich) (AEI).

**Distribution** (Fig. 1025). Japan (Hokkaido, Honshu, Sado Is.\*, Shikoku\*, Kyushu\* and Yakushima Is.\*); widely distributed in the Palearctic region.

**Bionomics.** The following tortricid hosts have been recorded in Japan: *Pandemis heparana* (Denis & Schiffermüller) (Momoi, 1963) and *Pandemis cinnamomeana* (Treitschke) (Nakaya, 2009; present study).

**Remarks.** This species resembles *A. honmai* in the slender body with blue reflection, but it can be easily distinguished from the latter by the epicnemial carina absent laterally (present in *honmai*), the metasomal tergite almost smooth (weakly punctate in *honmai*), and the yellow area of pronotum restricted as a small spot before tegula (Fig. 292) (yellow band along upper margin in *honmai*: Fig. 293). This species is sometimes collected with *A. bipunctoria*, *A. honmai* and *A. stena* at same habitats and thus they may be confused.

*Apophua honmai* Momoi, 1978

(Figs. 282, 293, 301, 307, 318, 329, 340, 351, 352, 367-369)

*Apophua honmai* Momoi, 1978: 11.

**Description. Female** (n=67). Body slender, its length 8.5–11.0 mm.

Head 0.6 times as long as wide. Clypeus 0.6 times as long as wide, its upper 0.6–0.7 punctate. Face 0.6 times as long as wide. MSL 0.9 times as long as BWM. OOD 1.4 times as long as OD. IOD 1.4–1.6 times as long as OD. Antenna with 44–45 flagellomeres. F1 2.0 times as long as F2.

Mesosoma. Lateral area of pronotum largely smooth ventral 0.3. Epicnemial carina present laterally. Mesopleuron with a large speculum. Anterior transverse carina of propodeum complete on lateral section. Posterior transverse carina of propodeum complete. Lateral longitudinal carina of propodeum usually partly weakly present by weak ridge, or absent. Lateromedian longitudinal carina of propodeum usually indistinct except for basal section, sometimes median section restricted by weak ridge. Fore wing length 7.0–9.0 mm, with vein *2m-cu* with two bullae. Hind wing with *Cu1* present, nebulous. Fore coxa without ridge (Fig. 307). Hind femur 6.4–6.6 times as long as maximum depth in lateral view. Hind TS1 2.3–2.5 times as long as TS2.

Metasoma punctate, shiny by strong reflection (Figs. 282, 293, 340). Punctures on T1 to basal 0.5 of T4 slightly longitudinally striated by coalescent punctures. T1 1.6–1.8 times as long as maximum wide, its median dorsal carina nearly completely present, short median longitudinal keel sometimes present posteriorly (Fig. 329). T2 1.0–1.1 times as long as maximum wide (Figs. 329, 340). T2 and T3 with short median longitudinal keel less than basal 0.5 (latter somewhat indistinct) (Fig. 329). Ovipositor sheath 1.9–2.1 times as long as hind tibia.

Colouration (Figs. 282, 293, 318, 340). Body rather strongly polished by dark blue reflection. Head black except for: clypeus, mandible excluding tip, malar space along mandible yellow; palpi yellowish-brown; antenna dark brown sometimes ventral surface of pedicel tinged with yellow. Mesosoma black except for: upper margin of pronotum excluding median part, tegula, scutellum excluding basal spot, postscutellum, hind margins of each axilla yellow. Wings hyaline with veins and stigma brown except for yellow wing base. Fore and mid legs yellowish-brown, except for: fore and mid coxae, trochanters and trochantelli somewhat paler than other area; mid tarsal segment more or less darker than other area. Hind leg reddish-brown except for: base and apex of femur, tibia excluding base and basal 0.6–0.7 of ventral surface, tarsus including claws dark brown; trochanter, trochantellus, base of tibia, basal 0.6–0.7 of ventral surface of tibia and tibial spur yellowish-brown. Metasoma black except for: membranous area of sternites, apex of subgenital plate whitish-yellow. Ovipositor reddish-brown. Mesosoma and metasoma sometimes partly tinged with red. Yellow area on postscutellum sometimes darkened. Black area of hind tibia varied from entirely black to broadly

whitish-yellow. Subtegular ridge sometimes tinged with yellow.

**Male** (n=44). Similar to female. IOD 1.2 times as long as OD; MSL 0.5–0.6 times BWM; antenna with 45–47 flagellomeres. Hind femur 6.2–6.6 times as long as maximum depth. T1 1.7–1.9 times as long as maximum wide; T2 1.3 times as long as maximum wide. Subgenital plate with a long apodema sternalis, anterior margin slightly concave (Fig. 367). Inner margin of paramere strongly concave near basal inner angle (Fig. 351). Penis valve of aedeagus ca. 1.7 times as long as basal apodeme (Fig. 368). Face tinged with yellow ventrally. Ventral surface of scape and pedicel yellow.

**Specimens examined.** JAPAN: 1F (holotype), Hokkaido Pref., Kushiro, 19. ix. 1929, M. Yamanaka leg. (SEHU); 1M (paratype), Hokkaido Pref., Aizankei, 4. viii. 1956, S. Momoi leg. (MNHAH); 1F (paratype), Hokkaido Pref., Maruyama, 7. vii. 1955, S. Momoi leg. (MNHAH); 3M, Hokkaido Pref., Mt. Tarumae-san (MsT.), 12–21. vii. 1998, K. Konishi leg. (NIAES); 2F, same locality and collector (MsT.); 18–21. vii. 1998 (NIAES); 9M, same locality and collector (MsT.); 21–26. vii. 1998 (NIAES); 2M, same locality and collector; 21. vii. 1998 (NIAES); 1M, Hokkaido Pref., Mt. Daisetsu, 30. vii. 1967, K. Kusigemati leg. (KU); 1M, Hokkaido Pref., Mt. Soranuma, 26. vii. 1966, K. Kusigemati leg. (KU); 3F, same locality and collector, 30. viii. 1967, K. Kusigemati leg. (KU); 1M, Hokkaido Pref., Mt. Yubari, 11. viii. 1966, K. Kusigemati leg. (KU); 2F, Hokkaido Pref., Utanobori Town, Omagari, (44–39 N/ 142–35 E), 14–15. viii. 2003, T. Yoshida leg. (KPMNH); 1M, Hokkaido Pref., Sapporo, Hyakumatsuzawa, 28. vii. 1996, M. Sueyoshi leg. (OMNH); 1F2M, Hokkaido Pref., Kamishihoro Town, Oketo-rindo, 26. vii. 1997, R. Matsumoto leg. (OMNH); 3M, Hokkaido Pref., Chitose City, Tarumaesan, 24. vii. 1997, R. Matsumoto leg. (OMNH); 1M, Aomori Pref., Takko Town, Miroku rindo, 15. ix. 1993, T. Ichita leg. (NIAES); 1F, same locality and collector, 28. viii. 1994 (NIAES); 1F, Aomori Pref., Kuroishi City, Okiura, 6–19. xi. 1994, T. Ichita leg. (NIAES); 1F, Mt. Chokai, 4. ix. 1966, K. Kusigemati leg. (KU); 1F, Yamagata Pref., Mt. Akakuzure-yama, 24. vii. 1993, K. Konishi leg. (NIAES); 1F, Fukushima Pref., Hinoemata Vil., Jyukai-line, 17. vii. 2007, T. Ishizaki leg. (TUA); 1F, Fukushima Pref., Hinoemata Vil., Mikawa, 4. ix. 2004 (MsT), H. Makihara leg. (TPM); 1F, same locality and collector, 8. x. 2004 (TPM); 2F, Tochigi Pref., Nasu, 8–9. x. 1967, K. Kusigemati leg. (KU); 3F1M, Tochigi Pref., Yaita (MsT.), 30. vi. – 15. vii. 1989, K. Konishi leg. (NIAES); 1F, same locality and collector (MsT.), 15–28. vii. 1989 (NIAES); 1M, same locality and collector (MsT.), 22. viii. – 8. ix. 1989 (NIAES); 1F, Tochigi Pref., Kuriyama Vil., Kinunuma (MsT.), 14. viii. 2004, H. Makihara leg. (TPM); 1F, same locality and collector (MsT.), 4. ix. 2004 (TPM); 1F, same locality and collector (MsT.), 8. x. 2004 (TPM); 2F, Ibaraki Pref., Mt. Yamizosan (LT.), 22. viii. 1992, K. Konishi leg.

(NIAES); 1M, Ibaraki Pref., Daigo, Mt. Yamizosan (36–55–48–4 N/ 140–16–24–3 E: 1022m alt.), 24. vii. 2008, H. Yoshitake leg. (TUA); 1M, Saitama Pref., Otaki Vil., Otaki (MsT.), 11. vii. 2004, T. Nambu leg. (TUA); 1F, Niigata Pref., Itoigawa City, Renge Spa., 27. vii. 1998, T. Tachi leg. (OMNH); 2F3M, Niigata Pref., Sado Is., Kanaishiraho, Hakuundai to Mt. Myoukenzan (38–5–20 N/ 138–20–15 E: 830–1000m alt.), K. Tokiwa leg. (KPMNH); 5F7M, ditto excluding K. Watanabe leg. (KPMNH); 1F, Kanagawa Pref., Hakone Town, Komagatake, 14. ix. 1999, H. Nagase leg. (KPMNH); 1M, same locality (1100–1300m alt.) and collector, 11. vii. 2000 (KPMNH); 1F, same locality (1000–1300m alt.) and collector, 6. viii. 2000 (KPMNH); 1F, same locality (1100–1300m alt.) and collector, 21. viii. 2002 (KPMNH); 1F, same locality (1100–1300m alt.) and collector, 7. vii. 2004 (KPMNH); 1F, same locality (1300m alt.) and collector, 17. vii. 2005 (KPMNH); 1F, Kanagawa Pref., Hakone Town, Owakudani (on flower of *Angelica pubescens* Maxim.), 18. viii. 2004, K. Kubo leg. (KPMNH); 1M, Kanagawa Pref., Yamakita Town, Myojinyama, 2. vii. 2000 (KPMNH); 1F1M, Kanagawa Pref., Atsugi City, Mt. Ooyama (1252m alt.), 9. ix. 1999, M. Yamamoto leg. (NSMT); 1F, Nagano Pref., Asani Vil., Hachimotiyama, 16. vii. 1997, R. Matsumoto leg. (OMNH); 2F, Nagano Pref., Namiai Vil., Jatougeyama, Umanose, 5. viii. 1999, R. Matsumoto leg. (OMNH); 1F, Ishikawa Pref., Okuchi Vil., Mt. Mimura, 12. viii. 1989, I. Togashi leg. (NIAES); 1F, Shiga Pref., Shiga Town, Hirasano-Yakumogahara, 16. vi. 1999, R. Matsumoto leg. (OMNH); 1F1M, Kyoto Pref., Kyoto City, Hanase-toge, 23. viii. 1999, R. Matsumoto leg. (OMNH); 1F, Tottori Pref., Mt. Daisen, 15. x. 1981, T. Goto leg. (NIAES); 2F, Tottori Pref., Daisen Town, Yokotemichi, 15. x. 2001, R. Matsumoto leg. (OMNH); 1F, Hiroshima Pref., Hiwa Town, Mt. Azuma-yama, 22. ix. 1984, K. Konishi leg. (NIAES); 6F, Ehime Pref., Omogo Town, Tsuchigoya, 12-15. vii. 1998, R. Matsumoto leg. (OMNH); 1F, Ehime Pref., Saijyo City, Ibukiyama, 18. viii. 1998, R. Matsumoto leg. (OMNH); 1M, Tokushima Pref., Mt. Tsurugisan, 12. vii. 1997, I. Yamashita leg. (NIAES); 1F, Tokushima Pref., Kiyahira Vil., Minokoshi, 5. vii. 1996, M. Sueyoshi leg. (OMNH); 1F, Kochi Pref., Higashitsuno Vil., Tengu-kogen (LT.), 20. vii. 2000, I. Yamashita leg. (NIAES); 1F, Kochi Pref., Higashisuno Vil., Tengu-kogen, 14. vii. 1998, R. Matsumoto leg. (OMNH); 1F, Oita Pref., Mts. Kuju, Mt. Kuro-dake (LT.), 13. x. 1984, R. Noda & Y. Nakata leg. (NIAES) 1F, Oita Pref., Yufuin Town, Yamashita L., 5. x. 1996, R. Matsumoto leg. (OMNH); 1M, Kumamoto Pref., Gokanoshou, 17. vii. 1994, Masunaga leg. (OMNH); 1F, Kumamoto Pref., Izumi Vil., Yamaingiri, 17. vii. 1994, R. Matsumoto leg. (OMNH); 2F, Kumamoto Pref., Izumi Vil., Momoki, 18. vii. 1994, R. Matsumoto leg. (OMNH).

**Distribution** (Fig. 1026). Japan (Hokkaido, Honshu, Sado Is.\*, Shikoku\* and

Kyushu\*).

**Bionomics.** The following tortricid hosts were recorded in Japan: *Pandemis heparana* (Denis & Schiffermüller) (Momoi, 1978), *Homonopsis illotana* (Kennel) and *Acleris* sp. (Nakaya, 2009).

**Remarks.** This species resembles *A. bipunctoria* and *A. evanescens*, but it can be distinguished from them as shown in the Remarks of *A. bipunctoria* and *A. evanescens*.

*Apophua kikuchii* (Uchida, 1932)

(Figs. 283, 294, 308, 319, 330, 341, 353, 354, 370-372)

*Glypta kikuchii* Uchida, 1932: 157.

*Apophua kikuchii*: Townes et al., 1961: 203; Momoi, 1970: 369.

*Apophua gracilis* Cushman, 1933: 22.

**Description. Female** (n=10). Body slender, its length 6.5–9.0 mm.

Head 0.6 times as long as wide. Clypeus 0.8 times as long as wide, its upper 0.5 sparsely punctate. Face 0.6 times as long as wide. MSL 0.9 times as long as BWM. Upper part of occipital carina widely obscured medially. OOD 1.4 times as long as OD. IOD 1.4 times as long as OD. Antenna with 36–37 flagellomeres. F1 2.0 times as long as F2.

Mesosoma. Lateral area of pronotum largely smooth ventral 0.5. Epicnemial carina present laterally. Mesopleuron with a large speculum. All carinae of propodeum strong and complete except median section of lateral longitudinal carina partly absent. Fore wing length 4.0–6.0 mm, with vein *2m-cu* with one long bulla. Hind wing with *Cu1* obscured. Fore coxa without ridge (Fig. 308). Hind femur 6.0 times as long as maximum depth in lateral view. Hind TS1 2.1 times as long as TS2.

Metasoma punctate. Punctures on posterior part of T1 to T4 slightly longitudinally striated by coalescent punctures. T1 1.4–1.5 times as long as maximum wide, its median dorsal carina nearly completely present, median longitudinal keel absent (Fig. 330). T2 0.9–1.0 times as long as maximum wide (Figs. 283, 330, 341). T2-T4 with short median longitudinal keel only at base (Fig. 330). Ovipositor sheath 3.0–3.7 times as long as hind tibia.

Colouration (Figs. 283, 294, 319, 341). Head black except for: face excluding median longitudinal stripe, mandible excluding tip, malar space, palpi, ventral surface of scape and pedicel yellow; antenna sometimes tinged with dark brown excluding yellow area. Mesosoma black except for: pronotum excluding median black area, tegula,

scutellum, subtegular ridge, large spot along episternal scrobe on mesopleuron, postscutellum, hind margins of each axilla, metapleuron, posterior half of propodeum yellow. Wings hyaline with veins and stigma brown except for yellow wing base. Legs yellowish brown except for: apical 0.2 of hind tibia, apex of TS1-TS5, mid TS5, hind TS4 and TS5 brown. Metasoma black except for: posterior margin of T1-T3, postero-lateral margin of T5-T7, membranous area of sternites, subgenital plate whitish-yellow. Ovipositor reddish-brown. Yellow area of body sometimes expanded. Black area of mesosoma and metasoma sometimes partly tinged with red.

**Male** (n=12). Similar to female. OOD 1.2–1.4 times as long as OD; F1 1.7–2.0 times as long as F2. Hind femur 5.8–6.0 times as long as maximum depth. Subgenital plate with a short apodema sternalis, anterior margin convex (Fig. 370). Inner margin of paramere slightly concave near basal inner angle (Fig. 353). Penis valve of aedeagus ca. 2.3 times as long as basal apodeme (Fig. 371).

**Specimens examined.** JAPAN: 1M, Okinawa Pref., Miyakojima Is., Gusukube, 11. iii. 1953, T. Shiraki leg. (NIAES); 2F2M, Okinawa Pref., Ishigakijima Is., Ohama, 29. i. 1953, T. Shiraki leg. (NIAES); 1F, same locality and collector, 6. ii. 1953 (NIAES); 1M, Okinawa Pref., Ishigakijima Is., Ishigaki, 5. ii. 1953, T. Shiraki leg. (NIAES); 1M, Okinawa Pref., Ishigakijima Is., Kainan, 8. ii. 1953, T. Shiraki leg. (NIAES); 1M, same locality and collector, 24. ii. 1953, T. Shiraki leg. (NIAES); 1F3M, Okinawa Pref., Ishigakijima Is., Kabira, 12. ii. 1953, T. Shiraki leg. (NIAES); 1M, Okinawa Pref., Ishigakijima Is., 20. x. 1999, K. Konishi, Y. Nakadani and S. Belokobylskij leg. (NIAES); 1F, Okinawa Pref., Ishigakijima Is., Mt. Omoto (N24–25/ E124–10: 180–300m), 14. v. 2008, T. Mita leg. (KPMNH); 1F, Okinawa Pref., Iriomotejima Is., Sonai, 31. xii. 1952, T. Shiraki leg. (NIAES); 1M, same locality and collector, 6. i. 1953 (NIAES); 1F, same locality and collector, 10. i. 1953 (NIAES); 1M, same locality, 5. vii. 1982, K. Ohara leg. (NIAES); 1F, Okinawa Pref., Iriomotejima Is., Komi, 20. i. 1953, T. Shiraki leg. (NIAES); 1F, Okinawa Pref., Iriomotejima Is., 13. iii. 1980, A. Ishida leg. (OMNH). TAIWAN 1F (holotype), Yakanron, 26. I. 1927, K. Kikuchi leg. (SEHU).

**Distribution** (Fig. 1026). Japan (Ryukyus: Miyakojima Is.\*, Ishigakijima Is. and Iriomotejima Is.); Taiwan.

**Bionomics.** Unknown.

**Remarks.** This species can be distinguished from any other Japanese species of *Apophua* by the following character states: upper part of occipital carina widely obscured medially (narrower in other species), ovipositor sheath relatively long, 3.0–3.7 times as long as hind tibia (less than 3.0 in other species, Table 1), pronotum largely yellow (Fig. 294) (yellow area at most present dorsally in other species), and

mesopleuron with a large yellow spot (Fig. 294) (without it in other species). This species resembles *A. karenkona* Sonan, 1936, from Taiwan in the long ovipositor and the colouration of face, pronotum and mesopleuron, but it can be easily distinguished from the latter by the posterior part of propodeum and T1-T3 each with a conspicuous yellow marking (Fig. 283) (entirely black in *A.k arenkona*).

*Apophua maetai* Momoi, 1978

(Figs. 284, 295, 309, 320, 331, 342, 355, 356, 373-375)

*Apophua maetai* Momoi, 1978: 11.

*Apophua genalis kasparyani* Kuslitzky, 2007: 434. **syn. nov.**

**Description. Female** (n=8). Body robust, its length 9.0–9.5 mm.

Head 0.6 times as long as wide. Clypeus 0.8 times as long as wide, its upper 0.5 punctate. Face 0.6 times as long as wide. MSL 1.0–1.1 times as long as BWM. OOD 1.6–2.0 times as long as OD. IOD 1.4–2.0 times as long as OD. Antenna with 43–45 flagellomeres. F1 2.0 times as long as F2.

Mesosoma. Lateral area of pronotum largely smooth ventral 0.5. Epicnemial carina present laterally. Mesopleuron with a small speculum. All carinae of propodeum present, or sometimes partly obscured or absent. Fore wing length 6.0–7.0 mm, with vein *2m-cu* with two bullae. Hind wing with *Cu1* present, nebulous. Fore coxa without ridge (Fig. 309). Hind femur 5.5–6.0 times as long as maximum depth in lateral view. Hind TS1 2.5 times as long as TS2.

Metasoma punctate. Punctures on T2 slightly longitudinally striated by coalescent punctures. T1 1.1–1.2 times as long as maximum wide, its median dorsal carina present less than basal 0.5, short median longitudinal keel sometimes absent (Fig. 331). T2 0.9 times as long as maximum wide (Figs. 331, 342). T2-T4 without short median longitudinal keel (Figs. 331, 342). Ovipositor sheath 2.2–2.3 times as long as hind tibia.

Colouration (Figs. 284, 295, 320, 342). Head black except for: clypeus, mandible excluding tip yellow; palpi yellowish-brown; antenna brown excluding dorsal part of scape blackish-brown. Mesosoma black except for: upper margin of pronotum excluding median part, median part of collar, tegula, subtegular ridge, scutellum, postscutellum, hind margins of each axilla yellow. Wings hyaline with veins and stigma brown except for yellow wing base. Legs: yellowish-brown to reddish-brown except for: apex of hind tibia brown; hind tarsus more or less partly darkened. Metasoma black



except for: T1-T3 reddish-yellow; membranous area of sternites, apex of subgenital plate whitish-yellow. Ovipositor reddish-brown. Red area on T1-T3 sometimes partly tinged with brown or in some Russian specimens this area present as posterior band.

**Male** (n=6). Similar to female. BL 8.0–9.0 mm; OOD 1.2–1.6 times as long as OD; IOD 1.4–1.6 times as long as OD; antenna with 40–43 flagellomeres. Hind TS1 2.4–2.5 times long as TS2; hind femur 5.4–5.6 times as long as maximum depth. Subgenital plate with a long apodema sternalis, anterior margin slightly concave (Fig. 373). Inner margin of paramere strongly concave near basal inner angle (Fig. 355). Penis valve of aedeagus ca. 2.0 times as long as basal apodeme (Fig. 374). Metasomal tergite darker than female, base of T1-T3 more or less tinged with black.

**Specimens examined.** JAPAN: 1F, Hokkaido Pref., Shimamatsu, 19. viii. 1967, K. Kusigemati leg. (KU); 4M, Hokkaido Pref., Sarobetsu, Toyotomi, 2. viii. 1961, G. Kudo leg. (KU); 1M, same locality, 2. viii. 1961, C. Watanabe leg. (KU); 3F, Shizuoka Pref., East Izu, Mt. Iwamura, 12. viii. 1967, K. Ogura leg. (NIAES); 1F (holotype), Nagano Pref., Ina, Minamiminowa, 16. vi. 1964, Y. Maeta leg. (MNHAH); 1F, Oita Pref., Kokonoe Town, Yutsubo, 5. x. 1996, R. Matsumoto leg. (OMNH). RUSSIA: 1F (paratype of *A. genalis kasparyani*), Pigeon Cliff (Hassan), 8. ix. 1980, Gorokhov leg. (ZIS); 1F (paratype of *A. genalis kasparyani*), Khabarovsk Territory, Dormidontovka, 92 km south of Khabarovsk, meadow, 28. vii. 1978, Kasparyan leg. (ZIS). MONGOLIA: 1M (paratype of *A. genalis kasparyani*), Eastern. Aimag, p. Halhin-Gol, 33 km SW Somony Khalkhas Goal, 31.VIII, 1976 Kozlov leg. (ZIS).

**Distribution** (Fig. 1026). Japan (Hokkaido\*, Honshu and Kyushu\*); Mongolia, Russian Far East.

**Bionomics.** Unknown.

**Remarks.** Although this species was not treated in the study of *Apophua* in Russian Far East by Kuslitzky (2007), he described a new subspecies *A. genalis kasparyani* from Russian Far East. In the relative length of malar space, however, *A. maetai* and *A. genalis kasparyani* are identical ( $MSL/BWM = 1.0-1.1$ ), while the length in *A. genalis* (Moller, 1833) from Eurasia is obviously larger ( $MSL/BWM = ca. 1.5$ ). I have examined the types of *A. genalis kasparyani* and convinced that this subspecies should be synonymized under *A. maetai*.

*Apophua stena* (Momoi, 1963)

(Figs. 285, 296, 310, 321, 332, 343, 357, 358, 376-378)

*Glypta stenus* Momoi, 1963: 107.

*Apophua stena*: Townes, Momoi & Townes, 1965: 209; Yu & Horstmann, 1997: 95.

**Description. Female** (n=39). Body slender, its length 6.5–10.5 mm.

Head 0.6 times as long as wide. Clypeus 0.8 times as long as wide, its upper 0.3 punctate. Face 0.6 times as long as wide. MSL 0.8 times as long as BWM. OOD 1.4–1.6 times as long as OD. IOD 1.2–1.4 times as long as OD. Antenna with 44–47 flagellomeres. F1 2.0 times as long as F2.

Mesosoma. Lateral area of pronotum largely smooth ventral half. Epicnemial carina present laterally. Mesopleuron with a large speculum. Anterior transverse carina of propodeum complete on lateral section. Posterior transverse carina of propodeum complete. Lateral longitudinal carina of propodeum usually present, its median section sometimes partly absent. Lateromedian longitudinal carina of propodeum usually indistinct except for base, sometimes median section restricted by weak ridge. Fore wing length 6.5–7.5 mm, with vein *2m-cu* with two bullae. Hind wing with *Cu1* present, nebulous. Fore coxa without ridge (Fig. 310). Hind femur 6.0–6.4 times as long as maximum depth in lateral view. Hind TS1 2.5 times as long as TS2.

Metasoma punctate. Punctures on T1 to basal 0.5 of T4 slightly longitudinally striated by coalescent punctures. T1 1.4–1.5 times as long as maximum wide, its median dorsal carina nearly completely present, short median longitudinal keel absent (Fig. 332). T2 1.0 times as long as maximum wide (Figs. 332, 343). T2 and T3 with short median longitudinal keel except for posterior part (Figs. 332, 343). Ovipositor sheath 2.0–2.2 times as long as hind tibia.

Colouration (Figs. 285, 296, 321, 343). Body weakly polished by dark blue reflection. Head black except for: clypeus, mandible excluding tip yellow; palpi yellowish-brown; antenna dark brown. Mesosoma black except for: small spot before tegula on pronotum, tegula, apex of scutellum, hind margins of each axilla yellow. Wings hyaline with veins and stigma brown except for yellow wing base. Legs reddish-brown except for: apex of mid TS5, apex of claws, apex of hind femur, subbasal band and apical 0.2 of hind tibia, hind tarsus including claws dark brown; hind tibia excluding black area, hind tibial spur whitish-yellow. Metasoma black except for: membranous area of sternites, apex of subgenital plate whitish-yellow. Ovipositor reddish-brown. Black area of body sometimes more or less tinged dark blue. Mesosoma sometimes tinged with red. Malar space and postscutellum sometimes tinged with yellow. Subbasal black band of hind tibia sometimes erased. Metasomal tergites sometimes posteriorly or entirely tinged red.

**Male** (n=19). Similar to female. MSL 0.6 times as BWM; Flagellum with 42–44

segments. Subgenital plate with a long apodema sternalis, anterior margin slightly concave (Fig. 376). Inner margin of paramere strongly concave near basal inner angle (Fig. 357). Penis valve of aedeagus ca. 1.9 times as long as basal apodeme (Fig. 377). Ventral surface of pedicel yellow.

**Specimens examined.** JAPAN: 1F, Hokkaido Pref., Shimamatsu, 8. vii. 1965, K. Kusigemati leg. (KU); 1F, same locality and collector, 15. ix. 1967 (KU); 1F, Hokkaido Pref., Nakasatsunai, 8. viii. 1968, H. Torikura leg. (KU); 1F, Nopporo, 24. ix. 1963 (KU); 1F, Hokkaido Pref., Sapporo, 4. ix. 1968, S. Umezawa leg. (KU); 5F, same locality, 4. x. 1968, H. Torikura leg. (KU); 1M, same locality and collector, 28. viii. 1968 (KU); 3F, Hokkaido Pref., Akkeshi Town, Bekanbeshi marsh, 30. viii. 2003, R. Matsumoto leg. (MsT) (OMNH); 1M, Hokkaido Pref., Shibeche Town, Gojikkoku, 14. viii. 1996, T. Tachi leg. (OMNH); 1M, Hokkaido Pref., Ashoro Town, Kamishibetsu, 10. viii. 1996, T. Tachi leg. (OMNH); 1M, Hokkaido Pref., Chitose City, Tarumaesan, 27. vii. 1997, R. Matsumoto leg. (OMNH); 1F, Hokkaido Pref., Sapporo City, Hitsujigaoka (N43-00/ 141-24) (MsT), 29. x. – 5. xi. 2003, K. Konishi leg. (NIAES); 1M, Hokkaido Pref., Sapporo City, Misumai, Kannnon-zawa (MsT), 16-27. vii. 1992, M. Kuhara leg. (NIAES); 1F1M, Hokkaido Pref., Tomakomai City, Uenae, Utonai-ko, 5. viii. 2006, T. Yoshida leg. (KPMNH); 1F, Aomori Pref., Aomori City, Yokouchi-Yaegiku, 3. x. 1992, T. Ichita leg. (NIAES); 1F, Aomori Pref., Rokkasho Vil., Obuchinuma, 12. ix. 1993, T. Ichita leg. (NIAES); 1F, same locality and collector, 23. ix. 1995, T. Ichita leg. (NIAES); 1F, Aomori Pref., Aomori City, Sakaimatsu, 23. vii. 1993, T. Ichita leg. (NIAES); 1F, same locality and collector, 30. vii. 1993 (NIAES); 1F, same locality and collector, 6. viii. 1993 (NIAES); 1F, Aomori Pref., Shiura Vil., Aiuchi, 23. ix. 1994, T. Ichita leg. (NIAES); 1F, Aomori, Iwaki Town, Iwakisan, 4. ix. 1995, M. Sueyoshi leg. (OMNH); 4F, Tochigi Pref., Nasushiobara City, Nakashiobara, Tashiro (600m alt.) (MsT), 2-9. x. 2008, T. Matsumura leg. (3F, KPMNH; 1F, TUA); 1M, Tochigi Pref., Kuriyama Vil., Kawamata (LT), 29. vii. 1995, M. Yoshida leg. (NIAES); 2F, Ibaraki Pref., Tsuchiura City, Shishizuka-Oike (MsT), 2-16. x. 1989, M. Sharkey leg. (NIAES); 1M, Saitama Pref., Ogano, Moriyado, 6. vii. 1988, T. Nambu leg. (NIAES); 1F, Saitama Pref., Kodama Town, Jyuniten-ike, 3. xi. 1989, T. Nambu leg. (NIAES); 1F, Tokyo Pref., Kodaira, 10. x. 1970, J. Minamikawa leg. (NIAES); 1M, Kanagawa Pref., Yamakita Vil., Myojin-yama 1200m, 20. ix. 2000, H. Nagase leg. (KPMNH); 1F, Kanagawa Pref., Yugawara Town, Okuyugawara, 29. ix. 2010, R. Kaga leg. (KPMNH); 1M, Yamanashi Pref., Yamato Vil., Yunosawa toge, 18. vii. 1996, T. Tachi leg. (OMNH); 1M, Ishikawa Pref., Komatsu City, Ohara, 14. ix. 1986, I. Togashi leg. (NIAES); 1F, Ishikawa Pref., Kawachi Vil., Fukuoka, 26. ix. 1989, I. Togashi leg. (NIAES); 1M, Nara Pref.,

Kamikitayama Vil., Wasamatayama, 27. vii. 1995, M. Sueyoshi leg. (OMNH); 1F, Tottori Pref., Daisen Town, Daisen, 8. vii. 1994, R. Matsumoto leg. (OMNH); 1F, Fukuoka Pref., Mt. Hiko, 24–26. x. 1979, K. Maeto leg. (NIAES); 2M, Fukuoka Pref., Fukuoka City, Sefuriyama, 13. ix. 1996, R. Matsumoto leg. (OMNH); 1M, same locality, 12. vi. 1998, T. Tachi leg. (OMNH); 1M, same locality, 24. vi. 1994, R. Matsumoto leg. (OMNH); 1M, same locality and collector, 26. vi. 1994 (OMNH); 1M, same locality and collector, 5. ix. 1996 (OMNH); 1F, Oita Pref., Shonai Town, Asono, 10. x. 1995, R. Matsumoto leg. (OMNH); 2F, Oita Pref., Kakonoe Town, Yutsubo, 5. x. 1996, R. Matsumoto leg. (OMNH); 1M, Kumamoto Pref., Izumi Vil., Momiki, 18. vii. 1994, R. Matsumoto leg. (OMNH).

**Distribution** (Fig. 1027). Japan (Hokkaido, Honshu and Kyushu\*); China, Russian Far East.

**Bionomics.** Unknown.

**Remarks.** This species may be confused with *A. bipunctoria* and *A. honmai*, but it can be distinguished from them by the following combination of character states: yellow area of upper margin of pronotum always present as a small spot anterior to tegula (usually present as a yellow stripe along upper margin in *A. bipunctoria* and *A. honmai*), female MSL 0.8 times as long as BWM (0.5–0.7 in female *A. bipunctoria*, 0.9 in female *A. honmai* and 0.5–0.6 in male *A. honmai*), and T1 1.4–1.5 times as long as wide (1.2–1.4 in *A. bipunctoria*, 1.6–1.9 in *A. honmai*).

*Apophua sugaharai* Momoi, 1978

(Figs. 286, 297, 311, 322, 333, 344, 359, 360, 379–381)

*Apophua sugaharai* Momoi, 1978: 9.

**Description. Female** (n=5). Body slender, its length 9.0–10.0 mm.

Head 0.6 times as long as wide. Clypeus 0.8 times as long as wide, its upper 0.6–0.7 punctate. Face 0.6–0.7 times as long as wide. MSL 0.7 times as long as BWM. OOD 1.6 times as long as OD. IOD 1.6 times as long as OD. Antenna with 44–47 flagellomeres. F1 2.0 times as long as F2.

Mesosoma. Lateral area of pronotum largely smooth ventral 0.5. Epicnemial carina present laterally. Mesopleuron with a large speculum. All carinae of propodeum present but median section of lateromedian longitudinal carina and lateral longitudinal carina more or less obscured and restricted by weak ridge or sometimes absent. Fore wing length 7.5–8.5 mm, with vein *2m-cu* with two bullae. Hind wing with *Cu1* present,

nebulous. Fore coxa without ridge (Fig. 311). Hind femur 6.4–6.5 times as long as maximum depth in lateral view. Hind TS1 2.5 times as long as TS2.

Metasoma punctate, shiny by reflection. Punctures on T1 to basal 0.5 of T4 slightly longitudinally striated by coalescent punctures. T1 1.4 times as long as maximum wide, its median dorsal carina nearly completely present (Fig. 333), short median longitudinal keel sometimes present posteriorly. T2 1.0 times as long as maximum wide, short median longitudinal keel present only at base (Figs. 333, 344). T3 with short and weak median longitudinal at base (Figs. 333, 344). Ovipositor sheath 2.2–2.3 times as long as hind tibia.

Colouration (Figs. 286, 297, 322, 344). Body rather strongly polished by dark blue reflection. Head black except for: clypeus, mandible excluding tip, malar space along mandible, narrow ventral spot on apex of pedicel, palpi yellow to yellowish-brown; antenna sometimes tinged with dark brown except for yellow area. Mesosoma black except for: upper margin of pronotum excluding median part, tegula, subtegular ridge, scutellum excluding basal spot, postscutellum, hind margins of each axilla, transverse stripe on propodeum along posterior transverse carina yellow. Wings hyaline with veins and stigma brown except for yellow wing base. Legs reddish-brown except for: fore and mid coxae, trochanters and trochantellus, dorsal part of hind coxa, hind trochanter yellow; mid TS5, ventral part of apex of hind coxa, hind trochantellus, base and apex of hind femur, subbasal band and apical 0.2 of hind tibia, hind tarsus including claw blackish-brown; hind tibia excluding brown area, hind tibial spur whitish-yellow. Metasoma black except for: posterior margin of T4-T7, membranous area of sternites, apex of subgenital plate whitish-yellow. Ovipositor reddish-brown. Yellow stripe on propodeum sometimes small in size.

**Male** (n=5). Similar to female. MSL 0.6; OOD 1.2–1.4 times as long as OD; IOD 1.4 times as long as OD. Subgenital plate with a long apodema sternalis, anterior margin slightly concave (Fig. 379). Inner margin of paramere strongly concave near basal inner angle (Figs. 359, 381). Penis valve of aedeagus ca. 1.5 times as long as basal apodeme (Fig. 380). Ventral surface of scape and pedicel yellow.

**Specimens examined.** JAPAN: 1M (paratype), Hokkaido Pref., Bibai, 1. ix. 1961, K. Kamijo leg. (MNHAH); 1F, Hokkaido Pref., Shimamatsu, 8. vii. 1965, K. Kusigemati leg. (KU); 2M, Hokkaido Pref., Akkeshi Town, Bekanbeshi marsh, 1-31. viii. 2003, R. Matsumoto leg. (MsT) (OMNH); 1F, Hokkaido Pref., Ashoro Town, Kamishibetsu, 17. viii. 1996, T. Tachi leg. (OMNH); 1F (holotype), Iwate Pref., Wakare, 22. vi. 1968, T. Oku leg., (host: *Ptycholoma circumclusana*) (MNHAH); 1M, Mt. Gassan, 2. ix. 1966, K. Kusigemati leg. (KU); 1F, Tokushima Pref., Ichiu Vil., Mt. Tsurugisan (1500m), 16. x.

1980, H. Takemoto leg. (NIAES); 1F, same data excluding T. Goto leg. (NIAES); 1F, Ehime Pref., Mt. Odamiyama, Mt. Mizuashiyama, 6. viii. 1994 (LT), E. Yamamoto leg. (NIAES).

**Distribution** (Fig. 1027). Japan (Hokkaido, Honshu and Shikoku\*).

**Bionomics.** The following tortricid hosts were recorded in Japan: *Ptycholoma lecheana circumclusana* (Treitschke) and *Pandemis heparana* (Denis & Schiffermüller) (Momoi, 1978), *Acleris alnivora* Oku (Nakaya, 2002), and *Adoxophyes orana fasciata* Walsingham (Nakaya, 2009).

**Remarks.** This species resembles *A. honmai*, but it can be distinguished from the latter by the posterior margin of T4-T7 each with a conspicuous white band (without white band in *A. honmai*).

*Apophua tobensis* (Uchida, 1928)

(Figs. 287, 298, 312, 323, 334, 345)

*Glypta bipunctoria* var. *tobensis* Uchida, 1928: 75.

*Glypta bipunctoria*: Momoi & Kamijo, 1963: 56.

*Apophua tobensis*: Momoi, 1965: 81; Townes, Momoi & Townes, 1965: 209; Yu & Horstmann, 1997: 95.

**Description. Female** (n=5). Body robust, its length 10.0–12.0 mm.

Head 0.6 times as long as wide. Clypeus 0.7–0.8 times as long as wide, its upper 0.5 punctate. Face 0.6 times as long as wide. MSL 0.7 times as long as BWM. OOD 1.4 times as long as OD. IOD 1.4 times as long as OD. Antenna with 47–48 flagellomeres. F1 2.0 times as long as F2.

Mesosoma. Lateral area of pronotum largely smooth ventral 0.5. Epicnemial carina present laterally. Mesopleuron with a large speculum. Anterior transverse carina of propodeum complete on lateral section. Posterior transverse carina of propodeum complete. Lateral longitudinal carina of propodeum present, its median section sometimes partly absent. Lateromedian longitudinal carina of propodeum usually indistinct except for base, sometimes median section reduced as weak ridge. Fore wing length 8.0–8.5 mm, with vein *2m-cu* with two bullae. Hind wing with *Cu1* present, nebulous. Fore coxa without ridge (Fig. 312). Hind femur 6.5–6.6 times as long as maximum depth in lateral view. Hind TS1 2.5 times as long as TS2.

Metasoma punctate. Punctures on T1 to basal 0.5 of T4 slightly longitudinally striated by coalescent punctures. T1 1.4 times as long as maximum wide, its median

dorsal carina nearly completely present, short median longitudinal keel sometimes present posteriorly (Fig. 334). T2 0.9–1.0 times as long as maximum wide (Figs. 334, 345). T2 and T3 with short median longitudinal keel except for posterior part (Figs. 334, 345). Ovipositor sheath 2.9–3.0 times as long as hind tibia.

Colouration (Figs. 287, 298, 323, 345). Body weakly polished by dark blue reflection. Head black except for: clypeus, mandible excluding tip, malar space along mandible, ventral apex of pedicel yellow; palpi yellowish-brown; antenna sometimes tinged with dark brown. Mesosoma black except for: upper margin of pronotum excluding median part, tegula, scutellum excluding basal spot, postscutellum, hind margins of each axilla yellow. Wings hyaline with veins and stigma brown except for yellow wing base. Fore and mid legs yellowish-brown except for fore coxa partly tinged pale yellow. Hind leg dark brown except for dorsal surface of coxa, trochanter, trochantellus, base of tibia, tibial spur more or less tinged yellow. Metasoma black except for: membranous area of sternites, apex of subgenital plate whitish-yellow. Ovipositor reddish-brown. Subtegular ridge sometimes tinged with yellow. Fore and mid coxae, trochanters and trochantelli sometimes entirely pale yellow.

**Male.** Not examined, but see male specimens examined by Momoi (1965) and deposited in SEHU.

**Specimens examined.** JAPAN: 1F, Hokkaido Pref., Sapporo City, Hokkaido University, 27. vii. 1996, M. Matsuda leg. (KPMNH); 1F, Aomori Pref., Aomori City, Kasamatsu-touge, 15. viii. 1992, T. Ichita leg. (NIAES); 1F, Nagano Pref., Hiziri highland, 2. viii. 1965, S. Katsuya leg. (NIAES); 1F (lectotype), Mie Pref., Toba, 22. vi. 1922, M. Yanagihara leg. (SEHU); 1F, Okayama Pref., Chuka Vil., Tsuguro, 10. vii. 1993, R. Matsumoto leg. (OMNH).

**Distribution** (Fig. 1027). Japan (Hokkaido, Honshu and Shikoku); Russian Far East.

**Bionomics.** The following tortricid hosts were recorded in Japan: *Archips oporanus* (Linnaeus), *Archips pulcher* (Butler), *Homona issikii* Yasuda (Momoi, 1965), and *Choristoneura diversana* (Hübner) (Kamijo, 1973).

**Remarks.** This species resembles *A. yamato*, but it can be distinguished from the latter by the length of ovipositor sheath 2.9–3.0 times as long as hind tibia (1.9–2.0 times in *A. yamato*), the hind coxa with a yellow marking dorsally (Fig. 323) (without yellow marking dorsally in *A. yamato*; Fig. 324), and the median dorsal carina of T1 at least present in basal 0.6 (Fig. 334) (largely obsolete posteriorly, distinct area shorter than basal 0.5 in *A. yamato*; Fig. 335).

***Apophua yamato* sp. nov.**

(Figs. 288, 289, 300, 313, 324, 335, 346)

**Description. Female** (n=3). Body robust, its length 9.5 mm.

Head 0.6 times as long as wide. Clypeus 0.8 times as long as wide, its upper 0.5 punctate. Face 0.5–0.6 (HT: 0.5) times as long as wide. MSL 0.8 times as long as BWM. OOD 1.3–1.4 (HT: 1.3) times as long as OD. IOD 1.3 times as long as OD. Antenna with 49–50 (HT: 49) flagellomeres. F1 2.0 times as long as F2.

Mesosoma covered with dense, fine punctures. Lateral area of pronotum largely smooth ventral 0.2–0.3. Epicnemial carina present laterally. Mesopleuron with a small speculum. Anterior transverse carina of propodeum complete on lateral section. Posterior transverse carina of propodeum complete. Lateral longitudinal carina of propodeum weakly present. Lateromedian longitudinal carina of propodeum usually indistinct, sometimes median section restricted by weak ridge. Fore wing length 8.5 mm, with vein *2m-cu* with two bullae. Hind wing with *Cu1* present, nebulous. Fore coxa without ridge (Fig. 313). Hind femur 6.3–6.9 (HT: 6.9) times as long as maximum depth in lateral view. Hind TS1 2.5–2.7 (HT: 2.7) times as long as TS2.

Metasoma punctate. Punctures on T1 to basal 0.5 of T4 slightly longitudinally striated by coalescent punctures. T1 1.5 times as long as maximum wide, its median dorsal carina largely obsolete posteriorly, distinct area shorter than basal 0.5, short median longitudinal keel sometimes present posteriorly (Fig. 335). T2 1.0 times as long as maximum wide (Figs. 335, 346). T2 and T3 with short median longitudinal keel except for posterior part (Figs. 335, 346). Ovipositor sheath 1.9–2.0 (HT: 1.9) times as long as hind tibia.

Colouration (Figs. 288, 289, 300, 324, 346). Body weakly polished by dark blue reflection. Head black except for: clypeus, mandible excluding tip, malar space along mandible, ventral apex of pedicel yellow; palpi yellowish-brown; antenna sometimes tinged with dark brown. Mesosoma black except for: upper margin of pronotum excluding median part, tegula, scutellum excluding basal spot, postscutellum, hind margins of each axilla yellow. Wings hyaline with veins and stigma brown except for yellow wing base. Fore and mid legs yellowish-brown except for fore and mid coxae partly tinged brown. Hind leg dark brown except for trochanter and trochantellus, base of tibia yellowish-brown: basal 0.7–0.8 of hind tibia more or less tinged with yellow ventrally. Metasoma black except for: membranous area of sternites, apex of subgenital plate whitish-yellow. Ovipositor reddish-brown.

**Male.** Unknown.

**Type series.** JAPAN: [Holotype] F, Nagano Pref., Shimashimadani, 14. x. 1982, T. Goto



leg. (NIAES). [Paratypes] 1F, same data of holotype (NIAES); 1F, Yamanashi Pref., Hirogawara, 2. viii. 1995, T. Tachi leg. (OMNH).

**Distribution** (Fig. 1027). Japan (Honshu).

**Etymology**. This species is named after “Yamato”, which is an old name of Japan.

**Bionomics**. Unknown.

**Remarks**. This species may be confused with *A. tobensis*, but it can be distinguished by the character states shown in the Remarks of *A. tobensis*.

### Discussion about *Apophua*

The hosts of *Apophua* are relatively well known in the Glyptini. In Japan, all of the known hosts belong to the subfamily Tortricinae of the family Tortricidae (Table 5), while the host records of *A. bipunctoria* and *A. evanescens* include not only such hosts but also the subfamily Olethreutinae of Tortricidae and the families Coleophoridae, Gelechiidae, Lasiocampidae, Nolidae and Yponomeutidae in the Eurasia (Yu *et al.*, 2012). Hosts of Japanese species of *Apophua* are usually polyphagous and some of them use both broadleaved and coniferous trees (Table 5). *A. bipunctoria*, *A. evanescens*, *A. honmai* and *A. sugaharai* are somewhat biased to broadleaf-feeding hosts, whereas *A. tobensis* is strongly biased to conifer-feeding hosts (Table 5).

Each three Japanese species of *Apophua*, *A. aquilonia*, *A. elegans* and *A. kikuchii*, has its own unusual character state. *A. aquilonia* shows the convexity of fore coxa (Figs. 302, 303), which is only occasionally found in *Glypta*. *A. elegans* has a strong median longitudinal carina on T2 and T3 (Fig. 327), which is also found in some Oriental species of *Apophua* (e.g., *A. formosana*). Although male genitalia of this species is unknown to me, Chiu (1965) described it. According to her study, male genitalia of *A. formosana* is similar to that of other Japanese species of *Apophua* excluding *A. kikuchii*.

*A. kikuchii* bears many interesting character states, i.e., the number of flagellomeres much fewer than in other Japanese species (Table 4), the propodeal carinae strong and complete, the convex anterior margin of male subgenital plate (Fig. 370), and the weak concavity of inner margin of paramere (Fig. 353). Most other species (*A. bipunctoria*, *A. evanescens*, *A. honmai*, *A. stena*, *A. sugaharai*, *A. tobensis*, *A. yamato*) are lacking such remarkable character states as mentioned above. By the result of this study, *A. kikuchii* has been proved to be peculiar in *Apophua*. It also resembles *A. karenkona* from Taiwan (see Remarks of *A. kikuchii*), and thus generic position of both species should be revised.

Genus *Glypta* Gravenhorst, 1829 s. lat.

**Taxonomic problems of *Glypta* and its subgenera**

*Glypta* is the largest genus of the tribe Glyptini, having more than 400 described species in the world (Yu *et al.*, 2012). Förster (1869) proposed two genera related to *Glypta*, *Conoblasta* Förster, 1869, and *Diblastomorpha* Förster, 1869, based on the number of horns on frons (i.e., *Conoblasta* with a single horn between antennal sockets and *Diblastomorpha* with a pair of horns above antennal sockets). They have been synonymized under *Glypta*, whereas two opinions are still present to treat them as subgenera of *Glypta* (Schmiedeknecht, 1934; Kuslitzky, 1974a, 2007; Aubert, 1978) or not (Townes 1970b; Gauld *et al.*, 2002; Yu *et al.*, 2012).

The subgenus *Diblastomorpha* sensu Aubert (1978) and Kuslitzky (1974a, 2007) is only found from the Palaearctic region, containing three species, *Glypta* (*D.*) *biauriculata* Strobl, 1901, *G. (D.) cylindrator* (Fabricius, 1787), and *G. (D.) delicatula* Kuslitzky, 2007 (Kuslitzky, 2007). In Japan, all these species were recorded with only a few specimens from South Kuril Islands (Kuslitzky, 2007; Kasparyan *et al.*, 2012). Recently, I found additional specimens of *G. (D.) biauriculata* and *G. (D.) cylindrator* from Hokkaido and Honshu. In this study, I redescribe these two species and discuss their taxonomic status within the tribe Glyptini.

The subgenus *Conoblasta* sensu Aubert (1978) and Kuslitzky (1974a, 2007) is found from the Palaearctic, Nearctic, and Oriental regions, comprising about one-fourth to one-third of the species of *Glypta*. In Japan, six species of *Glypta*, *G. acares* Momoi 1965, *G. biauriculata*, *G. cymolomia* Uchida 1932, *G. delicatula*, *G. kamijoi* Momoi 1966, and *G. tumor* Momoi 1970, have been classified into the subgenus *Conoblasta* (Momoi 1963, 1965, 1966, 1970; Kuslitzky 2007), but the monophyly of the subgenus should be suspected as discussed below.

Genus *Diblastomorpha* Förster, 1869

*Diblastomorpha* Förster, 1869: 165.

Type-species: *Glypta bicornis* Boie, 1850 (= *Ichneumon cylindrator* Fabricius, 1787), by original designation.

**Description.** Head strongly elongated ventrally (Figs. 382, 383, 402). Clypeus roundly

convex in lateral view (Fig. 383). Anterior tentorial pit apparently absent, barely present as shallow depression (Figs. 382, 383). Supraclypeal suture slightly present (Figs. 382, 383). Face slightly convex medially. Frons flat, covered with strong irregular rugose, usually with distinct horn-like projection (Figs. 382-385, 403). Mandible with a narrow ventral flange excluding apical 0.1 (Fig. 386). Upper part of occipital carina complete or narrowly obscured medially; lower part of occipital carina complete, connected to hypostomal carina at base of mandible or slightly distant from it.

Mesosoma. Posterior transverse carina of propodeum complete (Figs. 393, 395). Anterior transverse and lateral longitudinal carinae of propodeum absent (Figs. 393, 395). Propodeal spiracle elongated (Figs. 393, 394). Junction of vein *Cu1* and vein *Cu-a* distant from junction of vein *Rs+M* and vein *M+Cu* by width of these veins. Vein *Rs+2r* arisen basal 0.4 of stigma. Vein *Rs* almost straight. *2m-cu* with one long bulla. Hind wing with abscissa of vein *Cu1* of between vein *M* and vein *cu-a* 2.5–5.0 times as long as *cu-a*. Fore coxa weakly curved, without weak ridge (Figs. 388, 389). Hind tarsal claw distinctly longer than arolium, twisted near apex, pectinate with short and narrow teeth (Figs. 390-392).

Metasoma. Lateral sides of tergites largely parallel in dorsal view (Fig. 395). Ovipositor sheath longer than hind tibia.

**Distribution.** Palaearctic region.

**Bionomics.** Parasitoids of the Tortricidae and other lepidopterous families.

**Remarks.** *Diblastomorpha* can be easily distinguished from other genera of Glyptini by the following character states: frons usually with a pair of tubercle horns above each antennal socket (Figs. 382-384); tarsal claw long, twisted near apex (Figs. 390-392); propodeal spiracle elongated (Figs. 393, 394); and areolet absent. This genus contains only one species, *D. cylindrator*, redescribed below.

*Diblastomorpha cylindrator* (Fabricius, 1787)

(Figs. 382-403)

*Ichneumon cylindrator* Fabricius, 1787: 266.

*Diblastomorpha bicornis* ab. *sachalinensis* Uchida, 1928: 76 (= *Glypta bicornis sachalinensis* Townes, Momoi & Townes, 1965: 210).

*Glypta capra* Kuslitzky, 1974b: 1264.

See Yu *et al.* (2012) for other synonymies.

**Description. Female** (n=30). Body length 7.0–12.0 mm.

Head 0.6 times as long as wide. Clypeus 0.7 times as long as wide. Face 0.5–0.6 times as long as wide. OOL 1.6–2.0 times as long as OD; POL 1.6–1.8 times as long as OD. Vertex and gena finely punctate. MSL 1.5 times as long as BWM. Antenna with 38–42 flagellomeres. F1 2.0 times as long as F2.

Mesosoma punctate. Punctures on lateral lobes of mesoscutum (excluding near notaulus) separated by 0.4–2.5 (usually ca. 1.0) times their diameter. Lateral area of pronotum entirely punctate. Both sides of mesoscutum near tegula weakly produced posteriorly (Fig. 387). Fore wing length 6.0–8.0 mm. Hind femur 5.7–6.5 times as long as maximum depth in lateral view. Hind TS1 2.0–2.1 times as long as TS2; TS3 1.1–1.3 times as long as TS5.

Metasoma. T1 1.3–1.4 times as long as maximum width, its median dorsal carina present ca. basal 0.3–0.4 (Fig. 395). T2 0.9–1.0 times as long as maximum width. T2–T4 densely punctate. Ovipositor sheath 0.8–1.0 times as long as fore wing, 2.0–2.2 times as long as hind tibia.

Colouration (Figs. 401–403). Body (excluding wings and legs) black, except for: apex of clypeus and palpi yellowish-brown, tip of mandible tinged with reddish-brown, sometimes clypeus and mandible largely yellow; scape, pedicel and dorsal surface of flagellum blackish-brown; ventral surface of flagellum yellowish-brown; mesosoma, especially scutellum, sometimes tinged with red, tegula yellow; metasomal tergite variously tinged with red, posterior margin of T1–T7 narrowly red to metasoma entirely red except for posterior segment(s), usually median areas of T2 and T3 more or less largely tinged with red; membranous part of sternites whitish-yellow; ovipositor reddish-brown to yellowish-brown. Wings hyaline; veins and stigma yellowish-brown to brownish-yellow. Legs yellowish-brown; apex of hind tibia and hind tarsus usually tinged with brown; all coxae usually black.

Variation. Body punctures often denser than normal condition; horn of frons sometimes absent (16/30); propodeum often covered with rugae along posterior transverse carina (14/30).

**Male** (n=42). Similar to female. Clypeus 1.0 times as long as wide. Face and clypeus covered with silver sub-erect setae. Anterior tentorial pit present, small. Supraclypeal suture obscured. OOL 1.4 times as long as OD. POL 1.4 times as long as OD. MSL 1.0–1.5 times as long as BWM. T1 1.7 times as long as maximum width, its median dorsal carina obsolete posteriorly present on behind half-length of tergite. with a long apodema sternalis, posterior margin weakly convex (Fig. 397). Apical margin of paramere roundly produced (Figs. 397, 398). Dorsal margin of paramere with a convexity apically (Figs. 397, 398, 400). Apical part of digitus strongly bend ventrally

(Fig. 400). Aedeagus more or less curved (Fig. 399). Penis valve of aedeagus ca. 1.5 times as long as basal apodeme (Fig. 399). Clypeus entirely yellow. Mandible yellow except for brown tip.

**Specimens examined.** JAPAN: 1F, Hokkaido Pref., Ikeda, 1. viii. 1967, T. Kocho leg. (KU); 15M, Hokkaido Pref., Akkeshi Town, Bekanbeushi marsh, 12–31. vii. 2003, R. Matsumoto leg. (MsT.) (OMNH); 1F4M, same locality and collector, 1. viii. 2003 (OMNH); 14F18M, same locality and collector, 1–31. viii. 2003 (MsT.) (OMNH); 1F1M, same locality and collector, 31. viii. 2003 (MsT.) (OMNH); 1F, Hokkaido Pref., Shikotan Is., 5 km SW. Krabozavodska, 15.VIII 1973, Kasparyan leg. (ZIS); 1F1M, Hokkaido Pref., Shikotan Is., Bay Church, 16. viii. 1973, Kasparyan leg. (ZIS); 2F, Malokurilskoye, Shikotan Is., 21. viii. 1973, Kasparyan leg. (ZIS). RUSSIA: 1F (lectotype of *bicornis sachalinensis* Uchida, 1928), “Sakhalin, Matsumura”, “Ichinosawa, July 25, 24” (SEHU); 3F, Pushkin, 22 km S., Leningrad, 30. vii. 1972, Kasparyan leg. (ZIS); 1F1M, Pavlovsk, 27 km S., Leningrad, 28. vii. 1969, Kasparyan leg. (1F, ZIS; 1M, AEI, data without “27 km S.”). ARMENIA: 2F (holotype and paratype of *G. capra*), Армения, Цав, Кафанский р-н, цветущий зспарцет, 4. vii. 1971, Kuslitzky leg. (holotype, ZIS; paratype, AEI). GERMANY: 1M, Berchtesgaden, Jennermassiv, 1200m, 25. vi. 1947 (AEI); 1F, same locality, 5. vii. 1947 (AEI).

**Distribution** (Fig. 1028). Japan (Shikotan Is. and Hokkaido\*); Russian Far East to Europe.

**Bionomics.** The following thirteen insects were recorded as hosts in Europa (Yu *et al.*, 2012): *Anacamptis populella* (Clerck), *Triedris paleana* (Hubner) [Lepidoptera: Tortricidae], *Chortodes elymi* (Treitschke), *Oligia strigilis* (Linnaeus), *Panolis flammea* (Denis & Schiffermuller), *Photedes minima* (Haworth) [Lepidoptera: Noctuidae], *Ochsenheimeria taurella* (Denis & Schiffermuller) [Lepidoptera: Yponomeutidae], *Pleuroptya ruralis* (Scopoli) [Lepidoptera: Crambidae], *Scotopteryx chenopodiata* (Linnaeus), *Scotopteryx luridata plumbaria* (Hufnagel) [Lepidoptera: Geometridae], *Thaumetopoea processionea* (Linnaeus) [Lepidoptera: Thaumetopoeidae], *Gymnocheta viridis* (Fallen) (?) [Diptera: Tachinidae], and *Saperda populnea* (Linnaeus) (?) [Coleoptera: Cerambycidae], while the records other from tortricids should be reconfirmed.

**Remarks.** This species has been classified into four subspecies, *G. c. cylindrator* (Fabricius, 1787), *G. c. nigerrima* (Schmiedeknecht, 1934) and *G. c. rufescens* (Schmiedeknecht, 1934) from Europe, and *G. c. sachalinensis* (Townes, Momoi & Townes, 1965) from the Russian Far East, based only on the colouration especially on metasoma. Because of a large and rather continuous colour variation over the

distribution range, however, I could not discriminate these subspecies successfully. Within Japan, no marked body colour variation is observed (n=55).

### **Discussion about *Diblastomorpha***

The type species of the genus *Diblastomorpha*, *D. cylindrator*, has some unique character states within the tribe Glyptini, i.e., 1) frons covered with irregular rugae (Figs. 382, 384, 385), 2) a pair of horns on frons in “tubercle form”, not in “laminated form” as in many *Glypta* (Figs. 382-385), 3) tarsal claw long, twisted near apex (Figs. 390-392), and 4) propodeal spiracle elongated (Figs. 393, 394). On the other hand, two other species previously placed under the subgenus *Diblastomorpha*, *biauriculata* and *delicatula*, share a pair of characteristic lamellae above the antennal sockets (Fig. 404), that is morphologically similar to a horn-like structure related with lamellae on frons in many other *Glypta*, not like a growth of rugae in *D. cylindrator* (Figs. 382-385). Thus, it is most likely that the origins of the paired horns in *D. cylindrator* and that in *biauriculata* and *delicatula* are different. Furthermore, no shared apomorphic states are found in *D. cylindrator* and two other species. Therefore, I restore the status of *Diblastomorpha* from subgenus to genus, containing a single species *D. cylindrator*, and change the taxonomic position of *biauriculata* and *delicatula* from subgenus *Diblastomorpha* to the strict genus *Glypta*.

#### Genus *Glypta* Gravenhorst, 1829 **s. str.**

*Glypta* Gravenhorst, 1829: 3.

Type species: *Glypta sculpturata* Gravenhorst, 1829, designated by Westwood (1840).

*Conoblasta* Förster, 1869: 165.

Type species: *Glypta ceratites* Gravenhorst, 1829, designated by Viereck (1914).

*Hemiephialtes* Ashmead, 1906: 177.

Type species: *Hemiephialtes glyptus* Ashmead, 1906, by original designation.

*Foveoglypta* Hellén, 1915: 57.

Type species: *Glypta (Foveoglypta) monstrosa* Hellén, 1915 (= *Glypta vulnerator* Gravenhorst 1829), by original designation.

**Diagnosis.** Anterior tentorial pit present and usually small. Supraclypeal suture slightly to strongly present. Frons usually with transverse rugae above each antennal socket (Figs. 599, 601). Occiput without strong concavity. Antenna without a median white band.

Epomia usually weak or sometimes absent, or if strong, its dorsal end not enlarged. Epicnemial carina present. Propodeal spiracle rounded (Fig. 614). Areolet and vein *3rs-m* of fore wing completely absent. Hind wing with abscissa of vein *Cu1* of between vein *M* and vein *cu-a* less than 5.0 times as long as *cu-a*. Fore tibial spur shorter than 0.5 times of TS1 (Figs. 615, 617). Hind tarsal claw not twisted near apex, pectinate (Figs. 622–624). T1 with a pair of dorsolateral longitudinal carinae and with or without sharp lateral teeth at base (Figs. 696–749). T5–T7 not reduced (e.g. Fig. 505).

**Distribution.** Palaearctic, Oriental, Nearctic and Neotropical regions.

**Bionomics.** Parasitoids of the Tortricidae and other lepidopterous families.

**Remarks.** *Glypta* is one of the largest genera of Ichneumonidae. Its morphological characters often show a very large range of continuous variations and thus this is called a “waste-box group” in Glyptini. Here I propose two species groups of *Glypta* as below, which were treated as subgenera in Aubert (1978) and Kuslitzky (1974, 2007).

### Key to species groups of the genus *Glypta*

1. Frons with a horn or projection(s) (Figs. 404–456). [Frons with a transverse crease above each antennal socket, which is often modified into a median horn between each antennal socket or a pair of projections above antennal sockets.]  
 .....*Conoblasta* species group
- . Frons without any projection(s) (Figs. 2, 3). [Frons sometimes with a transverse crease above each antennal socket but not formed into projection(s).].....*Glypta* species group

### The *Conoblasta* species group

**Description based on Japanese species.** Body punctate, covered with silver setae, its length 7.0–14.0 mm.

Head weakly elongated ventrally. Lower margin of clypeus convex in anterior view. Anterior tentorial pit small. Supraclypeal suture shallow. Frons flat to slightly convex in lateral view, with transverse crease above each antennal socket, this crease modified into a median horn between each antennal socket (Fig. 1 B–Q) or a pair of projection above each antennal socket (Fig. 1A). Upper part of occipital carina more or less incomplete (Fig. 1A–Q). Lower part of occipital carina complete, its lower end connected to hypostomal carina at base of mandible (Fig. 2 A–Q). Vertex and gena finely punctate. Occiput not concave, smooth. Subocular groove absent.

Mesosoma. Notaulus slightly present anteriorly, usually indistinct. Epicnemial carina present. Mesopleuron with a large speculum. Sternaulus defined as shallow concavity on anteriorly. Posterior transverse carina of mesosternum absent. Pleural carina of propodeum complete, sometimes weak. Posterior transverse carina of propodeum at least partly present. Propodeal spiracle round. Fore wing length 6.0–11.5 mm. Junction of vein *Cu1* and vein *Cu-a* distinctly distant from junction of vein *Rs+M* and vein *M+Cu*. Areolet absent. Pterostigma receiving vein *Rs+M* medially. Hind wing with abscissa of vein *Cu1* between vein *M* and vein *cu-a* 2.0–5.0 times as long as *cu-a*. *Cu1* present, nebulous. Fore tibial spur shorter than half length of fore TS1. Tarsal claw longer than arolium, apex not twisted, pectinate from base to near apex (teeth arising on inner side), teeth short.

Metasoma. Metasomal tergites largely parallel-sided in dorsal view, width of T5 only slightly less than T2–T4. Median dorsal carina of T1 complete anteriorly, absent posteriorly (Figs. 517, 542). Dorsolateral carina of T1 present, usually complete, sometimes incomplete near spiracle. Oblique grooves on T2–T4 present (Figs. 517, 542). Ovipositor longer than hind tibia (e.g., Fig. 505). Apical part of upper valve of ovipositor without a distinct dorsal tubercle before notch.

Male subgenital plate with apodema sternalis strongly projecting (Fig. 8 A, D, G, J, M). Inner margin of paramere concave near basal inner angle (Fig. 9 A–J). Apex of aedeagus not strongly projecting beyond apex of paramere (Fig. 9 A–J). Aedeagus weakly curved, its basal apodeme ca. 0.5 times total length of aedeagus (Fig. 8 C, F, I, L, O).

Sexual dimorphism. Punctuation on body of males sparser than females. Colouration of males more or less paler than females.

**Distribution.** Palaearctic, Oriental and Nearctic regions.

**Remarks.** I have examined the type species of the genus *Conoblasta*, *G. ceratites* Gravenhorst 1829, deposited in AEI (1F, det. by G. Heinrich) and ZIS (1F, det. by D. Kasparyan) to confirm that the above diagnosis based on Japanese species is consistent with the character states of the type species. Among Japanese species, *G. zenibakoensis* most resembles *G. ceratites* (see Remarks under *G. zenibakoensis*).

#### **Key to Japanese species of the *Conoblasta* species group (♀)**

1. Scutellum yellow (Fig. 541). Dorsolateral carina of T1 incomplete (Fig. 542). T2–T4 each with a pair of strong and deep oblique grooves (Fig. 542). Hind coxa and femur largely reddish-brown (Fig. 539). Hind tarsus blackish-brown to black except for



base of TS1 (Fig. 473). Larger species, body length 11.0–14.0 mm. .....	<i>G. tumor</i> Momoi, 1970
- Scutellum black. T2-T4 each with a pair of moderate oblique grooves (Fig. 517). Colouration of hind leg various. Smaller species, body length less than 10.5 mm. ....	2
2(1). Frons with a pair of projections above each antennal socket (Fig. 404).....	3
- Frons with a median projection between each antennal socket (Figs. 405-421).....	4
3(2). Frons with a horn-like lamella above each antennal socket (Fig. 404). Both sides of mesoscutum near tegula strongly produced posteriorly. Tegula black (Fig. 505) or sometimes tinged with yellow in male. Coxae (at least hind coxa) and hind femur black (Figs. 457, 505).....	<i>G. biauriculata</i> Strobl, 1901
- Frons without horn-like lamella above each antennal socket. Both sides of mesoscutum near tegula not produced posteriorly. Tegula yellow. Coxae yellow.....	<i>G. delicatula</i> Kuslitzky, 2007
4(2). Hind femur and tibia blackish-brown to black (Figs. 464, 465, 520, 522).....	5
- Hind femur and tibia yellowish-brown to yellow (e.g., Figs. 458-463, 466-472, 474, 507).....	7
5(4). Frons with a small horn (like as Fig. 456). Ovipositor sheath ca. 0.9 times as long as fore wing. ....	<i>G. aceris</i> Momoi, 1963
- Frons with a large horn (Figs. 411, 412, 446, 447). Ovipositor sheath longer than 1.0 times as long as fore wing.....	6
6(5). Apex of frontal horn without median notch (Figs. 411, 446). Hind TS1-TS3 each with a conspicuous white area at base (Figs. 464, 520). Ovipositor sheath ca. 1.0 times as long as fore wing, 2.3 times as long as hind tibia.....	<i>G. ichitai</i> <b>sp. nov.</b>
- Apex of frontal horn with a median notch (Figs. 412, 447). Hind tarsus nearly almost black (Figs. 465, 522). Ovipositor sheath ca. 1.3 times as long as fore wing, 2.9–3.1 times as long as hind tibia.....	<i>G. kamijoi</i> Momoi, 1966
7(4). Ovipositor sheath long (Fig. 534), 3.4–3.5 times as long as hind tibia. Frontal horn small, its length distinctly shorter than height of scape (Figs. 418, 453). Coxae black or sometimes tinged with reddish-brown (Figs. 534, 536).....	<i>G. tamanukii</i> Uchida, 1928
- Ovipositor sheath short, less than 2.9 times as long as hind tibia. Character states of frontal horn and hind coxa various.....	8
8(7). Hind coxa black (Figs. 458, 467, 507, 526). Frontal horn small (Figs. 440, 449)....	9
- Hind coxa reddish-brown to reddish-yellow (Figs. 459-463, 466, 468-470, 472, 474,	

- 524). Frontal horn sometimes large (Figs. 441, 444, 445, 450, 451, 454).....10
- 9(8). Flagellum yellowish-brown (Fig. 507). Fore and mid coxae largely yellowish-brown (Fig. 507).....*G. cognata* **sp. nov.**
- . Flagellum blackish-brown to black (Fig. 526). Fore and mid coxae black (Fig. 526).....*G. lapponica* Holmgren, 1860  
(= *G. chinensis* (Uchida 1952) **syn. nov.**)
- 10(8). Hind TS1 whitish-yellow except for apical ca. 0.2 black (Figs. 463, 518). Frontal horn large, its apex rounded (Figs. 410, 445). MSL 1.0 times as long as BWM. Ovipositor sheath ca. 0.9 times as long as fore wing, 2.4 times as long as hind tibia.....*G. flavitarsus* **sp. nov.**
- . Hind TS1 with a yellow area at most in basal 0.6 (Figs. 459, 460-462, 468-470, 472, 474, 517). Other character states various.....11
- 11(10). Colouration of hind tibia well-contrasted: whitish-yellow except for a subbasal band, ventral surface and apical part black (Figs. 462, 515). Ovipositor sheath short, ca. 0.8 times as long as fore wing, 1.7–1.9 times as long as hind tibia. Basal yellow area of hind TS1 shorter than apical black area (Figs. 462, 515). Frontal horn large, its apex relatively pointed (Figs. 409, 444). MSL 1.0-1.1 times as long as BWM. Propodeal carinae absent excluding posterior transverse carina and pleural carina present.....*G. extincta* Ratzeberg, 1852
- . Colouration of hind tibia contrasted but sometimes its border indistinct (Figs. 459-461, 466, 468-470, 472, 474). Basal yellow area of hind TS1 sometimes same length of apical black area (Figs. 459, 461, 468-470, 472, 474). Other character states various.....12
- 12(11). Frontal horn small, its length distinctly shorter than height of scape (Figs. 407, 413, 421, 442, 448, 456). Basal yellow area of TS1 shorter than apical black area (Figs. 460, 466, 474) (excluding *G. zenibakoensis* sp. nov., which has a wide reddish posterior margin of T2 and T3 as Fig. 543).....13
- . Frontal horn large, its length same or longer than height of scape (Figs. 406, 408, 415-417, 419, 441, 443, 450-452, 454). Basal yellow area of TS1 almost same length of apical black area (Figs. 459, 461, 468, 470, 472), or slightly longer than apical black area in *G. shigaensis* **sp. nov.** (Fig. 469).....15
- 13(12). Lateral margin of frontal horn strongly produced inward (Figs. 413, 448). Apex of frontal horn rounded (Fig. 448). MSL 0.8 times as long as BWM. Ovipositor sheath ca. 1.0 times as long as fore wing (or slightly shorter than fore wing) and 2.4 times as long as hind tibia. Clypeus and mandible each with a conspicuous yellow area (Fig. 525).....*G. karasawensis* **sp. nov.**

- . Combination of characteristics above lacking. Lateral margin of frontal horn not produced inward (Figs. 407, 421, 442, 456). Apex of this horn pointed (Figs. 442, 456)..... 14
- 14(13). MSL 0.8 times as long as BWM. Ovipositor sheath 2.5 times as long as hind tibia. Posterior margin of T2 and T3 without wide red area (Fig. 511). Clypeus and mandible each with a conspicuous yellow area (Fig. 512).....*G. daisetsuzana* **sp. nov.**
- . MSL 1.0–1.1 times as long as BWM. Ovipositor sheath 2.0–2.2 times as long as hind tibia. Clypeus tinged with yellowish-brown apically (Fig. 544). Mandible without yellow area (Fig. 544).....*G. zenibakoensis* **sp. nov.**
- 15(12). Lateral margin of frontal horn weakly produced inward basally (Figs. 417, 452). The yellow spot of posterodorsal corner of pronotum weakly elongated anteriorly, its length longer than tegula (Fig. 532). Mesosoma densely punctate. MSL 1.0 times as long as BWM. Ovipositor sheath ca. 0.7 times as long as fore wing, 2.3 times as long as hind tibia. Clypeus and mandible each with a conspicuous yellow area (Fig. 533).....*G. suwai* **sp. nov.**
- . Lateral margin of frontal horn not produced inward (Figs. 441, 450, 451, 454, 455). The yellow spot of posterodorsal corner of pronotum not elongated anteriorly, its length shorter than tegula (Figs. 509, 513, 528, 530, 537). Other character states various.....16
- 16(15). MSL 0.8 times as long as BWM. Hind femur with a dorsal subapical black area (Fig. 468). Hind tibia darkened except for base (Fig. 468). T1 1.2 times as long as maximum width. Ovipositor sheath ca. 1.0 times as long as fore wing, 2.5 times as long as hind tibia.....*G. nipponica* **sp. nov.**
- . MSL 1.0-1.1 times as long as BWM. Other character states various...17
- 17(16). Body densely punctate, punctures on lateral lobes of mesoscutum (excluding near notaulus) separated by 0.3–1.0 (usually ca. 0.6) times their diameter. Frontal horn with a basal deep concavity and relatively pointed apex (Figs. 408, 443). T1 1.2 times as long as maximum width, its posterior area longitudinally striated. Ovipositor sheath ca. 1.1 times as long as fore wing, 2.8 times as long as hind tibia. Clypeus tinged with reddish-brown apically (Fig. 514). Mandible without yellow area (Fig. 514).....*G. densepunctata* **sp. nov.**
- . Combination of characteristics above lacking. Body punctate, punctures on lateral lobes of mesoscutum (excluding near notaulus) separated by 0.3–2.0 (usually ca. 1.0) times their diameter.....18
- 18(17). Ovipositor sheath short, 2.1–2.2 times as long as hind tibia and 0.7–0.8 times as long as fore wing. Apex of frontal horn relatively rounded (Figs. 406, 441). Clypeus

- tinged with reddish-brown to yellowish-brown apically (Fig. 510). Mandible without yellow area (Fig. 510).....*G. cymolomiae* Uchida 1932
- . Ovipositor sheath long, 2.5–2.9 times as long as hind tibia and 1.0–1.2 times as long as fore wing. Apex of frontal horn relatively pointed (Figs. 416, 419, 451, 454)...19
- 19(18). Mandible with a conspicuous yellow area medially (Fig. 531). Basal yellow area of TS1 slightly longer than apical black area (Fig. 469). T1 1.2 times as long as maximum width. Ovipositor sheath 1.0–1.1 times as long as fore wing, 2.5 times as long as hind tibia. Clypeus with a conspicuous yellow area (Fig. 531).....*G. shigaensis* **sp. nov.**
- . Mandible black, at most slightly tinged with red (Fig. 538). Basal yellow area of TS1 ca. 0.5 times of TS1 (Fig. 472). Ovipositor sheath ca. 1.2 times as long as fore wing, 2.9 times as long as hind tibia. Clypeus tinged with reddish-brown apically (Fig. 538).....*G. touyaensis* **sp. nov.**

***Glypta acares* Momoi, 1965**

*Glypta parva* Momoi, 1963: 114. Preoccupied by Cresson (1870).

*Glypta acares* Momoi, 1965: 82. New name.

**Specimen examined.** No additional specimens available.

**Distribution** (Fig. 1029). Japan (Honshu and Kyushu). Nakaya (2009) recorded this species from Honshu.

**Bionomics.** Unknown

**Remarks.** This species resembles *G. ichitai*, but it can be easily distinguished from the latter (see Remarks under *G. ichitai*).

***Glypta biauriculata* Strobl, 1901**

(Figs. 404, 422, 457, 475-477, 493, 494, 505, 506)

*Glypta biauriculata* Strobl, 1901, in Strobl 1902: 18.

*Glypta laminate* Kuslitzky, 1973: 1583.

**Description based on Japanese specimens. Female** (n=33). Body length 6.5–8.0 mm.

Head 0.6 times as long as wide. Clypeus 0.7 times as long as wide, pyramidically convex in lateral view (Fig. 422). Face slightly convex medially (Fig. 422), 0.5–0.6 times as long as wide. Frons with a pair of projection above each antennal

socket (Fig. 404). OOL 1.6–2.0 times as long as OD; POL 1.2–1.4 times as long as OD. Mandible with a narrow ventral flange by basal 0.6, its base flat. MSL 1.0 times as long as BWM. Antenna with 37–38 flagellomeres. F1 1.7 times as long as F2.

Mesosoma punctate. Punctures on lateral lobes of mesoscutum separated by 0.3–2.0 times their diameter. Epomia weak and short. Lateral area of pronotum entirely punctate except for areas near epomia and lower posterior angle. Both sides of mesoscutum near tegula strongly produced posteriorly. Propodeum entirely sparsely punctate. Posterior transverse carina of propodeum usually obscured medially. Anterior transverse and lateral longitudinal carinae of propodeum at least partly present. Fore wing length 6.0–7.0 mm. Fore coxa not curved, with a weak ridge. Hind femur 6.9–7.0 times as long as maximum depth in lateral view. Hind TS1 2.2 times as long as TS2.

Metasoma. T1-T4 punctate. T1 1.3–1.4 times as long as maximum width, its median dorsal carina present on ca. basal 0.5 of tergite. T2 1.0 times as long as maximum width. T2-T4 each with a pair of moderate oblique groove. Ovipositor sheath 0.6 times as long as fore wing, 1.6–1.7 times as long as hind tibia.

Colouration (Figs. 457, 505, 506). Body (excluding wings and legs) black, except for: apex of clypeus and palpi yellow, tip of mandible tinged with reddish-brown; scape, pedicel and dorsal surface of flagellum brown, ventral surface of flagellum yellow; posterior margins of T1-T7 and sclerotized part of sternites slightly tinged with reddish-brown, membranous parts of sternites whitish-yellow; ovipositor reddish-brown to yellowish-brown. Wings hyaline; veins and pterostigma brown except for yellow wing base. Legs (hind leg: Fig. 457) yellow to yellowish-brown, except for: all coxae and trochanters except for apices of each trochanter black, hind femur excluding narrow yellow areas on base and apex black, hind tibia excluding basal yellow area (usually basal 0.1), black, each hind tarsal segment except for its brown base and apex black. Black area of body and legs sometimes more or less changed as blackish-brown.

**Male** (n=28). Similar to female. POL 1.4–1.6 times as long as OD. Hind basitarsus 2.0–2.1 times as long as second tarsal segment; third tarsal segment 1.8–1.9 times as long as fifth tarsal segment. T1 1.4–1.5 times as long as maximum width, its median dorsal carina slightly longer and stronger than female. T2 0.9–1.0 times as long as maximum width. Posterior margin of subgenital plate convex to nearly straight (Fig. 475). Apical margin of paramere roundly produced (Figs. 476, 493, 494). Dorsal margin of paramere with a convexity apically (Figs. 476, 493). Clypeus entirely yellow. Mandible yellow except for brown tip. Fore coxa, mid coxa except for black base and all trochanters whitish yellow. Hind tibia and tarsus paler than female. Tegula sometimes tinged with yellowish brown.

**Specimens examined.** JAPAN: 1F, Hokkaido Pref., Sapporo City, Kannon-zawa, 7. vii. 2001, T. Yoshida leg. (KPMNH: KPM-NK 5001175); 1M, same locality, 18. v. 2008, T. Yoshida leg. (Host: larva of *Olethreutes sideranus* (Treitschke, 1835) on *Spiraea miyabei*: em. 2. vi. 2008) (KPMNH: KPM-NK 5001176); 1M, Hokkaido Pref., Mt. Tarumae-san, 11-12. vii. 1998, K. Konishi leg. (MsT) (NIAES); 3F and 1M, same locality and collector, 12-18. vii. 1998 (MsT) (NIAES); 1F, same locality and collector, 12-21. vii. 1998 (MsT) (NIAES); 3F and 2M, same locality and collector, 18-21. vii. 1998 (MsT) (NIAES); 3F and 1M, same locality and collector, 21-26. vii. 1998 (MsT) (NIAES); 1M, Hokkaido Pref., Kimobetsu Town, Nakayama-toge, 800m alt., 15. vii. 1980, K. Maeto leg. (NIAES); 2M, Hokkaido Pref., Jozankei, 20. vi. 1967, K. Kusigemati leg. (KU); 1M, Hokkaido Pref., Touya, 9. vii. 1967, K. Kusigemati leg. (KU); 1F, same locality and collector, 10. vii. 1967 (KU); 1F, Hokkaido Pref., Akkeshi Town, Bekanbeshi marsh, 30. viii. 2003, R. Matsumoto leg. (MsT) (OMNH); 7F8M, same locality and collector, 1-31. viii. 2003 (MsT) (OMNH); 6F8M, same locality and collector, 12. vii. - 1. viii. 2003, R. Matsumoto leg. (MsT) (OMNH); 6F2M, Hokkaido Pref., Rausu Town, Rausudake, 27. vii. 1997, R. Matsumoto leg. (OMNH); 1F, Hokkaido Pref., Vulkan, Golovnina, Kunashiri Is., 24. vii. 1973, Kasparyan leg. (ZIS); 1F, Yamanashi Pref., Daibosatsu-toge, 6. viii. 1969, M. Suwa leg. (KU). RUSSIA: 1F (holotype of *G. laminate*), Кудара-Сомон, Бурятия, 8. viii. 1970, Kasparyan leg. (ZIS).

**Distribution** (Fig. 1029). Japan (Kunashiri Is., Hokkaido\* and Honshu\*); Russian Far East, North East Europe.

**Bionomics.** *Olethreutes sideranus* (Treitschke) [Tortricidae] is first recorded here as a host.

**Remarks.** This species can be easily distinguished from any other Japanese species of *Glypta* by a pair of projections above each antennal socket, the clypeus pyramidically convex in lateral view, and the hind leg largely blackish-brown to black.

***Glypta cognata* sp. nov.**

(Figs. 405, 423, 440, 458, 507, 508)

**Description. Female** (n=2). Body length 7.5–8.0 (HT: 7.5) mm.

Head 0.6 times as long as wide. Clypeus 0.7 times as long as wide, roundly convex in lateral view (Fig. 423). Face weakly convex medially (Fig. 423), 0.5 times as long as wide. Frons with a small median horn between each antennal socket, its apex relatively pointed (Figs. 405, 440). OOL 1.6 times as long as OD; POL 1.0–1.4 (HT: 1.4) times as long as OD. Mandible with a narrow ventral flange by basal 0.6, its base

flat. MSL 1.0–1.1 (HT: 1.0) times as long as BWM. Antenna with 37 flagellomeres. F1 1.8 times as long as F2.

Mesosoma densely punctate, punctures on lateral lobes of mesoscutum (excluding near notaulus) separated by 0.3–2.0 (usually ca. 0.7) times their diameter. Epomia obtuse. Lateral area of pronotum entirely punctate except for ventral area longitudinally striated. Both sides of mesoscutum near tegula weakly and obtusely produced posteriorly. Propodeum entirely densely punctate. Anterior transverse carina of propodeum absent. Lateromedian longitudinal carina of propodeum present on basal section. Lateral longitudinal carina of propodeum largely absent. Posterior transverse carina of propodeum complete. Fore wing length 6.0 mm. Fore coxa without ridge antero-dorsally. Hind femur 5.5–5.6 (HT: 5.5) times as long as maximum depth in lateral view. Hind TS1 2.1 times as long as TS2.

Metasoma. T1-T4 densely punctate. T1 1.1 times as long as maximum width, its median dorsal carina present on ca. basal 0.5 of tergite. T2 0.8–0.9 (HT: 0.9) times as long as maximum width. T2-T4 each with a pair of moderate oblique groove. Ovipositor sheath ca. 0.8 times as long as fore wing, 2.1–2.3 (HT: 2.1) times as long as hind tibia.

Colouration (Figs. 458, 507, 508). Body (excluding wings and legs) black, except for: apical part of clypeus, tip of mandible, posterior margin of each metasomal tergite tinged with reddish-brown; palpi, pedicel, flagellum, membranous parts of sternites and posterior part of subgenital plate yellowish-brown; posterodorsal corner of pronotum and tegula yellow; ovipositor reddish-brown to yellowish-brown. Wings hyaline, slightly tinged with yellow; veins and pterostigma yellowish-brown except for yellow wing base. Legs (hind leg: Fig. 458) yellowish-brown, except for: all trochanters and trochantelli pale yellow; hind coxa blackish-brown; hind femur more or less darkened; subbasal band of hind tibia weakly tinged with black; apical part of hind tibia black; hind tarsus blackish-brown to black each with a basal yellow area on TS1-TS3 and with slightly yellowish-brown on TS4. Basal yellow areas of TS1 ca. 0.5 length of TS1 and of TS2-TS3 shorter than each black area.

**Male.** Unknown.

**Specimens examined.** JAPAN: [Holotype] F, Hokkaido Pref., Kami-shihoro Town, Tokachi, Nukabira, 24. viii. 1981, Y. Shono leg. (NIAES) [Non-type] 1F, Hokkaido Pref., Rausu Town, Rausudake, 27. vii. 1997, R. Matsumoto leg. (OMNH).

**Distribution** (Fig. 1029). Japan (Hokkaido).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the Latin “*cognata*”, which means “*similar*”.

**Remarks.** This species most resembles *G. lapponica*, but it can be distinguished by the fore and mid coxae yellowish-brown (black in *lapponica*) and the antenna yellowish-brown (black in *lapponica*). The gap of colouration between them is distinct and thus I am convinced *G. cognata* as a separate species.

***Glypta cymolomiae* Uchida 1932**

(Figs. 406, 424, 441, 459, 478-480, 495, 496, 509, 510)

*Glypta cymolomiae* Uchida, 1932: 156.

**Description. Female** (n=22). Body length 5.5–8.5 mm.

Head 0.6–0.7 times as long as wide. Clypeus 0.6–0.7 times as long as wide, roundly convex in lateral view (Fig. 424). Face strongly convex medially (Fig. 424), 0.5 times as long as wide. Frons with a large median horn between each antennal socket, its apex relatively rounded (Figs. 406, 441). OOL 1.2–1.6 times as long as OD; POL 1.2–1.8 times as long as OD. Mandible with a very narrow ventral flange by basal 0.5–0.6, its base flat to slightly convex. MSL 1.0–1.1 times as long as BWM. Antenna with 34–37 flagellomeres. F1 1.4–1.7 times as long as F2.

Mesosoma. Punctate, punctures on lateral lobes of mesoscutum (excluding near notaulus) separated by 0.3–2.0 (usually ca. 1.0) times their diameter. Epomia weak and short. Lateral area of pronotum entirely punctate except for ventral area longitudinally striated. Both sides of mesoscutum near tegula weakly and obtusely produced posteriorly. Propodeum entirely punctate. Anterior transverse carina of propodeum slightly present on lateral section. Lateromedian longitudinal carina of propodeum present on anterior section. Lateral longitudinal carina of propodeum largely obscured. Posterior transverse carina of propodeum complete. Fore wing length 5.0–6.5 mm. Fore coxa with a weak ridge antero-dorsally. Hind femur 5.2–5.8 times as long as maximum depth in lateral view. Hind TS1 2.0–2.2 times as long as TS2.

Metasoma. T1–T4 punctate. T1 1.1–1.2 times as long as maximum width, its median dorsal carina present on ca. basal 0.5 of tergite. T2 0.9–1.0 times as long as maximum width. T2–T4 each with a pair of moderate oblique groove. Ovipositor sheath ca. 0.7–0.8 times as long as fore wing, 2.0–2.2 times as long as hind tibia.

Colouration (Figs. 459, 509, 510). Body (excluding wings and legs) black, except for: apical part of clypeus, mandible excluding apex and base (sometimes reduced into small spot on tip), posterior margin of each metasomal tergite tinged with reddish-brown; flagellum blackish-brown, its ventral surface more or less paler than



dorsal surface; palpi, posterodorsal corner of pronotum, tegula, membranous parts of sternites and posterior part of subgenital plate yellow to yellowish-brown; ovipositor reddish-brown to yellowish-brown. Wings hyaline, slightly tinged with yellow; veins and pterostigma brown except for yellow wing base. Legs (hind leg: Fig. 459) yellowish-brown, except for: fore coxa, all trochanters and all trochanters pale yellow; hind femur more or less darkened apically; subbasal band of hind tibia weakly tinged with black; apical part of hind tibia black; hind tarsus blackish-brown to black each with a basal yellow area on TS1-TS3 and with slightly tinged with yellow on TS4 and TS5. Basal yellow areas of TS1 ca. 0.4–0.5 length of TS1, or slightly shorter than black area of TS1 and of TS2-TS3 shorter than each black area.

**Male** (n=3). Similar to female. OOL 1.0–1.4 times as long as OD; POL 1.2–1.8 times as long as OD. Propodeum with all carinae except for anterior transverse carina, lateromedian longitudinal carina and lateral longitudinal carina partly absent. Hind basitarsus 1.9 times as long as second tarsal segment. T1 1.2–1.3 times as long as maximum width, its median dorsal carina slightly longer and stronger than female. Posterior margin of subgenital plate convex to nearly straight (Fig. 478). Apical margin of paramere roundly produced (Figs. 479, 495, 496). Dorsal margin of paramere with a convexity apically (Figs. 479, 495). Mandible yellowish-brown except for the brown tip. Yellow area of TS1 and TS2 larger than female.

**Specimens examined.** JAPAN: 1F (holotype), Hokkaido Pref., Kotoni, 10. viii. 1931, em. from *Cymolomia (Exartima) mori* (= *Olethreutes mori*), M. Takizawa leg. (SEHU); 1F, Hokkaido Pref., Shimamatsu, 19. viii. 1967, K. Kusigemati leg. (KU); 1F, same locality and collector, 14. viii. 1968 (KU); 1M, Hokkaido Pref., Toyotomi, 11–13. vii. 1968, H. Takizawa leg. (KU); 1F, Hokkaido Pref., Mt. Daisetsu, 29. vii. 1967, K. Kusigemati leg. (KU); 1M, same locality and collector, 30. vii. 1967 (KU); 1F, Hokkaido Pref., Jozankei, 19. viii. 1967, M. Suwa leg. (KU); 1F, Hokkaido Pref., Sapporo, 20. vii. 1965, K. Kusigemati leg. (KU); 1F, same locality and collector, 8. ix. 1967 (KU); 1F, Hokkaido Pref., Hokkaido Univ., 10. vii. 1996, M. Matsuda leg. (KPMNH: KPM-NK 5001177); 1M, Hokkaido Pref., Muroran, Rakusan, 16. vii. 2007, T. Yoshida leg. (KPMNH: KPM-NK 5001178); 1F, Hokkaido Pref., Shiraoi, 10. viii. 2600 (=1940) (NSMT); 4F, Hokkaido Pref., Kamishihoro Town, Oketo-rindo, 6. viii. 1997, R. Matsumoto leg. (OMNH); 1F, Yamagata Pref., Haguro-san, 1. ix. 1966, K. Kusigemati leg. (KU); 1F, same locality and collector, 3. ix. 1966 (KU); 1F, Nagano Pref., Suzaka City, Nirei, Ubara-gawa valley, 23. vii. 2013, S. Shimizu leg. (KPMNH); 2F, Yamanashi Pref., Sutama Town, Mizugakiyama, 15–16. vii. 1996, T. Tachi leg. (OMNH); 1F, Yamanashi Pref., Yumoto Vil., Yunosawa-touge, 18. vii. 1996, T. Tachi

leg. (OMNH); 1F, Shizuoka Pref., Fujinomiya Town, Mt. Fujisan, Nishi-usuduka, 1. ix. 2007, H. Katahira leg. (KPMNH: KPM-NK 5001179); 1F, Kumamoto Pref., Izumi Vil., Mt. Shiratori-yama, 1300m alt., 18. ix. 1980, H. Takemoto leg. (NIAES); 1F, Kagoshima Pref., Terayama, 1. v. 1970, K. Kusigemati leg. (KU).

**Distribution** (Fig. 1030). Japan (Hokkaido, Honshu and Kyushu\*).

**Bionomics.** The following tortricid hosts were recorded in Japan: *Acleris ulmicana* (Meyrick) (= *A. boscana*) (Momoi, 1963), *Acleris enitescens* (Meyrick) (Nakaya, 2009), *Grapholita molesta* (Busck) (Uchida, 1933; Haeussler, 1940; Momoi, 1963), *Hedye dimidiana* (Clerck) (Nakaya, 2009), and *Olethreutes mori* (Matsumura) (Uchida, 1932; Momoi, 1963; Kusigemati, 1987). Most host records by Uchida and Momoi are based on exact identification of *G. cymolomiae*, which I have confirmed, but other records should be reexamined.

**Remarks.** This is one of the most common species in Japan. Many other species of *Glypta* having the reddish-brown to reddish-yellow hind coxa and the yellowish-brown to yellow hind femur and tibia have been misidentified as this species. Most of them are described to be new species in this study and can be distinguished from each other by the above key and Table 6.

***Glypta daisetsuzana* sp. nov.**

(Figs. 407, 425, 442, 460, 511, 512)

**Description. Female** (n=1: HT). Body length 7.0 mm.

Head 0.6 times as long as wide. Clypeus 0.7 times as long as wide, roundly convex in lateral view (Fig. 425). Face weakly convex medially (Fig. 425), 0.5 times as long as wide. Frons with a small median horn between each antennal socket, its apex relatively pointed (Figs. 407, 442). OOL 1.6 times as long as OD; POL 1.8 times as long as OD. Mandible with a narrow ventral flange by basal 0.7, its base slightly convex. MSL 0.8 times as long as BWM. Antenna with 36 flagellomeres. F1 1.5 times as long as F2.

Mesosoma densely punctate. Punctures on lateral lobes of mesoscutum (excluding near notaulus) separated by 0.3–2.0 (usually ca. 1.0) times their diameter. Epomia weak and short. Lateral area of pronotum entirely punctate except for ventral area longitudinally striated. Both sides of mesoscutum near tegula weakly and obtusely produced posteriorly. Propodeum entirely densely punctate except for narrow smooth area present anteriorly. Anterior transverse carina of propodeum weakly present on lateral section. Lateromedian longitudinal carina of propodeum present on anterior and

median section. Lateral longitudinal carina of propodeum largely obscured. Posterior transverse carina of propodeum complete. Fore wing length 6.5 mm. Fore coxa without ridge antero-dorsally. Hind femur 6.5 times as long as maximum depth in lateral view. Hind TS1 2.1 times as long as TS2.

Metasoma. T1-T4 densely punctate. T1 1.4 times as long as maximum width, its median dorsal carina present on ca. basal 0.5 of tergite, slightly longitudinally striated posteriorly. T2 0.9 times as long as maximum width. T2-T4 each with a pair of moderate oblique groove. Ovipositor sheath ca. 0.9 times as long as fore wing, 2.5 times as long as hind tibia.

Colouration (Figs. 460, 511, 512). Body (excluding wings and legs) black, except for: apical part of clypeus, mandible excluding apex and base, palpi, posterodorsal corner of pronotum, tegula, membranous parts of sternites and posterior part of subgenital plate yellow to yellowish-brown; posterior margin of each metasomal tergite tinged with reddish-brown; flagellum blackish-brown, its ventral surface more or less paler than dorsal surface; ovipositor reddish-brown to yellowish-brown. Wings hyaline; veins and pterostigma brown except for yellow wing base. Legs (hind leg: Fig. 460) reddish-brown, except for: hind femur slightly darkened apically; basal and apical parts of hind tibia black; hind tibial spurs blackish-brown; hind tarsus blackish-brown to black with basal narrow yellow areas on TS1-TS3. Basal yellow areas of TS1 ca. 0.1 length of TS1.

**Male.** Unknown.

**Specimen examined.** JAPAN: [Holotype] 1F, Hokkaido Pref., Mt. Daisetsu, 26. vii. 1967, K. Kusigemati leg. (KU).

**Distribution** (Fig. 1030). Japan (Hokkaido).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the type locality, Mt. Daisetsu.

**Remarks.** This species most resembles *G. karasawensis* in the small frontal horn and the colouration of hind leg and metasoma, but it can be distinguished by the lateral margin of frontal horn not produced inward (produced inward in *G. karasawensis*) and the T1 1.4 time as long as maximum width (1.2 times in *G. karasawensis*). This species also resembles *G. cymolomiae* in the body colouration, but it can be distinguished by the small frontal horn (large in *G. cymolomiae*).

***Glypta densepunctata* sp. nov.**

(Figs. 408, 426, 443, 461, 513, 514)

**Description. Female** (n=1: HT). Body length 7.5 mm.

Head 0.6 times as long as wide. Clypeus 0.8 times as long as wide, roundly convex in lateral view (Fig. 426). Face slightly convex medially (Fig. 426), 0.5 times as long as wide. Frons with a large median horn between each antennal socket, its apex relatively pointed (Figs. 408, 443). OOL 2.0 times as long as OD; POL 2.0 times as long as OD. Mandible with a very narrow ventral flange by basal 0.5, its base slightly convex. MSL 1.0 times as long as BWM. Antenna with 32 flagellomeres. F1 1.4 times as long as F2.

Mesosoma densely punctate. Punctures on lateral lobes of mesoscutum (excluding near notaulus) separated by 0.3–1.0 (usually ca. 0.6) times their diameter. Epomia obscure. Lateral area of pronotum entirely densely punctate. Both sides of mesoscutum near tegula weakly and obtusely produced posteriorly. Propodeum entirely densely punctate, median part slightly transversely striated. Anterior transverse carina of propodeum slightly present on lateral section. Lateromedian longitudinal carina of propodeum absent. Lateral longitudinal carina of propodeum slightly present on median section. Posterior transverse carina of propodeum complete. Fore wing length 6.0 mm. Fore coxa without ridge antero-dorsally. Hind femur 5.7 times as long as maximum depth in lateral view. Hind TS1 2.0 times as long as TS2.

Metasoma. T1-T4 densely punctate. T1 1.1 times as long as maximum width, its median dorsal carina present on ca. basal 0.6 of tergite, longitudinally striated posteriorly. T2 0.9 times as long as maximum width. T2-T4 each with a pair of moderate oblique groove. Ovipositor sheath ca. 0.9 times as long as fore wing, 2.4 times as long as hind tibia.

Colouration (Figs. 461, 513, 514). Body (excluding wings and legs) black, except for: apical part of clypeus, tip of mandible, posterior margin of each metasomal tergite tinged with reddish-brown; flagellum blackish-brown, its ventral surface more or less paler than dorsal surface apically; palpi, posterodorsal corner of pronotum, tegula, membranous parts of sternites and posterior part of subgenital plate yellow to yellowish-brown; ovipositor reddish-brown to yellowish-brown. Wings hyaline, slightly tinged with yellow; veins and pterostigma brown except for yellow wing base. Legs (hind leg: Fig. 461) reddish-brown, except for: all trochanters and all trochanters, base of all tibiae yellow; hind femur more or less darkened apically; subbasal band of hind tibia weakly tinged with black; apical part of hind tibia black; hind tibia excluding yellow and black area yellowish-brown; hind tarsus blackish-brown to black each with a basal yellow area on TS1-TS3 and with slightly tinged with yellow on TS4. Basal yellow areas of TS1 ca. 0.5 length of TS1 and of TS2-TS3 shorter than each black area.

**Male.** Unknown.

**Specimen examined.** JAPAN: [Holotype] 1F, Kagoshima Pref., Terayama, 8. v. 1970, K. Kusigemati leg. (KU).

**Distribution** (Fig. 1030). Japan (Kyushu).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the dense body punctation.

**Remarks.** This species has been confused with *G. cymolomiae* and its allied species, but they can be distinguished from each other by the above key and Table 1. This species also resembles *G. caudata* Thomson, 1889, from Eurasia and *G. lapponica*, but it can be distinguished by the mesosoma and metasoma densely punctate (relatively sparsely punctate in *G. caudata* and *G. lapponica*), the hind coxa reddish-brown (black in *G. lapponica*), and the ovipositor slightly but distinctly shorter than fore wing (almost same length in *G. caudata*).

*Glypta delicatula* Kuslitzky, 2007

*Glypta (Diblastomorpha) delicatula* Kuslitzky 2007: 440.

**Specimen examined.** No specimens available.

**Distribution** (Fig. 1030). Japan (Kunashiri Is. and Shikotan Is.); Russian Far East.

**Bionomics.** Unknown

**Remarks.** Kuslitzky (2007) described this species based on the specimens collected at Kunashiri Is. and Shikotan Is., while I could not find any specimens at ZIS having the character states given in the original description.

*Glypta extincta* Ratzeberg, 1852

(Figs. 409, 427, 444, 462, 481-483, 497, 498, 515-517)

*Glypta extincta* Ratzeberg, 1852: 112.

*Glypta nigriventris* Thomson, 1889: 1325.

**Description based on Japanese specimens. Female** (n=6). Body length 8.5–10.0 mm.

Head 0.6 times as long as wide. Clypeus 0.7 times as long as wide, roundly convex in lateral view (Fig. 427). Face strongly convex medially (Fig. 427), 0.5 times as long as wide. Frons with a large median horn between each antennal socket, its apex relatively pointed (Figs. 409, 444). OOL 1.6–1.8 times as long as OD; POL 1.8–2.0

times as long as OD. Mandible with a narrow ventral flange by basal 0.6, its base flat. MSL 1.0-1.1 times as long as BWM. Antenna with 39–40 flagellomeres. F1 1.5-1.6 times as long as F2.

Mesosoma densely punctate. Punctures on lateral lobes of mesoscutum (excluding near notaulus) separated by 0.3–1.8 (usually ca. 1.0) times their diameter. Epomia weak and short. Lateral area of pronotum entirely punctate. Both sides of mesoscutum near tegula weakly and obtusely produced posteriorly. Propodeum entirely densely punctate. Posterior transverse carina and pleural carina of propodeum complete. Other carinae of propodeum absent. Fore wing length 6.0–7.5 mm. Fore coxa with a weak ridge antero-dorsally. Hind femur 6.0 times as long as maximum depth in lateral view. Hind TS1 2.0-2.1 times as long as TS2.

Metasoma. T1-T4 densely punctat. T1 1.3–1.4 times as long as maximum width, its median dorsal carina present on ca. basal 0.5 of tergite. T2 1.0 times as long as maximum width. T2-T4 each with moderate a pair of oblique groove (Fig. 517). Ovipositor sheath ca. 0.8 times as long as fore wing, 1.7–1.9 times as long as hind tibia.

Colouration (Figs. 462, 515-517). Body (excluding wings and legs) black, except for: apical half of clypeus, small spot of mandible, palpi, posterodorsal corner of pronotum, tegula, membranous parts of sternites and posterior part of subgenital plate yellow to yellowish-brown; posterior margin of each metasomal tergite tinged with reddish-brown; flagellum blackish-brown, its ventral surface more or less paler than dorsal surface; ovipositor reddish-brown to yellowish-brown. Wings hyaline; veins and pterostigma brown except for yellow wing base. Legs (hind leg: Fig. 462) reddish-brown, except for: all trochanters, all trochanters and base of all tibiae pale yellow; hind femur darkened apically; subbasal band, ventral surface and apical part of hind tibia black; hind tibia excluding yellow and black areas whitish-yellow; middle and hind tarsus blackish-brown to black each with a basal yellow area on TS1-TS3 and with slightly tinged with yellow on TS4. Basal yellow area of TS1-TS3 shorter than black areas of each segment.

**Male** (n=2). Similar to female. OOL 1.4-1.8 times as long as OD; POL 1.6-2.0 times as long as OD. MSL 0.9 times as long as BWM. Antenna with 42 flagellomeres. F1 1.4-1.5 times as long as F2. Lateral section of anterior transverse carina and basal section of lateromedian longitudinal carina present. Hind femur 6.0–6.1 times as long as maximum depth in lateral view. Hind TS1 1.8-2.0 times as long as TS2. Posterior margin of subgenital plate convex with a median weak concavity (Fig. 481). Apical margin of paramere roundly produced (Figs. 482, 497, 498). Dorsal margin of paramere with a convexity apically (Figs. 482, 497). Clypeus entirely yellow.

**Specimens examined.** JAPAN: 1F, Yamagata Pref., Shirafutakayu, 29. vi. 1967, H. Higuchi leg. (KU); 1M, Yamanashi Pref., Mt. Daibosatsu, Sagashio-kosen, Hikawa-rindo, 16. vi. 2007, K. Watanabe leg. (KPMNH: KPM-NK5001180); 2F, same data excluding T. Ban leg. (KPMNH: KPM-NK5001181); 1F, Yamanashi Pref., Sutama Town, Mizugakiyama, 18. vii. 1997, R. Matsumoto leg. (OMNH); 2F, Nagano Pref., Utsukushigahara, 5. viii. 1970, H. Takizawa leg. (KU); 1M, Fukui Pref., Oono City, Koike, 8. vi. 1980, H. Kurokawa leg. (KPMNH: KPM-NK5001182). MOLDOVA: 1F (det. by Kuslitzky), “Оницканы Криулянский” (Onitskany, Criuleni), 16. v. 1978, Kuslitzky leg. (ZIS).

**Distribution** (Fig. 1031). Japan (Honshu\*); widely distributed in Eurasia.

**Bionomics.** Unknown in Japan. A tortricid host, *Acleris rosana* (Hübner), was recorded in Europe (e.g., Ratzeburg, 1852; Constantineanu & Pisica, 1977).

**Remarks.** This is the first record of this species from Japan. By the result of morphological comparison, no differences were found between Japanese and Moldvanese females.

***Glypta flavitarsus* sp. nov.**

(Figs. 410, 428, 445, 463, 518, 519)

**Description. Female** (n=1: HT). Body length 8.0 mm.

Head 0.6 times as long as wide. Clypeus 0.7 times as long as wide, roundly convex in lateral view (Fig. 428). Face strongly convex medially (Fig. 428), 0.4 times as long as wide. Frons with a large median horn between each antennal socket, its apex relatively rounded (Figs. 410, 445). OOL 1.4 times as long as OD; POL 1.6 times as long as OD. Mandible with a narrow ventral flange by basal 0.6, its base flat. MSL 1.0 times as long as BWM. Antenna with 36 flagellomeres. F1 1.6 times as long as F2.

Mesosoma punctate. Punctures on lateral lobes of mesoscutum (excluding near notaulus) separated by 0.3–3.5 (usually ca. 2.0) times their diameter. Epomia weak and short. Lateral area of pronotum entirely punctate except for ventral area longitudinally striated. Both sides of mesoscutum near tegula weakly and obtusely produced posteriorly. Propodeum entirely punctate. Anterior transverse carina present on lateral section. Lateromedian longitudinal carina present on basal section. Lateral longitudinal carina largely absent. Posterior transverse carina of propodeum complete. Fore wing length 6.0 mm. Fore coxa with a weak ridge antero-dorsally. Hind femur 6.0 times as long as maximum depth in lateral view. Hind TS1 2.3 times as long as TS2.

Metasoma. T1-T4 punctate. T1 1.2 times as long as maximum width, its

median dorsal carina present on ca. basal 0.5 of tergite. T2 1.0 times as long as maximum width. T2-T4 each with a pair of moderate oblique groove. Ovipositor sheath ca. 0.9 times as long as fore wing, 2.4 times as long as hind tibia.

Colouration (Figs. 463, 518, 519). Body (excluding wings and legs) black, except for: apical part of clypeus, tip of mandible, posterior margin of each metasomal tergite tinged with reddish-brown; palpi, pedicel, flagellum, membranous parts of sternites and posterior part of subgenital plate yellowish-brown, dorsal surface of flagellum more or less darkened; posterodorsal corner of pronotum and tegula yellow; ovipositor reddish-brown to yellowish-brown. Wings hyaline; veins and pterostigma yellowish-brown except for yellow wing base. Legs (hind leg: Fig. 463) yellowish-brown, except for: hind femur more or less darkened apically; subbasal band of hind tibia weakly tinged with black; apical part of hind tibia black; hind tarsus blackish-brown to black each with a basal yellow area on TS1-TS3 and with slightly tinged with yellow on TS4 and TS5. Basal yellow area of TS1 very large, ca. 0.8 length of TS1 and of TS2 also large, ca. 0.5 length of TS2.

**Male.** Unknown.

**Specimen examined.** JAPAN: [Holotype] 1F, Hokkaido Pref., Sapporo, 12. viii. 1967, K. Kusigemati leg. (KU).

**Distribution** (Fig. 1031). Japan (Hokkaido).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the hind TS1 with a large yellow area.

**Remarks.** This species can be distinguished from any other Japanese species by the hind tarsal segments largely yellowish-brown. In the colouration of the hind leg, this species resembles *G. monoceros* Gravenhorst, 1829, from Europe, but it can be distinguished by the yellowish-brown flagellum (blackish-brown in *G. monoceros*) and the black metasoma (with a large red area in *G. monoceros*). This species has been confused with *G. cymolomiae* and its allied species but they can be distinguished from each other by the above key and Table 6.

***Glypta ichitai* sp. nov.**

(Figs. 411, 429, 446, 464, 484-486, 499, 500, 520, 521)

**Description. Female** (n=1: HT). Body length 7.0 mm.

Head 0.6 times as long as wide. Clypeus 0.7 times as long as wide, roundly convex in lateral view (Fig. 429). Face weakly convex medially (Fig. 429), 0.5 times as long as wide. Frons with a large median horn between each antennal socket, its apex



relatively rounded (Figs. 411, 446). OOL 1.4 times as long as OD; POL 1.4 (1.4–1.6) times as long as OD. Mandible with a narrow ventral flange by basal 0.6, its base flat. MSL 1.1 times as long as BWM. Antenna with 35 flagellomeres. F1 1.7 times as long as F2.

Mesosoma punctate. Punctures on lateral lobes of mesoscutum (excluding near notaulus) separated by 0.3–2.0 (usually ca. 1.0) times their diameter. Epomia weak and short. Lateral area of pronotum entirely punctate. Both sides of mesoscutum near tegula weakly and obtusely produced posteriorly. Propodeum entirely densely punctate except for narrow smooth area anteriorly. Anterior transverse carina of propodeum absent. Lateromedian longitudinal carina of propodeum present on anterior part. Lateral longitudinal carina of propodeum absent. Posterior transverse carina of propodeum complete. Fore wing length 5.0 mm. Fore coxa with a slight ridge antero-dorsally. Hind femur 6.0 times as long as maximum depth in lateral view. Hind TS1 2.2 times as long as TS2.

Metasoma. T1-T4 punctate. T1 1.2 times as long as maximum width, its median dorsal carina present on ca. basal 0.6 of tergite. T2 1.0 times as long as maximum width. T2-T4 each with a pair of moderate oblique groove. Ovipositor sheath ca. 1.0 times as long as fore wing, 2.3 times as long as hind tibia.

Colouration (Figs. 464, 520, 521). Body (excluding wings and legs) black, except for: apical part of clypeus, tip of mandible, palpi, posterodorsal corner of pronotum, tegula, membranous parts of sternites and posterior part of subgenital plate yellowish-brown; posterior margin of each metasomal tergite tinged with reddish-brown; flagellum blackish-brown, its ventral surface slightly paler than dorsal surface; ovipositor reddish-brown. Wings hyaline; veins and pterostigma yellowish-brown except for yellow wing base. Legs (hind leg: Fig. 464) blackish-brown to black, except for: apex of all trochanters, all trochantellus, fore and mid femora, tibiae and tarsi yellowish-brown to yellow; middle part of hind tibia slightly tinged with yellow; hind tarsus each with a basal yellow area on TS1-TS4 and with slightly tinged with yellow on TS5. Yellow areas of TS1 slightly shorter than its black area and of TS2-TS3 shorter than black area of each segment.

**Male** (n=5). Similar to female. Body length 6.5-8.0 mm. OOL 1.2–1.4 times as long as OD; POL 1.4–1.6 times as long as OD. MSL 1.0-1.1 times as long as BWM. Antenna with 35–37 flagellomeres. F1 1.4-1.7 times as long as F2. Fore wing length 5.0-6.5 mm. Hind femur 5.5–6.0 times as long as maximum depth in lateral view. Hind TS1 1.8-2.0 times as long as TS2. T1 1.2–1.4 times as long as maximum width. T2 0.9-1.0 times as long as maximum width. Posterior margin of subgenital plate convex to nearly straight

(Fig. 484). Apical margin of paramere roundly produced (Figs. 485, 499, 500). Dorsal margin of paramere with a convexity apically (Figs. 485, 499). Flagellum sometimes paler than female. Posterodorsal corner of pronotum, tegula and base of hind tibia paler than female. Fore and mid coxae largely reddish-brown to yellowish-brown. Hind tibia and tarsus sometimes paler than female.

**Specimens examined.** JAPAN: [Holotype] F, Aomori Pref., Aomori City, Tashirotai, 6. vii. 1997, T. Ichita leg. (NIAES). [Paratypes] 1M, Hokkaido Pref., Sapporo, 20. vii. 1965, K. Kusigemati leg. (KU); 2M, same data as holotype (NIAES); 1M, Tokyo Pref., Oume-City, Mt. Mitake-san to Mt. Ootake-san, 1. vi. 2008, T. Ishizaki leg. (KPMNH: KPM-NK5001183); 1M, Nagano Pref., Takekawa-dani, 5. viii. 1934, N. Kumazawa leg. (NIAES) [Non-type] 1M, Hokkaido Pref., Akkeshi Town, Bekanbeushi marsh, 12–31. vii. 2003, R. Matsumoto leg. (MsT.) (OMNH).

**Distribution** (Fig. 1031). Japan (Hokkaido and Honshu).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the collector of types, Mr. Tadao Ichita, who has contributed to the applied and faunal studies of Japanese insects.

**Remarks.** This species resembles *G. aceres* and *G. kamijoi* in the colouration of hind leg, but it can be distinguished by the large frontal horn without median notch at apex (with a small notch in *G. aceres*, or with a median notch in *G. kamijoi*), the ovipositor sheath longer than fore wing (shorter than fore wing in *G. aceres*), and the hind TS1-TS3 each with a white band (without it in *G. kamijoi*).

*Glypta kamijoi* Momoi, 1966

(Figs. 412, 430, 447, 465, 522, 523)

*Glypta kamijoi* Momoi, 1966: 47.

**Description. Female** (n=4). Body length 7.0–7.5 mm.

Head 0.7 times as long as wide. Clypeus 0.6–0.7 times as long as wide, roundly convex in lateral view (Fig. 430). Face weakly convex medially (Fig. 430), 0.5 times as long as wide. Frons with a large median horn between each antennal socket, its apex with median notch and relatively rounded (Figs. 412, 447). OOL 1.0–1.2 times as long as OD; POL 1.2–1.4 times as long as OD. Mandible with a narrow ventral flange by basal 0.6, its base slightly convex. MSL 1.2–1.3 times as long as BWM. Antenna with 40 flagellomeres. F1 1.5–1.7 times as long as F2.

Mesosoma punctate. Punctures on lateral lobes of mesoscutum (excluding near

notaulus) separated by 0.3–2.0 (usually ca. 1.0) times their diameter. Epomia weak and short. Both sides of mesoscutum near tegula weakly and obtusely produced posteriorly. Propodeum entirely densely punctate except for narrow smooth area antero-medially. Posterior transverse carina and pleural carina of propodeum complete. Other carinae of propodeum absent. Fore wing length 6.0–6.5 mm. Fore coxa with a weak ridge antero-dorsally. Hind femur 6.0–6.4 times as long as maximum depth in lateral view. Hind TS1 2.0–2.1 times as long as TS2.

Metasoma. T1–T4 punctate. T1 1.2 times as long as maximum width, its median dorsal carina present on ca. basal 0.5 of tergite. T2 1.0 times as long as maximum width. T2–T4 each with a pair of moderate oblique groove. Ovipositor sheath ca. 1.3 times as long as fore wing, 2.9–3.1 times as long as hind tibia.

Colouration (Figs. 465, 522, 523). Body (excluding wings and legs) black, except for: apical part of clypeus, small spot of mandible, palpi, posterodorsal corner of pronotum, tegula, membranous parts of sternites and posterior part of subgenital plate yellowish-brown; posterior margin of each metasomal tergite tinged with reddish-brown; antenna blackish-brown, its ventral surface slightly paler than dorsal surface; ovipositor reddish-brown to yellowish-brown. Wings hyaline; veins and pterostigma yellowish-brown except for yellow wing base. Fore and mid legs reddish-brown to yellowish-brown. Hind leg (Fig. 465) blackish-brown to black, except for: trochantellus, base of tibia whitish-yellow; tarsus largely black with narrow, indistinct basal yellow area on TS1.

**Male.** No additional specimens available.

**Specimens examined.** JAPAN: 1F (holotype), Hokkaido Pref., Bibai, 23. vii. 1964, em. from *Cymolomia hartigiana*, K. Kamijo leg. (MNHAH); 1F, Hokkaido Pref., Nopporo, 26. iv. 1992, Y. Sakamaki leg. (NIAES); 1F, Hokkaido Pref., Sapporo, 27. viii. 1965 (KU); 1F, same locality and collector, 23. vii. 1966 (KU).

**Distribution** (Fig. 1031). Japan (Hokkaido).

**Bionomics.** The following tortricid hosts were recorded in Japan: *Lozotaenia coniferana* (Issiki) (= *Christoneura coniferana*) and *Cymolomia hartigiana* (Saxesen) (Momoi, 1966).

**Remarks.** This species resembles *G. elongata elongata* Holmgren, 1860, from Eurasia and *G. elongate montana* Kuslitzky, 1977, from Europe in the slender body and the long MSL, but it can be distinguished by the largely black hind leg (largely reddish-brown in *G. elongata elongata* and *G. elongata montana*), the black metasoma (with large red area in *G. elongata elongata*), and the long ovipositor (ca. 1.3 times as long as fore wing in *G. kamijoi* but slightly longer than fore wing in *G. elongata montana*). This species is

also similar to *G. aceres* and *G. ichitai*, but it can be distinguished from them (see Remarks under *G. ichitai*).

***Glypta karasawensis* sp. nov.**

(Figs. 413, 431, 450, 466, 524, 525)

**Description. Female** (n=2). Body length 8.0 mm.

Head 0.6 times as long as wide. Clypeus 0.7 times as long as wide, roundly convex in lateral view (Fig. 431). Face strongly convex medially (Fig. 431), 0.5 times as long as wide. Frons with a large median horn between each antennal socket, its apex relatively pointed and its lateral margin strongly inward (Figs. 413, 450). OOL 1.2–1.4 (HT: 1.4) times as long as OD; POL 1.0–1.8 (HT: 1.8) times as long as OD. Mandible with a narrow ventral flange by basal 0.7, its base flat. MSL 0.8 times as long as BWM. Antenna with 36–37 (HT: 36) flagellomeres. F1 1.5 times as long as F2.

Mesosoma punctate. Punctures on lateral lobes of mesoscutum (excluding near notaulus) separated by 0.3–2.5 (usually ca. 2.0) times their diameter. Epomia weak and short. Lateral area of pronotum entirely punctate. Both sides of mesoscutum near tegula weakly produced posteriorly. Propodeum entirely densely punctate. Posterior transverse carina and pleural carina of propodeum complete. Lateral section of anterior transverse carina of propodeum slightly present. Anterior part of lateromedian longitudinal carina of propodeum present. Lateral longitudinal carina of propodeum largely absent. Fore wing length 7.0 mm. Fore coxa with a weak ridge antero-dorsally. Hind femur 6.2–6.4 (HT: 6.2) times as long as maximum depth in lateral view. Hind TS1 2.1 times as long as TS2.

Metasoma. T1-T4 punctate. T1 1.2 times as long as maximum width, its median dorsal carina present on ca. basal 0.5 of tergite. T2 0.9 times as long as maximum width. T2-T4 each with a pair of moderate oblique groove. Ovipositor sheath ca. 1.0 (slightly shorter than fore wing) times as long as fore wing, 2.4 times as long as hind tibia.

Colouration (Figs. 466, 524, 525). Body (excluding wings and legs) black, except for: apical part of clypeus, mandible excluding apex and base, palpi, posterodorsal corner of pronotum, tegula, membranous parts of sternites and posterior part of subgenital plate yellowish-brown; ventral surface of flagellum and posterior margin of each metasomal tergite tinged with reddish-brown; scape, pedicel, dorsal surface of flagellum blackish-brown; ovipositor reddish-brown to yellowish-brown. Wings hyaline; veins and pterostigma yellowish-brown except for yellow wing base.

Legs (hind leg: Fig. 466) reddish-brown, except for: all trochanters, base of all tibiae, base of hind tibial spurs and basal areas of hind TS1-TS3 pale yellow; hind femur darkened apically; subbasal band and apical part of hind tibia blackish-brown to black; hind tarsus blackish-brown to black with basal yellow area on TS1-TS3 and with slightly tinged with yellow on TS4. Basal yellow areas of TS1 0.2 length of TS1 and of TS2-TS3 present only basally.

**Male.** Unknown.

**Specimens examined.** JAPAN: [Holotype] F, Nagano Pref., Karasawa, 26-28. viii. 1967, H. Higuchi leg. (KU). [Non-type] 1F, Hokkaido Pref., Akkeshi Town, Bekanbeushi marsh, 1-31. viii. 2003, R. Matsumoto leg. (MsT.) (OMNH).

**Distribution** (Fig. 1032). Japan (Honshu).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the type locality, Karasawa.

**Remarks.** This species has been confused with *G. cymolomiae* and its allied species, but they can be distinguished from each other by the above key and Table 6. This species resembles *G. tegularis* Thomson, 1889, from Eurasia in having the frontal horn with a separated edge, but it can be distinguished by the coxae reddish-brown (black in *G. tegularis*) and the apex of ovipositor without tubercle (with a small tubercle in *G. tegularis*). This species also resembles *G. caudata* and *G. nipponica*, but it can be easily distinguished by the horn with a separated edge (without edge in *G. caudata* and *G. nipponica*) and the mandible with a yellow spot (without spot in *G. caudata* and *G. nipponica*).

### ***Glypta lapponica* Holmgren, 1860**

(Figs. 414, 432, 449, 467, 526, 527)

*Glypta annulata* Bridgeman, 1890: 71.

*Glypta (Conoblasta) areolaris* Hellén, 1915: 63.

*Conoblasta nigricoxa* Kokujev, 1927: 67.

*Conoblasta alpine* Heinrich, 1949: 71.

*Conoblasta chinensis* Uchida, 1952: 50. **syn. nov.**

**Description based on Japanese specimens. Female** (n=5). Body length 6.0–7.5 mm.

Head 0.6 times as long as wide. Clypeus 0.7 times as long as wide, roundly convex in lateral view (Fig. 432). Face weakly convex medially (Fig. 432), 0.5 times as

long as wide. Frons with a small median horn between each antennal socket, its apex relatively pointed (Figs. 414, 449). OOL 1.4–1.6 times as long as OD; POL 1.6–1.8 times as long as OD. Mandible with a narrow ventral flange by basal 0.6, its base flat. MSL 1.2 times as long as BWM. Antenna with 34–35 flagellomeres. F1 1.5–1.6 times as long as F2.

Mesosoma punctate. Punctures on lateral lobes of mesoscutum (excluding near notaulus) separated by 0.3–2.0 (usually ca. 1.0) times their diameter. Epomia weak and short. Lateral area of pronotum entirely punctate except for ventral area longitudinally striated. Both sides of mesoscutum near tegula weakly and obtusely produced posteriorly. Propodeum entirely densely punctate. Anterior transverse carina of propodeum slightly present on lateral section. Lateromedian longitudinal carina of propodeum present on anterior section. Lateral longitudinal carina of propodeum largely absent. Posterior transverse carina of propodeum complete. Fore wing length 5.0–6.0 mm. Fore coxa with a weak ridge antero-dorsally. Hind femur 5.8–6.0 times as long as maximum depth in lateral view. Hind TS1 2.0–2.1 times as long as TS2.

Metasoma. T1–T4 densely punctate. T1 1.2 times as long as maximum width, its median dorsal carina present on ca. basal 0.5 of tergite. T2 1.0 times as long as maximum width. T2–T4 each with a pair of moderate oblique groove. Ovipositor sheath 0.8–1.0 times as long as fore wing, 2.1–2.6 times as long as hind tibia.

Colouration (Figs. 467, 526, 527). Body (excluding wings and legs) black, except for: apical part of clypeus, tip of mandible, posterior margin of each metasomal tergite tinged with reddish-brown; ventral surface of flagellum blackish-brown; palpi, posterodorsal corner of pronotum, tegula, membranous parts of sternites and posterior part of subgenital plate yellowish-brown; ovipositor reddish-brown to yellowish-brown. Wings hyaline, slightly tinged with yellow; veins and pterostigma brown except for yellow wing base. Legs (hind leg: Fig. 467) yellowish-brown, except for: all coxae and all trochanters except for apices of each trochanter black or sometimes tinged with yellow; hind femur more or less darkened apically; subbasal band and apical part of hind tibia blackish-brown to black; hind tarsus blackish-brown to black each with a basal yellow area on TS1–TS3 and with slightly tinged with yellow on TS4. Basal yellow areas of TS1–TS3 shorter than each black area.

**Male.** No additional specimens available.

**Specimens examined.** JAPAN: 1F, Hokkaido Pref., Sapporo, 12. viii. 1967, M. Suwa leg. (KU); 1F, Hokkaido Pref., Mt. Soranuma, 29. viii. 1965, K. Kusigemati leg. (KU); 1F, Iwate Pref., Mt. Hiraniwa, 27. viii. 1966, K. Kusigemati leg. (KU); 4F, Hokkaido Pref., Sarufutsu Vil., 5. viii. 1996, T. Tachi leg. (OMNH); 1F, Hokkaido Pref., Hidaka

Town, Penkenushi, 24. vii. 1997, R. Matsumoto leg. (OMNH); 1F, Hokkaido Pref., Oketo Town, Oketo-rindo, 6. viii. 1997, R. Matsumoto leg. (OMNH); 1F, Iwate Pref., Mt. Hayachine-san, 11. viii. 1969, M. Suwa leg. (KU). CHINA: 1F (holotype), “Schansi Provinz, Wuta”, vii. 1924, Ishitani leg. (SEHU). RUMANIA: 1F, 5. vii. 1956 (det. as *G. areolaris* by Constantineanu) (AEI).

**Distribution** (Fig. 1029). Japan (Hokkaido\* and Honshu\*); widely distributed in Eurasia.

**Bionomics**. Two tortricid hosts, *Olethreutes lediana* (Linnaeus) and *Olethreutes rivulana* (Scopoli), were recorded from Europe (Fulmek, 1968; Aubert, 1978).

**Remarks**. This is the first record of this species from Japan. By the result of comparison, no differences were found between Japanese specimens of *G. chinensis* (including holotype) and *G. lapponica* from Rumania. This species resembles *G. tegularis* Thomson, 1889, and *G. yasumatsui* (Uchida, 1952) from Far East Asia in the black coxae, but it can be distinguished by the ovipositor sheath distinctly shorter than fore wing, ca. 1.0 times as long as fore wing (0.7-0.8 times in *G. tegularis* and *G. yasumatsui*) and the T2 1.0 times as long as maximum width (ca. 0.7 in *G. yasumatsui*). This species also resembles *G. cognata*, but it can be easily distinguished as mentioned in the Remarks under *G. cognata*.

***Glypta nipponica* sp. nov.**

(Figs. 415, 433, 450, 468, 528, 529)

**Description. Female** (n=1: holotype). Body length 8.0 mm.

Head 0.6 times as long as wide. Clypeus 0.7 times as long as wide, roundly convex in lateral view (Fig. 433). Face strongly convex medially (Fig. 433), 0.5 times as long as wide. Frons with a large median horn between each antennal socket, its apex relatively rounded (Figs. 415, 450). OOL 1.6 times as long as OD; POL 1.6 times as long as OD. Mandible with a narrow ventral flange by basal 0.7, its base flat. MSL 0.8 times as long as BWM. Antenna with 35 flagellomeres. F1 1.5 times as long as F2.

Mesosoma punctate. Punctures on lateral lobes of mesoscutum (excluding near notaulus) separated by 0.3–2.5 (usually ca. 2.0) times their diameter. Epomia weak and short. Lateral area of pronotum entirely punctate. Both sides of mesoscutum near tegula weakly produced posteriorly. Propodeum entirely densely punctate. Posterior transverse carina and pleural carina of propodeum complete. Other carinae of propodeum absent. Fore wing length 6.5 mm. Fore coxa with a weak ridge antero-dorsally. Hind femur 5.5 times as long as maximum depth in lateral view. Hind TS1 2.1 times as long as TS2.

Metasoma. T1-T4 punctate. T1 1.2 times as long as maximum width, its median dorsal carina present on ca. basal 0.5 of tergite. T2 0.8 times as long as maximum width. T2-T4 each with a pair of moderate oblique groove. Ovipositor sheath ca. 1.0 times as long as fore wing, 2.5 times as long as hind tibia.

Colouration (Figs. 468, 528, 529). Body (excluding wings and legs) black, except for: apical part of clypeus, tip of mandible, posterior margin of each metasomal tergite tinged with reddish-brown; flagellum blackish-brown, its ventral surface more or less paler than dorsal surface; palpi, posterodorsal corner of pronotum, tegula, membranous parts of sternites and posterior part of subgenital plate yellow to whitish-yellow; ovipositor reddish-brown to yellowish-brown. Wings hyaline, slightly tinged with yellow; veins and pterostigma brown except for yellow wing base. Legs (hind leg: Fig. 468) reddish-brown, except for: fore coxa, fore and mid trochanters, all trochantelluses, base of all tibiae, all tibial spurs excluding apex of mid and hind tibial spurs, fore and mid tarsi excluding mid TS5 and basal area of hind TS1-TS3 pale yellow; hind femur more or less darkened basally and apically; subbasal band and apical part of hind tibia, and apex of mid and hind tibial spurs blackish-brown to black; hind tibia except for base and black area more or less dark brown; hind tarsus blackish-brown to black each with a basal yellow area on TS1-TS3 and with slightly tinged with yellow on TS4. Basal yellow areas of TS1 0.5 length of TS1 and of TS2-TS3 shorter than each black area.

**Male.** Unknown.

**Specimen examined.** JAPAN: [Holotype] F, Hokkaido Pref., Kumaishi, Kenichi-gawa, Iwafuchi-zawa, 1-11. ix. 1995, Y. Ito and T. Ito leg. (MsT) (NIAES).

**Distribution** (Fig. 1032). Japan (Hokkaido).

**Bionomics.** Unknown.

**Etymology.** The specific name is from “Nippon” (= Japan).

**Remarks.** This species has been confused with *G. cymolomiae* and its allied species, but they can be distinguished from each other by the above key and Table 1. This species also resembles *G. caudata*, but it can be easily distinguished by the hind tibia largely dark brown (largely reddish-brown in *G. caudata*) and the basal yellow areas of TS1 0.5 times as long as TS1 (0.2 in *G. caudata*).

***Glypta shigaensis* sp. nov.**

(Figs. 416, 434, 451, 469, 530, 531)

**Description. Female** (n=2). Body length 7.5–9.0 (HT: 7.5) mm.



Head 0.6 times as long as wide. Clypeus 0.7 times as long as wide, roundly convex in lateral view (Fig. 434). Face strongly convex medially (Fig. 434), 0.5 times as long as wide. Frons with a large median horn between each antennal socket, its apex relatively pointed (Figs. 416, 451). OOL 1.4–1.6 (HT: 1.4) times as long as OD; POL 1.4–2.0 (HT: 1.4) times as long as OD. Mandible with a narrow ventral flange by basal 0.6, its base flat. MSL 1.0 times as long as BWM. Antenna with 35–38 (HT: 35) flagellomeres. F1 1.3 times as long as F2.

Mesosoma punctate. Punctures on lateral lobes of mesoscutum (excluding near notaulus) separated by 0.3–2.0 (usually ca. 1.0) times their diameter. Epomia weak and short. Lateral area of pronotum entirely punctate, its lower part more or less sparser than upper part. Both sides of mesoscutum near tegula weakly and obtusely produced posteriorly. Propodeum entirely densely punctate except for narrow smooth area present anteriorly. Posterior transverse carina and pleural carina of propodeum complete. Other carinae of propodeum absent. Fore wing length 5.5–7.0 (HT: 5.5) mm. Fore coxa with a weak ridge antero-dorsally. Hind femur 5.8–6.1 (HT: 5.8) times as long as maximum depth in lateral view. Hind TS1 2.2 times as long as TS2.

Metasoma. T1-T4 punctate. T1 1.2 times as long as maximum width, its median dorsal carina present on ca. basal 0.4 of tergite. T2 0.9–1.0 (HT: 1.0) times as long as maximum width. T2-T4 each with a pair of moderate oblique groove. Ovipositor sheath ca. 0.8–1.1 times as long as fore wing, 2.5 times as long as hind tibia.

Colouration (Figs. 469, 530, 531). Body (excluding wings and legs) black, except for: apical part of clypeus, mandible excluding tip and base, palpi, posterodorsal corner of pronotum, tegula, membranous parts of sternites and posterior part of subgenital plate yellowish-brown to yellow; flagellum and posterior margin of each metasomal tergites tinged with reddish-brown; scape and pedicel blackish-brown; ovipositor reddish-brown to yellowish-brown. Legs (hind leg: Fig. 469) reddish-brown, except for: fore and mid coxae and trochanters, all trochantelluses, base of all tibiae, all tibial spurs and basal area of hind TS1-TS4 pale yellow; hind femur darkened apically; subbasal band of hind tibia weakly tinged with black; apical part of hind tibia blackish-brown to black; hind tarsus blackish-brown to black with yellow areas on TS1-TS3 and with slightly tinged with yellow on TS4. Basal yellow area of TS1 large, ca. 0.6 length of TS1 and of TS2-TS4 shorter than each black area.

**Male.** Unknown.

**Specimens examined.** JAPAN: [Holotype] F, Shiga Pref., Kinomoto Town, Mt. Hassotoge, about 1000m alt., 18-21. v. 1993, em. from *Olethreutes moderatus*, Y. S. Bae leg. (NIAES). [Non-type] 1F, Yamanashi Pref., Sutama Town, Mizugakiyama, 15. vii.

1996, T. Tachi leg. (OMNH).

**Distribution** (Fig. 1032). Japan (Honshu).

**Bionomics.** The holotype was emerged from *Olethreutes moderatus* (Falkovitsh) [Tortricidae].

**Etymology.** The specific name is from the type locality, Shiga Prefecture.

**Remarks.** This species has been confused with *G. cymolomiae* and its allied species, but they can be distinguished from each other by the above key and Table 6. This species also resembles *G. caudata*, but it can be distinguished by the basal yellow areas of TS1 0.6 as long as TS1 (0.2 in *G. caudata*) and the ovipositor slightly longer than fore wing (almost same length in *G. caudata*).

***Glypta suwai* sp. nov.**

(Figs. 417, 435, 452, 470, 532, 533)

**Description. Female** (n=1: HT). Body length 7.0 mm.

Head 0.7 times as long as wide. Clypeus 0.7 times as long as wide, roundly convex in lateral view (Fig. 435). Face strongly convex medially (Fig. 435), 0.5 times as long as wide. Frons with a large median horn between each antennal socket, its apex relatively pointed (Figs. 417, 452). OOL 1.6 times as long as OD; POL 1.6 times as long as OD. Mandible with a narrow ventral flange by basal 0.5, its base slightly convex. MSL 1.0 times as long as BWM. Antenna with 35 flagellomeres. F1 1.5 times as long as F2.

Mesosoma. densely punctate. Punctures on lateral lobes of mesoscutum (excluding near notaulus) separated by 0.3–2.0 (usually ca. 0.6) times their diameter. Epomia obscured. Lateral area of pronotum entirely punctate. Both sides of mesoscutum near tegula weakly produced posteriorly. Propodeum entirely densely punctate. Anterior transverse carina of propodeum slightly present on lateral section. Lateromedian longitudinal carina of propodeum present on anterior section. Lateral longitudinal carina of propodeum largely obscured. Posterior transverse carina of propodeum complete. Fore wing length 6.0 mm. Fore coxa with a weak ridge antero-dorsally. Hind femur 5.1 times as long as maximum depth in lateral view. Hind TS1 2.3 times as long as TS2.

Metasoma. T1-T4 densely punctate. T1 1.1 times as long as maximum width, its median dorsal carina present on ca. basal 0.6 of tergite. T2 0.8 times as long as maximum width. T2-T4 each with a pair of moderate oblique groove. Ovipositor sheath ca. 0.7 times as long as fore wing, 2.3 times as long as hind tibia.

Colouration (Figs. 470, 532, 533). Body (excluding wings and legs) black, except for: apical part of clypeus, mandible excluding tip and base, palpi, posterodorsal corner of pronotum (weakly elongated anteriorly), tegula, membranous parts of sternites and posterior part of subgenital plate yellowish-brown; apex of pedicel, flagellum and posterior margin of each metasomal tergites tinged with reddish-brown; scape and base of pedicel blackish-brown; ovipositor reddish-brown to yellowish-brown. Wings hyaline, slightly tinged with yellow; veins and pterostigma brown except for yellow wing base. Legs (hind leg: Fig. 470) reddish-brown, except for: fore and mid coxae, all trochanters, all trochanters, hind tibia excluding black area, all tibial spurs and basal area of hind TS1-TS3 pale yellow; hind femur slightly darkened apically; subbasal band of hind tibia weakly tinged with black; apical part of hind tibia black; hind tarsus blackish-brown to black each with a basal yellow area on TS1-TS3. Yellow areas of TS1 ca. 0.5 length of TS1 and of TS2-TS3 present only basally.

**Male.** Unknown.

**Specimen examined.** JAPAN: [Holotype] F, Hokkaido Pref., Sapporo, 8. viii. 1966, M. Suwa leg. (KU).

**Distribution** (Fig. 1032). Japan (Hokkaido).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the collector of holotype, Dr. Masaaki Suwa. He has contributed to Japanese entomology, especially in the taxonomy of Diptera.

**Remarks.** This species has been confused with *G. cymolomiae* and its allied species, but they can be distinguished from each other by the above key and Table 6. This species also resembles *G. elongata asiatica* Kuslitzky, 2007, from Far East Asia in the yellow spot of posterodorsal corner of pronotum weakly elongated anteriorly, but it can be distinguished by the ovipositor sheath distinctly shorter than fore wing, ca. 0.7 times as long as fore wing (slightly longer than fore wing in *G. elongata asiatica*), and the metasomal tergites largely black (tinged with red basally in *G. elongata asiatica*).

### ***Glypta tamanukii* Uchida, 1928**

(Figs. 418, 436, 453, 471, 487-489, 501, 502, 534-536)

*Glypta tamanukii* Uchida, 1928: 73.

**Description based on Japanese specimens. Female** (n=16). Body length 6.5–8.0 mm.

Head 0.6 times as long as wide. Clypeus 0.7 times as long as wide, roundly convex in lateral view (Fig. 436). Face weakly convex medially (Fig. 436), 0.5 times as

long as wide. Frons with a small median horn between each antennal socket, its apex relatively pointed (Figs. 418, 453). OOL 1.4–1.7 times as long as OD; POL 1.1–1.7 times as long as OD.. Mandible with a very narrow ventral flange by basal 0.5, its base flat. MSL 1.0–1.1 times as long as BWM. Antenna with 35–36 flagellomeres. F1 1.4–1.5 times as long as F2.

Mesosoma punctate. Punctures on lateral lobes of mesoscutum (excluding near notaulus) separated by 0.3–2.0 (usually ca. 1.0) times their diameter. Epomia weak and short. Lateral area of pronotum entirely punctate, its lower part more or less sparser than upper part. Both sides of mesoscutum near tegula obtusely produced posteriorly. Propodeum entirely punctate excluding base of area externa. Pleural carina and posterior transverse carina of propodeum complete. Lateral longitudinal carina of propodeum partly present or absent. Anterior transverse carina of propodeum present only lateral section as trace-like carina. Fore wing length 5.0–6.5 mm. Fore coxa without ridge antero-dorsally. Hind femur 6.0–6.2 times as long as maximum depth in lateral view. Hind TS1 2.0–2.1 times as long as TS2.

Metasoma. T1-T4 punctate. T1 1.3 times as long as maximum width, its median dorsal carina present on ca. basal 0.5 of tergite. T2 1.0 times as long as maximum width. Punctures on T1-T4 partly longitudinally striated by coalescent punctures. T2-T4 each with a pair of moderate oblique groove. Ovipositor sheath 1.4–1.5 times as long as fore wing, 3.4–3.5 times as long as hind tibia.

Colouration (Figs. 471, 534-536). Body (excluding wings and legs) black, except for: apical part of clypeus reddish-yellow; mandible slightly tinged with red or in a few specimens largely reddish-yellow; palpi yellowish-brown; postero-dorsal corner of pronotum and tegula yellow to yellowish-brown; membranous parts of metasomal sternite and posterior part of subgenital plate yellowish-brown; axillae dark yellowish-brown; posterior margin of metasomal tergites and ovipositor reddish-brown. Wings hyaline, slightly tinged with yellow; veins and pterostigma yellowish-brown except for yellow wing base. Legs (hind leg: Fig. 471) reddish-yellow, except for: all coxae black to blackish-brown but a few specimens reddish-brown; all trochanters blackish-brown with a yellow area; fore and mid trochanteruses yellow; apex of hind femur usually darkened; subbasal band of hind tibia and apical part of hind tibia black; hind tarsus blackish-brown to black each with a basal yellow area on TS1-TS3. Basal yellow area of TS1 ca. 0.2 length of TS1.

**Male** (n=26). Similar to female. Head 0.6–0.7 times as long as wide. MSL 0.9–1.0 times as long as BWM. Antenna with 34–38 flagellomeres. Hind femur 5.6–5.7 times as long as maximum depth in lateral view. T1 1.3–1.4 times as long as maximum width.

Posterior margin of subgenital plate convex to nearly straight (Fig. 487). Apical margin of paramere roundly produced (Figs. 488, 501, 502). Dorsal margin of paramere with a convexity apically (Figs. 488, 501). Flagellum sometimes paler than female. Posterodorsal corner of pronotum, tegula and base of hind tibia paler than female. Fore and mid coxae largely reddish-brown to yellowish-brown. Hind tibia and tarsus sometimes paler than female. Apical part of flagellum, all coxae, posterior margin of each metasomal tergite paler than female.

**Specimens examined.** JAPAN: 1F, Hokkaido Pref., Mt. Tarumae-san, 12-18. vii. 1998, K. Konishi leg. (MsT) (NIAES); 1F, same locality and collector, 11-12. vii. 1998 (MsT) (NIAES); 5F17M, same locality and collector, 12-21. vii. 1998 (MsT) (NIAES); 1F1M, same locality and collector, 18-21. vii. 1998 (MsT) (NIAES); 7F7M, same locality and collector, 21-28. vii. 1998 (MsT) (NIAES); 1M, Hokkaido Pref., Goshiki, 2. vii. 2620 (= 1960?) (NSMT). RUSSIA: 1F (lectotype), Sakhalin, Tonnai, 24. vii. 1927, K. Tamanuki leg. (SEHU).

**Distribution** (Fig. 1032). Japan (Hokkaido\*); Russian Far East.

**Bionomics.** Unknown.

**Remarks.** This is the first record of this species from Japan. This species can be easily distinguished from any other Japanese species by the long ovipositor. The colouration of coxae and mandible shows a marked variation, gradually changing with body size, i.e., large-body specimens have paler coxae and mandible.

***Glypta touyaensis* sp. nov.**

(Figs. 419, 437, 454, 472, 537, 538)

**Description. Female** (n=1: HT). Body length 7.5 mm.

Head 0.6 times as long as wide. Clypeus 0.7 times as long as wide, roundly convex in lateral view (Fig. 437). Face weakly convex medially (Fig. 437), 0.5 times as long as wide. Frons with a large median horn between each antennal socket, its apex relatively pointed (Figs. 419, 454). OOL 1.6 times as long as OD; POL 1.6 times as long as OD. Mandible with a very narrow ventral flange by basal 0.6, its base flat. MSL 1.0 times as long as BWM. Antenna with 33 flagellomeres. F1 1.5 times as long as F2.

Mesosoma punctate. Punctures on lateral lobes of mesoscutum (excluding near notaulus) separated by 0.3–2.0 (usually ca. 1.0) times their diameter. Epomia weak and short. Lateral area of pronotum entirely punctate, its lower part more or less sparser than upper part. Both sides of mesoscutum near tegula weakly and obtusely produced posteriorly. Propodeum entirely punctate. Posterior transverse carina and pleural carina

of propodeum complete. Other carinae of propodeum absent. Fore wing length 6.0 mm. Fore coxa with a weak ridge antero-dorsally. Hind femur 5.4 times as long as maximum depth in lateral view. Hind TS1 2.2 times as long as TS2.

Metasoma. T1-T4 punctate. T1 1.3 times as long as maximum width, its median dorsal carina present on ca. basal 0.5 of tergite. T2 0.9 times as long as maximum width. T2-T4 each with a pair of moderate oblique groove. Ovipositor sheath ca. 1.2 times as long as fore wing, 2.9 times as long as hind tibia.

Colouration (Figs. 472, 537, 538). Body (excluding wings and legs) black, except for: apical part of clypeus, tip of mandible, palpi, posterodorsal corner of pronotum, tegula, membranous parts of sternites and posterior part of subgenital plate yellow to yellowish-brown; posterior margin of each metasomal tergite tinged with reddish-brown; flagellum blackish-brown, its ventral surface more or less paler than dorsal surface; ovipositor reddish-brown to yellowish-brown. Wings hyaline; veins and pterostigma brown except for yellow wing base. Legs (hind leg: Fig. 472) reddish-brown, except for: fore and mid trochanters, all trochantelluses and base of all tibiae pale yellow; hind femur darkened apically; subbasal band and apical part of hind tibia black; hind tibia excluding yellow and black areas yellowish-brown; mid and hind tarsi blackish-brown to black each with a basal yellow area on TS1-TS3 and with slightly tinged with yellow on TS4 and TS5. Basal yellow areas of TS1 ca. 0.5 length of TS1 and of TS2-TS3 present only basally.

**Male.** Unknown.

**Specimen examined.** JAPAN: [Holotype] F, Hokkaido Pref., Touya, 8. vii. 1967, K. Kusigemati leg. (KU).

**Distribution** (Fig. 1032). Japan (Hokkaido).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the type locality, Touya.

**Remarks.** This species has been confused with *G. cymolomiae* and its allied species, but they can be distinguished from each other by the above key and Table 6. This species also resembles *G. extincta* but can be easily distinguished by the long ovipositor, 2.9 times as long as hind tibia (1.7–1.9 in *G. extincta*).

### ***Glypta tumor* Momoi, 1970**

(Figs. 420, 438, 455, 473, 490-492, 503, 504, 539-542)

*Glypta tumor* Momoi, 1970: 371.

**Description. Female** (n=3). Body length 11.0–14.0 mm.

Head 0.6 times as long as wide. Clypeus 0.7 times as long as wide, roundly convex in lateral view (Fig. 438). Face strongly convex medially (Fig. 438), 0.6 times as long as wide. Frons with a small median horn between each antennal socket, its apex relatively pointed (Figs. 420, 455). OOL 1.6–1.8 times as long as OD; POL 1.4–1.6 times as long as OD. Mandible with a narrow ventral flange by basal 0.6, its base weakly convex. MSL 0.8 times as long as BWM. Antenna with 45–47 flagellomeres. F1 1.7 times as long as F2.

Mesosoma densely punctate. Punctures on lateral lobes of mesoscutum (excluding near notaulus) separated by 0.1–1.0 (usually ca. 0.3) times their diameter. Epomia weak and short. Lateral area of pronotum entirely punctate. Both sides of mesoscutum near tegula weakly and obtusely produced posteriorly. Propodeum entirely densely punctate. Anterior transverse carina and lateromedian longitudinal carina of propodeum absent. Lateral longitudinal carina slightly present on median section. Posterior transverse carina of propodeum usually broadly incomplete medially. Fore wing length 8.5–10.0 mm. Fore coxa without ridge antero-dorsally. Hind femur 5.4–5.5 times as long as maximum depth in lateral view. Hind TS1 2.0–2.2 times as long as TS2.

Metasoma. T1–T4 densely punctate. T1 1.2 times as long as maximum width, its median dorsal carina present on ca. basal 0.2 of tergite. T2 1.0 times as long as maximum width. T2–T4 each with a pair of deep oblique groove. Ovipositor sheath ca. 1.1 times as long as fore wing, 3.0 times as long as hind tibia.

Colouration (Figs. 473, 539–542). Body (excluding wings and legs) black, except for: clypeus, mandible excluding apex, palpi, posterodorsal corner of pronotum (weakly elongated anteriorly), tegula, scutellum, membranous parts of sternites and posterior part of subgenital plate yellowish-brown; apex of scape, pedicel, apical part of flagellum and posterior margin of each metasomal tergites narrowly tinged with reddish-brown; antenna largely blackish-brown; ovipositor reddish-brown to yellowish-brown. Wings hyaline; veins and pterostigma dark brown except for yellow wing base. Fore and mid legs yellowish-brown to reddish-brown, apical part of mid tarsus more or less darkened; hind leg (Fig. 473) reddish-brown, except for: dorsal surface of coxa, base of tibia and TS1 pale yellow; femur darkened apically; tibia excluding base blackish-brown to black; tarsus blackish-brown to black excluding base of TS1.

**Male** (n=7). Similar to female. Clypeus 0.6 times as long as wide. OOL 1.2–1.6 times as long as OD; POL 1.2–1.4 times as long as OD. MSL 0.7–0.8 times as long as BWM. Lateral section of anterior transverse carina of propodeum present. Posterior transverse

carina of propodeum complete. Hind femur 5.5-5.9 times as long as maximum depth in lateral view. T1 1.3-1.4 times as long as maximum width, T2 1.0-1.1 times as long as maximum width. Posterior margin of subgenital plate convex (Fig. 490). Apical margin of paramere sharply produced dorsally, roundly produced ventrally (Figs. 491, 503, 504). Dorsal margin of paramere with a convexity medially (Figs. 491, 503). Ventral surfaces of scape and pedicel yellow.

**Specimens examined.** JAPAN: 1F, Tokyo Pref. (Izu Isls.), Mikurajima Island, 11. v. 1969, S. Katsuya and H. Yuasa leg. (NIAES); 1M, Kagoshima Pref., Mt. Kurino, 23. v. 1969, K. Kusigemati leg. (KU); 4M, Kagoshima Pref., Ibusuki, 3. vi. 1966, K. Kusigemati leg. (KU); 1M (holotype), Kagoshima Pref., Amamioshima Island, 10. v. 1966, K. kusigemati leg. (MNHAH); 1F, Kagoshima Pref., Amamioshima Island, Kinsakubaru, 31. v. 2004, T. Mita leg. (KPMNH: KPM-NK5001184); 1F2M, Okinawa Pref., Okinawajima Island, 15. v. 1953, T. Shiraki leg. (NIAES).

**Distribution** (Fig. 1032). Japan (Mikurajima Is.\*, Kyushu\*, Amamioshima Is. and Okinawajima Is.\*).

**Bionomics.** Unknown.

**Remarks.** This species can be easily distinguished from any other Japanese species by the yellow marking of scutellum and the deep oblique grooves on T2-T4. The distribution of this species seems to be restricted to the islands along the Kuroshio Current.

***Glypta zenibakoensis* sp. nov.**

(Figs. 421, 439, 456, 474, 543, 544)

**Description. Female** (n=2). Body length 7.0 mm.

Head 0.6-0.7 (HT: 0.6) times as long as wide. Clypeus 0.6-0.7 (HT: 0.7) times as long as wide, roundly convex in lateral view (Fig. 439). Face strongly convex medially (Fig. 439), 0.5 times as long as wide. Frons with a small median horn between each antennal socket, its apex relatively pointed (Figs. 421, 456). OOL 1.6-1.8 (HT: 1.8) times as long as OD; POL 1.8-2.0 (HT: 2.0) times as long as OD. Mandible with a very narrow ventral flange by basal 0.6, its base flat. MSL 1.0-1.1 (HT: 1.1) times as long as BWM. Antenna with 33-34 (HT: 34) flagellomeres. F1 1.6-1.8 (HT: 1.7) times as long as F2.

Mesosoma densely punctate. Punctures on lateral lobes of mesoscutum (excluding near notaulus) separated by 0.3-1.5 (usually ca. 1.0) times their diameter. Epomia weak and short. Lateral area of pronotum entirely punctate except for ventral



area usually longitudinally striated. Both sides of mesoscutum near tegula weakly and obtusely produced posteriorly. Propodeum entirely densely punctate except for narrow smooth area present anteriorly. Anterior transverse carina of propodeum slightly present on lateral section. Lateromedian longitudinal carina of propodeum present on anterior section. Lateral longitudinal carina of propodeum largely absent. Posterior transverse carina of propodeum complete. Fore wing length 4.5–5.0 (HT: 4.5) mm. Fore coxa with a weak ridge antero-dorsally. Hind femur 5.5–6.0 (HT: 6.0) times as long as maximum depth in lateral view. Hind TS1 2.0–2.2 (HT: 2.0) times as long as TS2.

Metasoma. T1-T4 densely punctate. T1 1.2–1.4 (HT: 1.3) times as long as maximum width, its median dorsal carina present on ca. basal 0.5 of tergite. T2 0.9 times as long as maximum width. T2-T4 each with a pair of moderate oblique groove. Ovipositor sheath 0.8–0.9 (HT: 0.9) times as long as fore wing, 2.1–2.2 (HT: 2.2) times as long as hind tibia.

Colouration (Figs. 474, 543, 544). Body (excluding wings and legs) black, except for: apical part of clypeus, tip of mandible and posterior margin of each metasomal tergite usually tinged with reddish-brown, reddish posterior margins on T2 and T3 sometimes broader than other tergites; ventral surface of flagellum blackish-brown; palpi, posterodorsal corner of pronotum, tegula, membranous parts of sternites and posterior part of subgenital plate yellowish-brown; ovipositor reddish-brown to yellowish-brown. Wings hyaline; veins and pterostigma brown except for yellow wing base. Legs (hind leg: Fig. 475) yellowish-brown to reddish-brown, except for: apex of hind femur more or less darkened; base of hind tibia whitish-yellow; subbasal band of hind tibia more or less darkened; apical part of hind tibia blackish-brown to black; hind tarsus black with yellow areas on TS1-TS3 and with slightly tinged with yellow on TS4. Basal yellow areas of TS1 less than 0.5 length of TS1 and of TS2-TS3 shorter than each black area.

**Male.** Unknown.

**Specimens examined.** JAPAN: [Holotype] F, Hokkaido Pref., Zenibako, 24. vi. 1968, T. Kocha leg. (KU); [Paratype] 1F, Hokkaido Pref., Toyotomi, 11-13. vii. 1968, H. Takizawa leg. (KU).

**Distribution** (Fig. 1032). Japan (Hokkaido).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the locality of holotype, Zenibako.

**Remarks.** This species resembles *G. ceratites* in body colouration, but it can be distinguished by the frontal horn small, i.e., its length is less than depth of F1 (large, ca.

2.0 times in *G. ceratites*). The reddish-brown areas of metasomal T2 and T3 vary from narrow to wide.

### **Discussion about the *Conoblasta* species group**

I have recognized 22 species of the *Conoblasta* species group from Japan, including 12 new species and three species new to Japan. Most of the new species have been confused with *G. cymolomiae* because of the similar colouration of the hind legs (coxa reddish-brown to reddish-yellow, and femur and tibia yellowish-brown to yellow), but they can be discriminated from each other by the combination of non-colouration characters (Table 6).

Presumable synapomorphies of the subgenus *Conoblasta* were proposed by Momoi (1963), Townes (1970b), Kuslitzky (1974a, 2004), and Aubert (1978), but all these character states, except for the presence of a frontal horn, have been ultimately observed in any other species of *Glypta* (Dasch, 1978; Kuslitzky, 2004). After all, I have recognized no reliable synapomorphies for the species of *Conoblasta*. In addition, the shape and size of frontal horns markedly varies among species (Figs. 404-456) without any distinct gap between subgenera *Conoblasta* (with a large to small horn) and *Glypta* (with or without produced carina). Such continuous variation of the frontal horn in *Conoblasta* and *Glypta* was also reported for Nearctic species (Dasch, 1978). These indicate that the presence / absence of a frontal horn is not a suitable character for subgeneric division. Thus, I conclude that the subgenus *Conoblasta* is not a genuine taxon (against the opinion of Momoi (1963), Townes (1970b), and Gauld *et al.* (2002)) and, at most, should be treated as a tentative species group.

In Japan, host records have been reported for the four species of the *Conoblasta* species group, *G. biauriculate*, *G. cymolomiae*, *G. kamijoi*, and *G. shigaensis* (Table 7). Although the host records of *G. cymolomiae* may include some misidentifications of any of the new species described here, those of *G. cymolomiae* and *G. kamijoi* indicate that they both use the same two subfamilies of Tortricidae, Tortricinae and Olethreutinae, while their host ranges are biased to broadleaf (*G. cymolomiae*) or conifer (*G. kamijoi*) feeders, respectively (Table 7). Such differentiation of host plants, i.e., between broad-leaves and conifers, is also observed for the related genera *Apophua* and *Teleutaea* in this study.

In Japanese species of the *Conoblasta* group of *Glypta*, *G. tumor* has unique character states, i.e., (1) dorsolateral carina of T1 obscured (Fig. 542), (2) a pair of oblique grooves of T2-T4 strong and deep (Fig. 542), and (3) dorsal margin of paramere

with a convexity medially (Fig. 492). In addition, the distribution of this species is mainly restricted to the islands with evergreen forests along the Kuroshio Current (Ryukyu Islands, Southern Kyushu, and Izu Islands: see Fig. 1032), unique in Japanese species.

### The *Glypta* species group

**Description based on Japanese species.** Body punctate, covered with silver setae, its length 4.5–12.0 mm.

Head weakly elongated ventrally. Lateral profile of clypeus roundly convex. Lower margin of clypeus convex in anterior view. Supraclypeal suture shallow (Fig 2) or indistinct (Fig. 601). Anterior tentorial pit small (Figs. 2, 601). Frons flat to slightly convex in lateral view, neither with a median horn between each antennal socket nor a pair of projection above each antennal socket (Figs. 3, 545-598). Occiput not strongly concave (Fig. 3), smooth. Upper end of occipital carina not down-curved. Lower part of occipital carina complete. Subocular groove absent (Fig. 4).

Mesosoma. Notaulus slightly present anteriorly, usually indistinct (Figs. 849, 850). Both sides of mesoscutum near tegula obtusely produced posteriorly (Figs. 849, 850, 854, 858, 862). Epicnemial carina present. Episternal scrobe smooth. Sternaulus slightly to weakly defined as shallow concavity on anteriorly. Posterior transverse carina of mesosternum absent. Pleural carina of propodeum complete (Fig. 614). Posterior transverse carina of propodeum at least partly present (Figs. 613, 614, 626-695). Propodeal spiracle round (Fig. 614). Fore wing length 4.0–9.5 mm. Junction of vein *Cu1* and vein *Cu-a* distinctly distant from junction of vein *Rs+M* and vein *M+Cu*. Areolet absent. Pterostigma receiving vein *Rs+M* medially. Hind wing with abscissa of vein *Cu1* between vein *M* and vein *cu-a* 2.0–5.0 times as long as *cu-a*. *Cu1* present, nebulous. Fore tibial spur shorter than half length of fore TS1. Tarsal claw usually longer than arolium, apex not twisted, pectinate from base to near apex (teeth arising on inner side), teeth short (Figs. 623-625).

Metasoma. Median dorsal carina of T1 complete anteriorly, absent posteriorly (Figs. 696-749). Dorsolateral carina of T1 present, usually complete, sometimes incomplete near spiracle. Oblique grooves on T2-T4 present (Figs. 696-749, 915). Ovipositor longer than hind tibia (e.g., Fig. 845). Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Figs. 750-805).

Male subgenital plate with an apodema sternalis strongly projecting (Figs. 812, 815, 818, 821, 836, 839, 842). Apex of paramere not strongly produced (Figs. 806-811,

822, 823, 826-833). Basal inner angle of paramere produced (Figs. 806, 808, 810, 822, 826, 828, 289, 832).

Sexual dimorphism. Punctuation on body of males sparser than females. Colouration of male more or less paler than females.

**Distribution.** Palaearctic, Oriental and Nearctic regions.

**Remarks.** I have examined the the type species of the genus *Glypta*, *G. sculpturata* Gravenhorst 1829, deposited in AEI (1F1M, det. by V. Kuslitzky) and ZIS (2F, det. by V. Kuslitzky) to confirm that the diagnosis based on Japanese species are consistent with the character states of the type species. Among Japanese species, *G. glypta* and *G. japonica* most resembles *G. sculpturata* (see Remarks under *G. japonica*).

### Key to Japanese subgroups of the *Glypta* species group (♀)

1. Scutellum yellow or reddish-brown (Figs. 849, 850, 854, 858, 862). Metasoma always black (Figs. 845, 852, 856, 860).....*maruyamensis* subgroup
- . Scutellum black or at most slightly tinged with reddish-brown partly (Figs. 919, 945, 946). Metasoma various in colouration.....2
- 2(1). Hind coxa black or dark reddish-brown and/or hind femur black or dark reddish-brown (Figs. 864, 867, 869, 872, 875, 877, 879, 881, 883, 885, 887, 890). Outline of both lateral sides of T1 usually more or less straight in dorsal view (Figs. 871, 874, 889) .....*glypta* subgroup
- . Hind coxa and femur not darkened, yellow, white, brown or reddish-brown (e.g., Figs. 892, 895, 998, 1006), or if coxae black, apex of clypeus with a median notch (Figs. 601, 604). Outline of both lateral sides of T1 in dorsal view various.....3
- 3(2). Face and clypeus not separated by concavity in lateral view and form a united single flat plane (Fig. 561). Apex of clypeus with a median notch (Figs. 601, 604).....*rufa* subgroup
- . Face and clypeus various in profile, usually separated by concavity in lateral view (Figs. 562-598). Apex of clypeus without notch (Figs. 2, 605).....*media* subgroup

#### The *maruyamensis* subgroup

Four species are recognized in Japan. This subgroup is easily separable from other subgroups by the yellow scutellum (black in most other subgroups, or in *G. konishii* of the *media* subgroup with a pair of indistinct reddish-brown spots).

### Key to Japanese species of the *maruyamensis* subgroup (♀)

1. Ovipositor sheath short, 0.6 times as long as fore wing and 1.6–1.7 times as long as hind tibia. Lower part of occipital carina sinuated, its lower end joined hypostomal carina distant from base of mandible (Figs. 546, 603). Lateral part of pronotum yellow with a median longitudinal black stripe (Fig. 852). Lower posterior part of mesopleuron with a yellow marking (Fig. 852).....*G. kusigematii* **sp. nov.**
- Ovipositor sheath long, more than 0.8 times as long as fore wing and more than 2.1 times as long as hind tibia. Lower part of occipital carina various. Lateral part of pronotum black with yellow area(s) on upper margin and sometimes on collar (Figs. 845, 856, 860). Lower posterior part of mesopleuron without yellow marking (Figs. 845, 856, 860).....2
- 2(3). Pronotum largely smooth, with strong epomia (Figs. 610, 847, 848). Collar and upper margin of lateral area of pronotum yellow (Fig. 845). T1 sparsely punctate (Fig. 851). Subbasal band of hind tibia obscured (Fig. 845)..... *G. elegans* **sp. nov.**
- Pronotum largely punctate, with weak epomia (cf. Figs. 612). Collar black or at most tinged with yellow on anterior part (Figs. 856, 860). Colouration of upper margin of lateral area of pronotum various. T1 densely punctate (Figs. 859, 863). Subbasal band of hind tibia distinct (Figs. 856, 860).....3
- 3(4). Ovipositor sheath less than 0.9 times as long as fore wing and less than 2.6 times as long as hind tibia. T1 1.0–1.1 times as long as maximum width. Clypeus and mandible without conspicuous yellow area (Fig. 857). Pronotum with a small yellow area on upper posterior angle (Fig. 856)..... *G. maruyamensis* Uchida, 1928
- Ovipositor sheath more than 1.0 times as long as fore wing and more than 2.7 times as long as hind tibia. T1 1.2–1.3 times as long as maximum width. Clypeus and mandible each with a conspicuous yellow area (Fig. 861). Pronotum usually with a yellow stripe along upper margin (Fig. 860)..... *G. yamamotoi* **sp. nov.**

#### *Glypta elegans* **sp. nov.**

(Figs. 545, 600, 602, 610, 626, 627, 696, 750, 845-851)

**Description. Female** (n=9). Body length 4.5–6.5 (HT: 5.5) mm.

Head 0.7 times as long as wide. Clypeus 0.5–0.6 (HT: 0.6) times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 545), 0.5–0.6 (HT: 0.6) times as long as wide. Frons punctate except for smooth area around antennal socket, without a pair of longitudinal creases between each antennal socket

(Fig. 600). POL 0.6–0.9 (HT: 0.7) times as long as OOL. Mandible slightly convex basally, with a narrow ventral flange. Upper part of occipital carina incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at or slightly distant from base of mandible (Fig. 602). Lower part of gena slightly narrower than dorsal part. MSL 0.8–1.0 (HT: 0.8) times as long as BWM. Antenna with 35–38 (HT: 35) flagellomeres. F1 1.7–2.0 (HT: 1.8) times as long as F2.

Mesosoma. Pronotum largely smooth with strong epomia (Figs. 610, 847, 848). Mesopleuron with a large speculum. Epicnemial carina present. Sternaulus present basally. Metapleuron punctate. Lateral longitudinal carina of propodeum partly present (Figs. 626, 627). Anterior transverse carina of propodeum complete, sometimes its median section trace-like (Figs. 626, 627). Posterior transverse carina of propodeum complete (Figs. 626, 627). Areae externa and dentipara of propodeum clearly separated by a complete carina (Figs. 626, 627). Fore wing length 4.0–5.0 (HT: 5.0) mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 5.1–6.1 (HT: 5.3) times as long as maximum depth in lateral view. Hind TS1 2.1–2.3 (HT: 2.2) times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 sparsely punctate (Fig. 851), 1.3–1.5 (HT: 1.5) times as long as maximum width, its median dorsal carina present on basal ca. 0.5 of tergite (Fig. 696). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 696). T2 0.9–1.0 (HT: 1.0) times as long as maximum width. Ovipositor sheath 0.6–1.3 (HT: 1.0) times as long as fore wing, 2.1–3.0 (HT: 2.6) times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 750).

Colouration (Figs. 845-851). Body (excluding wings and legs) black, except for: clypeus, mandible excluding apex, palpi, dorsal margin of pronotum excluding median part, collar, tegula, subalar prominence, scutellum, postscutellum, axillae, membranous parts of metasomal sternite, posterior part of subgenital plate and ovipositor whitish-yellow to yellowish-brown; antenna blackish-brown, its ventral surface sometimes slightly paler than dorsal surface; posterior margin of metasomal tergites narrowly tinged with red. Wings hyaline; veins and pterostigma yellowish-brown except for yellow wing base. Legs yellowish-brown except for: fore and mid coxae, trochanters and trochantellus whitish-yellow; basal and apical areas of hind tibia tinged with blackish-brown; hind tarsus more or less tinged with blackish-brown; hind coxa usually with a whitish-yellow area; outer surface of hind leg sometimes tinged with blackish-brown. Basal yellow area of TS1 ca. 0.2 length of TS1 or not clearly defined.

**Male.** Unknown.

**Specimens examined.** JAPAN: [Holotype] F, Yamagata Pref., Mt. Haguro-san, 3. ix. 1966, K. Kusigemati leg. (KU). [Paratypes] 2F, Hokkaido Pref., Akkeshi Town, Bekanbeushi marsh, 1–31. viii. 2003, R. Matsumoto leg. (MsT.) (OMNH); 1F, same data of holotype (KU); 1F, Tochigi Pref., Nikko City, Tamozawa, 25. viii. – 5. ix. 2008, T. Nakamura leg. (MsT) (TPM); 1F, Tochigi Pref., Nasushiobara City, Shiobara, Sukkan-sawa, 1000m alt., 13–21. viii. 2008, T. Matsumura leg. (MsT) (KPMNH); 1F, Tochigi Pref., Nasushiobara City, Shiobara, Hakonomori-park, 630m alt., 4–10. ix. 2008, T. Matsumura leg. (MsT) (KPMNH); 1F, Ibaraki Pref., Kita-ibaraki, Ogawa forest reserve, 6–20. viii. 1996, K. Maeto leg. (MsT) (NIAES); 1F, same locality and collector, 17. ix. – 10. x. 1996 (MsT) (NIAES); 1F, Ehime Pref., Mt. Odamiyama, Odamiyamakeikoku, 20. ix. 1994, E. Yamamoto leg. (NIAES); 1F, Kagoshima Pref., Amamioshima Island, Mt. Yui, 400m alt., 13. ix. – 27. xii. 2000, T. Muroi and Y. Maeda leg. (MsT) (KPMNH).

**Distribution** (Fig. 1033). Japan (Hokkaido, Honshu, Shikoku and Amamioshima Is.).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the Latin word "elegans", which means elegant.

**Remarks.** This species is one of characteristic species in Japanese *Glypta*, i.e., body punctuation sparse, especially in pronotum and T1, and epomia strong. The strong epomia suggests that this species may be more related to the genus *Zaglyptomorpha* Viereck, 1913, whereas this species can be distinguished from *Zaglyptomorpha* by the epomia not enlarged dorsally and not forming a strongly raised tubercle in dorsal view (enlarged and forming such a tubercle in *Zaglyptomorpha*). This species also resembles *Glyptopimpla*, but it can be easily distinguished by the areolet absent (present in *Glyptopimpla*). Although the length of ovipositor sheath varies markedly (almost double in relative length), the variation is continuous and thus it can be thought to be intraspecific.

***Glypta kusigematii* sp. nov.**

(Figs. 546, 603, 628, 697, 751, 852-855)

**Description. Female** (n=2). Body length 6.5–7.0 (HT: 6.5) mm.

Head 0.7 times as long as wide. Clypeus 0.6 times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 546), 0.6 times as long as wide. Frons punctate except for smooth area around antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.3–1.4 (HT: 1.3) times as

long as OOL. Mandible slightly convex basally, with a narrow ventral flange. Upper part of occipital carina incomplete behind posterior ocelli. Lower part of occipital carina complete, distinctly sinuate (Fig. 546), its lower end connected to hypostomal carina distant from base of mandible (Fig. 603). Lower part of gena, strongly narrower than dorsal part. MSL 0.7–0.8 (HT: 0.8) times as long as BWM. Antenna with 36 flagellomeres. F1 2.0–2.1 (HT: 2.1) times as long as F2.

Mesosoma. Pronotum punctate dorsally, smooth ventrally, with a weak epomia. Mesopleuron with a large speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum partly present (Fig. 628). Anterior transverse carina of propodeum complete (Fig. 628). Posterior transverse carina of propodeum complete (Fig. 628). Areae externa and dentipara of propodeum clearly separated by a complete carina (Fig. 628). Fore wing length 5.5–6.0 (HT: 5.5) mm. Fore coxa not curved to outward, slightly concave above socket of trochanter. Hind femur 4.5–4.6 (HT: 4.6) times as long as maximum depth in lateral view. Hind TS1 2.0–2.1 (HT: 2.1) times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 densely punctate (Fig. 851), 1.2 times as long as maximum width, its median dorsal carina present on basal ca. 0.7 of tergite (Fig. 697). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 697). T2 0.8 times as long as maximum width. Punctures on T1–T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 0.6 times as long as fore wing, 1.6–1.7 (HT: 1.6) times as long as hind tibia. Apical part of upper valve of ovipositor without with distinct dorsal tubercle before subapical notch (Fig. 751).

Colouration (Figs. 852–855). Body (excluding wings and legs) black, except for: clypeus, mandible excluding apex, palpi, ventral spot of scape, ventral surface of pedicel, dorsal margin of pronotum excluding median part, posterior part of collar, tegula, subalar prominence, postero-ventral corner of mesopleuron, scutellum, axillae, membranous parts of metasomal sternite, posterior part of subgenital plate and ovipositor whitish-yellow to yellowish-brown; antenna blackish-brown, its ventral surface slightly paler than dorsal surface; posterior margin of each metasomal tergite slightly tinged with red. Wings hyaline; veins and pterostigma yellowish-brown except for yellow wing base. Legs yellowish-brown except for: fore and mid coxae, all trochanters and trochantellus, and dorsal surface of hind coxa whitish-yellow; apex of hind femur and subbasal and apical areas of hind tibia tinged with blackish-brown; hind tarsus blackish-brown and each segment with narrow yellow base. Basal yellow area of TS1 ca. 0.1 length of TS1.

**Male.** Unknown.



**Specimens examined.** JAPAN: [Holotype] F, Hokkaido Pref., Jozankei, 27. ix. 1967, K. Kusigemati leg. (KU). [Paratype] 1F, Hokkaido Pref., Kumaishi, Kenichi-gawa, Iwafuchi-zawa, 29. ix.-10. x. 1995, Y. Ito and T. Ito leg. (MsT) (NIAES).

**Distribution** (Fig. 1033). Japan (Hokkaido).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the collector of holotype, Emeritus Prof. Kanetoshi Kusigemati of Kagoshima University, who is an excellent taxonomist of the Ichneumonidae.

**Remarks.** This species resembles *G. scutellaris* Thomson, 1889, from Eurasia in the body colouration, but it can be distinguished by the ovipositor 0.6 times as long as fore wing (more than 0.8 times as long as fore wing in *G. scutellaris*). This species can be easily distinguished from any other species of Japanese *Glypta* by the character states shown in the above key.

*Glypta maruyamensis* Uchida, 1928

(Figs. 547, 629, 631, 698, 752, 856-859)

*Glypta maruyamensis* Uchida, 1928: 74; Momoi, 1963: 117; Nakaya, 2009: 7; Katayama *et al.*: 151.

**Description. Female** (n=14). Body length 5.5–7.0 mm.

Head 0.6 times as long as wide. Clypeus 0.6–0.7 times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 547), 0.5–0.6 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.3–1.4 times as long as OOL. Mandible flat basally, with a narrow ventral flange. Upper part of occipital carina complete, its top narrowly obsolete. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.6–0.8 times as long as BWM. Antenna with 29–33 flagellomeres. F1 1.4–1.6 times as long as F2.

Mesosoma. Pronotum nearly entirely punctate, with a weak epomia. Mesopleuron with a small speculum. Metapleuron punctate. Pleural carina of propodeum complete or partly absent (Figs. 629-631). Lateral longitudinal carina of propodeum partly present (Figs. 629-631). Anterior transverse carina of propodeum present only lateral section, its sometimes trace-like (Figs. 629-631). Posterior transverse carina of propodeum complete (Figs. 629-631). Areae externa and dentipara

of propodeum separated by complete or trace-like carina (Figs. 629-631). Fore wing length 4.5–6.5 mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 4.7–5.2 times as long as maximum depth in lateral view. Hind TS1 1.9–2.1 times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 densely punctate (Fig. 859), 1.0–1.1 times as long as maximum width, its median dorsal carina present on basal ca. 0.6 of tergite (Fig. 698). Both lateral sides of T1 with or without a convexity just after the base of median dorsal carina (Fig. 698). T2 0.7–0.8 times as long as maximum width. Punctures on T1-T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 0.8–0.9 times as long as fore wing, 2.3–2.6 times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 752).

Colouration (Figs. 856-863). Body (excluding wings and legs) black, except for: clypeus, mandible excluding apex, ventral surface of pedicel, ventro-posterior angle of pronotum and subalar prominence usually slightly tinged with reddish-brown; palpi, postero-dorsal corner of pronotum, tegula, scutellum, axillae and membranous parts of metasomal sternite whitish-yellow to yellowish-brown; posterior margin of each metasomal tergite, posterior part of subgenital plate and ovipositor reddish-brown; scutellum sometimes tinged with reddish-brown. Wings hyaline; veins and pterostigma yellowish-brown except for yellow wing base. Fore and mid leg whitish-yellow to reddish-yellow. Hind coxa reddish-yellow with whitish-yellow dorsal area. Hind trochanter and trochantellus whitish-yellow. Hind femur reddish-yellow, its apex slightly tinged with blackish-brown. Hind tibia whitish-yellow with subbasal and apical blackish-brown to black area, its ventral surface sometimes slightly tinged with blackish-brown. Hind tibial spurs whitish-yellow. Hind tarsus blackish-brown to black excluding basal whitish-yellow area of TS1-TS4. Basal yellow area of TS1 ca. 0.4 length of TS1.

**Male.** Unknown.

**Specimens examined.** JAPAN: 1F (lectotype), Hokkaido Pref., Sapporo, “8. 9. 1923”, T. Uchida leg. (SEHU); 1F, Hokkaido Pref., Sapporo, 12. viii. 1967, K. Kusigemati leg. (KU); 1F, same locality and collector, 27. v. 1968 (KU); 1F, Hokkaido Pref., Sapporo City, Misumai, Kannon-zawa, 27. vii.-11. viii. 1992, N. Kuhara leg. (MsT) (NIAES); 1F, Hokkaido Pref., Akkeshi Town, Bekanbeushi marsh, 30. viii. 2003, R. Matsumoto leg. (OMNH); 1F, Hokkaido Pref., Toyotomi Town, 4. viii. 1996, T. Tachi leg. (OMNH); 1F, Aomori Pref., Ikarigaseki Vil., Warisawa, 18. ix. 1994, T. Ichita leg. (NIAES); 1F, Iwate Pref., Yamada, 25-27. ix. 1989, Y. Katayama leg. (NIAES); 1F, Iwate Pref., Mt. Hayachine, 400m alt., 3-10. ix. 1989, M. Sharkey and H. Makihara leg. (MsT)

(NIAES); 1F, Tochigi Pref., Kanuma, Hachioka, 21. ix. 1997, T. Matsumura leg. (NIAES); 1F, Tochigi Pref., Yaita, 11-22. viii. 1989, K. Konishi leg. (MsT) (NIAES); 1F, Kanagawa Pref., Atsugi City, Nanasawa, Osawa, I. Waki leg. (NSMT); 1F, Shizuoka Pref., Mt. Hakkosan, 24. ix. 1947, J. Minamikawa leg. (NIAES); 1F, Tottori Pref., Mt. Daisen, 800-1000m alt., 9. vi. 1981, T. Goto leg. (NIAES).

**Distribution** (Fig. 1033). Japan (Hokkaido and Honshu); Russian Far East.

**Bionomics.** *Ancylis nemorana* Kuznetsov and *Olethreutes sideranus* (Treitschke) [Tortricidae] were recorded as hosts (Nakaya, 2009).

**Remarks.** This species is common in northern Japan, while some specimens previously misidentified as this species are *G. yamamotoi* (see Remarks under *G. yamamotoi*).

***Glypta yamamotoi* sp. nov.**

(Figs. 548, 632, 633, 699, 753, 860-863)

**Description. Female** (n=12). Body length 6.5–9.5 (HT: 9.0) mm.

Head 0.6 times as long as wide. Clypeus 0.6 times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 548), 0.5–0.6 (HT: 0.5) times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.3–1.4 (HT: 1.4) times as long as OOL. Mandible slightly convex basally, with a narrow ventral flange. Upper part of occipital carina complete, its top narrowly obsolete. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.7–0.8 (HT: 0.7) times as long as BWM. Antenna with 36–38 (HT: 36) flagellomeres. F1 1.5–1.7 (HT: 1.6) times as long as F2.

Mesosoma. Pronotum entirely punctate, with strong epomia. Mesopleuron with a small speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum partly present to absent (HT: partly present) (Figs. 632, 633). Anterior transverse carina of propodeum present only lateral section, its sometimes trace-like (HT: complete laterally) (Figs. 632, 633). Posterior transverse carina of propodeum complete (Figs. 632, 633). Areae externa and dentipara of propodeum separated by complete or completely united into single area (HT: separated) (Figs. 632, 633). Fore wing length 5.5–7.0 (HT: 7.0) mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 5.6–5.7 (HT: 5.6) times as long as maximum depth in lateral view. Hind TS1 2.1 times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 densely punctate (Fig. 863), 1.2–1.3 (HT: 1.3) times as long as

maximum width, its median dorsal carina present on basal ca. 0.7 of tergite, area near end of this carina distinctly concave (Fig. 699). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 699). T2 0.9–1.0 (HT: 1.0) times as long as maximum width. Punctures on T1-T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 1.0–1.1 (HT: 1.0) times as long as fore wing, 2.7–3.0 (HT: 2.7) times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 753).

Colouration (Figs. 860-863). Body (excluding wings and legs) black, except for: clypeus, mandible excluding apex, palpi, dorsal margin of pronotum excluding median part (and sometimes also anterior part), tegula, subalar prominence, scutellum, axillae, membranous parts of metasomal sternite and posterior part of subgenital plate whitish-yellow to yellowish-brown; posterior margin of each metasomal tergite and ovipositor reddish-brown; collar usually partly tinged with yellow. Wings hyaline; veins and pterostigma yellowish-brown except for yellow wing base. Fore and mid leg whitish-yellow to reddish-yellow. Hind coxa reddish-yellow with whitish-yellow dorsal area. Hind trochanter and trochantellus whitish-yellow, sometimes slightly tinged with blackish-brown. Hind femur reddish-yellow excluding apex blackish-brown. Hind tibia whitish-yellow with subbasal and apical blackish-brown to black area, its ventral surface sometimes broadly tinged with blackish-brown. Hind tibial spurs whitish-yellow. Hind tarsus blackish-brown to black excluding basal whitish-yellow area of TS1-TS4 (but indistinct in TS4). Basal yellow area of TS1 ca. 0.3 length of TS1.

**Male.** Unknown.

**Specimens examined.** JAPAN: [Holotype] F, Hokkaido Pref., Sapporo City, Hitsujigaoka (GPS: N 43-00/ E 141-24), 24-31. viii. 2010, K. Konishi leg. (MsT) (KPMNH). [Paratypes] 1F, Hokkaido Pref., Sapporo, 27. viii. 1965, K. Kusigemati leg. (KU); JAPAN: 1F, Hokkaido Pref., Sapporo City, Kannon-zawa, stream side (GPS: N 42-58/ E 141-15), 7. viii.-13. ix. 2002, T. Yoshida leg. (MsT) (KPMNH); 2F, Miyagi Pref., Akiu, Futakuchi-kyokoku, 12. vii. 1985, K. Konishi leg. (LT) (NIAES); 1F, Fukushima Pref., Hinoemata Vil., 29. vi. 1991, K. Konishi leg. (NIAES); 1F, Niigata Pref., Myokou City, Suginosawa, Mt. Sasagamine (1250–1400 m alt.), 9. vii. 2013, S. Shimizu leg. (KPMNH); 1F, Aichi Pref., Shitara, Uradani, 1-7. viii. 1994, T. Kanbe leg. (MsT) (NIAES); 1F, same locality and collector, 8-14. viii. 1994 (MsT) (NIAES); 1F, Ehime Pref., Mt. Odamiyama, 11. vii. 1994, E. Yamamoto leg. (NIAES); 1F, Ehime Pref., Mt. Odamiyama, Hontani, 7. viii. 1994, E. Yamamoto leg. (NIAES); 1F, same locality and collector, 3. ix. 1994 (LT) (NIAES).

**Distribution** (Fig. 1033). Japan (Hokkaido, Honshu and Shikoku).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the collector of types, Dr. Eiji Yamamoto of Ehime Prefecture, who has contributed to regional insect conservation and entomology.

**Remarks.** This species may be confused with *G. maruyamensis*, but it can be easily distinguished by the character states shown in the above key. This species also resembles *G. scutellaris*, *G. longiungula* Kuslitzky, 2007, from Tajikisutan, and *G. picta* Kuslitzky, 2007, from Russian Far East, in the body colouration, but it can be distinguished by the ovipositor not shorter than fore wing (at most slightly shorter than fore wing in the other species).

#### The *glypta* subgroup

This subgroup consists of 13 species in Japan. *G. tamanukii* Uchida, 1928, and *G. aceras* Momoi, 1965, of the *Conoblasta* group are more or less similar to the species of this subgroups but they can be easily separated by the frons with a conspicuous median projection.

#### Key to Japanese species of the *glypta* subgroup (♀)

Note: If the species has the combination of reddish-brown hind coxa, dark reddish-brown hind femur and long ovipositor without distinctly convex tubercle before subapical notch, it may be *G. ezoensis* **sp. nov.** or *G. hayachinensis* **sp. nov.** of the *media* subgroup (in *G. ezoensis*, the convex tubercle before subapical notch is present but indistinct).

1. Ovipositor sheath very long, more than 1.5 times as long as fore wing and more than 4.3 times as long as hind tibia.....2
- . Ovipositor sheath short to long, less than 1.4 times as long as fore wing and less than 4.3 times as long as hind tibia.....4
- 2(1). Ovipositor without conspicuous tubercle before subapical notch (Fig. 766). Ovipositor sheath 4.5–5.2 times as long as hind tibia. Hind leg nearly completely black (base of hind tibia and each tarsal segment slightly tinged with yellow) (Fig. 890).....*G. sudai* **sp. nov.**
- . Ovipositor with a conspicuous tubercle before subapical notch (Figs. 756, 763, 764). Ovipositor sheath less than 4.7 times as long as hind tibia. Hind coxa nearly almost reddish-yellow to reddish-brown (Figs. 869, 885). Hind trochantellus more or less

whitish-yellow (Figs. 869, 885).....	3
3(2). Hind TS1 2.2–2.3 times as long as TS2. Large species, body length 9.0–12.0 mm.....	<i>G. glypta</i> Ashmead, 1906
-. Hind TS1 2.7 times as long as TS2. Small species, body length 7.0–7.5 mm.....	<i>G. nagasei</i> <b>sp. nov.</b>
4(1). T1 1.5 times as long as maximum width, its both lateral sides parallel in dorsal view (Fig. 874). Ovipositor sheath 3.9–4.3 times as long as hind tibia. Hind leg without reddish-yellow area (Fig. 872).....	<i>G. kochai</i> <b>sp. nov.</b>
-. T1 less than 1.4 times as long as maximum width, its both lateral sides parallel (Fig. 889) or gradually widen (Fig. 866) in dorsal view. Ovipositor sheath less than 3.5 times as long as hind tibia. Hind leg sometimes with a reddish-yellow area (e.g., Figs. 864, 867).....	5
5(4). T1 short (Fig. 700), 0.9 times as long as maximum width. T2 0.6–0.7 times as long as maximum width. Ovipositor sheath 0.6 times as long as fore wing, 1.6–1.7 times as long as hind tibia. Hind leg, excluding hind coxa, largely reddish-yellow (Fig. 634).....	<i>G. adachii</i> Uchida, 1928
-. Combination of characteristics above lacking.....	6
6(5). Hind femur and tibia largely reddish-yellow, yellowish-brown and/or brown (Fig. 867).....	7
-. Hind tibia (and usually hind femur) without reddish-yellow area (e.g., Figs. 875, 877, 883, 887).....	8
7(6). MSL 0.9 times as long as BWM. Ovipositor sheath 0.9–1.0 times as long as fore wing. Posterior margin of T1-T3 each with a conspicuous red area.....	<i>G. kasparyani</i> Kuslitzky, 1976
-. MSL 0.7 times as long as BWM. Ovipositor sheath longer than 1.1 times as long as fore wing. Posterior margin of T1-T3 without red area....	<i>G. akiuensis</i> <b>sp. nov.</b>
8(6). Ovipositor sheath longer than fore wing, more than 3.3 times as long as hind tibia.....	9
-. Ovipositor sheath as long as or shorter than fore wing, less than 2.5 times as long as hind tibia.....	10
9(8). T1 1.1 times as long as maximum width. T2 0.7 times as long as maximum width. Antenna with 31 flagellomeres. Hind femur 5.4 times as long as maximum depth in lateral view. Small species, body length 7.5 mm.....	<i>G. kumaishiensis</i> <b>sp. nov.</b>
-. T1 1.3–1.4 times as long as maximum width. T2 1.0 times as long as maximum width. Antenna with 38–41 flagellomeres. Hind femur 4.7–4.8 times as long as maximum depth in lateral view. Large species, body length 8.5–10.5 mm.....	<i>G. kuro</i> <b>sp. nov.</b>

- 10(8). Small species, body length 7.0–7.5 mm. Hind coxa always black (Fig. 881, 887). Length of ovipositor sheath various.....11
- . Large species, body length 9.0–9.5 mm. Hind coxa black (Fig. 879) or reddish brown (Fig. 883). Ovipositor sheath 0.8–0.9 times as long as fore wing, 2.3–2.4 times as long as hind tibia.....12
- 11(10). MSL 1.0 times as long as BWM. Ovipositor sheath 0.9–1.0 times as long as fore wing, 2.5–2.8 times as long as hind tibia.....*G. minamikawai* **sp. nov.**
- . MSL 0.7 times as long as BWM. Ovipositor sheath 0.7 times as long as fore wing, 1.8 times as long as hind tibia.....*G. nakamurai* **sp. nov.**
- 12(10). Hind coxa black (Fig. 879). Fore and mid coxae blackish brown. Basal 0.2 of hind TS1 whitish-yellow. MSL 0.7 times as long as BWM. Antenna with 33–37 flagellomeres. F1 1.4–1.5 times as long as F2. Hind femur 5.2–5.5 times as long as maximum depth in lateral view.....*G. maetoi* **sp. nov.**
- . Hind coxa reddish-yellow (Fig. 883). Fore and mid coxae reddish-yellow (Fig. 883). Hind TS1 entirely black (Fig. 883). MSL 0.8 times as long as BWM. Antenna with 44 flagellomeres. F1 1.5–1.8 times as long as F2. Hind femur 5.9–6.2 times as long as maximum depth in lateral view.....*G. murotai* **sp. nov.**

***Glypta adachii*** Uchida, 1928

(Figs. 549, 634, 700, 754, 806, 807, 812-814, 864-866)

*Glypta adachii* Uchida, 1928: 72; Matsumura, 1931: 49.

**Description. Female** (n=8). Body length 6.0–6.5 mm.

Head 0.6–0.7 times as long as wide. Clypeus 0.6–0.7 times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 549), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.3–1.4 times as long as OOL. Mandible flat basally, with a narrow ventral flange. Upper part of occipital carina complete or narrowly incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 1.0 times as long as BWM. Antenna with 31 flagellomeres. F1 1.5–1.7 times as long as F2.

Mesosoma. Pronotum entirely densely punctate, with a weak epomia. Mesopleuron with a small speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum partly present. Anterior transverse carina of propodeum present only

lateral section (Fig. 634). Posterior transverse carina of propodeum complete (Fig. 634). Areae externa and dentipara of propodeum clearly separated by a complete carina (Fig. 634). Fore wing length 5.0–5.5 mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 5.0 times as long as maximum depth in lateral view. Hind TS1 2.0–2.1 times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 densely punctate (Fig. 866), 0.9 times as long as maximum width, its median dorsal carina present on basal ca. 0.5 of tergite (Fig. 700). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 700). T2 0.6–0.7 times as long as maximum width. Punctures on T1–T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 0.6 times as long as fore wing, 1.6–1.7 times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 754).

Colouration (Figs. 864–866). Body (excluding wings and legs) black, except for: apical part of clypeus reddish-yellow; mandible slightly tinged with red; palpi yellowish-brown; flagellum dark reddish-brown; postero-dorsal corner of pronotum, tegula and axillae yellow to yellowish-brown; posterior margin of each metasomal tergite tinged with reddish-brown and other area of tergites also sometimes tinged with red; membranous parts of metasomal sternite, posterior part of subgenital plate and ovipositor reddish-brown to yellowish-brown. Wings hyaline; veins and pterostigma yellowish-brown except for yellow wing base. Legs reddish-yellow, except for: all coxae black to blackish-brown; all trochanters blackish-brown with a yellow area; all trochanteruses yellow; subbasal band of hind tibia weakly tinged with black; apical part of hind tibia black; hind tarsus blackish-brown to black each with a basal yellow area on TS1–TS3 and with slightly tinged with yellow on TS4 and TS5. Basal yellow area of TS1 ca. 0.3 length of TS1.

**Male** (n=2). Similar to female. MSL 0.8 times as long as BWM. Hind femur 5.3 times as long as maximum depth in lateral view. T1 1.0 times as long as maximum width. T2 0.8 times as long as maximum width. Posterior margin of subgenital plate convex (Fig. 812). Apical margin of paramere roundly produced (Figs. 806, 807, 814). Dorsal margin of paramere without a convexity apically (Figs. 806, 814). Inner margin of paramere concave near basal inner angle (Fig. 806). Aedeagus weakly curved, its basal apodeme ca. 0.5 times total length of aedeagus (Fig. 813). Penis valve without a minute notch at posterior part of dorsal surface (Fig. 813). Basal margin of dorsal surface of penis valve not produced medially (Fig. 813). Hind coxa and metasomal tergites partly and sometimes paler than female.



**Specimens examined.** JAPAN: 2F, Hokkaido Pref., Mt. Muine, 20. viii. 1968, K. Kusigemati leg. (KU); 3F, Hokkaido Pref., Mt. Soranuma, 4. viii. 1967, K. Kusigemati leg. (KU); 1M, same locality, 1. viii. 1968, M. Suwa leg. (KU); 1M, Hokkaido Pref., Mashike, 24. vii. 1964, K. Kusigemati leg. (KU); 1F, Hokkaido Pref., Shiretoko pen., Okeppu rindo, 13. viii. 1996, T. Tachi (OMNH). RUSSIA: 1F (lectotype) "Saghalin, Adachi, Isshiki", "Ohtani, 22 VIII-1914" (SEHU).

**Distribution** (Fig. 1034). Japan\* (Hokkaido); Russian Far East.

**Bionomics.** Unknown.

**Remarks.** This is the first record of this species from Japan. The very wide T1 and T2 of this species is unique in the *glypta* subgroup.

***Glypta akiuensis* sp. nov.**

(Figs. 550, 635, 701, 755, 867, 878)

**Description. Female** (n=2). Body length 5.5–6.5 (HT: 5.5) mm.

Head 0.6 times as long as wide. Clypeus 0.6 times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 550), 0.5 times as long as wide. Frons punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.1–1.3 (HT: 1.1) times as long as OOL. Mandible flat basally, with a narrow ventral flange. Upper part of occipital carina incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.7 times as long as BWM. Antenna with 29–32 (HT: 29) flagellomeres. F1 1.4 times as long as F2.

Mesosoma. Pronotum punctate, with a small smooth area along ventral margin, with a weak epomia. Mesopleuron with a large speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum partly present (Fig. 635). Anterior transverse carina of propodeum present only lateral section (Fig. 635). Posterior transverse carina of propodeum complete (Fig. 635). Areae externa and dentipara of propodeum clearly separated by a complete carina (Fig. 635). Fore wing length 5.0–6.0 (HT: 5.0) mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 5.2–5.7 (HT: 5.7) times as long as maximum depth in lateral view. Hind TS1 2.2 times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 punctate, 1.1 times as long as maximum width, its median dorsal carina present on basal ca. 0.6 of tergite (Fig. 701). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 701). T2 0.7 times as long as

maximum width. Punctures on T2-T4 partly longitudinally or transversely striated by coalescent punctures. Ovipositor sheath 1.1–1.2 (HT: 1.1) times as long as fore wing, 3.2–3.3 (HT: 3.2) times as long as hind tibia. Apical part of upper valve of ovipositor with a slightly convex dorsal tubercle before subapical notch (Fig. 755).

Colouration (Figs. 867, 868). Body (excluding wings and legs) black, except for: apical part of clypeus slightly tinged with red; palpi yellowish-brown; postero-dorsal corner of pronotum and tegula yellow to yellowish-brown; membranous parts of metasomal sternite, posterior margin of each metasomal tergite, posterior part of subgenital plate and ovipositor reddish-brown to yellowish-brown. Wings hyaline; veins and pterostigma yellowish-brown except for yellow wing base. Legs reddish-yellow to yellowish-brown, except for: all coxae and hind trochantellus black to blackish-brown excluding yellow narrow apex; fore and mid trochanters and all trochanteruses whitish-yellow; subbasal band of hind tibia weakly tinged with black; apical part of hind tibia black; hind tarsus slightly tinged with black, with an indistinct basal yellow area on TS1. Basal yellow areas of TS1 ca. 0.1 length of TS1.

**Male.** Unknown.

**Specimens examined.** JAPAN: [Holotype] F, Miyagi Pref., Akiu, Futakuchi-kyokoku, 12. vii. 1985, K. Konishi leg. (LT) (NIAES). [Paratype] 1F, Yamanashi Pref., Ashiyasu Vil., Kitasawa-toge, 20. vii. 1997, R. Matsumoto leg. (OMNH).

**Distribution** (Fig. 1034). Japan (Honshu).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the type locality, Akiu Town.

**Remarks.** This species resembles *G. kaspanyi* Kusltzky, 1976, in the colouration of hind leg, but it can be distinguished by the MSL 0.7 times as long as BWM (0.9 in *G. kaspanyi*), the ovipositor longer than fore wing (at most same length in *G. kaspanyi*), and the T1-T3 without conspicuous red posterior margin (with the red margin in *G. kaspanyi*).

***Glypta glypta*** (Ashmead, 1906)

(Figs. 551, 636, 702, 756, 808, 809, 815-817, 869-871)

*Hemiephialtes glyptus* Ashmead, 1906: 177.

*Glypta glypta*: Iwata, 1960: 160; Momoi, 1963: 117; Togashi, 1993: 48; Konishi & Maeto, 2000: 313; Nakaya, 2009: 7.

**Description. Female** (n=46). Body length 9.0–12.0 mm.

Head 0.6 times as long as wide. Clypeus 0.6 times as long as wide, its apex without a small median notch. Face weakly to strongly convex medially (Fig. 551), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.1 times as long as OOL. Mandible flat basally, with a narrow ventral flange. Upper part of occipital carina narrowly incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.8–1.0 times as long as BWM. Antenna with 40–41 flagellomeres. F1 1.9–2.0 times as long as F2.

Mesosoma. Pronotum entirely punctate, with a weak epomia. Mesopleuron with a large speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum partly present (Fig. 636). Anterior transverse carina of propodeum present only lateral section (Fig. 636). Posterior transverse carina of propodeum complete (Fig. 636). Areae externa and dentipara of propodeum clearly separated by a complete carina (Fig. 636). Fore wing length 6.0–8.5 mm. Fore coxa slightly curved to outward, with a shallow concavity above socket of trochanter. Hind femur 4.7–5.2 times as long as maximum depth in lateral view. Hind TS1 2.2–2.3 times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 densely punctate (Fig. 871), 1.3–1.4 times as long as maximum width, its median dorsal carina present on basal ca. 0.6 of tergite (Fig. 702). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 702). T2 0.9–1.0 times as long as maximum width. Punctures on T1–T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 1.5–1.8 times as long as fore wing, 4.3–4.7 times as long as hind tibia. Apical part of upper valve of ovipositor with a distinct dorsal tubercle before wide subapical notch (Fig. 756).

Colouration (Figs. 869–871). Body (excluding wings and legs) black, except for: apical part of clypeus slightly tinged with red; palpi brownish-yellow; postero-dorsal corner of pronotum, tegula and axillae dark yellowish-brown; membranous parts of metasomal sternite and ovipositor reddish-brown to yellowish-brown; posterior margin of each metasomal tergite slightly narrowly tinged with red. Wings hyaline; veins and pterostigma brown to yellowish-brown except for yellow wing base. Legs reddish-yellow, except for: hind coxae reddish-brown, usually partly tinged with blackish-brown; all trochantellus and base of all tibiae whitish-yellow; hind leg excluding reddish-brown coxa, white trochantellus and narrow white or yellow base of tibia and TS1 black. Basal yellow area of TS1 ca. 0.1 length of TS1. Hind coxa usually reddish-brown but sometimes darkened as blackish-brown.

**Male** (n=12). Similar to female. POL 1.1–1.3 times as long as OOL. MSL 0.7–0.9 times as long as BWM. Antenna with 39–42 flagellomeres. F1 1.4 times as long as F2. Hind basitarsus 2.1–2.2 times as long as second tarsal segment. Posterior margin of subgenital plate concave to nearly straight (Fig. 818). Apical margin of paramere roundly produced (Fig. 810, 811, 820). Dorsal margin of paramere without a convexity apically (Figs. 810, 817). Inner margin of paramere concave near basal inner angle (Fig. 810). Aedeagus weakly curved, its basal apodeme ca. 0.5 times total length of aedeagus (Fig. 819). Penis valve without a minute notch at posterior part of dorsal surface (Fig. 819). Posterior dorsal end of penis valve produced (Figs. 810, 819). Fore and mid legs whitish-yellow to yellow. Hind coxa usually yellowish-brown but sometimes darkened. Hind femur and tibia usually paler than female.

**Specimens examined.** JAPAN: 3F, Hokkaido Pref., Mt. Soranuma, 30. viii. 1967, K. Kusigemati leg. (KU); 1F, same locality and collector, 17. vi. 1967 (KU); 1F, Hokkaido Pref., Kamikawa, Asahi Vil., Shin-okushibetsu, 19-21. viii. 1981, Y. Shono leg. (NIAES); 1F, Hokkaido Pref., Kumaishi, Kenichi-gawa, Iwafuchi-zawa, 1-11. ix. 1995, Y. Ito and T. Ito leg. (MsT) (NIAES); 1F, Hokkaido Pref., Mt. Yubari, 11. viii. 1966, K. Kusigemati leg. (KU); 1F, Hokkaido Pref., Mt. Daisetsu, 29. vii. 1967, K. Kusigemati leg. (KU); 1F, Hokkaido Pref., Nakasatsunai, 4. viii. 1968, H. Torikura leg. (KU); 1F, Hokkaido Pref., Sapporo City, Misumai, Kannnon-zawa, 11-22. viii. 1992, N. Kuhara leg. (MsT) (NIAES); 1F, same locality and collector, 24. viii.-7. ix. 1993 (MsT) (NIAES); Hokkaido Pref., Sapporo, 2. ix. 1964, K. Kusigemati leg. (KU); 1M, Hokkaido Pref., Sapporo City, Misumai, 27. vii. – 11. viii. 1992, N. Kuhara leg. (MsT) (NIAES); 2F, Hokkaido Pref., Sapporo City, Hitsujigaoka (GRS: N 43-00/ E 141-24), 13-20. ix. 2007, K. Konishi leg. (MsT) (SEHU); 1F, same locality and collector, 17-24. viii. 2010 (MsT) (KPMNH); 1F, Hokkaido Pref., Akkeshi Town, Bekanbeshi marsh, 31. viii. 2003, R. Matsumoto leg. (MsT) (OMNH); 2M, Hokkaido Pref., Kuromatsunai Town, Utsai, 10. viii. 2008, T. Yoshida & P. Tripotin leg. (KPMNH); 1M, Hokkaido Pref., Kamiiso Town, 1. viii. 2002, T. Yoshida leg. (KPMNH); 1M, Hokkaido Pref., Oshamanbe Town, Warabitai, 10. viii. 2008, T. Yoshida & P. Tripotin leg. (KPMNH); 1F, Hokkaido Pref., Kamishihoro Town, Upepesankeyama, 4. viii. 1997, R. Matsumoto leg. (OMNH); 1F, Hokkaido Pref., 2. viii. 1965, H. Suwa leg. (KU); 1F, Aomori Pref., Aomori City, Hibakozawa-rindo, 21. viii. 1993, T. Ichita leg. (NIAES); 1F, Aomori Pref., Ohma Town, Okoppegawa, 22. viii. 1992, T. Ichita leg. (NIAES); 1F, Iwate Pref., Sukawa, 17. viii. 1965, T. Ishii leg. (NIAES); 4F, Fukushima Pref., Hinoemata Vil., Mikawa, 8. x. 2004, H. Makihara leg. (MsT) (TPM); 1F, Fukushima Pref., Hinoemata, 1300m alt., 24-25. 1989, K. Konishi leg. (NIAES); 1F, Ibaraki Pref., Kita-ibaraki,

Ogawa forest reserve, 6-20. viii. 1996, K. Maeto leg. (MsT) (NIAES); 1F, Tochigi Pref., Yaita, 22. viii.-8. ix. 1989, K. Konishi leg. (MsT) (NIAES); 1F, Tochigi Pref., Nikko City, Tamozawa, 25. viii.-5. ix. 2008, T. Nakamura leg. (MsT) (TPM); 1F, Kanagawa Pref., Kamakura, 17. ix. 1953, H. Nagase leg. (SEHU); 1F, Niigata Pref., Sado Island, Kanaishinbo, Hakuundai to Mt. Myouken-zan, 830-1030 m alt. (GPS: N 38-52-0/ E 138-20-15), 4. viii. 2009, K. Watanabe leg. (KPMNH); 1M, same data except for K. Tokiwa leg. (KPMNH); 1F, Ishikawa Pref., Mt. Hakusan, 1500-1700 m alt., 10. vii. 1992, I. Togashi leg. (NIAES); 1F, Fukui Pref., Ikeda Town, Takakura pass, 9. vii. 1981, T. Murota leg. (KPMNH); 1M, Fukui Pref., Izumi Vil., Aburazaka-toge, 18. vii. 1982, T. Tano leg. (FCMNH); 1M, Fukui Pref., Katsuyama City, Ohara, 19. vi. 1982, T. Murota leg. (FCMNH); 1M, Fukui Pref., Oono City, Mt. Dosaizan, 27. vii. 1982, H. Kurokawa leg. (FCMNH); 1M, Fukui Pref., Oono City, Haeboshi, 15. ix. 1982, H. Kurokawa leg. (FCMNH); 1F, Nagano Pref., Shiga-kogen, 26-27. vii. 1961, J. Minamikawa leg. (NIAES); 1F, Nagano Pref., Outaki Vil., Mt. Ontake-san, Hakkaisan, 1720-1820m alt. (GPS: N 35-52-0/ E 137-31-28), 6. viii. 2010, K. Watanabe leg. (KPMNH); 1F1M, Nagano Pref., Outaki Vil., Mt. Ontake-san, Hakkaisan, 1660-1700m alt. (GPS: N 35-51-47/ E 137-31-37), 7. viii. 2010, K. Watanabe leg. (KPMNH); 1F, Shizuoka Pref., Ikawa Vil., Nikenkoya, 18-20. viii. 1957, J. Minamikawa leg. (NIAES); 1F, Aichi Pref., Mt. Sanage, 14-20. vi. 1993, T. Kanbe leg. (MsT) (NIAES); 1F, Gifu Pref., Kamitakara Vil., Hidarimata, 1. ix. 1996, M. Sueyoshi leg. (OMNH); 1M, Tokushima Pref., Mt. Koutsusan 1100 m alt., 12. v. 1985, K. Oohara leg. (NIAES); 1F, Ehime Pref., Mt. Odamiyama, Mt. Mizunashiyama, 4. ix. 1994, E. Yamamoto leg. (LT) (NIAES); 1F, Fukuoka Pref., Fukuoka City, Sefurisan, 23. v. 1993, S. Kajino leg. (OMNH); 1F, Fukuoka Pref., Mt. Hikosan, 9. vii. 1981, K. Maeto leg. (NIAES); 1F, Fukuoka Pref., Fukuoka City, Nishi ku, Kanayama, 15. x. 1981, F. Sugita leg. (NIAES); 1F, Fukuoka Pref., Maebaru t., Raizan, 28. v. 1995, R. Matsumoto leg. (OMNH); 1F, Kumamoto Pref., Izumi Vil., Shiiba-goe, 3. vi. 1996, T. Nakamura leg. (OMNH); 1F, Nagasaki Pref., Mts. Unzen, Nita pass, 24. ix. 1983, K. Konishi leg. (LT) (NIAES).

**Distribution** (Fig. 1034). Japan (Hokkaido, Honshu, Sado, Shikoku and Kyushu); Russian Far East.

**Bionomics.** Host unknown. Adults are usually collected around broadleaf forests.

**Remarks.** The aedeagus of this species is apparently unique because the posterior dorsal end of the penis valve is produced (not produced in other species).

*Glypta kasparyani* Kuslitzky, 1976

*Glypta kasparyani* Kuslitzky, 1976: 303.

**Specimen examined.** I have examined the holotype (female collected from Kunashiri Is.) deposited in ZIS and paratypes (1 female and 2 males collected from Russian Far East) deposited in AEI and ZIS.

**Distribution** (Fig. 1034). Japan (Kunashiri Is.); Russian Far East.

**Bionomics.** Unknown

**Remarks.** I could not find any additional specimens of this species from Japan.

***Glypta kochai* sp. nov.**

(Figs. 552, 637, 703, 757, 810, 811, 818-820, 872-874)

**Description. Female** (n=14). Body length 6.5–8.0 (HT: 7.0) mm.

Head 0.6–0.7 (HT: 0.7) times as long as wide. Clypeus 0.6 times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 552), 0.6 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket, its area before median ocellus slightly convex. POL 0.8–1.0 (HT: 1.0) times as long as OOL. Mandible flat basally, with a narrow ventral flange. Upper part of occipital carina complete or narrowly incomplete behind posterior ocelli (HT: complete). Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.9–1.0 (HT: 0.9) times as long as BWM. Antenna with 36–38 (HT: 36) flagellomeres. F1 1.7–1.8 (HT: 1.7) times as long as F2.

Mesosoma. Pronotum entirely punctate, with a small epomia. Mesopleuron with a small speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum absent (Fig. 637). Anterior transverse carina of propodeum absent (Fig. 637). Posterior transverse carina of propodeum complete (Fig. 637). Areae externa and dentipara of propodeum completely united into single area (Fig. 637). Fore wing length 5.0–6.0 (HT: 5.5) mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 4.4–4.6 (HT: 4.4) times as long as maximum depth in lateral view. Hind TS1 2.1–2.2 (HT: 2.1) times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 densely punctate (Fig. 874), 1.5 times as long as maximum width, its median dorsal carina present on basal ca. 0.5 of tergite (Fig. 703). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 703). T2 1.1–1.2 (HT: 1.2) times as long as maximum width. Punctures on T1-T4 partly

longitudinally or transversely striated by coalescent punctures. Ovipositor sheath 1.4 times as long as fore wing, 3.9–4.3 (HT: 4.3) times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 757).

Colouration (Figs. 872-874). Body (excluding wings and legs) black, except for: apical part of clypeus and apex of mandible slightly tinged with red; palpi yellowish-brown; postero-dorsal corner of pronotum, tegula and axillae yellow to yellowish-brown; posterior margin of metasomal tegites, membranous parts of metasomal sternite, posterior part of subgenital plate and ovipositor reddish-brown to yellowish-brown; posterior margin of each metasomal tergite narrowly tinged with red. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Fore and mid legs reddish-yellow, except for: coxae blackish-brown; trochanters tinged with brown; trochantelli whitish-yellow. Hind leg blackish-brown except for: trochantellus, base of femur, base of tibia, tarsal spurs and base of TS1 yellowish-brown; middle part of tibia usually tinged with yellowish-brown. Basal yellow area of TS1 ca. 0.2 length of TS1.

**Male** (n=7). Similar to female. Face 0.7 times as long as wide. MSL 0.7–0.9 times as long as BWM. Hind basitarsus 1.8–2.0 times as long as second tarsal segment. Hind femur 5.0 times as long as maximum depth in lateral view. T2 0.9–1.2 times as long as maximum width. Posterior margin of subgenital plate slightly convex to nearly straight (Fig. 818). Apical margin of paramere roundly produced (Figs. 810, 811, 820). Dorsal margin of paramere with a convexity apically (Figs. 810, 820). Inner margin of paramere concave near basal inner angle (Fig. 810). Aedeagus weakly curved, its basal apodeme ca. 0.3 times total length of aedeagus (Fig. 819). Penis valve with a minute notch at posterior part of dorsal surface (Fig. 819). Basal margin of dorsal surface of penis valve not produced medially (Fig. 819).

**Specimens examined.** JAPAN: [Holotype] F, Yamanashi Pref., Yashajin-toge, 13. ix. 1970, T. Kocha leg. (KU). [Paratypes] 1M, Hokkaido Pref., Mt. Yubari, 11. viii. 1966, K. Kusigemati leg. (KU); 1F3M, Fukushima Pref., Hinoemata Vil., Mikawa, 4. ix. 2004, H. Makihara leg. (MsT) (TPM); 12F, same locality and collector, 8. x. 2004 (MsT) (TPM); 1F, same data as holotype (KU); 2M, Nagano Pref., Outaki Vil., Mt. Ontakesan, Tanohara (ca. 1800m alt.), 8–9. viii. 2007, K. Watanabe leg. (KPMNH).

**Distribution** (Fig. 1035). Japan (Hokkaido and Honshu).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the collector of types, Dr. Takeo Kocha, who has contributed to applied entomology in Japan.

**Remarks.** This species may be confused with *G. minamikawai*, *G. nakamurai* and *G. nagasei* in the slender body, but it can be distinguished by the character states shown in the above key. This species also resembles *G. glypta* and *G. clypeata* Kuslitzky, 2007, from Far East Asia in the shape of T1 and the long ovipositor, but it can be distinguished by the black hind coxa (red in *G. clypeata*), the T2 1.1–1.2 times as long as maximum width (not longer than width in *G. glypta* and *G. clypeata*), and the ovipositor 1.4 times as long as fore wing (1.5–1.8 times as long as hind tibia in *G. glypta* and *G. clypeata*).

***Glypta kumaishiensis* sp. nov.**

(Figs. 553, 638, 704, 758, 875, 876)

**Description. Female** (n=1). Body length 7.5 mm.

Head 0.7 times as long as wide. Clypeus 0.7 times as long as wide, its apex without a small median notch. Face strongly convex medially (Fig. 553), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.1 times as long as OOL. Mandible with a narrow ventral flange, its base slightly convex flat. Upper part of occipital carina incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.8 times as long as BWM. Antenna with 31 flagellomeres. F1 1.6 times as long as F2.

Mesosoma. Pronotum entirely sparsely punctate, with a weak epomia. Mesopleuron with a large speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum partly present (Fig. 638). Anterior transverse carina of propodeum present only a part of lateral section as trace-like (Fig. 638). Posterior transverse carina of propodeum complete (Fig. 638). Areae externa and dentipara of propodeum partly separated by trace-like carina (Fig. 638). Fore wing length 5.5 mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 5.4 times as long as maximum depth in lateral view. Hind TS1 2.0 times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 sparsely punctate, 1.1 times as long as maximum width, its median dorsal carina present on basal ca. 0.6 of tergite (Fig. 704). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 704). T2 0.7 times as long as maximum width. Punctures on T2–T4 partly longitudinally or transversely striated by coalescent punctures. Ovipositor sheath 1.3 times as long as fore wing, 3.5



times as long as hind tibia. Apical part of upper valve of ovipositor with a slightly convex dorsal tubercle before subapical notch (Fig. 758).

Colouration (Figs. 875, 876). Body (excluding wings and legs) black, except for: apical part of clypeus and apex of mandible slightly tinged with red; palpi yellowish-brown; postero-dorsal corner of pronotum and tegula yellow to yellowish-brown; axillae dark yellowish-brown; membranous parts of metasomal sternite whitish-yellow; posterior margin of each metasomal tergite, posterior part of subgenital plate and ovipositor reddish-brown. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Legs reddish-yellow, except for: fore and mid trochanters, all trochantellus and base of hind tibia whitish-yellow; all coxae, hind trochanter, hind femur, hind tibia except for whitish-yellow base, hind tibial spurs and hind tarsus blackish-brown; apex of fore and mid coxae, middle part of hind tibia and base of TS1-TS3 slightly tinged with yellow. Basal yellow area of TS1 ca. 0.1 length of TS1.

**Male.** Unknown.

**Specimen examined.** JAPAN: [Holotype] F, Hokkaido Pref., Kumaishi, Kenichi-gawa, Iwafuchi-zawa, 10-20. vii. 1995, Y. Ito and T. Ito leg. (MsT) (NIAES).

**Distribution** (Fig. 1035). Japan (Hokkaido).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the type locality, Kumaishi Town.

**Remarks.** This species resembles *G. vulnerator* Gravenhorst, 1829, from Eurasia in the length of ovipositor and the propodeum with lateromedian longitudinal carina, but it can be distinguished by the MSL 0.8 times as long as BWM (0.7 in *G. vulnerator*) and the lateromedian longitudinal carina present (absent in *G. flagellaris*). This species also resembles *G. flagellaris* Kuslitzky, 1973, from Russia and *G. kuro* in the body colouration, but it can be distinguished by the frontal horn absent (present in *G. flagellaris*), the T1 1.1 times as long as maximum width (1.3–1.4 times in *G. kuro*), the T2 0.7 times as long as maximum width (1.0 times in *G. kuro*), and the ovipositor sheath 1.3 times as long as fore wing (1.0 times as long as fore wing in *G. flagellaris*; ).

***Glypta kuro* sp. nov.**

(Figs. 554, 639, 705, 759, 877, 878)

**Description. Female** (n=2). Body length 8.5–10.5 (HT: 10.5) mm.

Head 0.6–0.7 (HT: 0.7) times as long as wide. Clypeus 0.6 times as long as wide, its apex without a small median notch. Face strongly convex medially (Fig. 554),

0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.0–1.1 (HT: 1.1) times as long as OOL. Mandible flat basally, with a narrow ventral flange. Upper part of occipital carina narrowly incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.9 times as long as BWM. Antenna with 38–41 (HT: 41) flagellomeres. F1 1.6–1.7 (HT: 1.6) times as long as F2.

Mesosoma. Pronotum entirely densely punctate, with a weak epomia. Mesopleuron with a small speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum partly present (Fig. 639). Anterior transverse carina of propodeum present only lateral section (Fig. 639). Posterior transverse carina of propodeum complete (Fig. 639). Areae externa and dentipara of propodeum clearly separated by a complete carina (Fig. 639). Fore wing length 7.0–7.5 (HT: 7.5) mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 4.7–4.8 (HT: 4.8) times as long as maximum depth in lateral view. Hind TS1 2.1–2.2 (HT: 2.1) times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 densely punctate, 1.3–1.4 (HT: 1.3) times as long as maximum width, its median dorsal carina present on basal ca. 0.6 of tergite (Fig. 705). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 705). T2 1.0 times as long as maximum width. Punctures on T1–T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 1.3 times as long as fore wing, 3.3–3.5 (HT: 3.3) times as long as hind tibia. Apical part of upper valve of ovipositor with slightly convex dorsal tubercle before subapical notch (Fig. 759).

Colouration (Figs. 877, 878). Body (excluding wings and legs) black, except for: apical part of clypeus and apex of mandible slightly tinged with reddish-yellow; palpi yellowish-brown; postero-dorsal corner of pronotum, tegula and axillae yellow to yellowish-brown; membranous parts of metasomal sternite yellowish-brown; ovipositor reddish-brown. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Fore and mid legs reddish-brown to yellowish-brown except for coxae and mid TS5 blackish-brown and mid trochanter slightly tinged with blackish-brown. Hind leg blackish-brown except for: trochantellus and base of femur, tibia and TS1–TS3 whitish-yellow. Basal yellow area of TS1 ca. 0.1 length of TS1.

**Male.** Unknown.

**Specimens examined.** JAPAN: [Holotype] F, Hokkaido Pref., Okushiri Island, Miyatsu, 20. vii. 2000, T. Nambu leg. (KPMNH). [Paratype] 1F, Hokkaido Pref., Jozankei, 18. viii. 1965, K. Kusigemati leg. (KU).

**Distribution** (Fig. 1035). Japan (Okushiri Is. and Hokkaido).

**Bionomics**. Unknown.

**Etymology**. The specific name is from the Japanese word, “Kuro” (= black).

**Remarks**. This species resembles *G. glypta* in the long ovipositor, the slender body, and the body colouration, but it can be distinguished by the ovipositor sheath 3.3–3.5 times as long as hind tibia (4.3–4.7 times in *G. glypta*) and the black hind coxa (nearly always red in *G. glypta*). This species also resembles *G. kumaishiensis* (see Remarks of *G. kumaishiensis*).

***Glypta maetoi* sp. nov.**

(Figs. 555, 640, 706, 760, 879, 880)

**Description. Female** (n=11). Body length 9.0–9.5 (HT: 9.0) mm.

Head 0.6–0.7 (HT: 0.7) times as long as wide. Clypeus 0.6 times as long as wide, its apex without a small median notch. Face strongly convex medially (Fig. 555), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.1–1.3 (HT: 1.3) times as long as OOL. Mandible flat basally, with a narrow ventral flange. Upper part of occipital carina incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.7 times as long as BWM. Antenna with 33–37 (HT: 33) flagellomeres. F1 1.4–1.5 (HT: 1.4) times as long as F2.

Mesosoma. Pronotum densely punctate dorsally, punctate and transversely striated ventrally, with a weak epomia. Mesopleuron with a small speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum partly present (Fig. 640). Anterior transverse carina of propodeum present only lateral section, sometimes reduced as trace-like (HT: complete) (Fig. 640). Posterior transverse carina of propodeum complete (Fig. 640). Areae externa and dentipara of propodeum clearly separated by a complete carina or partly separated by trace-like carina (HT: completely separated) (Fig. 640). Fore wing length 7.5–8.5 (HT: 7.5) mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 5.2–5.5 (HT: 5.2) times as long as maximum depth in lateral view. Hind TS1 2.0–2.1 (HT: 2.0) times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 densely punctate, 1.1 times as long as maximum width, its median dorsal carina present on basal ca. 0.6 of tergite (Fig. 706). Both lateral sides of T1 with or without a convexity just after the base of median dorsal carina (Fig. 706). T2

0.8–0.9 (HT: 0.8) times as long as maximum width. Punctures on T1-T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 0.8–0.9 (HT: 0.9) times as long as fore wing, 2.3–2.4 (HT: 2.4) times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 760).

Colouration (Figs. 879, 880). Body (excluding wings and legs) black, except for: apical part of clypeus yellowish-brown; apex of mandible usually slightly tinged with reddish-yellow; palpi yellowish-brown; postero-dorsal corner of pronotum and tegula yellow to yellowish-brown; axillae dark yellowish-brown; membranous parts of metasomal sternite yellowish-brown; posterior margin of each metasomal tergite, posterior part of subgenital plate and ovipositor reddish-brown. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Fore and mid legs reddish-brown to yellowish-brown except for coxae and trochanters brown to blackish-brown and mid trochanter tinged with whitish-yellow. Hind leg blackish-brown except for: trochantellus and base of femur, tibia and TS1-TS3 whitish-yellow to yellow. Basal yellow area of TS1 ca. 0.2 length of TS1.

**Male.** Unknown.

**Specimens examined.** JAPAN: [Holotype] F, Hokkaido Pref., Sapporo City, Mt. Soranuma-dake, 100-500m alt., 14. vii. 1980, K. Maeto leg. (NIAES). [Paratypes] 1F, Hokkaido Pref., Rausu, 29. vii. 1981, R. Noda leg. (NIAES); 1F, Hokkaido Pref., Mt. Soranuma, 26. vii. 1966, K. Kusigemati leg. (KU); 1F, Tochigi Pref., Kuriyama, Kinunuma, 19. vii. 2004, H. Makihara leg. (MsT) (TPM); 1F, Tochigi Pref., Nikkozawa, 28. vii. 1983, H. Makihara leg. (NIAES); 1F, Yamagata Pref. (=Yamanashi Pref.?), Daibosatsu, 5. viii. 1970, H. Takizawa leg. (KU); 1F, Niigata Pref., Itoigawa City, Renge Spa., 27. vii. 1998, T. Tachi leg. (OMNH); 1F, Nagano Pref., Shiga-kogen, 26-27. vii. 1961, J. Minamikawa leg. (NIAES); 2F, Nagano Pref., Asahi Vil., Hachimoriyama, 16. vii. 1997, R. Matsumoto leg. (OMNH); 1F, Shizuoka Pref., Mt. Fuji, 2. viii. 1959, J. Minamikawa leg. (NIAES).

**Distribution** (Fig. 1035). Japan (Hokkaido and Honshu).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the collector of holotype, Prof. Kaoru Maeto of Kobe University, who is an Asian entomologist.

**Remarks.** Although a female collected in Nagano (OMNH) has reddish-brown hind femur, this should be an intraspecific variation because a female specimen with normal colouration was collected at the same time. This species resembles *G. vulnerator* and *G. kozlovi* Kuslitzky, 1976, from Mongolia in the body colouration, but it can be

distinguished by the ovipositor sheath shorter than fore wing (longer than fore wing in *G. vulnerator* and *G. kozlovi*) and the black metasomal tergites (red in *G. vulnerator* and *G. kozlovi*). This species may be confused with *G. murotai* in the body size and the length of ovipositor, but it can be distinguished by black hind coxa (reddish-yellow in *G. murotai*), the blackish-brown fore and mid coxae (reddish-yellow in *G. murotai*), the MSL 0.7 times as long as BWM (0.8 times in *G. murotai*), the antenna with 33–37 flagellomeres (44 in *G. murotai*) and the hind femur 5.2–5.5 times as long as maximum depth in lateral view (5.9–6.2 times in *G. murotai*).

***Glypta minamikawai* sp. nov.**

(Figs. 556, 641, 707, 761, 881, 882)

**Description. Female** (n=2). Body length 7.0 mm.

Head 0.6 times as long as wide. Clypeus 0.6 times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 556), 0.5 times as long as wide. Frons entirely densely punctate, without smooth area and a pair of longitudinal crease around each antennal socket. POL 1.0–1.1 (HT: 1.1) times as long as OOL. Mandible with a narrow ventral flange, its base slightly flat. Upper part of occipital carina narrowly incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 1.0 times as long as BWM. Antenna with 32–38 (HT: 32) flagellomeres. F1 1.4 times as long as F2.

Mesosoma. Pronotum densely punctate dorsally, covered with weak rugae ventrally, with a weak epomia. Mesopleuron with a small speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum absent (Fig. 641). Anterior transverse carina of propodeum present only lateral section (Fig. 641). Posterior transverse carina of propodeum complete (Fig. 641). Areae externa and dentipara of propodeum clearly separated by a complete carina (Fig. 641). Fore wing length 6.0 mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 6.0–6.2 (HT: 6.2) times as long as maximum depth in lateral view. Hind TS1 2.0 times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 punctate, 1.3–1.4 (HT: 1.3) times as long as maximum width, its median dorsal carina present on basal ca. 0.5 of tergite (Fig. 707). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 707). T2 0.9–1.0 (HT: 0.9) times as long as maximum width. Punctures on T1–T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 0.9–1.0 (HT: 0.9) times as long as

fore wing, 2.5–2.8 (HT: 2.5) times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 761).

Colouration (Figs. 881, 882). Body (excluding wings and legs) black, except for: apical part of clypeus and palpi yellowish-brown; apex of mandible slightly tinged with reddish-yellow; postero-dorsal corner of pronotum, tegula and axillae yellow to yellowish-brown; membranous parts of metasomal sternite yellowish-brown; posterior margin of each metasomal tergite, posterior part of subgenital plate and ovipositor reddish-brown. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Fore and mid legs reddish-brown to yellowish-brown except for coxae, trochanters except for each apex and mid TS5 blackish-brown and mid trochanter yellow. Hind leg blackish-brown except for: trochantellus and base of femur, tibia and TS1-TS3 whitish-yellow. Basal yellow area of TS1 ca. 0.1 length of TS1.

**Male.** Unknown.

**Specimens examined.** JAPAN: [Holotype] F, Shizuoka Pref., Mt. Fuji, 22. vii. 1956, J. Minamikawa leg. (NIAES). [Paratype] 1F, Hokkaido Pref., Kamishihoro Town, Oketo-rindo, 26. vii. 1997, R. Matsumoto leg. (OMNH).

**Distribution** (Fig. 1036). Japan (Hokkaido and Honshu).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the collector of holotype, Dr. Jinhaku Minamikawa (= Sonan), who has contributed to the taxonomic, applied and faunal studies of Asian insects.

**Remarks.** This species resembles *G. glypta* and *G. flagellaris* in the body colouration, but it can be distinguished by the frons without horn or projection (present small horn in *G. flagellaris*) and ovipositor without distinct dorsal tubercle (present distinct tubercle in *G. glypta*) the ovipositor sheath 2.5–2.8 times as long as hind tibia (4.3–4.7 times in *G. glypta*). This species may be confused with *G. nakamurai* in the small body size and the colouration of hind leg, but it can be distinguished by the MSL 1.0 times as long as BWM (0.7 times in *G. nakamurai*) and the ovipositor sheath 2.5–2.8 times as long as hind tibia (1.8 times in *G. nakamurai*).

***Glypta murotai* sp. nov.**

(Figs. 557, 642, 708, 762, 883, 884)

**Description. Female** (n=8). Body length 9.5–10.5 (HT: 10.0) mm.

Head 0.6 times as long as wide. Clypeus 0.6 times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 557), 0.5 times as

long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.0–1.3 (HT: 1.3) times as long as OOL. Mandible flat basally, with a narrow ventral flange. Upper part of occipital carina incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.8 times as long as BWM. Antenna with 44 flagellomeres. F1 1.5–1.8 (HT: 1.8) times as long as F2.

Mesosoma. Pronotum entirely punctate, with a weak epomia. Mesopleuron with a small speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum partly present (Fig. 642). Anterior transverse carina of propodeum present only lateral section, its sometimes trace-like (HT: trace-like) (Fig. 642). Posterior transverse carina of propodeum complete (Fig. 642). Areae externa and dentipara of propodeum partly separated by trace-like carina (Fig. 642). Fore wing length 8.0–9.5 (HT: 8.5) mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 5.9–6.2 (HT: 6.2) times as long as maximum depth in lateral view. Hind TS1 2.0–2.3 (HT: 2.3) times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 densely punctate, 1.1–1.4 (HT: 1.4) times as long as maximum width, its median dorsal carina present on basal ca. 0.5 of tergite (Fig. 708). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 708). T2 0.8–1.0 (HT: 0.9) times as long as maximum width. Punctures on T1–T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 0.8 times as long as fore wing, 2.3–2.4 (HT: 2.3) times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 762).

Colouration (Figs. 883, 884). Body (excluding wings and legs) black, except for: apical part of clypeus, small spot of mandible and palpi yellowish-brown; apex of mandible usually slightly tinged with reddish-yellow; postero-dorsal corner of pronotum and tegula yellow to yellowish-brown; membranous parts of metasomal sternite yellowish-brown; posterior part of subgenital plate and ovipositor reddish-brown. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Fore and mid legs reddish-brown to yellowish-brown. Hind leg blackish-brown except for: coxa reddish-brown or sometimes dark reddish-brown; trochantellus and base of femur whitish-yellow to yellow. Hind TS1 without basal yellow area.

**Male.** Unknown.

**Specimens examined.** JAPAN: [Holotype] F, Fukui Pref., Izumi Vil., Nyu-dani, 27. v. 1982, T. Murota leg. (KPMNH). [Paratypes] 1F, Yamagata Pref., Yonezawa, 22. v. 1944, Y. Kurosawa leg. (NSMT); 1F, Gunma Pref., Hoshi-onsen, 11. vi. 1955, T. Shiraki leg.

(NIAES); 1F, Gunma Pref., Mt. Akagiyama, 18. vi. 1980, M. Hayashi leg. (LT); 1F, Nagano Pref., Oiwake, 29. vi. 1952, E. Kawase leg. (NIAES); 1F, Yamanashi Pref., Sutama Town, Mizugakiyama, 15. vii. 1996, T. Tachi leg. (OMNH); 1F, Tottori Pref., Mt. Daisen, Daisenji (800 m alt.), 29. v. 1983, S. Yoshimatsu, K. Konishi and Y. Yoshida leg. (LT) (NIAES); 1F, Kochi Pref., Hongawa Vil., Kannarashi-ike, 13. vi. 2002, R. Matsumoto leg. (OMNH).

**Distribution** (Fig. 1036). Japan (Honshu and Shikoku).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the collector of holotype, Mr. Tadao Murota, who is a good collector of Hymenoptera.

**Remarks.** This species resembles *G. glypta* in the colouration of hind leg, but it can be easily distinguished by the ovipositor sheath 0.8 times as long as fore wing (1.5–1.8 times in *G. glypta*), 2.3–2.4 times as long as hind tibia (4.3–4.7 times in *G. glypta*). This species may be also confused with *G. maetoi* (see Remarks of *G. maetoi*).

***Glypta nagasei* sp. nov.**

(Figs. 558, 643, 709, 763, 764, 885, 886)

**Description. Female** (n=4). Body length 7.0–7.5 (HT: 7.0) mm.

Head 0.7 times as long as wide. Clypeus 0.5 times as long as wide, its apex without a small median notch. Face strongly convex medially (Fig. 558), 0.5 times as long as wide. Frons densely punctate with weak transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.1 times as long as OOL. Mandible flat basally, with a narrow ventral flange. Upper part of occipital carina narrowly incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.8–0.9 (HT: 0.8) times as long as BWM. Antenna with 36–38 (HT: 36) flagellomeres. F1 1.7–1.9 (HT: 1.9) times as long as F2.

Mesosoma. Pronotum entirely punctate, its fine and sparse in collar, with a weak epomia. Mesopleuron with a large speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum partly present (Fig. 643). Anterior transverse carina of propodeum present only lateral section as trace-like carina (Fig. 643). Posterior transverse carina of propodeum complete (Fig. 643). Areae externa and dentipara of propodeum partly separated by trace-like carina (Fig. 643). Fore wing length 5.0–6.0 (HT: 5.0) mm. Fore coxa not curved to outward, slightly convex above socket of trochanter. Hind femur 4.5 times as long as maximum depth in lateral view. Hind TS1



2.6–2.7 (HT: 2.7) times as long as TS2. Hind tarsal claw longer than arolium.

**Metasoma.** T1 punctate, 1.3–1.4 (HT: 1.3) times as long as maximum width, its median dorsal carina present on basal ca. 0.5 of tergite (Fig. 709). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 709). T2 0.9 times as long as maximum width. Ovipositor sheath 1.6–1.8 (HT: 1.6) times as long as fore wing, 4.5–4.6 (HT: 4.5) times as long as hind tibia. Apical part of upper valve of ovipositor with a strong dorsal tubercle before subapical notch (Figs. 763, 764).

**Colouration** (Figs. 885, 886). Body (excluding wings and legs) black, except for: apical part of clypeus and apex of mandible tinged with red; palpi yellowish-brown; postero-dorsal corner of pronotum and tegula yellow to yellowish-brown; axillae dark yellowish-brown; membranous parts of metasomal sternite whitish-yellow; posterior margin of each metasomal tergite, ovipositor and sometimes posterior part of subgenital plate reddish-brown. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Legs reddish-yellow, except for: hind trochanter, hind femur excluding whitish-yellow base, hind tibia excluding whitish-yellow base, hind tibial spurs and hind tarsus excluding yellow base blackish-brown. Basal yellow area of TS1 ca. 0.1 length of TS1. Hind femur, tibia and tarsus sometimes weakly tinged with yellow.

**Male.** Unknown.

**Specimens examined.** JAPAN: [Holotype] F, Kanagawa Pref., Hakone, Mt. Komagatake, 1300m alt., 29. vii. 2005, H. Nagase leg. (KPMNH). [Paratype] 1F, Hokkaido Pref., Sapporo, 27. viii. 1965, K. Kusigemati leg. (KU); 1F, Fukushima Pref., Hinoemata Vil., Mikawa, 4. ix. 2004, H. Makihara leg. (MsT) (TPM); 1F, Tochigi Pref., Kuriyama Vil., Kinunuma, 14. viii. 2004, H. Makihara leg. (Malaise trap.) (TPM)..

**Distribution** (Fig. 1036). Japan (Hokkaido and Honshu).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the collector of holotype, Mr. Hirohiko Nagase, who is my teacher of hymenopterology and has contributed to the taxonomic and faunal studies of Japanese Hymenoptera.

**Remarks.** This species resembles *G. glypta* in the long ovipositor with a conspicuous tubercle before subapical notch, the slender body, and the body colouration, but it can be distinguished by the hind TS1 2.7 times as long as TS2 (2.2–2.3 times in *G. glypta*) and the body length 7.0–7.5 mm (9.0–12.0 mm in *G. glypta*).

***Glypta nakamurai* sp. nov.**

(Figs. 559, 644, 710, 765, 887-889)

**Description. Female** (n=1). Body length 7.5 mm.

Head 0.7 times as long as wide. Clypeus 0.6 times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 559), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.0 times as long as OOL. Mandible flat basally, with a narrow ventral flange. Upper part of occipital carina narrowly incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina slightly (= width of occipital carina) distant from base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.7 times as long as BWM. Antenna with 39 flagellomeres. F1 1.6 times as long as F2.

Mesosoma. Pronotum entirely punctate, its fine and sparse in collar, with a weak epomia. Mesopleuron with a large speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum absent (Fig. 644). Anterior transverse carina of propodeum absent (Fig. 644). Posterior transverse carina of propodeum complete (Fig. 644). Areae externa and dentipara of propodeum completely united into single area (Fig. 644). Fore wing length 6.0 mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 5.6 times as long as maximum depth in lateral view. Hind TS1 2.0 times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 densely punctate (Fig. 889), 1.3 times as long as maximum width, its median dorsal carina present on basal ca. 0.5 of tergite (Fig. 710). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 710). T2 1.0 times as long as maximum width. Punctures on T1-T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 0.7 times as long as fore wing, 1.8 times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 765).

Colouration (Figs. 887-889). Body (excluding wings and legs) black, except for: apical part of clypeus and palpi yellowish-brown; apex of mandible slightly tinged with reddish-yellow; postero-dorsal corner of pronotum and tegula yellow to yellowish-brown; membranous parts of metasomal sternite whitish-yellow; posterior margin of each metasomal tergite slightly narrowly tinged with red; ovipositor reddish-brown. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Fore and mid legs reddish-brown to yellowish-brown except for blackish-brown coxae (fore coxa more or less tinged with reddish-brown). Hind leg blackish-brown except for: trochantellus and base of femur, tibia, tibial spurs and TS1-TS2 whitish-yellow; trochanter and middle area of tibia tinged with whitish-yellow.

Basal yellow area of TS1 ca. 0.1 length of TS1.

**Male.** Unknown.

**Specimen examined.** JAPAN: [Holotype] F, Tochigi Pref., Nikko City, Tamozawa, 27. v. 2008, T. Nakamura leg. (MsT) (TPM).

**Distribution** (Fig. 1036). Japan (Honshu).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the collector of holotype, Dr. Takeyuki Nakamura, who has contributed to the taxonomy of Asian Diptera.

**Remarks.** This species resembles *G. glypta* and *G. flagellaris* in the body colouration, but it can be distinguished by the frons without horn or projection (present small horn in *G. flagellaris*), the ovipositor without distinct dorsal tubercle (with a distinct tubercle in *G. glypta*), and the ovipositor sheath 1.8 times as long as hind tibia (4.3–4.7 times in *G. glypta*). This species may be also confused with *G. minamikawai* (see Remarks of *G. minamikawai*).

***Glypta sudai* sp. nov.**

(Figs. 560, 645, 711, 766, 890, 891)

**Description. Female** (n=3). Body length 7.5–9.5 (HT: 8.0) mm.

Head 0.7 times as long as wide. Clypeus 0.5–0.6 (HT: 0.5) times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 560), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 0.9 times as long as OOL. Mandible flat basally, with a narrow ventral flange. Upper part of occipital carina narrowly incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.9–1.0 (HT: 0.9) times as long as BWM. Antenna with 36–37 (HT: apical part damaged) flagellomeres. F1 1.7–1.8 (HT: 1.7) times as long as F2.

Mesosoma. Pronotum entirely punctate, with a weak epomia. Mesopleuron with a large speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum absent (Fig. 645). Anterior transverse carina of propodeum absent (Fig. 645). Posterior transverse carina of propodeum complete (Fig. 645). Areae externa and dentipara of propodeum completely united into single area (Fig. 645). Fore wing length 6.5–8.0 (HT: 7.0) mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 4.6–4.8 (HT: 4.6) times as long as maximum depth in lateral

view. Hind TS1 2.2–2.4 (HT: 2.2) times as long as TS2. Hind tarsal claw longer than arolium.

**Metasoma.** T1 densely punctate, 1.4–1.5 (HT: 1.4) times as long as maximum width, its median dorsal carina present on basal ca. 0.4 of tergite (Fig. 711). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 711). T2 1.0 times as long as maximum width. Punctures on T1–T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 1.6–1.7 (HT: 1.7) times as long as fore wing, 4.5–5.2 (HT: 5.2) times as long as hind tibia. Apical part of upper valve of ovipositor with a slightly convex dorsal tubercle before subapical notch (Fig. 766).

**Colouration** (Figs. 890, 891). Body (excluding wings and legs) black, except for: apical part of clypeus and palpi yellowish-brown; apex of mandible slightly tinged with reddish-yellow; postero-dorsal corner of pronotum and tegula blackish-brown; membranous parts of metasomal sternite whitish-yellow; axillae, posterior margin of each metasomal tergite, posterior part of subgenital plate and ovipositor reddish-brown. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Legs blackish-brown except for: Basal yellow area of TS1 ca. 0.1 length of TS1.

**Male.** Unknown.

**Specimens examined.** JAPAN: [Holotype] F, Nagano Pref., Matsumoto City, Utsukushigahara, 29. viii. 1962, H. Suda leg. (KPMNH). [Paratype] 1F, Gunma Pref., Asama-yama, 9. viii. 1965, S. Ohsawa leg. (KU); 1F, Kochi Pref., Hongawa Vil., Ibukiyama, 10. viii. 1998, R. Matsumoto leg. (OMNH).

**Distribution** (Fig. 1036). Japan (Honshu and Shikoku).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the collector of types, Mr. Hirohisa Suda, who is an excellent collector of Hymenoptera.

**Remarks.** This species may be confused with *G. glypta* and *G. nagasei* in the slender body with long ovipositor and the body colouration, but it can be distinguished by the ovipositor without conspicuous tubercle before subapical notch (with the tubercle in *G. glypta* and *G. nagasei*) and the black hind coxa (red in *G. glypta* and *G. nagasei*).

#### The *rufa* subgroup

This subgroup contains a single species *G. rufa* from Japan and Russian Far East. A western Palaearctic species, *G. nigrina* Desvignes, 1856, may also belong to this subgroup.

*Glypta rufa* Uchida, 1928

(Figs. 561, 601, 604, 606, 617, 618, 619, 646, 712, 767, 822-825, 892-894)

*Glypta rufa* Uchida, 1928: 74.

*Apophua rufa*: Townes, Momoi & Townes, 1965: 209.

*Glypta bisinuata* Momoi, 1963: 114; Konishi & Maeto, 2000: 313; Nakaya, 2009: 8.

**syn. nov.**

**Description. Female** (n=55). Body length 7.5–9.0 mm.

Head 0.6 times as long as wide. Clypeus 0.7 times as long as wide, its apex with a small median notch (Figs. 601, 604). Face flat, its outline straight in lateral view (Fig. 561), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket (Fig. 601). POL 0.9–1.1 times as long as OOL. Mandible with a wide ventral flange by basal 0.8 (Figs. 601, 606), its base flat. Upper part of occipital carina complete or narrowly incomplete, if incomplete its dorsal end slightly up-curved. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part (Fig. 561). MSL 1.1–1.2 times as long as BWM. Antenna with 37–39 flagellomeres. F1 1.4–1.6 times as long as F2.

Mesosoma. Pronotum entirely punctate, with a weak epomia. Mesopleuron with a small speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum partly present (Fig. 646). Anterior transverse carina of propodeum complete or absent in median section, sometimes partly trace-like (Fig. 646). Posterior transverse carina of propodeum complete (Fig. 646). Areae externa and dentipara of propodeum separated by complete or trace-like carina (Fig. 646). Fore wing length 6.5–8.0 mm. Fore coxa curved to outward, with concavity above socket of trochanter (Figs. 617-619). Hind femur 5.6–6.3 times as long as maximum depth in lateral view. Hind TS1 2.1–2.2 times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 punctate (Fig. 894), 1.2–1.3 times as long as maximum width, its median dorsal carina present on basal ca. 0.6 of tergite (Fig. 712). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 712). T2 0.9 times as long as maximum width. Ovipositor sheath 0.8 times as long as fore wing, 2.1 times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 767).

Colouration (Figs. 892-894). Body (excluding wings and legs) black, except for: subapical median spot of clypeus and mandible excluding yellow spot

reddish-brown; ventral surfaces of apex of scape and pedicel, and flagellum yellowish-brown; palpi, postero-dorsal corner of pronotum, tegula, membranous parts of sternites and posterior part of subgenital plate yellow to yellowish-brown; posterior margin of each metasomal tergite reddish-brown; ovipositor reddish-brown to yellowish-brown. Wings hyaline; veins and pterostigma yellowish-brown except for yellow wing base. Legs reddish-brown to yellowish-brown, except for: hind trochanter, base and apex of hind femur slightly tinged with blackish-brown; hind tibia excluding white base and hind tarsus excluding whitish-yellow bases of TS1-TS3 blackish-brown. Basal whitish-brown area of TS1 ca. 0.1 length of TS1.

**Male** (n=10). Similar to female excluding yellow clypeus. Clypeus 0.7–0.8 times as long as wide, its apex without median notch. Face 0.5–0.6 times as long as wide. MSL 1.0 times as long as BWM. Hind femur 5.2–7.0 times as long as maximum depth in lateral view. T1 punctate, 1.3–1.4 times as long as maximum width. Posterior margin of subgenital plate slightly concave to slightly convex (Fig. 821). Apical margin of paramere roundly produced (Figs. 822, 823). Dorsal margin of paramere without a convexity apically (Fig. 822). Inner margin of paramere concave near basal inner angle (Fig. 822). Aedeagus weakly curved, its basal apodeme ca. 0.5 times total length of aedeagus (Fig. 824). Penis valve without a minute notch at posterior part of dorsal surface (Fig. 824). Basal margin of dorsal surface of penis valve not produced medially (Fig. 824). Clypeus yellow to whitish-yellow. Fore and mid legs paler than female. Reddish brown area(s) of hind leg sometimes darkened.

**Specimens examined.** JAPAN: 1F (holotype of *G. bisinuata*), Hokkaido Pref., Maruyama, 15. vii. 1955, S. Takagi leg. (MNHAH); 1M (holotype of *G. rufa*), Hokkaido Pref., Garuagawa, 23. vi. 1924, T. Uchida leg. (SEHU); 4F, Hokkaido Pref., Mt. Daisetsu, 10. vii. 1965, K. Kusigemati leg. (KU); 2F, same locality and collector, 12. vii. 1965 (KU); 5F and 1M, same locality and collector, 13. vii. 1965 (KU); 12F and 2M, same locality and collector, 15-18. vii. 1966 (KU); 1F, same locality, 20. vii. 1968, M. Suwa leg. (KU); 1F, same locality, 17-23. vii. 1968, H. Takizawa leg. (KU); 1F, Hokkaido Pref., Mt. Daisetsu, Takanegahara, 12. vii. 1985 (NIAES); 1F1M, Hokkaido Pref., Sounkyo, 9. vii. 1965, K. Kusigemati leg. (KU); 2F, Hokkaido Pref., Sapporo, 13. vii. 1964, K. Kusigemati leg. (KU); 1F, same locality and collector, 17. vii. 1964 (KU); 1F and 2M, same locality and collector, 3. vii. 1965 (KU); 1F, same locality and collector, 28. vi. 1966 (KU); 1F, same locality and collector, 23. vii. 1968 (KU); 1F, Hokkaido Pref., Sapporo City, Maruyama, 12. vi. 1980, H. Takemoto leg. (NIAES); 1F, Hokkaido Pref., Sapporo City, Kannon-zawa, 26. vi. 2002, T. Yoshida leg. (KPMNH); 1F, Hokkaido Pref., Sapporo City, Misumai, Kannon-zawa, 16-27. vii. 1992, N. Kuhara

leg. (MsT) (NIAES); 1F, same locality and collector, 27. vii.-11. viii. 1992 (MsT) (NIAES); 2M, Hokkaido Pref., Aizankei, 19. vii. 1966, K. Kusigemati leg. (KU); 8F, Hokkaido Pref., Jozankei, 23. v. 1967, K. Kusigemati leg. (KU); 1F, same locality and collector, 20. vi. 1967 (KU); 1F, Hokkaido Pref., Touya, 8. vii. 1967, K. Kusigemati leg. (KU); 1F, same locality and collector, 9. vii. 1967 (KU); 1F, Hokkaido Pref., 9. vii. 1968, M. Suwa leg. (KU); 1M, Hokkaido Pref., Sapporo City, Hitsujigaoka (GRS: N 43-00/ E 141-24), 11-18. vi. 2003, K. Konishi leg. (MsT) (KPMNH); 1F, same locality and collector, 23-30. vii. 2003 (MsT) (KPMNH); 1F, Hokkaido Pref., Jozankei, 23. v. 1967, K. Kusigemati leg. (KU); 1F, Hokkaido Pref., Kumaishi, Kenichi-gawa, Iwafuchi-zawa, 20. vii.-1. viii. 1995, Y. Ito and T. Ito leg. (MsT) (NIAES); 1F, Hokkaido Pref., Sapporo City, Misumai, Kannon-zawa, 16-27. vii. 1992, N. Kuhara leg. (MsT) (NIAES); 1F, Gunma Pref., Katashina Vil., Mt. Hotakasan, 1. viii. 2007, J. Imura leg. (LT) (KPMNH).

**Distribution** (Fig. 1037). Japan (Hokkaido and Honshu); Russian Far East.

**Bionomics.** Unknown.

**Remarks.** *Glypta rufa* was originally described on a single teneral male specimen in bad condition, and thus the taxonomic status of this species has been confused. For example, Townes *et al.* (1965) classified this species into *Apophua*, but Kuslitzky (2007) did it into *Glypta*.

On the other hand, *G. bisinuata* was described on some female and one male specimens. Later, some additional female and male specimens were collected in Hokkaido, including a few teneral ones. These teneral specimens are apparently very similar to the type of *G. rufa*.

Kuslitzky (2007) redescribed the female of *G. rufa* based on Russian specimens, showing no difference from *G. bisinuata*. Although the female and male specimens determined as *G. rufa* by V. Kuslitzky deposited in SEHU (1 female from Russia) and ZIS (some females and males from Russia) were different in the colouration of clypeus (black in female but yellow in male), the peculiar condition of head (i.e., face and clypeus not separated by concavity in lateral view, forming a united single flat plane) indicates that they all belong to a same species. In addition, this sexual dimorphism of clypeus colouration is also recognized in a related species *G. nigripes*.

Based on above background and my observation, I conclude that the opinion of Kuslitzky (2007) about the sexual dimorphism of *G. rufa* should be accepted and here I newly synonymize *G. bisinuata* under *G. rufa* (**syn. nov.**).

The *media* subgroup

This subgroup contains 40 species from Japan, including *G. clypeata* Kuslitzky, 2007, *G. kunashirica* Kuslitzky, 2007, and *G. parvicaudata* Bridgeman, 1889, while they are not treated here. In the key below, “large species” vs. “small species” and “slender” vs. “robust” make sense only for each couplet.

**Key to Japanese species of the *media* subgroup (♀)**

1. Ovipositor sheath short, 0.4–0.5 times as long as fore wing and 1.0–1.3 times as long as hind tibia. Body densely punctate (Figs. 907, 910, 921, 959, 1011). Antenna with 23–30 flagellomeres. Subapical notch of ovipositor shallow and narrow (Figs. 772, 773, 776, 788, 805).....2
- Ovipositor sheath more or less long, 0.6–2.1 times as long as fore wing and 1.9–5.7 times as long as hind tibia. Body sparsely to densely punctate. Number of flagellomeres various. Subapical notch of ovipositor various.....6
- 2(1). Small species, body length 4.5–5.5 mm. Antenna with 23–24 flagellomeres. Posterior transverse carina of propodeum obscured medially (Fig. 673). Median dorsal carina of T1 present on ca. basal 0.2 of tergite (Fig. 732).....*G. mame* **sp. nov.**
- Large species, body length 6.0–8.5 mm. Antenna with 26–30 flagellomeres. Posterior transverse carina of propodeum complete medially or sometimes obscured medially in *G. breviterebra* (Figs. 653, 654, 657, 695). Median dorsal carina of T1 present on at least basal 0.3 of tergite (Figs. 717, 718, 721, 749).....3
- 3(2). Subalar prominence black (Fig. 907). Hind coxa unicolour, reddish-brown (Fig. 907). MSL 1.0 times as long as BWM. T1 1.1 times as long as maximum width. Ovipositor sheath 1.3 times as long as hind tibia.....*G. biwakuboensis* **sp. nov.**
- Subalar prominence yellow (Figs. 910, 921, 1011). Hind coxa always bicolour as pale yellow and reddish-yellow (Figs. 910, 921, 1011). Other character states various.....4
- 4(3). Ovipositor sheath 0.5 times as long as fore wing, 1.3 times as long as hind tibia. Upper margin of lateral part of pronotum yellow (Fig. 1011). Whitish-yellow area of hind TS1 shorter than 0.5 of TS1 (Fig. 1011).....*G. yoshidai* **sp. nov.**
- Ovipositor sheath 0.4–0.5 times as long as fore wing, 1.1–1.2 times as long as hind tibia. Upper margin of lateral part of pronotum yellow or pronotum entirely black except for postero-dorsal corner with a yellow spot (Figs. 910, 921). Whitish-yellow area of hind TS1 usually more than 0.5 times of TS1 (Figs. 910, 921).....5
- 5(4). Lateromedian longitudinal carina of propodeum weak but complete (Fig. 657).



- Posterior transverse carina of propodeum complete (Fig. 657). Upper margin of lateral part of pronotum yellow (Fig. 921). Hind TS1 whitish-yellow except for narrowly black apex (Fig. 921).....*G. densa* Momoi, 1970
- . Lateromedian longitudinal carina of propodeum weak, usually absent posteriorly (Fig. 654). Posterior transverse carina of propodeum sometimes obscured medially. Pronotum entirely black except for a small yellow spot on postero-dorsal corner (Fig. 910). Whitish-yellow area of hind TS1 more or less darkened except for base (Fig. 910).....*G. breviterebra* Momoi, 1963
- 6(1). Median dorsal carina of T1 long, present on basal ca. 0.9 of tergite (Fig. 735). Ovipositor sheath 1.3 times as long as fore wing, 3.5–3.7 times as long as hind tibia. Hind tibia yellow with a black subbasal and an apical bands (Fig. 968). Basal yellow area of hind TS1 present ca. 0.5 of segment (Fig. 968). Carinae of propodeum strong and complete except for lateral longitudinal carina partly weak (Fig. 677).....*G. momoi* Kuslitzky, 2007
- . Median dorsal carina of T1 short, present on shorter than 0.7 of tergite (e.g., Fig. 730, 739). Combination of characteristics above lacking.....7
- 7(6). Large species, body length 9.5–11.0 mm. Ovipositor sheath 1.3–1.4 times as long as fore wing and 3.2–3.6 times as long as hind tibia. Hind tibia blackish-brown with basal ca. 0.1 whitish-yellow (Fig. 940). Hind TS1 blackish-brown with basal ca. 0.2 whitish-yellow (Fig. 940). Hind TS2-TS5 blackish-brown with a very narrow yellow area at base (Fig. 940). Mandible without a yellow area (Fig. 941). Clypeus black, partly tinged with reddish-yellow (Fig. 941).....*G. japonica* **sp. nov.**
- . Combination of characteristics above lacking.....8
- 8(7). Ovipositor sheath more than 3.9–5.7 times as long as hind tibia.....9
- . Ovipositor sheath 1.9–3.7 times as long as hind tibia.....14
- 9(10). Ovipositor sheath very long (Fig. 974), 1.8 times as long as fore wing and 5.7 times as long as hind tibia. ....*G. onaga* **sp. nov.**
- . Ovipositor sheath not very long, shorter than 1.3–1.7 times as long as fore wing and shorter than 3.9–4.7 times as long as hind tibia.....10
- 10(9). Body robust. T1 1.1–1.2 times as long as maximum width. T2 0.6–0.8 times as long as maximum width. Hind femur slender, 5.2–5.4 times as long as as long as maximum depth in lateral view.....11
- . Body slender. T1 more than 1.4 times as long as maximum width. T2 1.0–1.3 times as long as maximum width. Hind femur robust, 4.2–4.9 times as long as as long as maximum depth in lateral view.....12
- 11(12). Hind coxa yellow dorsally and reddish-yellow ventrally (Fig. 931). Anterior

- transverse carina of propodeum trace-like (Fig. 661). Ovipositor sheath 3.9–4.0 times as long as hind tibia.....*G. fujisana* **sp. nov.**
- . Hind coxa entirely reddish-yellow (Fig. 962). Anterior transverse carina of propodeum at least slightly present laterally (Fig. 674). Ovipositor sheath 4.2–4.3 times as long as hind tibia.....*G. matsumotoi* **sp. nov.**
- 12(10). Ovipositor sheath 4.3–4.7 times as long as hind tibia. Hind TS1 2.1–2.2 times as long as TS2. ....*G. slenda* **sp. nov.**
- . Ovipositor sheath 4.0 times as long as hind tibia. Hind TS1 2.5 times as long as TS2.....13
- 13(12). T2 1.2 times as long as maximum width. MSL 1.0 times as long as BWM. Hind trochantellus yellowish-brown (Fig. 934).....*G. hayachinensis* **sp. nov.**
- . T2 1.0 times as long as maximum width. MSL 0.7 times as long as BWM. Hind trochanter reddish-brown.....*G. yashajinensis* **sp. nov.**
- 14(8). Lower part of gena very narrow, its width ca. 0.5 of maximum width of gena in lateral view (Figs. 580, 956). T1 1.3–1.5 times as long as maximum width. T2 1.0–1.1 times as long as maximum width. Apical part of clypeus, median large spot of mandible and ventral surface of pedicel whitish-yellow (Fig. 957). Body with weak blue reflections.....*G. makiharai* **sp. nov.**
- . Lower part of gena not very narrow, its width more than 0.5 of maximum width of gena in lateral view (e.g., Fig. 596). Other character states various.....15
- 15(14). Ovipositor sheath 3.0–3.7 times as long as hind tibia and longer than fore wing.....16
- . Ovipositor sheath 1.9–2.8 times as long as hind tibia and/or shorter than fore wing.....19
- 16(15). Ovipositor sheath 3.7 times as long as hind tibia. T1 1.0–1.1 times as long as maximum width.....*G. shibetsuensis* **sp. nov.**
- . Ovipositor sheath shorter than 3.0–3.4 times as long as hind tibia. T1 1.3 times as long as maximum width.....17
- 17(16). Hind tarsus blackish brown except for narrowly yellowish-brown base of TS1 (Fig. 928). Clypeus and mandible black each with a reddish-brown area (Fig. 929). Pronotum sparsely punctate dorsally, largely smooth ventrally. Ovipositor sheath 3.0 times as long as hind tibia.....*G. ezoensis* **sp. nov.**
- . Hind tarsus blackish brown with a conspicuous whitish-yellow area (Figs. 971, 1001). Clypeus and mandible black each with yellow area (Figs. 972, 1002). Pronotum various. Ovipositor sheath 3.0–3.4 times as long as hind tibia.....18
- 18(17). Ovipositor sheath 3.4 times as long as hind tibia. Hind coxa pale yellow dorsally

- and reddish-yellow ventrally.....*G. yamagishii* **sp. nov.**
- . Ovipositor sheath 3.0 times as long as hind tibia. Hind coxa entirely reddish-yellow (Fig. 971).....*G. niigataensis* **sp. nov.**
- 19(15). Hind femur 6.7 times as long as maximum depth in lateral view. Hind tibia blackish-brown basally and apically, median part tinged with reddish-yellow (Fig. 898). Hind tarsal segment blackish-brown except for a narrow yellow area of each base of TS1-TS3 (Fig. 898). Clypeus and mandible each with a yellow area (Fig. 899).....*G. aino* **sp. nov.**
- . Hind femur shorter than 4.5–6.3 times as long as maximum depth in lateral view. Combination of characteristics above lacking.....20
- 20(19). Posterior transverse carina of propodeum largely obsolete (Fig. 687).....*G. tomuraushiensis* **sp. nov.**
- . Posterior transverse carina of propodeum complete (e.g., Figs. 668, 690).....21
- 21(20). Large species, body length 9.0–10.0 mm. Ovipositor sheath 0.8–1.0 times as long as fore wing and 2.2–2.5 times as long as hind tibia. Clypeus and mandible each with a yellow area (Fig. 944). Hind tibia blackish brown with basal ca. 0.1 whitish-yellow and dorsal part of median area usually tinged with whitish-yellow (Fig. 943). Hind TS1 blackish-brown with basal ca. 0.2 whitish-yellow (Fig. 943). Hind TS2-TS3 blackish-brown each with a very narrow yellow area at base. Scutellum sometimes with a pair of small yellow spots (Fig. 946).....*G. konishii* **sp. nov.**
- . Small species, body length 6.0–8.5 mm. Other characters above various condition...21
- 21(20). Hind tarsal segment largely blackish-brown (Figs. 895, 951, 965). Hind TS2 blackish-brown, at most slightly tinged with yellow at base (Figs. 895, 951, 965). Basal yellow area of hind TS1 usually shorter than 0.1 length of segment (Figs. 895, 951, 965). Ovipositor sheath 1.9–2.2 times as long as hind tibia. (in *G. iriei*, basal yellow area of tarsal segments sometimes enlarged, please try both couplets)....22
- . Hind tarsal segment blackish-brown with a conspicuous, broad (at least as long as hind tibial spurs) yellow area on several segment(s) (Figs. 937, 989, 1004, 1006). Length of ovipositor various.....25
- 22(21). Fore and mid legs almost unicolour by reddish-yellow (trochaliteli sometimes tinged with yellow) (Fig. 937). Hind coxa reddish-brown (Fig. 937). Hind tibia tricolour, white at base, subbasal band (sometimes obscured) and apex black, remainder of median area reddish-brown (Fig. 937). Propodeal carinae weak but almost complete (Figs. 663, 664). Clypeus and mandible black, or sometimes tinged with dark reddish-brown (Fig. 938). Ovipositor sheath 1.9–2.2 times as long as hind

- tibia.....*G. iriei* **sp. nov.**
- . Fore and mid legs bicolour by pale yellow and reddish-yellow (Figs. 895, 951, 965).  
Other character above various condition.....23
- 23(22). Clypeus and mandible each with a pale yellow area (Fig. 966). Body densely punctate. Hind TS1 2.4–2.5 times as long as TS2. Ovipositor sheath 0.8–0.9 times as long as fore wing. MSL 0.8 times as long as BWM.....*G. media* Momoi, 1963
- . Clypeus and mandible at most tinged with reddish-yellow (Figs. 896, 952, 953). Body moderately punctate. Hind TS1 1.8–2.3 times as long as TS2. Ovipositor sheath 0.7–0.8 times as long as fore wing. MSL various.....24
- 24(23). Fore and mid coxae bicolour, at least partly reddish-brown to reddish-yellow (Fig. 895). Hind coxa unicolor as reddish-yellow (Fig. 895). MSL 0.7–0.8 times as long as BWM. Ovipositor sheath 2.2 times as long as hind tibia. Hind TS1 1.8–2.1 times as long as TS2.....*G. aichinensis* **sp. nov.**
- . Fore and mid coxae unicolor as pale yellow, each without a reddish-brown to reddish-yellow area (Fig. 951). Hind coxa usually bicolour, pale yellow dorsally and reddish-yellow ventrally (Fig. 951). MSL 0.9–1.0 times as long as BWM. Ovipositor sheath 2.0–2.1 times as long as hind tibia. Hind TS1 2.1–2.3 times as long as TS2.....*G. kyushuensis* **sp. nov.**
- 25(21). Ovipositor sheath 0.9 times as long as fore wing and 2.6–2.8 times as long as hind tibia.....*G. pedata* Desvignes, 1856 (?)
- . Ovipositor sheath 0.6–1.0 times as long as fore wing and 1.9–2.5 times as long as hind tibia.....26
- 26(25). All coxae, trochanters and trochantellus whitish-yellow except for reddish-yellow ventral surface of hind coxa (Fig. 989). Propodeal carina well-developed excluding median section of anterior transverse carina (Fig. 685). Areae dentipara and lateralis of propodeum separated by angulate ridge and former area slightly concave laterally. Posterior transverse carina of propodeum highly produced at border of areae dentipara and lateralis of propodeum (Fig. 613). Hind tibial spurs blackish-brown. Basal yellow area of hind TS1 longer than tibial spurs, not clearly separated from black area. Ovipositor sheath 0.6 times as long as fore wing.....*G. shimizui* **sp. nov.**
- . Combination of characteristics above lacking.....27
- 27(26). Fore and mid legs almost unicolor by reddish-yellow (trochalitelli sometimes tinged with yellow) (Fig. 937). Hind coxa reddish-brown (Fig. 937). Hind tibia tricolour, white at base, subbasal band (sometimes obscured) and apex black, remainder of median area reddish-brown (Fig. 937). Propodeal carinae weak but

- almost complete (Figs. 663, 664). Clypeus and mandible black, or sometimes tinged with dark reddish-brown (Fig. 938). Ovipositor sheath 1.9–2.2 times as long as hind tibia. Basal yellow area of hind TS1 0.2–0.6 length of TS2....*G. iriei* sp. nov. (in part)
- . Combination of characteristics above lacking.....28
  - 28(27). Lateromedian longitudinal carina and anterior transverse carina of propodeum at least partly strongly present (Figs. 650, 651, 655, 656, 663, 664, 667) and metasomal tergites without a conspicuous red area except for narrow red posterior margin. T2 0.6–0.7 times as long as maximum width. Body usually robust (Figs. 901, 917, 948).....29
  - . Propodeal carinae weak, lateromedian longitudinal carina and/or anterior transverse carina usually completely absent or only present as trace-like ridge (Figs. 658, 659, 683, 688, 690-693), or if propodeal carinae well-developed (Fig. 652, 682), metasomal tergites with a conspicuous red area (Figs. 904, 980). Length of T2 various. Body robust or slender.....32
  - 29(28). Hind trochanter and trochantellus unicolour by pale yellow (Fig. 917). Small species, body length 6.0–6.5 mm. MSL 0.7 times as long as BWM. Ovipositor sheath 0.7–0.8 times as long as fore wing, 2.1–2.5 times as long as hind tibia. Apex of scutellum and metasomal tergites sometimes partly narrowly tinged with dark reddish-brown (Figs. 919, 920). Hind tibia whitish-yellow with subbasal and apical black areas (Fig. 917).....*G. daisensis* **sp. nov.**
  - . Hind trochanter and trochantellus with different colours by pale yellow and reddish-yellow. Large species, BL 7.0–8.5 mm. MSL 0.8–1.0 times as long as BWM. Other character states various.....30
  - 30(29). Hind tarsal claw short, as long as arolium (Fig. 624). Posterior margin of T1-T3 each tinged with reddish-brown (Fig. 916). T2-T4 flat, each with a posterior transverse shallow impression (Fig. 916). Ovipositor sheath 0.8 times as long as fore wing and 2.0 times as long as hind tibia. T4 entirely mat (Fig. 916). Dorsal surface of T5 mat (Fig. 916).....*G. breviungulata* Kuslitzky, 1976
  - . Hind tarsal claw with moderate length, at least slightly longer than arolium (Figs. 623, 625). T4 and T5 each with a smooth area. Other character states various.....31
  - 31(30). Both lateral sides of T1 with a convexity just after the base of median dorsal carina (Figs. 715, 903). Flagellum reddish-brown (Fig. 901).....*G. akahige* **sp. nov.**
  - . Both lateral sides of T1 without convexity just after the base of median dorsal carina (Figs. 729, 948). Flagellum blackish-brown (Fig. 948).....*G. kuslitzkii* **sp. nov.**
  - 32(28). Metasoma nearly entirely black (Fig. 998). All coxae, all trochanters and hind femur dark reddish-brown (Fig. 998). Median part of hind tibia more or less

- darknend (Fig. 998). Ovipositor sheath 0.7–0.9 times as long as fore wing, 2.2–2.3 times as long as hind tibia. Basal yellow areas of TS1 ca. 0.5 length of TS1 and of TS2-TS3 slightly shorter than each black area (Fig. 998). Mandible black (Fig. 999). Clypeus brownish-yellow apically (Fig. 999).....*G. uenaensis* **sp. nov.**
- . Combination of characteristics above lacking.....33
- 33(32). Length of basal yellow area of TS1 1.5 times as long as hind tibial spurs (Figs. 904, 980). Metasoma with conspicuous red areas (Figs. 904, 980). Fore and mid coxae whitish-yellow to yellow (Figs. 904, 980). Hind coxa and trochanter reddish-brown (Figs. 904, 980). Ovipositor sheath 0.7–0.8 times as long as fore wing. Clypeus and mandible without a conspicuous yellow area, at most tinged with red (Figs. 905, 981). T2 0.7–0.8 times as long as maximum width.....34
- . Length of basal yellow area of TS1 shorter than 1.1 times as long as hind tibial spurs (Figs. 924, 983, 1004, 1006). Metasoma with or without a conspicuous red area (Figs. 924, 983, 1004). Clypeus various colouration, sometimes with a conspicuous yellow area (Figs. 984, 1005). Length of T2 various.....35
- 34(33). Ovipositor sheath 0.8–0.9 times as long as fore wing and 2.2–2.5 times as long as hind tibia. Lateromedian longitudinal carina complete (Fig. 682). Area dentipara not concave (Fig. 682).....*G. rufata* Bridgman, 1887
- . Ovipositor sheath 0.7 times as long as fore wing and 2.0 times as long as hind tibia. Lateromedian longitudinal carina complete or partly absent. Area dentipara sometimes concave laterally (Fig. 652).....*G. aomoriensis* **sp. nov.**
- 35(33). T2 short, 0.6–0.7 times as long as maximum width (Figs. 739, 985). T2-T4 flat, usually each with a very shallow posterior transverse impression (Fig. 739). Clypeus and mandible each with a yellow area (Fig. 984). Ovipositor sheath 0.8–0.9 times as long as fore wing, 2.1 times as long as hind tibia. Metasomal tergites nearly entirely black.....*G. sankaku* **nom. nov.**  
(= *triangularis* Momoi, 1963)
- . T2 long, 0.8–1.0 times as long as maximum width. Other character above in various conditions.....36
- 36(35). Mandible with a reddish-brown area (Fig. 925). Ovipositor sheath 0.9–1.0 times as long as fore wing and 2.5 times as long as hind tibia. T1-T4 more or less tinged with red, at least posterior margin of T2 and T3 red (Figs. 924, 926).....*G. erythronota* **sp. nov.**
- . Mandible with a large yellow area (Fig. 1005). Ovipositor sheath 0.6–0.8 times as long as fore wing and 1.9–2.4 times as long as hind tibia. T1-T4 black (Fig. 1004).....*G. yamato* **sp. nov.**

***Glypta aichiensis* sp. nov.**

(Figs. 562, 647, 648, 713, 768, 895-897)

**Description. Female** (n=2). Body length 6.0 mm.

Head 0.7 times as long as wide. Clypeus 0.5–0.7 (HT: 0.5) times as long as wide, its apex without a small median notch. Face strongly convex medially (Fig. 562), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.1–1.3 (HT: 1.3) times as long as OOL. Mandible flat basally, with a narrow ventral flange. Upper part of occipital carina narrowly incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina slightly distant from base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.7–0.8 (HT: 0.8) times as long as BWM. Antenna with 31 flagellomeres. F1 1.5 times as long as F2.

Mesosoma. Pronotum punctate dorsally, longitudinally striated ventrally, with a weak epomia. Mesopleuron with a large speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum absent (Figs. 647, 648). Anterior transverse carina of propodeum present on lateral section as trace-like carina (Figs. 647, 648). Posterior transverse carina of propodeum complete (Figs. 647, 648). Areae externa and dentipara of propodeum partly separated by trace-like carina (Figs. 647, 648). Fore wing length 5.5 mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 5.1–5.3 (HT: 5.3) times as long as maximum depth in lateral view. Hind TS1 1.8–2.1 (HT: 1.8) times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 sparsely punctate (Fig. 897), 1.0–1.1 (HT: 1.1) times as long as maximum width, its median dorsal carina present on basal ca. 0.5 of tergite (Fig. 713). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 713). T2 0.7–0.8 (HT: 0.7) times as long as maximum width. Punctures on T1-T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 0.7–0.8 (HT: 0.7) times as long as fore wing, 2.2 times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 768).

Colouration (Figs. 895-897). Body (excluding wings and legs) black, except for: apex of mandible reddish-brown; palpi, postero-dorsal corner of pronotum, tegula, axillae, membranous parts of sternites and posterior margin of subgenital plate yellow to whitish-yellow; posterior margin of each metasomal tergite, subgenital plate excluding posterior margin and ovipositor reddish-brown; clypeus black in holotype, tinged with

yellowish-brown in paratype. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Fore and mid legs whitish-yellow excluding coxae and femora reddish-brown. Hind coxa reddish-brown. Hind trochanter reddish-brown excluding whitish-yellow apical part. Hind trochantellus whitish-yellow. Hind femur reddish-brown excluding whitish-yellow base and apex. Hind tibia whitish-yellow excluding blackish-brown to black subbasal band, apical part and ventral surface between subbasal band and apical part, subbasal band small and absent in dorsal surface. Hind tibial spurs whitish-yellow, its apex slightly tinged with brown. Hind tarsus blackish-brown to black excluding basal whitish-yellow area of TS1-TS2 (indistinct in TS2). Basal yellow area of TS1 ca. 0.2 length of TS1 but its border indistinct.

**Male.** Unknown.

**Specimens examined.** JAPAN: [Holotype] F, Aichi Pref., Shitara, Uradani (beech forest), 900m alt., 11-17. iv. 1994, K. Yamagishi leg. (MsT) (NIAES). [Paratype] 1F, Ehime Pref., Mt. Odamiyama, Mt., Takataruyama, 9. vii. 1994, E. Yamamoto leg. (LT) (NIAES).

**Distribution** (Fig. 1038). Japan (Honshu and Shikoku).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the type locality, Aichi Prefecture.

**Remarks.** This species resembles *G. media* in the colouration of hind leg, but it can be easily distinguished by the body without dense punctures (covered with dense punctures in *G. media*) and the clypeus and mandible at most tinged with reddish-yellow (each with a conspicuous pale yellow area in *G. media*). This species also resembles *G. kyushuensis* in the body colouration, but it can be distinguished by the fore and mid coxae bicolour (unicolour in *G. kyushuensis*), the hind coxa unicolour (bicolour in *G. kyushuensis*), MSL 0.7–0.8 times as long as BWM (0.9–1.0 times in *G. kyushuensis*), and the ovipositor sheath 2.2 times as long as hind tibia (2.0–2.1 times in *G. kyushuensis*).

***Glypta aino* sp. nov.**

(Figs. 563, 649, 714, 769, 898-900)

**Description. Female** (n=1). Body length 8.0 mm.

Head 0.7 times as long as wide. Clypeus 0.6 times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 563), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 0.9 times as long



as OOL. Mandible slightly convex basally, with a narrow ventral flange. Upper part of occipital carina incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina slightly distant from base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.8 times as long as BWM. Antenna with 36 flagellomeres. F1 1.7 times as long as F2.

Mesosoma. Pronotum densely punctate excluding ventral part with longitudinal striation, with a weak epomia. Mesopleuron with a large speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum absent (Fig. 649). Anterior transverse carina of propodeum absent (Fig. 649). Posterior transverse carina of propodeum complete (Fig. 649). Areae externa and dentipara of propodeum completely united into single area (Fig. 649). Fore wing length 7.0 mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 6.7 times as long as maximum depth in lateral view. Hind TS1 2.2 times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 punctate (Fig. 900), 1.3 times as long as maximum width, its median dorsal carina present on basal ca. 0.4 of tergite (Fig. 714). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 714). T2 1.0 times as long as maximum width. Punctures on T2-T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 0.9 times as long as fore wing, 2.4 times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 769).

Colouration (Figs. 898-900). Body (excluding wings and legs) black, except for: apical part of clypeus and mandible excluding black base and reddish-brown apex, palpi, postero-dorsal corner of pronotum, tegula and membranous parts of sternites yellow to yellowish-brown; apical part of flagellum weakly tinged with reddish-brown; axillae slightly tinged with yellowish-brown; posterior margin of each metasomal tergite, subgenital plate and ovipositor reddish-brown. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Legs reddish-brown to reddish-yellow, except for: apex of hind femur, subbasal band and apical part of hind tibia, hind tibial spurs and hind tarsus excluding basal whitish-yellow area of TS1-TS3 (indistinct in TS2 and TS3) tinged with blackish-brown to black. Basal yellow area of TS1 ca. 0.1 length of TS1.

**Male.** Unknown.

**Specimen examined.** JAPAN: [Holotype] F, Hokkaido Pref., Mt. Daisetsu, 26. vii. 1967, K. Kusigemati leg. (KU);

**Distribution** (Fig. 1038). Japan (Hokkaido).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the native people living in Hokkaido, “Ainu”.

**Remarks.** This species resembles *G. similis* Bridgman, 1886, from Eurasia in the body colouration (especially hind leg), but it can be distinguished by the MSL 0.8 times as long as BWM (1.0 times in *G. similis*).

***Glypta akahige* sp. nov.**

(Figs. 564, 623, 650, 651, 715, 770, 901-903)

**Description. Female** (n=7). Body length 7.0–8.5 (HT: 8.5) mm.

Head 0.6 times as long as wide. Clypeus 0.6–0.7 (HT: 0.6) times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 564), 0.4–0.5 (HT: 0.4) times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.1–1.3 (HT: 1.3) times as long as OOL. Mandible slightly convex basally, with a narrow ventral flange. Upper part of occipital carina incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.8–1.0 (HT: 0.8) times as long as BWM. Antenna with 35–37 (HT: 37) flagellomeres. F1 1.6–1.7 (HT: 1.6) times as long as F2.

Mesosoma. Pronotum entirely punctate, with a weak epomia. Mesopleuron with a small speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum absent (Figs. 650, 651). Anterior transverse carina of propodeum complete in lateral section to present only lateral section as trace-like (HT: complete in lateral section) (Figs. 650, 651). Posterior transverse carina of propodeum complete (Figs. 650, 651). Areae externa and dentipara of propodeum clearly separated by a complete carina or by trace-like carina partly (Figs. 650, 651). Fore wing length 6.0–7.0 (HT: 7.0) mm. Fore coxa slightly curved to outward, without a convexity above socket of trochanter. Hind femur 5.1–5.7 (HT: 5.1) times as long as maximum depth in lateral view. Hind TS1 2.0–2.1 (HT: 2.1) times as long as TS2. Hind tarsal claw longer than arolium (Fig. 623).

Metasoma. T1 punctate (Fig. 903), 1.0–1.1 (HT: 1.0) times as long as maximum width, its median dorsal carina present on basal ca. 0.5 of tergite (Fig. 715). Both lateral sides of T1 with a convexity just after the base of median dorsal carina (Figs. 715, 903). T2 0.6–0.7 (HT: 0.6) times as long as maximum width. Ovipositor sheath 0.9 times as long as fore wing, 2.2–2.4 (HT: 2.2) times as long as hind tibia. Apical part of upper valve of ovipositor with a slightly convex dorsal tubercle before

subapical notch (Fig. 770).

Colouration (Figs. 901-903). Body (excluding wings and legs) black, except for: apical part of clypeus and palpi yellowish-brown; mandible slightly tinged with red; scape and pedicel blackish-brown; postero-dorsal corner of pronotum, tegula, axillae, membranous parts of sternites and posterior part of subgenital plate yellow to yellowish-brown; flagellum and ovipositor reddish-brown to yellowish-brown. Wings hyaline; veins and pterostigma yellowish-brown except for yellow wing base. Fore and mid legs reddish-yellow to yellowish-brown. Hind coxa and trochanter reddish-yellow. Hind trochantellus yellowish-brown. Hind femur reddish-yellow, its apical part with blackish-brown area with narrow white apex. Hind tibia whitish-yellow excluding blackish-brown to black subbasal band and apical part. Hind tibial spurs whitish-yellow, its apex slightly darkened. Hind tarsus blackish-brown to black each with a basal yellow area on TS1-TS5 (sometimes indistinct in TS4 and TS5). Basal yellow areas of TS1 ca. 0.6 length of TS1 and of TS2-TS3 as long as or slightly shorter than each black area.

**Male.** Unknown.

**Specimens examined.** JAPAN: [Holotype] F, Hokkaido Pref., Toyotomi Town, Nishitoyotomi, 11. vii. 1980, K. Maeto leg. (NIAES). [Paratype] 1F, same data as holotype (NIAES); 1F, Hokkaido Pref., Hoheikyo, 13. vii. 1966, K. Kusigemati leg. (KU); 1F, Hokkaido Pref., Mt. Eniwa, 1. vii. 1966, K. Kusigemati leg. (KU); 2F, Yamanshi Pref., Sutama Town, Mizugakiyama, 15–16, vii. 1998, T. Tachi leg. (OMNH); 1F, Nagano Pref., Asahi Vil., Hachimoriyama, 16. vii. 1997, R. Matsumoto leg. (OMNH).

**Distribution** (Fig. 1038). Japan (Hokkaido and Honshu).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the Japanese word, “Aka” (= red) plus “Hige” (= antenna), which means reddish-brown antenna.

**Remarks.** This species resembles *G. kuslitzkii*, but it can be easily distinguished by the both lateral sides of T1 with convexity just after at base of median dorsal carina (without convexity just after at base of median dorsal carina in *G. kuslitzkii*). This species also resembles *G. breviungulata* and *G. momoi* in the body colouration, but it can be distinguished by the hind tarsal claw longer than arolium (as long as arolium in *G. breviungulata*) and the median dorsal carina present ca. 0.5 of tergite (ca. 0.9 of tergite in *G. momoi*).

***Glypta aomoriensis* sp. nov.**

(Figs. 565, 652, 716, 771, 904-906)

**Description. Female** (n=1). Body length 6.0 mm.

Head 0.6 times as long as wide. Clypeus 0.7 times as long as wide, its apex without a small median notch. Face strongly convex medially (Fig. 565), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.4 times as long as OOL. Mandible flat basally, with a narrow ventral flange. Upper part of occipital carina narrowly incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.7 times as long as BWM. Antenna with 31 flagellomeres. F1 1.5 times as long as F2.

Mesosoma. Pronotum densely punctate dorsally, longitudinally rugose ventrally, with a weak epomia. Mesopleuron with a small speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum partly present (Fig. 652). Anterior transverse carina of propodeum present only laterally, largely absent (Fig. 652). Posterior transverse carina of propodeum complete (Fig. 652). Areae externa and dentipara of propodeum broadly united into single area, latter area concave laterally (Fig. 652). Fore wing length 5.0 mm. Fore coxa not curved to outward, slightly convex above socket of trochanter. Hind femur 5.2 times as long as maximum depth in lateral view. Hind TS1 2.2 times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 densely punctate (Fig. 906), 0.9 times as long as maximum width, its median dorsal carina present on basal ca. 0.6 of tergite (Fig. 716). Both lateral sides of T1 with or without a convexity just after the base of median dorsal carina (Fig. 716). T2 0.7 times as long as maximum width. Posterior area of T1-T3 partly slightly concave. Punctures on T1-T3 partly longitudinally striated by coalescent punctures. Ovipositor sheath 0.7 times as long as fore wing, 2.0 times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 771).

Colouration (Figs. 904-906). Body (excluding wings and legs) black, except for: apical part of clypeus and mandible excluding apex and base reddish-brown; ventral surface of pedicel and flagellum and subalar prominence slightly tinged with red; palpi, postero-dorsal and postero-ventral corners of pronotum, tegula, axillae, membranous parts of metasomal sternite and subgenital plate whitish-yellow to yellowish-brown; posterior margin of scutellum, T1 excluding basal brack area, T2 and T3 excluding median black area and ovipositor reddish-brown to red. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Fore and mid leg

whitish-yellow to reddish-yellow. Hind coxa reddish-yellow. Hind trochanter and trochantellus whitish-yellow. Hind femur reddish-yellow. Hind tibia whitish-yellow with subbasal and apical blackish-brown to black areas, its ventral surface partly slightly tinged with black. Hind tibial spurs whitish-yellow. Hind tarsus blackish-brown to black excluding basal whitish-yellow area of TS1-TS4 (but indistinct in TS4). Basal yellow area of TS1 ca. 0.7 length of TS1 but its border indistinct.

**Male.** Unknown.

**Specimen examined.** JAPAN: [Holotype] F, Aomori Pref., Aomori City, Hibakozawa-rindo, 15. viii. 1992, T. Ichita leg. (NIAES).

**Distribution** (Fig. 1043). Japan (Honshu).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the type locality, Aomori Prefecture.

**Remarks.** This species resembles *G. microcera* Thomson, 1889, from Europe, *G. dentifera* Thomson, 1889, from Eurasia, *G. trochantelata* Bridgeman, 1886, from Europe, *G. talitzkii* Kuslitzky, 1974, from Eurasia and *G. rufata* in the body colouration, but it can be distinguished by the ovipositor sheath 0.7 times as long as fore wing (0.8–0.9 times in *G. trochantelata*, *G. dentifera* and *G. rufata*; 0.6 times in *G. talitzkii*).

***Glypta biwakuboensis* sp. nov.**

(Figs. 566, 653, 717, 772, 907-909)

**Description. Female** (n=1). Body length 8.0 mm.

Head 0.6 times as long as wide. Clypeus 0.6 times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 566), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.0 times as long as OOL. Mandible slightly convex basally, with a narrow ventral flange. Upper part of occipital carina narrowly incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 1.0 times as long as BWM. Antenna with 29 flagellomeres. F1 1.5 times as long as F2.

Mesosoma. Pronotum entirely densely punctate, with a weak epomia. Mesopleuron densely punctate, with small smooth area around episternal scrobe. Metapleuron punctate. Lateral longitudinal carina of propodeum absent (Fig. 653). Anterior transverse carina of propodeum largely absent, partly present as trace-like ridge (Fig. 653). Posterior transverse carina of propodeum complete (Fig. 653). Areae

externa and dentipara of propodeum completely united into single area (Fig. 653). Fore wing length 6.0 mm. Fore coxa not curved to outward, slightly convex above socket of trochanter. Hind femur 4.7 times as long as maximum depth in lateral view. Hind TS1 2.2 times as long as TS2. Hind tarsal claw longer than arolium.

**Metasoma.** T1 densely punctate (Fig. 909), 1.1 times as long as maximum width, its median dorsal carina present on basal ca. 0.4 of tergite (Fig. 717). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 717). T2 0.8 times as long as maximum width. Punctures on T1-T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 0.5 times as long as fore wing, 1.3 times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 772).

**Colouration** (Figs. 907-909). Body (excluding wings and legs) black, except for: clypeus, mandible excluding apex, palpi, ventral surface of pedicel, posterio-dorsal corner of pronotum, tegula, axillae, membranous parts of metasomal sternite and posterior part of subgenital plate whitish-yellow to yellowish-brown; ovipositor reddish-brown; posterior margin of each metasomal tergite narrowly tinged with red. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Legs reddish-brown except for: fore and mid coxae, trochanters and trochantellus, apex of hind femur, base of hind tibia, tibial spurs and basal parts of TS1-TS3 whitish-yellow; outer surface of hind coxa, apical part of hind femur, subbasal area and apical part of hind tibia and tarsus excluding yellow areas blackish-brown; median part of hind tibia more or less tinged with blackish-brown. Basal yellow area of TS1 ca. 0.6 length of TS1 but its border indistinct.

**Male.** Unknown.

**Specimen examined.** JAPAN: [Holotype] F, Yamanashi Pref., Hokuto City, Masutomi, Biwakubo-sawa, 7. viii. 2007, K. Watanabe leg. (KPMNH).

**Distribution** (Fig. 1038). Japan (Honshu).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the type locality, Biwakubo-sawa.

**Remarks.** This species resembles *G. breviterebra* and *G. yoshidai* in the short ovipositor, the body with dense punctures, and the shallow and narrow ovipositor sheath, but it can be distinguished by the ovipositor sheath 1.3 times as long as hind tibia (1.1–1.2 times in *G. breviterebra*), the MSL 1.0 times as long as BWM (0.7–0.8 times in *G. yoshidai*) the subalar prominence black (yellow in *G. breviterebra* and *G. yoshidai*), the T1 1.1 times as long as maximum width (1.3–1.4 times in *G. breviterebra*), and the hind coxa

unicolour (bicolour as pale yellow and reddish-yellow in *G. breviterebra* and *G. yoshidai*).

***Glypta breviterebra*** Momoi, 1963  
(Figs. 567, 611, 654, 718, 773, 910-912)

*Glypta breviterebra* Momoi, 1963: 116.

**Description. Female** (n=12). Body length 6.0–8.0 mm.

Head 0.7 times as long as wide. Clypeus 0.6–0.7 times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 567), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.0 times as long as OOL. Mandible slightly convex basally, with a narrow ventral flange. Upper part of occipital carina incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.8–0.9 times as long as BWM. Antenna with 26–28 flagellomeres. F1 1.5–1.6 times as long as F2.

Mesosoma. Pronotum entirely densely punctate, its epomia slightly present ventrally or apparently absent (Fig. 611). Mesopleuron densely punctate, with small smooth area around episternal scrobe. Metapleuron densely punctate. Lateral longitudinal carina of propodeum absent (Fig. 654). Anterior transverse carina of propodeum absent (Fig. 654). Posterior transverse carina of propodeum complete or sometimes obsolete medially (Fig. 654). Areae externa and dentipara of propodeum completely united into single area (Fig. 654). Fore wing length 5.0–6.5 mm. Fore coxa not curved to outward, slightly convex or not convex above socket of trochanter. Hind femur 4.8–5.2 times as long as maximum depth in lateral view. Hind TS1 2.1–2.3 times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 densely punctate (Fig. 912), 1.3–1.4 times as long as maximum width, its median dorsal carina present on basal ca. 0.5 of tergite (Fig. 718). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 718). T2 0.9–1.0 times as long as maximum width. Punctures on T1-T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 0.4 times as long as fore wing, 1.1–1.2 times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch. Subapical notch of ovipositor always shallow and small (Fig. 773).

Colouration (Figs. 910-912). Body (excluding wings and legs) black, except for: clypeus, mandible excluding apex, ventral spot of scape, ventral surface of pedicel, palpi, posterior part of propleuron, postero-dorsal corner of pronotum, tegula, subalar prominence and membranous parts of metasomal sternite whitish-yellow to yellowish-brown; posterior margin of T1-T3 and ovipositor reddish-brown; postero-ventral corners of pronotum and mesopleuron and posterior part of subgenital plate usually tinged with yellowish-brown. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Fore and mid leg whitish-yellow to reddish-yellow. Hind coxa reddish-yellow with whitish-yellow dorsal area. Hind trochanter and trochantellus whitish-yellow. Hind femur reddish-yellow excluding apical part blackish-brown with narrow whitish-yellow apex. Hind tibia whitish-yellow with subbasal and apical blackish-brown to black area. Hind tibial spurs whitish-yellow. Hind tarsus blackish-brown to black excluding basal whitish-yellow area of TS1-TS3 (but indistinct in TS3). Basal yellow area of TS1 ca. 0.3–0.5 length of TS1 but its border indistinct.

**Male.** Unknown.

**Specimens examined.** JAPAN:1F (holotype), Hokkaido Pref., Maruyama, 16. vii. 1955, S. Momoi leg. (SEHU); 2F, Hokkaido Pref., Sapporo, 23. vii. 1966, K. Kusigemati leg. (KU); 1F, same locality and collector, 6. ix. 1967 (KU); 1F, same locality and collector, 8. ix. 1967 (KU); 1F, Hokkaido Pref., Mt. Soranuma, 3. vii. 1964, H. Takada leg. (KU); 1F, same locality, 26. vii. 1966, K. Kusigemati leg. (KU); 1F, Hokkaido Pref., Sapporo City, Maruyama, 8. viii. 2001, T. Yoshida leg. (SEHU); 1F, Hokkaido Pref., Ebetsu City, Nishi-nopporo, Nopporo- Shinrin-park, 28. vi. 2007, Y. Matsumura leg. (LT) (SEHU); 1F, Hokkaido Pref., Yubari City, O-yubari, 3–17. viii. 2007, A. Ueda leg. (OMNH); 1F, Aomori Pref., Aomori City, Yokouchi-yaegiku, 4. vii. 1992, T. Ichita leg. (NIAES).

**Distribution** (Fig. 1038). Japan (Hokkaido and Honshu); China, Russian Far East.

**Bionomics.** Unknown.

**Remarks.** This species may be confused with *G. mame*, but it can be distinguished by some characters (see Remarks of *G. mame*).

### ***Glypta breviungulata* Kuslitzky, 1976**

(Figs. 568, 624, 655, 719, 774, 913-915)

*Glypta (Glypta) breviungulata* Kuslitzky, 1976: 308.

**Description. Female** (n=1). Body length 7.5 mm.



Head 0.6 times as long as wide. Clypeus 0.7 times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 568), 0.4 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.0 times as long as OOL. Mandible flat basally, with a narrow ventral flange. Upper part of occipital carina narrowly incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 1.0 times as long as BWM. Antenna with 34 flagellomeres. F1 1.4 times as long as F2.

Mesosoma. Pronotum entirely densely punctate, with a weak epomia. Mesopleuron with a small speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum partly present (Fig. 655). Anterior transverse carina of propodeum present only lateral section (Fig. 655). Posterior transverse carina of propodeum complete (Fig. 655). Areae externa and dentipara of propodeum clearly separated by a complete carina (Fig. 655). Fore wing length 6.0 mm. Tarsal claw short, as long as arolium (Fig. 624). Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 5.0 times as long as maximum depth in lateral view. Hind TS1 2.2 times as long as TS2. Hind tarsal claw short, as long as arolium (Fig. 624).

Metasoma. T1 densely punctate (Fig. 915), 1.0 times as long as maximum width, its median dorsal carina present on basal ca. 0.6 of tergite (Fig. 719). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 719). T2 0.6 times as long as maximum width. T3 and T4 partly mat (Fig. 915). Posterior area of T2-T4 flat to slightly concave. Ovipositor sheath 0.8 times as long as fore wing, 2.0 times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 774).

Colouration (Figs. 913-915). Body (excluding wings and legs) black, except for: apical part of clypeus excluding and palpi yellowish-brown; apex of mandible and flagellum reddish-brown; postero-dorsal corner of pronotum, tegula, axillae and membranous parts of metasomal sternite yellowish-brown; metasomal tergites slightly tinged with blue reflection; posterior margin of metasomal tergites, posterior part of subgenital plate and ovipositor reddish-brown. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Fore and mid leg whitish-yellow to reddish-yellow. Hind coxa and trochanter reddish-yellow. Hind trochantellus yellow. Hind femur reddish-yellow, its apical part tinged with black with white apex. Hind tibia whitish-yellow with subbasal and apical blackish-brown to black areas. Hind tibial spurs whitish-yellow. Hind tarsus blackish-brown to black excluding

basal whitish-yellow area of TS1-TS4 (but indistinct in TS4). Basal yellow area of TS1 ca. 0.4 length of TS1 but its border indistinct.

**Male.** Unknown.

**Specimen examined.** JAPAN: 1F, Hokkaido Pref., Toyotomi Town, Nishi-toyotomi, 11. vii. 1980, H. Takemoto leg. (NIAES). Russia: 1F (holotype), label data unreadable (ZIS).

**Distribution** (Fig. 1039). Japan\* (Hokkaido); Russian Far East.

**Bionomics.** Unknown.

**Remarks.** This is the first record of this species from Japan. I compared the above Japanese specimen with the holotype deposited in ZIS to see no marked differences between them.

***Glypta daisensis* sp. nov.**

(Figs. 569, 599, 656, 720, 775, 917-920)

**Description. Female** (n=7). Body length 6.0–6.5 (HT: 6.0) mm.

Head 0.6 times as long as wide. Clypeus 0.7 times as long as wide, its apex without small median notch (Fig. 599). Face weakly convex medially (Fig. 569), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.4 times as long as OOL. Mandible flat basally, with a narrow ventral flange. Upper part of occipital carina incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.7 times as long as BWM. Antenna with 32–34 (HT: 32) flagellomeres. F1 1.4–1.5 (HT: 1.5) times as long as F2.

Mesosoma. Pronotum punctate dorsally, sparsely punctate ventrally, with a weak epomia. Mesopleuron with a large speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum partly present (Fig. 656). Anterior transverse carina of propodeum completely or partly present (HT: partly present) (Fig. 656). Posterior transverse carina of propodeum complete (Fig. 656). Areae externa and dentipara of propodeum completely or broadly separated by carina (Fig. 656). Fore wing length 5.0–6.0 (HT: 5.0) mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 5.0 times as long as maximum depth in lateral view. Hind TS1 2.0 times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 densely punctate (Fig. 920), 1.0 times as long as maximum width, its median dorsal carina present on basal ca. 0.6 of tergite (Fig. 720). Both lateral

sides of T1 without convexity just after the base of median dorsal carina (Fig. 720). T2 0.6 times as long as maximum width. Punctures on T1-T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 0.7–0.8 (HT: 0.7) times as long as fore wing, 2.1–2.5 (HT: 2.1) times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 775).

Colouration (Fig. 917-920). Body (excluding wings and legs) black, except for: apical part of clypeus and mandible tinged with reddish-brown; palpi, axillae, posterior margin of each metasomal tergite, subgenital plate reddish-brown to yellowish-brown; postero-dorsal corner of pronotum, tegula and membranous parts of sternites yellow to whitish-yellow; ovipositor reddish-brown to yellowish-brown. Clypeus sometimes darkened. Posterior margin of scutellum and posterior margin of metasomal tergites sometimes tinged with red. Wings hyaline; veins and pterostigma yellowish-brown except for yellow wing base. Fore and mid legs reddish-yellow to whitish-yellow. Hind coxa reddish-yellow, its dorsal surface sometimes tinged with whitish-yellow. Hind trochanter and trochantellus whitish-yellow. Hind femur reddish-yellow with narrow white apex. Hind tibia whitish-yellow excluding blackish-brown to black subbasal band and apical part. Hind tibial spurs whitish-yellow. Hind tarsus blackish-brown to black excluding basal whitish-yellow area of TS1-TS4 (but indistinct in TS4). Basal yellow area of TS1 ca. 0.5 length of TS1 but its border indistinct.

**Male.** Unknown.

**Specimens examined.** JAPAN: [Holotype] F, Tottori Pref., Mt. Daisen (800–1000 m alt.), 9. vi. 1981, T. Goto leg. (NIAES). [Paratype] 1F, Hokkaido Pref., Zyozankei, 2. viii. 1965, K. Kusigemati leg. (KU); 1F, Tottori Pref., Kofu Town, Onaruhara, 17. vi. 1998, R. Matsumoto leg. (OMNH); 2F, Ehime Pref., Omogo Vil., Tsuchigoya, 14. vii. 1998, R. Matsumoto leg. (OMNH); 1F, Shirozawa, 18. viii. 1934, N. Kumazawa leg. (NIAES).

**Distribution** (Fig. 1039). Japan (Hokkaido, Honshu and Shikoku).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the type locality, Mt. Daisen.

**Remarks.** This species resembles *G. curvicoxa* Kuslitzky, 1977, from Eurasia in the body colouration and the length of ovipositor sheath, but it can be distinguished by the simple fore coxa (strongly bent in *G. curvicoxa*). This species also resembles *G. sankaku* in the body structure and the length of ovipositor sheath, but it can be distinguished by the clypeus and mandible at most tinged with red (each with a conspicuous yellow area in *G. sankaku*).

***Glypta densa*** Momoi, 1970

(Figs. 570, 657, 721, 776, 826, 827, 834, 835, 921-923)

*Glypta densa* Momoi, 1970: 370.

**Description. Female** (n=3). Body length 8.0 mm.

Head 0.6–0.7 times as long as wide. Clypeus 0.6 times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 570), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.0 times as long as OOL. Mandible slightly convex basally, with a narrow ventral flange. Upper part of occipital carina incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.8 times as long as BWM. Antenna with 28–29 flagellomeres. F1 1.7 times as long as F2.

Mesosoma. Pronotum entirely densely punctate, its epomia slightly present ventrally or apparently absent. Mesopleuron densely punctate, with small smooth area around episternal scrobe. Metapleuron densely punctate. Lateral longitudinal carina of propodeum partly present (Fig. 657). Anterior transverse carina of propodeum present only lateral section as trace-like carina (Fig. 657). Posterior transverse carina of propodeum complete (Fig. 657). Areae externa and dentipara of propodeum separated by trace-like carina (Fig. 657). Fore wing length 6.0 mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 4.9–5.0 times as long as maximum depth in lateral view. Hind TS1 2.3–2.4 times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 densely punctate (Fig. 923), 1.2–1.3 times as long as maximum width, its median dorsal carina present on basal ca. 0.5 of tergite (Fig. 721). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 721). T2 0.9 times as long as maximum width. Punctures on T1-T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 0.4–0.5 times as long as fore wing, 1.1–1.2 times as long as hind tibia. Apical part of upper valve of ovipositor without with distinct dorsal tubercle before subapical notch. Subapical notch of ovipositor always shallow and small (Fig. 776).

Colouration (Figs. 921-923). Body (excluding wings and legs) black, except for: clypeus, mandible excluding apex, ventral surface of pedicel, palpi, posterior part of propleuron, dorsal margin of pronotum, posterior part of collar, tegula, subalar

prominence, axillae and membranous parts of metasomal sternite whitish-yellow to yellowish-brown; posterior part of subgenital plate and ovipositor reddish-brown. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Fore and mid leg whitish-yellow to reddish-yellow. Hind coxa reddish-yellow with whitish-yellow dorsal area. Hind trochanter and trochantellus whitish-yellow. Hind femur reddish-yellow. Hind tibia whitish-yellow with subbasal and apical blackish-brown to black area. Hind tibial spurs whitish-yellow. Hind tarsus blackish-brown to black excluding basal whitish-yellow area of TS1-TS3. Basal yellow area of TS1 ca. 0.9 length of TS1.

**Male** (n=2). Similar to female. Face 0.6 times as long as wide. MSL 0.5 times as long as BWM. Antenna with 32 flagellomeres. F1 1.6 times as long as F2. Hind femur 5.4 times as long as maximum depth in lateral view. Posterior margin of subgenital plate nearly straight. Apical margin of paramere weakly pointly produced (Figs. 826, 827, 835). Dorsal margin of paramere without a convexity apically (Figs. 826, 835). Inner margin of paramere concave near basal inner angle (Fig. 826). Aedeagus weakly curved, its basal apodeme ca. 0.5 times total length of aedeagus (Fig. 834). Penis valve without a minute notch at posterior part of dorsal surface (Fig. 834). Basal margin of dorsal surface of penis valve not produced medially (Fig. 834). Ventral surface of flagellum tinged with reddish-brown. Dorsal margin of pronotum and collar black with a small yellow area on postero-dorsal and postero-ventral corner, respectively. Hind tarsus more or less darkened.

**Specimens examined.** JAPAN: 1F (holotype), Kagoshima Pref., Ryukyu Is., Amamioshima, 8. v. 1966, K. Kusigemati leg. (MNHAH); 1M (paratype), Kagoshima Pref., Ryukyu Is., Amamioshima, 6. v. 1966, K. Kusigemati leg. (MNHAH); 1F, Kagoshima Pref., Amamioshima Island, Yamato Vil., Odana, about 350m alt. (GPS: N 28-18-21/ E 129-20-15), 4. vii. 2011, K. Watanabe leg. (KPMNH); 1M, Kagoshima Pref., Amamioshima Island, Mt. Yuwan-dake, 30. iv. 1977, H. Takizawa leg. (KU); 1F, Kagoshima Pref., Tokunoshima Island, Kedoku, about 140m alt. (GPS: N 27-50-22/ E 128-56-47), 21. v. 2008, A. Sakai leg. (KPMNH).

**Distribution** (Fig. 1039). Japan (Amamioshima Is. and Tokunoshima Is.\*).

**Bionomics.** Host unknown. Adult wasps were collected in moist broadleaf forests.

**Remarks.** This species is endemic to Amami Islands (Amamioshima Is. and Tokunoshima Is.).

***Glypta erythoronota* sp. nov.**

(Figs. 570, 657, 721, 776, 826, 827, 834, 835, 921-923)

**Description. Female** (n=3). Body length 6.5–7.0 (HT: 6.5) mm.

Head 0.6 times as long as wide. Clypeus 0.6–0.7 (HT: 0.7) times as long as wide, its apex without a small median notch. Face strongly convex medially (Fig. 571), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.1 times as long as OOL. Mandible flat basally, with a narrow ventral flange. Upper part of occipital carina narrowly and slightly incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.8–1.0 (HT: 1.0) times as long as BWM. Antenna with 32 flagellomeres. F1 1.5 times as long as F2.

Mesosoma. Pronotum entirely punctate, with a weak epomia. Mesopleuron with a small speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum partly present or absent (Figs. 658, 659). Anterior transverse carina of propodeum present only lateral section as trace-like carina or absent (HT: absent) (Figs. 658, 659). Posterior transverse carina of propodeum complete (Figs. 658, 659). Areae externa and dentipara of propodeum partly separated by trace-like carina or completely united into single area (HT: completely united) (Figs. 658, 659). Fore wing length 5.0–5.5 (HT: 5.0) mm. Fore coxa slightly curved to outward, without a convexity above socket of trochanter. Hind femur 4.7–5.0 (HT: 5.0) times as long as maximum depth in lateral view. Hind TS1 2.0–2.1 (HT: 2.1) times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 punctate (Figs. 926, 927), 1.1 times as long as maximum width, its median dorsal carina present on basal ca. 0.6 of tergite (Fig. 722). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 722). T2 0.8–0.9 (HT: 0.9) times as long as maximum width. Ovipositor sheath 0.9–1.0 (HT: 1.0) times as long as fore wing, 2.5 times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 777).

Colouration (Figs. 924-927). Body (excluding wings and legs) black, except for: apical part of clypeus, mandible excluding apex and base and palpi reddish-brown; antenna brown with ventral spot of scape and ventral surface of pedicel and flagellum reddish-brown; postero-dorsal corner of pronotum, tegula, axillae and membranous parts of metasomal sternite whitish-yellow to yellowish-brown; posterior margin of T1-T3 and lateral part of T4, subgenital plate and ovipositor reddish-brown to red, red area of tergites usually more or less enlarged. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Fore and mid leg

whitish-yellow to reddish-yellow. Hind coxa reddish-yellow. Hind trochanter and trochantellus yellow, former sometimes tinged with reddish-yellow. Hind femur reddish-yellow, its apex narrowly tinged with black. Hind tibia yellow with subbasal and apical blackish-brown to black areas, its ventral surface sometimes slightly tinged with black. Hind tibial spurs yellow. Hind tarsus blackish-brown to black excluding basal yellow area of TS1-TS4 (but indistinct in TS4). Basal yellow area of TS1 ca. 0.4 length of TS1 but its border sometimes indistinct.

**Male.** Unknown.

**Specimens examined.** JAPAN: [Holotype] F, Hokkaido Pref., Mt. Soranuma, 1. viii. 1968, K. Kushigemati leg. (KU). [Paratypes] 1F, same data of holotype (KU); 1F, Hokkaido Pref., Sapporo City, Hyakumatsu-zawa, 18. viii. 2007, T. Yoshida leg. (KPMNH).

**Distribution** (Fig. 1039). Japan (Hokkaido).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the Latin word, “erythro-” (= red) plus “nota” (= notum), which means red metasomal tergites.

**Remarks.** This species resembles *G. trochantelata* Bridgeman, 1886, from Europe and *G. talitzkii* Kuslitzky, 1974, from Eurasia in the body colouration, but it can be distinguished by the ovipositor sheath 0.9–1.0 times as long as fore wing (0.8 times in *G. trochantelata*; 0.6 times in *G. talitzkii*).

***Glypta ezoensis* sp. nov.**

(Figs. 572, 660, 723, 778, 928-930)

**Description. Female** (n=1). Body length 7.5 mm.

Head 0.7 times as long as wide. Clypeus 0.5 times as long as wide, its apex without a small median notch. Face strongly convex medially (Fig. 572), 0.5 times as long as wide. Frons densely transversely striated above antennal socket excluding dorsal part punctate, without a pair of distinct longitudinal crease between each antennal socket. POL 1.3 times as long as OOL. Mandible flat basally, with a narrow ventral flange. Upper part of occipital carina incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.8 times as long as BWM. Antenna with 35 flagellomeres. F1 1.4 times as long as F2.

Mesosoma. Pronotum sparsely punctate dorsally, largely smooth ventrally, with a weak epomia. Mesopleuron with a small speculum. Metapleuron punctate. Lateral

longitudinal carina of propodeum partly present (Fig. 660). Anterior transverse carina of propodeum present on lateral section as trace-like carina (Fig. 660). Posterior transverse carina of propodeum complete (Fig. 660). Areae externa and dentipara of propodeum partly separated by trace-like carina (Fig. 660). Fore wing length 6.5 mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 5.2 times as long as maximum depth in lateral view. Hind TS1 2.1 times as long as TS2. Hind tarsal claw longer than arolium.

**Metasoma.** T1 densely punctate (Fig. 930), 1.3 times as long as maximum width, its median dorsal carina present on basal ca. 0.5 of tergite (Fig. 723). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 723). T2 0.9 times as long as maximum width. Ovipositor sheath 1.0 times as long as fore wing, 3.0 times as long as hind tibia. Apical part of upper valve of ovipositor with a slightly convex dorsal tubercle before subapical notch (Fig. 778).

**Colouration** (Figs. 928-930). Body (excluding wings and legs) black, except for: apical part of clypeus and of mandible excluding base, apex of pedicel, posterior margin of each metasomal tergite, subgenital plate and ovipositor reddish-brown; palpi, postero-dorsal corner of pronotum, tegula, axillae and membranous parts of sternites yellow to yellowish-brown. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Fore and mid legs reddish-yellow to yellowish-brown excluding mid tarsus partly tinged with brown. Hind coxa reddish-brown. Hind trochanter blackish-brown excluding whitish-yellow apical part. Hind trochantellus whitish-yellow. Hind femur dark reddish-brown excluding whitish-yellow base. Hind tibia whitish-yellow excluding subbasal band, apical part and ventral surface between subbasal band and apical part blackish-brown to black. Hind tibial spurs blackish-brown. Hind tarsus blackish-brown to black excluding base of TS1 slightly and indistinctly tinged with yellowish-brown.

**Male.** Unknown.

**Specimen examined.** JAPAN: [Holotype] F, Hokkaido Pref., Mt. Soranuma, 30. viii. 1967, K. Kusigemati leg. (KU).

**Distribution** (Fig. 1039). Japan (Hokkaido).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the Japanese term, “Ezo”, an old local name of Hokkaido.

**Remarks.** This species resembles *G. resinanae* Hartig, 1838, from Eurasia and *G. similis* Bridgeman, 1886, from Eurasia in the body colouration, but it can be distinguished by the MSL 0.8 times as long as BWM (at most slightly shorter than BWM in *G. resinanae*



and *G. similis*) and the body length 7.5 mm (more than 10.0 mm in *G. resinanae* and *G. similis*).

***Glypta fujisana* sp. nov.**

(Figs. 2, 3, 573, 607, 661, 724, 779, 931-933)

**Description. Female** (n=2). Body length 7.0 mm.

Head 0.6 times as long as wide. Clypeus 0.6 times as long as wide, its apex without small median notch (Fig. 2). Face weakly convex medially (Fig. 573), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.1–1.3 (HT: 1.3) times as long as OOL. Mandible with a narrow ventral flange, its basal 0.5 slightly expanded, with flat base (Fig. 607). Upper part of occipital carina narrowly incomplete behind posterior ocelli (Fig. 3). Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.6 times as long as BWM. Antenna with 31 flagellomeres. F1 1.6–1.7 (HT: 1.6) times as long as F2.

Mesosoma. Pronotum entirely punctate, with a weak epomia. Mesopleuron with a small speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum absent (Fig. 661). Anterior transverse carina of propodeum present on lateral section as trace-like carina (Fig. 661). Posterior transverse carina of propodeum complete (Fig. 661). Areae externa and dentipara of propodeum narrowly separated by trace-like carina (Fig. 661). Fore wing length 6.0–6.5 (HT: 6.0) mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 5.2–5.3 (HT: 5.2) times as long as maximum depth in lateral view. Hind TS1 1.9–2.1 (HT: 2.1) times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 punctate (Fig. 933), 1.1 times as long as maximum width, its median dorsal carina present on basal ca. 0.6 of tergite (Fig. 724). Both lateral sides of T1 with a convexity just after the base of median dorsal carina (Fig. 724). T2 0.6 times as long as maximum width. Punctures on T1 partly longitudinally striated by coalescent punctures. Ovipositor sheath 1.1–1.4 (HT: 1.1) times as long as fore wing, 3.9–4.0 (HT: 3.9) times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 779).

Colouration (Figs. 931-933). Body (excluding wings and legs) black, except for: apical part of clypeus, mandible excluding apex and base, palpi, subgenital plate and ovipositor reddish-brown to yellowish-brown; postero-dorsal corner of pronotum,

tegula, axillae and membranous parts of sternites yellow to whitish-yellow; posterior margin of each metasomal tergite slightly and narrowly tinged with yellowish-brown. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Fore and mid legs reddish-yellow excluding whitish-yellow coxae, trochanters and trochantelli. Hind coxa, trochanter and trochantellus whitish-yellow excluding reddish-yellow ventral surface. Hind femur reddish-yellow, its apical part tinged with blackish-brown with whitish-yellow apex. Hind tibia yellowish-brown excluding whitish-yellow base and blackish-brown to black subbasal band and apical part. Hind tibial spurs yellowish-brown to whitish-yellow. Hind tarsus blackish-brown to black excluding basal whitish-yellow area of TS1-TS4 (but indistinct in TS4). Basal whitish-yellow area of TS1 0.2 length of TS1 but its border sometimes indistinct.

**Male.** Unknown.

**Specimens examined.** JAPAN: [Holotype] ♀, Shizuoka Pref., Fujinomiya Town, Nishi-Usuduka, Mt. Fujisan, 1. ix. 2007, H. Katahira leg. (KPMNH). [Paratype] 1♀, Fukushima Pref., Hinoemata Vil., 11. ix. 1989, Y. Kurosawa leg. (NSMT).

**Distribution** (Fig. 1039). Japan (Honshu).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the type locality, Mt. Fuji.

**Remarks.** This species resembles *G. mensurator* Fabricius, 1775, from Eurasia and *G. lugubrina* Holmgren, 1860, from Eurasia in the body colouration and the long ovipositor, but it can be distinguished by the ovipositor sheath 1.1–1.4 times as long as hind tibia (2.0 times in *G. mensurator*), the T2 0.6 times as long as maximum width (0.7–0.8 times in *G. lugubrina*), the metasomal tergite without red area (with red area in *G. mensurator*), and the body length 7.0 mm (more than 8.0 mm in *G. lugubrina*).

***Glypta hayachinensis* sp. nov.**

(Figs. 574, 662, 725, 780, 934-936)

**Description. Female** (n=1). Body length 8.0 mm.

Head 0.6 times as long as wide. Clypeus 0.7 times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 574), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.1 times as long as OOL. Mandible flat basally, with a narrow ventral flange. Upper part of occipital carina narrowly incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly

narrower than dorsal part. MSL 1.0 times as long as BWM. Antenna with 36 flagellomeres. F1 1.9 times as long as F2.

**Mesosoma.** Pronotum entirely punctate, with a weak epomia. Mesopleuron with a large speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum absent (Fig. 662). Anterior transverse carina of propodeum absent (Fig. 662). Posterior transverse carina of propodeum present, its median part narrowly obsolete (Fig. 662). Areae externa and dentipara of propodeum completely united into single area (Fig. 662). Fore wing length 6.0 mm. Fore coxa not curved to outward, slightly convex above socket of trochanter. Hind femur 4.2 times as long as maximum depth in lateral view. Hind TS1 2.5 times as long as TS2. Hind tarsal claw longer than arolium.

**Metasoma.** T1 densely punctate excluding smooth apex (Fig. 936), 1.5 times as long as maximum width, its median dorsal carina present on basal ca. 0.4 of tergite (Fig. 725). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 725). T2 1.2 times as long as maximum width. Punctures on T1-T4 partly longitudinally or transversely striated by coalescent punctures. Ovipositor sheath 1.3 times as long as fore wing, 4.0 times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 780).

**Colouration** (Figs. 934-936). Body (excluding wings and legs) black, except for: apical part of clypeus and of mandible tinged with reddish-brown; antenna blackish-brown, its ventral surface of flagellum tinged with reddish-brown; postero-dorsal corner of pronotum, tegula and membranous parts of metasomal sternite yellow to yellowish-brown; axillae dark yellowish-brown; posterior margin of each metasomal tergite, subgenital plate and ovipositor reddish-brown. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Fore and mid legs reddish-yellow to reddish-brown. Hind coxa reddish-brown. Hind trochanter blackish-brown excluding yellowish-brown apex. Hind trochantellus yellowish-brown. Hind femur dark reddish-brown excluding yellowish-brown base. Hind tibia dark reddish-brown excluding whitish-yellow base and slightly yellowish-brown median part. Hind tibial spurs yellowish-brown. Hind tarsus blackish-brown to black excluding basal yellowish-brown area of TS1-TS3. Basal yellowish-brown area of TS1 ca. 0.2 length of TS1.

**Male.** Unknown.

**Specimen examined.** JAPAN: [Holotype] F, Iwate Pref., Mt. Hayachine, 30. viii. 1966, K. Kusigemati leg. (KU).

**Distribution** (Fig. 1039). Japan (Honshu).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the type locality, Mt. Hayachine.

**Remarks.** This species resembles *G. sculpturata* Gravenhorst, 1829, from Eurasia and *G. bifoveolata* Gravenhorst, 1829, from Eurasia in the slender body and the long ovipositor, but it can be distinguished by the apex of hind femur and tibia more or less black (hind femur and tibia entirely reddish-yellow in *G. sculpturata* and *G. bifoveolata*) and the body length 8.0 mm (more than 1.0 mm in *G. sculpturata*). This species also resembles *G. yashajinensis* in the body colouration, but it can be distinguished by the T2 1.2 times as long as maximum width (1.0 times in *G. yashajinensis*) and the MSL 1.0 times as long as BWM (0.7 times in *G. yashajinensis*).

***Glypta iriei* sp. nov.**

(Figs. 575, 663, 664, 726, 781, 937-939)

**Description. Female** (n=11). Body length 6.0–8.0 (HT: 7.0) mm.

Head 0.6 times as long as wide. Clypeus 0.6–0.7 (HT: 0.6) times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 575), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 0.8–1.1 (HT: 1.1) times as long as OOL. Mandible flat basally, with a narrow ventral flange. Upper part of occipital carina narrowly incomplete behind posterior ocelli or apparently complete (HT: apparently complete). Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.7–1.0 (HT: 0.8) times as long as BWM. Antenna with 32–35 (HT: 35) flagellomeres. F1 1.6–1.7 (HT: 1.7) times as long as F2.

Mesosoma. Pronotum entirely punctate excluding ventral area with longitudinal striae, with a weak epomia. Mesopleuron with a large speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum partly present (Figs. 663, 664). Anterior transverse carina of propodeum complete (Figs. 663, 664). Posterior transverse carina of propodeum complete (Figs. 663, 664). Areae externa and dentipara of propodeum clearly separated by a complete carina (Figs. 663, 664). Fore wing length 5.0–7.0 (HT: 6.5) mm. Fore coxa slightly curved to outward, without a convexity above socket of trochanter. Hind femur 5.1–6.0 (HT: 5.3) times as long as maximum depth in lateral view. Hind TS1 2.0–2.4 (HT: 2.0) times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 densely punctate (Fig. 939), 1.1–1.3 (HT: 1.1) times as long as maximum width, its median dorsal carina present on basal ca. 0.5 of tergite (Fig. 726).

Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 726). T2 0.9–1.0 (HT: 0.9) times as long as maximum width. Punctures on T1-T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 0.6–0.8 (HT: 0.8) times as long as fore wing, 1.9–2.2 (HT: 2.2) times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 781).

Colouration (Figs. 937-939). Body (excluding wings and legs) black, except for: apical part of clypeus and mandible slightly tinged with dark reddish-brown to dark yellowish-brown; palpi, apex of pedicel and axillae dark yellowish-brown; dorso-ventral corners of pronotum, tegula, membranous parts of sternites yellowish-brown; subgenital plate and ovipositor reddish-brown. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Legs reddish-brown to reddish-yellow, except for: base of all femora whitish-yellow; apical part of hind femur, subbasal band and apical part of hind tibia, apex of hind tibial spurs and hind tarsus excluding basal whitish-yellow area of TS1-TS3 tinged with blackish-brown to black. Basal yellow area of TS1 0.2–0.6 length of TS1 but its border indistinct.

**Male.** Unknown.

**Specimens examined.** JAPAN: [Holotype] F, Yamanashi Pref., Hokuto City, Masutomi, Biwakubo-sawa, 27. ix. 2007, M. Irie leg. (KPMNH). [Paratypes] 1F, Hokkaido Pref., Sapporo, 3. x. 1967, K. Kusigemati leg. (KU); 1F, Hokkaido Pref., Shibecha Town, Motosakimui river, 23. ix – 5. x. 1996, H. Kamei, T. Ito & A. Ohkawa leg. (NIAES); 1F, Hokkaido Pref., Sapporo City, Misumai, Kannonzawa, 7-21. ix. 1993, N. Kuhara leg. (MsT) (NIAES); 1F, Aomori Pref., Takko Town, Miroku-rindo, 15. ix. 1993, T. Ichita leg. (NIAES); 1F, same data as holotype (KPMNH); 1F, same locality as holotype, 27. ix. 2007, K. Watanabe leg. (KPMNH); 2F, Shizuoka Pref., Fujimi (=Fujinomiya City?), Nishiusuduka, 15. x. 2006, H. Katahira leg. (KPMNH); 1F, Toyama Pref., Oyama Town, Arimine Lake, 30. ix. 2002, R. Matsumoto leg. (OMNH); 1F, 9. viii., J. Yoshioka leg. (NSMT).

**Distribution** (Fig. 1040). Japan (Hokkaido and Honshu).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the collector of types, Mr. Masayuki Irie, who is my friend.

**Remarks.** This species resembles *G. resinanae* Hartig, 1838, from Eurasia and *G. similis* Bridgeman, 1886, from Eurasia in the body colouration, but it can be distinguished by the ovipositor sheath 0.6–0.8 times as long as fore wing (at most slightly shorter than

fore wing in *G. resinanae* and *G. similis*) and the body length 6.0–8.0 mm (more than 10.0 mm in *G. resinanae* and *G. similis*). This species is also similar to *G. scalaris* Gravenhorst, 1829, from Eurasia and *G. pedata* Desvignes, 1856, from Europe, but it can be distinguished by the propodeum with well-developed carinae (anterior transverse carina and lateromedian longitudinal carina absent in *G. scalaris* and *G. pedata*).

***Glypta japonica* sp. nov.**

(Figs. 576, 605, 608, 620, 621, 665, 727, 782, 940-942)

**Description. Female** (n=11). Body length 9.5–11.0 (HT: 9.5) mm.

Head 0.6 times as long as wide. Clypeus 0.6 times as long as wide, its apex without small median notch (Fig. 605). Face weakly convex medially (Fig. 576), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.0 times as long as OOL. Mandible with a narrow ventral flange, with flat base (Fig. 608). Upper part of occipital carina weak in area behind posterior ocelli but apparently complete. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.7–1.0 (HT: 0.7) times as long as BWM. Antenna with 39–42 (HT: 41) flagellomeres. F1 1.4–1.7 (HT: 1.4) times as long as F2.

Mesosoma. Pronotum entirely densely punctate excluding ventral small smooth area, with a weak epomia. Mesopleuron with a large speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum partly present (Fig. 665). Anterior transverse carina of propodeum present on lateral section (Fig. 665). Posterior transverse carina of propodeum complete (Fig. 665). Areae externa and dentipara of propodeum clearly separated by a complete carina (Fig. 665). Fore wing length 7.0–7.5 (HT: 7.0) mm. Fore coxa not curved to outward, without a convexity above socket of trochanter (Figs. 620, 621). Hind femur 4.7 times as long as maximum depth in lateral view. Hind TS1 2.0–2.1 (HT: 2.0) times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 densely punctate (Fig. 942), 1.2–1.4 (HT: 1.3) times as long as maximum width, its median dorsal carina present on basal ca. 0.5 of tergite (Fig. 727). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 727). T2 0.9–1.0 (HT: 1.0) times as long as maximum width. Punctures on T1-T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 1.3–1.4 (HT: 1.4) times as long as fore wing, 3.2–3.6 (HT: 3.6) times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch

(Fig. 782).

Colouration (Figs. 940-942). Body (excluding wings and legs) black, except for: apical part of clypeus, palpi, dorso-ventral corners of pronotum, tegula, membranous parts of sternites yellowish-brown; apex of mandible and posterior margin of each metasomal tergite slightly tinged with reddish-brown; axillae slightly tinged with yellowish-brown; antenna blackish-brown; ovipositor reddish-brown. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Legs reddish-brown to reddish-yellow, except for: base of all femora whitish-yellow; all tibial spurs yellowish-brown; mid TS5 and hind trochanter and trochantellus tinged with brown; apex of hind femur, hind tibia excluding whitish-yellow base and hind tarsus excluding basal whitish-yellow area of TS1-TS3 (but indistinct in TS2 and TS3) blackish-brown to black; middle area of hind tibia sometimes tinged with dark reddish-brown. Basal yellow area of TS1 ca. 0.2 length of TS1.

**Male.** Unknown.

**Specimens examined.** JAPAN: [Holotype] F, Hokkaido Pref., Furano City, Torinoshita, 23-26. 1993, K. Suzuki et al. leg. (NIAES). [Paratypes] 1F, Hokkaido Pref., Nopporo, 26. viii. 1967, M. Suwa leg. (KU); 1F, Hokkaido Pref., Toyotomi, Sarobetsu, 2. viii. 1961, G. Kuno leg., 1F, Hokkaido Pref., Toyotomi, 10. viii. 1965, K. Kusigemati leg. (KU); 1F, Hokkaido Pref., Kamikawa, Asahi Vil., Shin-okushibetsu, 19-21. viii. 1981, Y. Shono leg. (NIAES); 1F, Hokkaido Pref., Shari Town, Itashibetsubashi, 30. viii. 1995, M. Sueyoshi leg. (OMNH); 1F, Hokkaido Pref., Shibechea Town, Gojikkoku, 3. viii. 1997, R. Matsumoto leg. (OMNH); 1F, Aomori Pref., Rokkasho Vil., Obuchinuma, 12. ix. 1993, T. Ichita leg. (NIAES); 1F, Saitama Pref., Otaki, 31. vii. 1973, T. Nambu leg. (NIAES); 1F, Toyko Pref., Oume City, Nagabuchi, 10. ix. 1994, S. Kubota leg. (NIAES); 1F, Ishikawa Pref., Kawachi Vil., Fukuoka, 10. ix. 1989, I. Togashi leg. (NIAES).

**Distribution** (Fig. 1040). Japan (Hokkaido and Honshu).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the type locality, Japan.

**Remarks.** This species resembles *G. incisa* Gravenhorst, 1829, from Eurasia and *G. konishii* in the colouration of hind leg and the large and slender body, but it can be distinguished by the ovipositor sheath 1.3–1.4 times as long as fore wing (1.2 times in *G. incise* and 0.8–1.0 times in *G. konishii*).

***Glypta konishii* sp. nov.**

(Figs. 577, 666, 728, 783, 943-947)

**Description. Female** (n=15). Body length 9.0–10.0 (HT: 10.0) mm.

Head 0.6 times as long as wide. Clypeus 0.6 times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 577), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.0–1.1 (HT: 1.1) times as long as OOL. Mandible slightly convex basally, with a narrow ventral flange. Upper part of occipital carina weak in area behind posterior ocelli but apparently complete, or narrowly absent behind posterior ocelli (HT: apparently complete). Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.7–0.8 (HT: 0.7) times as long as BWM. Antenna with 36–40 (HT: 40) flagellomeres. F1 1.6–1.7 (HT: 1.7) times as long as F2.

Mesosoma. Pronotum entirely densely punctate, with a weak epomia. Mesopleuron with a small speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum absent (Fig. 666). Anterior transverse carina of propodeum absent (Fig. 666). Posterior transverse carina of propodeum complete (Fig. 666). Areae externa and dentipara of propodeum completely united into single area (Fig. 666). Fore wing length 6.5–7.0 (HT: 7.0) mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 5.5–5.9 (HT: 5.9) times as long as maximum depth in lateral view. Hind TS1 2.0–2.1 (HT: 2.0) times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 densely punctate (Fig. 947), 1.2–1.4 (HT: 1.4) times as long as maximum width, its median dorsal carina present on basal ca. 0.5 of tergite (Fig. 728). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 728). T2 0.9–1.0 (HT 1.0) times as long as maximum width. Punctures on T1-T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 0.8–1.0 (HT: 0.8) times as long as fore wing, 2.2–2.5 (HT: 2.3) times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 783).

Colouration (Figs. 943-947). Body (excluding wings and legs) black, except for: clypeus excluding dorsal part, mandible excluding brown apex and black base, palpi, dorso-ventral corners of pronotum, tegula, membranous parts of sternites and posterior margin of subgenital plate yellow to whitish-yellow; apex of pedicel, subgenital plate excluding posterior margin, and ovipositor reddish-brown; scutellum sometimes with a pair of indistinct yellowish-brown spots (HT: absent); posterior



margin of each metasomal tergite sometimes narrowly tinged with red. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Fore and mid legs reddish-yellow to yellowish-brown excluding apex of mid TS1-TS4, and mid TS5 tinged with brown. Hind coxa reddish-yellow to reddish-brown. Hind trochanter and trochantellus yellow, both partly tinged with brown. Hind femur reddish-yellow to reddish-brown excluding blackish-brown base and apical part. Hind tibia dark reddish-yellow excluding white base and blackish-brown to black subbasal band and apical part, reddish-yellow. Hind tibial spurs yellowish-brown, its apex slightly tinged with brown. Hind tarsus blackish-brown to black excluding basal whitish-yellow area of TS1-TS3 (but indistinct in TS2 and TS3). Basal yellow area of TS1 ca. 0.2 length of TS1.

**Male.** Unknown.

**Specimens examined.** JAPAN: [Holotype] F, Yamanashi Pref., Mt. Daibosatsu, Sagashio-kosen, Hikawa-rindo, 16. vi. 2007, K. Watanabe leg. (KPMNH). [Paratypes] 1F, Hokkaido Pref., Mt. Tarumae-san, 12-21. vii. 1998, K. Konishi leg. (MsT) (NIAES); 1F, same locality and collector, 18-21. vii. 1998 (MsT) (NIAES); 1F, same locality and collector, 21-26. vii. 1998 (MsT) (NIAES); 1F, Hokkaido Pref., Obihiro, Shihoro, 26. vi. 1996, M. Matsuda leg. (OMNH); 1F, Hokkaido Pref., Nukabira, 6. vii. 1966, K. Kusigemati leg. (KU); 1F, Hokkaido Pref., Jozankei, 25. vi. 1964, K. Kusigemati leg. (KU); 2F, Hokkaido Pref., Soranuma, 3. vii. 1964, K. Kusigemati leg. (KU); 1F, Ishikawa Pref., Mt. Hakusan, 1300-1500m alt., 4. vii. 1993, I. Togashi leg. (NIAES); 1F, Nagano Pref., Shiga, J. Yoshioka leg. (NSMT); 1F, Yamanashi Pref., Masutomi, 8. vii. 1967, H. Takizawa leg. (KU); 1F, Yamanashi Pref., Nirasaki City, Sawaraike, 11. vii. 1996, T. Tachi leg. (ONMH); 1F, Yamanashi Pref., Hokuto City, Masutomi, Biwakubo-sawa, 28. vii. 2007, K. Watanabe leg. (KPMNH); 1F, Shizuoka Pref., Shizuoka City, Mt. Yamabushi (= Yanbushi?), 6. vii. 1996, T. Tachi leg. (OMNH).

**Distribution** (Fig. 1040). Japan (Hokkaido and Honshu).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the collector of types, Prof. Kazuhiko Konishi of Ehime University, who is the great leader of Japanese ichneumonologists and has contributed to the taxonomic and applied entomology in Asia.

**Remarks.** This species is very similar to a Nearctic species, *G. severa* Dasch, 1888, but it can be distinguished by the ovipositor sheath 2.2–2.5 times as long as hind tibia (2.6–2.7 in *G. severa*) and the white basal area of TS1-TS3 ca. basal 0.1 of each segment (at least basal 0.3 of each segment in *G. severa*). The distribution ranges of *G. severa* (Dasch, 1988) and *G. konishii* are in the almost same latitude, showing a

disjunctive distribution between Nearctic and Eastern Palaearctic regions. This species also resembles *G. incisa* and *G. japnica* in the colouration of hind leg and the large and slender body, but it can be distinguished by the ovipositor sheath 0.8–1.0 times as long as fore wing (1.2 times in *G. incise* and 1.3–1.4 times in *G. japnica*).

***Glypta kuslitzkii* sp. nov.**

(Figs. 578, 609, 622, 625, 667, 729, 784, 948-950)

**Description. Female** (n=2). Body length 7.5–8.0 (HT: 8.0) mm.

Head 0.6 times as long as wide. Clypeus 0.7 times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 578), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.1 times as long as OOL. Mandible with a wide ventral flange by basal 0.8, its base flat (Fig. 609). Upper part of occipital carina incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 1.0 times as long as BWM. Antenna with 35–36 (HT: 36) flagellomeres. F1 1.6 times as long as F2.

Mesosoma. Pronotum densely punctate excluding longitudinal striation on postero-ventral area, with a weak epomia. Mesopleuron with a small speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum partly present (Fig. 667). Anterior transverse carina of propodeum complete excluding median section trace-like or absent (Fig. 667). Posterior transverse carina of propodeum complete (Fig. 667). Areae externa and dentipara of propodeum clearly separated by a complete carina (Fig. 667). Fore wing length 6.5–7.0 (HT: 7.0) mm. Fore coxa curved to outward, without a convexity above socket of trochanter (Fig. 622). Hind femur 5.0 times as long as maximum depth in lateral view. Hind TS1 2.1 times as long as TS2. Hind tarsal claw longer than arolium (Fig. 625).

Metasoma. T1 punctate (Fig. 950), 0.9–1.0 (HT: 0.9) times as long as maximum width, its median dorsal carina present on basal ca. 0.6 of tergite (Fig. 729). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Figs. 729, 948). T2 0.7 times as long as maximum width. Ovipositor sheath 0.7 times as long as fore wing, 1.9 times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 784).

Colouration (Figs. 948-950). Body (excluding wings and legs) black, except for: apical part of clypeus, mandible, axillae, part of metasomal tergites and subgenital

plate tinged with reddish-brown; palpi yellowish-brown; postero-dorsal corner of pronotum, tegula and membranous parts of sternites yellow; flagellum, posterior margin of each metasomal tergite and ovipositor reddish-brown to yellowish-brown. Wings hyaline; veins and pterostigma brown to yellowish-brown except for yellow wing base. Fore and mid legs reddish-yellow to whitish-yellow. Hind coxa reddish-yellow. Hind trochanter and trochantellus yellow, basal part of former more or less darkened. Hind femur reddish-yellow, its apical part tinged with black in paratype. Hind tibia whitish-yellow to yellowish-brown excluding blackish-brown subbasal band and apical part blackish-brown to black. Hind tibial spurs whitish-yellow. Hind tarsus blackish-brown to black excluding basal whitish-yellow area of TS1-TS5 (but indistinct in TS5). Basal yellow area of TS1 ca. 0.6 length of TS1.

**Male.** Unknown.

**Specimens examined.** JAPAN: [Holotype] F, Fukui Pref., Nanjo gun, Kono, 18. vi. 1991, Y. Sugie leg. (NIAES); 1F, same data as holotype except for M. Hashimoto leg. (NIAES).

**Distribution** (Fig. 1040). Japan (Honshu).

**Bionomics.** Unknown.

**Etymology.** This species is named after Dr. V. S. Kuslitzky, who has contributed to the classification of Banchinae with excellent observation and to the faunal knowledge of ichneumonids in Far East Asia.

**Remarks.** This species resembles *G. rufa* in the mandible with a wide ventral flange and the fore coxa curved outward, but it can be easily distinguished by the clypeus without median notch (with a notch in *G. rufa*). This species also resembles *G. akahige*, but it can be easily distinguished by the both lateral sides of T1 without convexity just after the base of median dorsal carina (with convexity just after the base of median dorsal carina in *G. akahige*).

***Glypta kyushuensis* sp. nov.**

(Figs. 12, 13, 579, 668-671, 730, 785, 786, 951-955)

**Description. Female** (n=44). Body length 6.0–8.5 (HT: 7.0) mm.

Head 0.6–0.7 (HT: 0.7) times as long as wide. Clypeus 0.6–0.7 (HT: 0.6) times as long as wide, its apex without a small median notch. Face strongly convex medially (Fig. 579), 0.5 times as long as wide. Frons densely punctate with weak transverse crease and narrow smooth area above antennal socket, with a pair of longitudinal creases between each antennal socket. POL 0.7–1.0 (HT: 1.0) times as long as OOL.

Mandible without ventral flange, with slightly convex base. Upper part of occipital carina incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.9–1.0 (HT: 1.0) times as long as BWM. Antenna with 32–34 (HT: 34) flagellomeres. F1 1.5–1.7 (HT: 1.6) times as long as F2.

Mesosoma. Pronotum entirely punctate excluding small ventral smooth area, with a weak epomia. Mesopleuron with a small speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum partly present (Figs. 668–671). Anterior transverse carina of propodeum present, its median section sometimes absent (Figs. 668–671). Posterior transverse carina of propodeum complete (Figs. 668–671). Areae externa and dentipara of propodeum clearly separated by a complete carina (Figs. 668–671). Fore wing length 5.0–6.5 (HT: 5.5) mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 5.1–5.7 (HT: 5.2) times as long as maximum depth in lateral view. Hind TS1 2.1–2.3 (HT: 2.1) times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 densely punctate (Figs. 954, 955), 1.2–1.3 (HT: 1.2) times as long as maximum width, its median dorsal carina present on basal ca. 0.5 of tergite (Fig. 730). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 730). T2 0.8–1.0 (HT: 0.9) times as long as maximum width. Punctures on T1–T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 0.7–0.8 (HT: 0.7) times as long as fore wing, 2.0–2.1 (HT: 2.0) times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Figs. 785, 786).

Colouration (Figs. 951–955). Body (excluding wings and legs) black, except for: apical part of clypeus, mandible excluding base and apex, posterior margin of each metasomal tergites and subgenital plate reddish-brown; palpi, axillae, postero-dorsal and postero-ventral corners of pronotum, tegula and membranous parts of sternites yellow to whitish-yellow; flagellum blackish-brown; ovipositor reddish-brown to yellowish-brown. Wings hyaline; veins and pterostigma brown to yellowish-brown except for yellow wing base. Fore and mid legs reddish-yellow excluding coxae to basal part of femur whitish-yellow. Hind coxa reddish-yellow with yellow to whitish-yellow dorsal area. Hind trochanter and trochantellus yellow to whitish-yellow, partly narrowly tinged with brown. Hind femur reddish-yellow excluding black apical part, sometimes its base narrowly tinged with black or apical black area reduced. Hind tibia whitish-yellow excluding apical black area, sometimes indistinct black subbasal band present, and sometimes outer ventral surfaces also tinged with black. Hind tibial spurs

whitish-yellow. Hind tarsus blackish-brown to black excluding basal whitish-yellow area of TS1-TS2 (but indistinct in TS2). Basal yellow area of TS1 ca. 0.1 length of TS1.

**Specimens examined.** JAPAN: [Holotype] F, Miyazaki Pref., Ebino City, Kuruson-kyo, 22. v. 1982, K. Konishi leg. (NIAES). [Paratypes] 1F, Hokkaido Pref., Sapporo, 13. vii. 1964, K. Kusigemati leg. (KU); 4F, same data as holotype (KU); 1F, same locality and collector, 27. viii. 1965 (KU); 1F, same locality and collector, 11. vii. 1967 (KU); 1F, same locality and collector, 23. vii. 1968 (KU); 1F, same locality, 24. vii. 1964, H. Takada leg. (KU); 1F, same locality, H. Tokikura leg. (KU); 1F, Hokkaido Pref., Mt. Daisetsu, 30. vii. 1967 K. Kusigemati leg. (KU); 1F, Hokkaido Pref., Horonobe, 30. vii. 1966, M. Miyazaki leg. (KU); 1F, Hokkaido Pref., Mt. Soranuma, 27. vii. 1965, K. Kusigemati leg. (KU); 1F, Hokkaido Pref., Yukomanbetsu, 29. vii. 1967, M. Miyazaki leg. (KU); 1F, Hokkaido Pref., Sapporo City, Kannonzawa, 27. iv. 1996, Y. Sakamaki leg. (em. from *Olethreutes siderana* on *Rubus idaeus melanolasius*) (OMNH); 1F, Hokkaido Pref., Oketo Vil., Oketo-rindo, 26. vii. 1997, R. Matsumoto leg. (OMNH); 1F, same locality and collector, 6. viii. 1997, R. Matsumoto leg. (OMNH); 1F, Tochigi Pref., Nikko City, Tamozawa, 25. viii.-5. ix. 2008 (MsT) (TPM); 1F, Tokyo Pref., Mt. Takao-san, 30. viii. 2602 (=1942), J. Yoshioka leg. (NSMT); 1F, Kofutsu (= Tokyo Pref., Kobotoke?), 25. vi. 2613 (= 1953?), J. Yoshioka leg. (NSMT); 1F, Yamanashi Pref., Ashiyasu Vil., Kitasawa-toge, 20. vii. 1997, R. Matsumoto leg. (OMNH); 1F, Aichi Pref., Asahi, Yawata, 650m alt., 19-26. v. 1998, M. Ozawa leg. (MsT) (MU); 1F, Kyoto Pref., Sasari-pass, 16. vii. 1989, H. Ohishi leg. (OMNH); 1F, Osaka Pref. (= Okayama Pref.), Nishiawakura Vil., Ogaya, 10. vii. 1999, R. Matsumoto leg. (OMNH); 1F, Osaka Pref., Kaizuka City, Izumi-Katsuragisan, 16. viii. 1999, R. Matsumoto leg. (OMNH); 1F, Hyogo Pref., Haga Town, Akazai-keikoku, 23. vi. 1984, K. Konishi leg. (NIAES); 2F, Tottori Pref., Daisen Town, Daisen, 8. vii. 1994, R. Matsumoto leg. (OMNH); 1F, Okayama Pref., Kamisaibara Town, Onbara, 3. vii. 1997, R. Matsumoto leg. (OMNH); 1F, Hiroshima Pref., Geihoku Town, Kakezuyama, 17. vii. 1998, R. Matsumoto leg. (OMNH); 1F, Fukuoka Pref., Mt. Hiko, 2-3. xi. 1979, H. Takemoto leg. (NIAES); 2F, Fukuoka Pref., Fukuoka City, Onigahara, 1. vi. 1994, R. Matsumoto leg. (OMNH); 1F, Fukuoka Pref., Fukuoka City, Nokonoshima, 20. x. 1996, R. Matsumoto leg. (OMNH); 1F, Fukuoka Pref., Wakamiya Town, Innakiyama, 28. v. 1994, R. Matsumoto leg. (OMNH); 1F, Fukuoka and Oita Pref., Mt. Hikosan, 17. v. 1967, H. Suwa leg. (KU); 2F, same data as holotype except for H. Takemoto leg. (NIAES); 1F, Oita Pref., Mts. Kuju, Mt. Kurodake, 18. v. 1982, H. Takemoto leg. (NIAES); 1F, Kumamoto Pref., Izumi Vil., Yamaingiri, 17. vii. 1994, R. Matsumoto leg. (OMNH); 1F, Kumamoto Pref., Izumi Vil., Momiki, 18. vii. 1994, R. Matsumoto leg. (OMNH); 1F,

Kagoshima Pref., Mt. Kurinodake, 10. vii. 1969, N. Sakane leg. (KU); 1F, no legible data (OMNH).

**Distribution** (Fig. 1041). Japan (Hokkaido, Honshu and Kyushu).

**Bionomics.** A tortricid moth, *Olethreutes siderana* (Treitschke), is recorded here as a host.

**Etymology.** The specific name is from the type locality, Kyushu.

**Remarks.** In the specimens collected from Hokkaido, the longitudinal striation of T1 is stronger than in the specimens from Honshu and Kyushu. This species resembles *G. media* in the colouration of hind leg, but it can be distinguished by the body without dense punctures (covered with dense punctures in *G. media*) and the clypeus and mandible at most tinged with reddish-yellow (each with a conspicuous pale yellow area in *G. media*). This species also resembles *G. aichiensis* in the body colouration, but it can be distinguished by several characters (see Remarks of *G. aichiensis*).

***Glypta makiharai* sp. nov.**

(Figs. 580, 672, 731, 787, 956-958)

**Description. Female** (n=36). Body length 6.5–7.5 (HT: 7.0) mm.

Head 0.6–0.7 (HT: 0.7) times as long as wide. Clypeus 0.6–0.7 (HT: 0.7) times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 580), 0.6 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 0.8–1.0 (HT: 0.8) times as long as OOL. Mandible with a narrow ventral flange, its base slightly convex or flat (HT: slightly convex). Upper part of occipital carina narrowly incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena strongly narrower than dorsal part, its minimum length of ca. 0.5 times as long as maximum width of gena. MSL 0.9–1.0 (HT: 1.0) times as long as BWM. Antenna with 38–40 (HT: 39) flagellomeres. F1 1.8 times as long as F2.

Mesosoma. Pronotum punctate dorsally, sparsely punctate ventrally with large smooth area, with a weak epomia. Mesopleuron with a large speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum absent (Fig. 672). Anterior transverse carina of propodeum absent (Fig. 672). Posterior transverse carina of propodeum complete (Fig. 672). Areae externa and dentipara of propodeum completely united into single area (Fig. 672). Fore wing length 5.5–6.5 (HT: 6.0) mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur

5.2–6.0 (HT: 5.2) times as long as maximum depth in lateral view. Hind TS1 2.4–2.5 (HT: 2.5) times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 densely punctate (Fig. 958), 1.3–1.5 (HT: 1.5) times as long as maximum width, its median dorsal carina present on basal ca. 0.5 of tergite (Fig. 731). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 731). T2 1.0–1.1 (HT: 1.0) times as long as maximum width. Punctures on T1-T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 0.7–0.8 (HT: 0.8) times as long as fore wing, 2.0 times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 787).

Colouration (Figs. 956-958). Body (excluding wings and legs) black, except for: apical half of clypeus, mandible excluding reddish-brown apex and black base, palpi, ventral surface of pedicel, postero-dorsal corner of pronotum, tegula, axillae, membranous parts of sternites and posterior part of subgenital plate yellow to whitish-yellow; antenna blackish-brown, ventral surface of flagellum more or less tinged with reddish-brown; subgenital plate excluding posterior part and ovipositor reddish-brown; posterior margin of each metasomal tergite slightly narrowly tinged with reddish-brown. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Fore and mid legs reddish-yellow excluding whitish-yellow coxae, trochanters and trochantelli. Hind coxa reddish-yellow, sometimes its dorsal surface paler than ventral surface. Hind trochanter and trochantellus whitish-yellow. Hind femur reddish-yellow, its apical part blackish-brown with whitish-yellow apex, and its base sometimes tinged with blackish-brown. Hind tibia reddish-brown excluding whitish-yellow base and blackish-brown to black subbasal band and apical part, sometimes reddish-brown part darkened. Hind tibial spurs whitish-yellow. Hind tarsus blackish-brown to black excluding basal whitish-yellow area of TS1-TS3. Basal yellow area of TS1 0.2–0.3 (HT: 0.3) length of TS1 but its border sometimes indistinct.

**Male.** Unknown.

**Specimens examined.** JAPAN: [Holotype] F, Hokkaido Pref., Sapporo City, Kannon-zawa, stream side (GPS: N 42-56/ E 141-15), 7. viii.-13. ix. 2002, T. Yoshida leg. (MsT) (KPMNH). [Paratypes] 1F, Hokkaido Pref., Goshiki, 14. vii. 2620 (= 1960?), J. Yoshioka leg. (NSMT); 1F, Hokkaido Pref., Uryu, 21. vii. 1964, K. Kusigemati leg. (KU); 2F, Hokkaido Pref., Rausu, 19. viii. 1968, H. Torikura leg. (KU); 1F, Hokkaido Pref., Mt. Soranuma, 30. viii. 1967, K. Kusigemati leg. (KU); 1F, Hokkaido Pref., Sapporo City, Jozankei, 21-29. viii. 1989, K. Maeto and M. Sharkey leg. (MsT) (NIAES); 3F, same locality and collector, 29. viii.-12. ix. 1989 (MsT) (NIAES); 1F, same locality and collector, 12-21. ix. 1989 (MsT) (NIAES); 1F, Hokkaido Pref.,

Kumaishi, Kenichi-gawa, Iwafuchi-zawa, 21-29. ix. 1995, Y. Ito and T. Ito leg. (MsT) (NIAES); 4F, sama data as holotype (KPMNH); 1F, Hokkaido Pref., Akkeshi Town, Bekanbeushi marsh, 30. vii. 2003, R. Matsumoto leg. (OMNH); 1F, same locality and collector, 1–31. viii. 2003 (MsT) (OMNH); 1F, Fukushima Pref., Hinoemata Vil., Mikawa, 1-14. viii. 2004, H. Makihara leg. (MsT) (TPM); 4F, same locality and collector, 4. ix. 2004 (MsT) (TPM); 11F, same locality and collector, 8. x. 2004 (MsT) (TPM); 1F, Tochigi Pref., Kuriyama Vil., Kinunuma, 4. ix. 2004, H. Makihara leg. (MsT.); 1F, Kagoshima Pref., Takachihono-mine, 27. vii. 1973, K. Kusigemati leg. (KU).

**Distribution** (Fig. 1041). Japan (Hokkaido, Honshu and Kyushu).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the collector of types, Mr. Hiroshi Makihara, who is known as an excellent collector of insects and has contributed to the taxonomy of Japanese Coleoptera.

**Remarks.** This species resembles *G. tuta* Kuslitzky, 1976, from Russian Far East in the lower part of gena strongly narrower than dorsal part, but it can be distinguished by the scutellum without yellow stripes (with a pair of yellow stripes in *G. tuta*) and the ovipositor sheath 0.7–0.8 times as long as fore wing (1.0 times in *G. tuta*). This species also resembles *G. kyushuensis* and *G. yamato* in the slender and small body, but it can be easily distinguished by the narrow lower part of gena (see the key above).

***Glypta mame* sp. nov.**

(Figs. 581, 612, 673, 732, 788, 959-961)

**Description. Female** (n=5). Body length 4.5–5.5 (HT: 4.5) mm.

Head 0.6 times as long as wide. Clypeus 0.6 times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 581), 0.6 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 0.9–1.0 (HT: 1.0) times as long as OOL. Mandible flat basally, with a narrow ventral flange. Upper part of occipital carina incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 1.0–1.1 (HT: 1.1) times as long as BWM. Antenna with 23–24 (HT: 24) flagellomeres. F1 1.6–1.7 (HT: 1.6) times as long as F2.

Mesosoma. Pronotum entirely densely punctate, with weak epomia (Fig. 612). Mesopleuron densely punctate, with small smooth area around episternal scrobe.



Metapleuron densely punctate. Lateral longitudinal carina of propodeum absent (Fig. 673). Anterior transverse carina of propodeum absent (Fig. 673). Posterior transverse carina of propodeum partly obsolete medially (Fig. 673). Areae externa and dentipara of propodeum completely united into single area (Fig. 673). Fore wing length 3.5–4.0 (HT: 3.5) mm. Fore coxa not curved to outward, slightly convex above socket of trochanter. Hind femur 4.1–4.4 (HT: 4.4) times as long as maximum depth in lateral view. Hind TS1 2.2 times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 punctate (Fig. 961), 1.2 times as long as maximum width, its median dorsal carina present on basal ca. 0.2 of tergite (Fig. 732). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 732). T2 0.7–0.8 (HT: 0.8) times as long as maximum width. Punctures on T2–T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 0.4 times as long as fore wing, 1.0–1.1 (HT: 1.1) times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 788). Subapical notch of ovipositor always shallow and small (Fig. 788).

Colouration (Figs. 959–961). Body (excluding wings and legs) black, except for: clypeus, mandible excluding apex, palpi, postero-dorsal corner of pronotum, tegula and membranous parts of metasomal sternite whitish-yellow to yellowish-brown; scape, pedicel basal part of flagellum, posterior margin of T1–T3 and ovipositor reddish-brown; apical part of flagellum reddish-brown; mesosoma and metasoma sometimes partly slightly tinged with red. Wings hyaline; veins and pterostigma yellowish-brown except for yellow wing base. Fore and mid leg whitish-yellow to reddish-yellow. Hind coxa reddish-yellow with whitish-yellow dorsal area. Hind trochanter and trochantellus whitish-yellow. Hind femur reddish-yellow, its apical part slightly tinged with black. Hind tibia whitish-yellow with subbasal and apical blackish-brown to black area. Hind tibial spurs whitish-yellow. Hind tarsus blackish-brown to black excluding basal whitish-yellow area of TS1–TS4 (indistinct in TS4). Basal yellow area of TS1 ca. 0.9 length of TS1.

**Male.** Unknown.

**Specimens examined.** JAPAN: [Holotype] F, Yamanashi Pref., Hokuto City, Masutomi, Biwakubo-sawa, 28. vii. 2007, K. Watanabe leg. (KPMNH). [Paratypes] 1F, Hokkaido Pref., Sapporo, 12. viii. 1967 (KU); 1F, Hokkaido Pref., Kumaishi, Kenichi-gawa, Iwafuchi-zawa, 10–21. viii. 1995, Y. Ito and T. Ito leg. (MsT) (NIAES); 2F, Shiga Pref., Kinomoto Town, Mt. Hassotoge, about 1000m alt., 18–21. v. 1993, Y. S. Bae leg. (Host: *Pseudogyrotoza diticinctana*) (NIAES).

**Distribution** (Fig. 1042). Japan (Honshu).

**Bionomics.** A tortricid moth, *Dicanticinta diticinctana* (Walsingham) (= *Pseudogyrotoza diticinctana*), is recorded here as a host.

**Etymology.** The specific name is from the Japanese word, “mame” (= bean), which means small in size.

**Remarks.** This species resembles *G. breviterebra* in the short ovipositor, the body with dense punctures, and the shallow and narrow ovipositor sheath, but it can be distinguished by the antenna with 23–24 flagellomeres (26–28 in *G. breviterebra*), the posterior transverse carina of propodeum always obscured medially (usually complete in *G. breviterebra*), and the median dorsal carina of T1 present on ca. basal 0.2 of tergite (ca. basal 0.5 in *G. breviterebra*).

***Glypta matsumotoi* sp. nov.**

(Figs. 582, 614, 674, 733, 789, 962–964)

**Description. Female** (n=24). Body length 6.0–6.5 (HT: 6.5) mm.

Head 0.6 times as long as wide. Clypeus 0.6 times as long as wide, its apex without a small median notch. Face strongly convex medially (Fig. 582), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket, its area before median ocellus slightly convex. POL 1.0–1.3 (HT: 1.0) times as long as OOL. Mandible flat basally, with a narrow ventral flange. Upper part of occipital carina incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.7–0.8 (HT: 0.8) times as long as BWM. Antenna with 29–31 (HT: 29) flagellomeres. F1 1.5 times as long as F2.

Mesosoma. Pronotum entirely punctate, with a weak epomia. Mesopleuron with a large speculum. Metapleuron punctate, its area along ventral margin with longitudinal rugae (Fig. 614). Lateral longitudinal carina of propodeum partly present (Figs. 614, 674). Anterior transverse carina of propodeum complete (Fig. 674). Posterior transverse carina of propodeum complete (Fig. 674). Areae externa and dentipara of propodeum clearly separated by a complete carina (Fig. 674). Fore wing length 5.0–6.0 (HT: 6.0) mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 5.2–5.4 (HT: 5.4) times as long as maximum depth in lateral view. Hind TS1 2.0 times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 punctate (Fig. 964), 1.1–1.2 (HT: 1.1) times as long as maximum width, its median dorsal carina present on basal ca. 0.6 of tergite (Fig. 733).

Both lateral sides of T1 with a convexity just after the base of median dorsal carina (Fig. 733). T2 0.7–0.8 (HT: 0.8) times as long as maximum width. Punctures on T1–T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 1.4–1.5 (HT: 1.4) times as long as fore wing, 4.2–4.3 (HT: 4.2) times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 789).

Colouration (Figs. 962–964). Body (excluding wings and legs) black, except for: apical part of clypeus, apex of mandible, subgenital plate excluding yellowish-brown posterior margin and ovipositor reddish-brown; palpi, postero-dorsal corner of pronotum, tegula, axillae and membranous parts of sternites yellow to whitish-yellow; posterior margin of each metasomal tergite slightly and narrowly tinged with red. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Fore and mid legs reddish-yellow excluding whitish-yellow coxae, trochanters and trochantelli. Hind coxa reddish-yellow. Hind trochanter and trochantellus whitish-yellow. Hind femur reddish-yellow, its apical part tinged with blackish-brown with whitish-yellow apex. Hind tibia whitish-yellow excluding blackish-brown to black subbasal band and apical part. Hind tibial spurs whitish-yellow. Hind tarsus blackish-brown to black excluding basal whitish-yellow area of TS1–TS4 (but indistinct in TS4). Basal yellow area of TS1 0.5 length of TS1 but its border sometimes indistinct.

**Male.** Unknown.

**Specimens examined.** JAPAN: [Holotype] F, Kumamoto Pref., Izumi Vil., Mt. Shiratori-yama, 18. ix. 1980, K. Ohara leg. (NIAES). [Paratype] 1F, Ehime Pref., Mt. Odamiyama, Odamiyamakeikoku, 21. ix. 1994, E. Yamamoto leg. (NIAES); 1F, same data, 18. ix. 1980, H. Takemoto leg. (NIAES); 5F, Oita Pref., Shonai t., Asono, 4. x. 1996, R. Matsumoto leg. (OMNH); 6F, same locality and collector, 5. x. 1996 (OMNH); 10F, same locality and collector, 10. x. 1996 (OMNH).

**Distribution** (Fig. 1042). Japan (Shikoku and Kyushu).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the collector of types, Mr. Rikio Matsumoto.

**Remarks.** This species resembles *G. mensurator* Fabricius, 1775, from Eurasia and *G. lugubrina* Holmgren, 1860, from Eurasia in the body colouration and the long ovipositor, but it can be distinguished by the ovipositor sheath 1.4–1.5 times as long as hind tibia (2.0 times in *G. mensurator* and 1.3–1.4 times in *G. lugubrina*), the metasomal tergite without red area (with a red area in *G. mensurator*), and the body length 6.0–6.5 mm (more than 8.0 mm in *G. lugubrina*).

*Glypta media* Momoi, 1963

(Figs. 4, 583, 615, 616, 675, 676, 734, 790, 965-967)

*Glypta media* Momoi, 1963: 116; Nakaya, 2009.

**Description. Female** (n=7). Body length 7.5–8.0 mm.

Head 0.6–0.7 times as long as wide. Clypeus 0.6 times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 583), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.0 times as long as OOL. Mandible with a narrow ventral flange, its base flat to slightly convex. Upper part of occipital carina incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.8 times as long as BWM. Antenna with 29–31 flagellomeres. F1 1.5–1.7 times as long as F2.

Mesosoma. Pronotum entirely densely punctate, with a weak epomia. Mesopleuron with a small speculum. Metapleuron densely punctate. Lateral longitudinal carina of propodeum absent (Figs. 675, 676). Anterior transverse carina of propodeum absent (Figs. 675, 676). Posterior transverse carina of propodeum complete (Figs. 675, 676). Areae externa and dentipara of propodeum completely united into single area (Figs. 675, 676). Fore wing length 6.0–6.5 mm. Fore coxa not curved to outward, slightly convex above socket of trochanter (Fig. 616). Hind femur 4.6–5.4 times as long as maximum depth in lateral view. Hind TS1 2.4–2.5 times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 densely punctate (Fig. 967), 1.2–1.3 times as long as maximum width, its median dorsal carina present on basal ca. 0.5 of tergite (Fig. 734). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 734). T2 0.8–0.9 times as long as maximum width. Punctures on T1-T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 0.8–0.9 times as long as fore wing, 2.0–2.3 times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 790).

Colouration (Figs. 965-967). Body (excluding wings and legs) black, except for: clypeus, mandible excluding brown apex, palpi, axillae, dorsal margin and postero-ventral corners of pronotum, tegula, subalar prominence, membranous parts of sternites and posterior margin of subgenital plate yellow to whitish-yellow; posterior

margin of each metasomal tergites and subgenital plate excluding posterior margin reddish-brown; flagellum blackish-brown, pedicel and ventral surface of flagellum tinged with reddish-brown; ovipositor reddish-brown to yellowish-brown. Wings hyaline; veins and pterostigma yellowish-brown except for yellow wing base. Fore and mid legs reddish-yellow excluding coxae, trochanters and trochantelli whitish-yellow. Hind coxa reddish-yellow with yellow to whitish-yellow dorsal area. Hind trochanter and trochantellus yellowish-brown to reddish-yellow. Hind femur reddish-yellow excluding blackish-brown apical part. Hind tibia reddish-yellow excluding white base and blackish-brown to black subbasal band and apical part. Hind tibial spurs yellowish-brown. Hind tarsus blackish-brown to black excluding basal whitish-yellow area of TS1-TS3 and sometimes TS4 (but indistinct in TS2-TS4). Basal yellow area of TS1 ca. 0.1 length of TS1.

**Male.** Unknown.

**Specimens examined.** JAPAN: 1F (holotype), Hokkaido Pref., Sapporo, 7. vii. 1952, T. Tomioka leg. (MNHAH); 3F, Hokkaido Pref., Teine, 15. vi. 1961, T. Kumata leg. (Host: Tortricid on *Salix* sp.) (KU); 1F, Hokkaido Pref., Touya, 9. vii. 1967, K. Kusigemati leg. (KU); 1F, same locality and collector, 10. vii. 1967 (KU); 1F, Hokkaido Pref., Kumaishi, Kenichi-gawa, Iwafuchi-zawa, 1-11. ix. 1995, Y. Ito and T. Ito leg. (MsT) (NIAES).

**Distribution** (Fig. 1042). Japan (Hokkaido and Honshu); Russian Far East. Nakaya (2009) reported this species from Iwate and Gunma Prefectures (Honshu).

**Bionomics.** Two tortricids, *Olethreutes moderatus* (Falkovitsh) and *Spilonota* sp., were recorded as hosts (Nakaya, 2009).

**Remarks.** The dense punctures of body and the more or less reduced propodeal carinae suggest that this species is closely related to *G. breviterebra*.

*Glypta momoi* Kuslitzky, 2007

(Figs. 584, 677, 735, 791, 828, 829, 836-838, 968-970)

*Glypta annulata* Momoi, 1970: 369. Name preoccupied by Bridgeman (1890).

*Glypta (Glypta) momoi* Kuslitzky, 2007: 445. New name.

**Description. Female** (n=3). Body length 7.5 mm.

Head 0.7 times as long as wide. Clypeus 0.6 times as long as wide, its apex without a small median notch. Face strongly convex medially (Fig. 584), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.3–1.4 times as

long as OOL. Mandible flat basally, with a narrow ventral flange. Upper part of occipital carina narrowly incomplete behind posterior ocelli, its dorsal end not down-curved, or apparently complete. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.7 times as long as BWM. Antenna with 31 flagellomeres. F1 1.3–1.4 times as long as F2.

Mesosoma. Pronotum entirely densely punctate, its ventral area partly covered with rugae, with a weak epomia. Mesopleuron with a small speculum. Metapleuron punctate, its area along ventral margin with rugae. Lateral longitudinal carina of propodeum partly present (Fig. 677). Anterior transverse carina of propodeum present on lateral section (Fig. 677). Posterior transverse carina of propodeum complete (Fig. 677). Areae externa and dentipara of propodeum clearly separated by a complete carina (Fig. 677). Fore wing length 6.5 mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 4.9–5.1 times as long as maximum depth in lateral view. Hind TS1 2.1–2.2 times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 densely punctate (Fig. 970), 1.1 times as long as maximum width, its median dorsal carina present on basal ca. 0.9 of tergite (Fig. 735). Both lateral sides of T1 with a convexity just after the base of median dorsal carina (Fig. 735). T2 0.7–0.8 times as long as maximum width. Punctures on T1–T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 1.3 times as long as fore wing, 3.5–3.7 times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 791).

Colouration (Figs. 968–970). Body (excluding wings and legs) black, except for: apical part of clypeus, apex of mandible, palpi, flagellum excluding base and dorsal surface, posterior margin of each metasomal tergite, subgenital plate and ovipositor reddish-brown; postero-dorsal corner of pronotum, tegula, axillae and membranous parts of sternites yellow to yellowish-brown. Wings hyaline; veins and pterostigma brown to yellowish-brown except for yellow wing base. Fore and mid legs reddish-yellow to yellow. Hind coxa reddish-yellow. Hind trochanter and trochantellus yellow, former more or less tinged with reddish-brown. Hind femur reddish-brown, its apical part blackish-brown with whitish-yellow apex. Hind tibia whitish-yellow to yellow excluding blackish-brown to black subbasal band and apical part. Hind tibial spurs yellow. Hind tarsus blackish-brown to black excluding basal whitish-yellow area of TS1–TS3. Basal yellow area of TS1 ca. 0.5 length of TS1 but its border indistinct.

**Male** (n=1). Similar to female. Body length 6.5 mm. F1 1.7 times as long as F2. Hind

basitarsus 2.0 times as long as second tarsal segment. Posterior margin of subgenital plate convex (Fig. 836). Apical margin of paramere roundly produced (Figs. 828, 829, 838). Dorsal margin of paramere without a convexity apically (Fig. 828, 838). Inner margin of paramere concave near basal inner angle (Fig. 828). Aedeagus weakly curved, its basal apodeme ca. 0.5 times total length of aedeagus (Fig. 837). Penis valve without a minute notch at posterior part of dorsal surface (Fig. 837). Basal margin of dorsal surface of penis valve not produced medially (Fig. 837).

**Specimens examined.** JAPAN: 1F (holotype), Okinawa Pref., Ryukyu, Okinoerabujima Is., 27. iii. 1964, H. Takada leg. (MNHAH); 2F, Okinawa Pref., Okinawa Is., 22. iii. 1953, T. Shiraki leg. (NIAES); 1M, same locality and collector, 24. iii. 1953 (NIAES).

**Distribution** (Fig. 1042). Japan (Okinawajima Is.\* and Okinoerabu Is.); Russian Far East.

**Bionomics.** Unknown.

**Remarks.** This species may be confused with *G. akahige* and *G. kuslitzkii*, but it can be easily distinguished by the median dorsal carina of T1 present on basal ca. 0.9 of the tergite (present on shorter than 0.7 of tergite in *G. akahige* and *G. kuslitzkii*). Although the Japanese specimens have reddish-yellow hind coxa, the Russian specimens have black hind coxa (Kuslitzky, 2007).

***Glypta niigatensis* sp. nov.**

(Figs. 585, 678, 736, 792, 971-973)

**Description. Female** (n=1). Body length 5.0 mm.

Head 0.7 times as long as wide. Clypeus 0.6 times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 585), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.0 times as long as OOL. Mandible slightly convex basally, with a narrow ventral flange. Upper part of occipital carina incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.8 times as long as BWM. Antenna with damaged flagellomeres, its apical part broken. F1 1.7 times as long as F2.

Mesosoma. Pronotum entirely punctate excluding small smooth area along collar, with a weak epomia. Mesopleuron with a small speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum absent (Fig. 678). Anterior transverse carina of propodeum absent (Fig. 678). Posterior transverse carina of propodeum complete

(Fig. 678). Areae externa and dentipara of propodeum completely united into single area (Fig. 678). Fore wing length 4.5 mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 6.1 times as long as maximum depth in lateral view. Hind TS1 2.1 times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 punctate (Fig. 973), 1.3 times as long as maximum width, its median dorsal carina present on basal ca. 0.4 of tergite (Fig. 736). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 736). T2 0.9 times as long as maximum width. Punctures on T1-T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 1.1 times as long as fore wing, 3.0 times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 792).

Colouration (Figs. 971-973). Body (excluding wings and legs) blackish-brown and partly tinged with reddish-brown (especially scutellum and metasoma: perhaps originated from teneral condition), except for: clypeus excluding dorsal part, mandible excluding apex and base, palpi, postero-dorsal corner of pronotum, tegula, axillae, membranous parts of sternites, posterior part of subgenital plate and ovipositor yellow to yellowish-brown; antenna reddish-brown. Wings hyaline; veins and pterostigma yellowish-brown except for yellow wing base. Legs reddish-brown to whitish-yellow, except for: subbasal band and apical part of hind tibia tinged with blackish-brown; hind tarsus blackish-brown each with a basal yellow area on TS1-TS3. Basal yellow areas of TS1 ca. 0.5 length of TS1 but its border indistinct.

**Male.** Unknown.

**Specimen examined.** JAPAN: [Holotype] F, Niigata Pref., Yuzawa Town, 5. vi. 1988, K. Konishi leg. (NIAES).

**Distribution** (Fig. 1042). Japan (Honshu).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the type locality, Niigata Prefecture.

**Remarks.** This species resembles *G. pedata* Desvignes, 1856, from Europe and *G. sankaku* in the body colouration, but it can be distinguished by the ovipositor sheath 1.1 times as long as hind tibia (0.8–0.9 times in *G. pedata* and *G. sankaku*).

***Glypta onaga* sp. nov.**

(Figs. 586, 679, 737, 793, 974-976)

**Description. Female** (n=1). Body length 8.0 mm.



Head 0.6 times as long as wide. Clypeus 0.5 times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 586), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.1 times as long as OOL. Mandible slightly convex basally, with a narrow ventral flange. Upper part of occipital carina incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 1.0 times as long as BWM. Antenna with damaged flagellomeres, its apical part broken. F1 1.8 times as long as F2.

Mesosoma. Pronotum entirely punctate excluding small smooth area along collar, with a weak epomia. Mesopleuron with a large speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum absent (Fig. 679). Anterior transverse carina of propodeum present only lateral section as trace-like carina (Fig. 679). Posterior transverse carina of propodeum complete (Fig. 679). Areae externa and dentipara of propodeum apparently united into single area (Fig. 679). Fore wing length 6.5 mm. Fore coxa slightly curved to outward, without a convexity above socket of trochanter. Hind femur 4.0 times as long as maximum depth in lateral view. Hind TS1 2.3 times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 densely punctate excluding a pair of smooth area posterior to end of median dorsal carina (Figs. 737, 976), 1.3 times as long as maximum width, its median dorsal carina present on basal ca. 0.5 of tergite (Fig. 737). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 737). T2 0.8 times as long as maximum width. Punctures on T1-T4 partly longitudinally or transversely striated by coalescent punctures. Ovipositor sheath 1.8 times as long as fore wing, 5.7 times as long as hind tibia. Apical part of upper valve of ovipositor with a distinct dorsal tubercle before subapical notch (Fig. 793).

Colouration (Figs. 974-976). Body (excluding wings and legs) black, except for: apical part of clypeus, palpi, apex of pedicel, ventral surface of flagellum, axillae, subgenital plate and ovipositor yellowish-brown; postero-dorsal corner of pronotum, tegula and membranous parts of sternites yellow to whitish-yellow; apex of mandible and posterior margin of T1-T3 tinged with red. Wings hyaline; veins and pterostigma yellowish-brown except for yellow wing base. Legs reddish-brown, except for: mid and hind coxa tinged with brown; base of hind tibia whitish-yellow; subbasal part of hind tibia slightly tinged with black; apical part of hind tibia and hind tarsus blackish-brown excluding whitish-yellow base of TS1. Basal whitish-yellow area of TS1 ca. 0.1 length of TS1.

**Male.** Unknown.

**Specimen examined.** JAPAN: [Holotype] F, Hokkaido Pref., Mt. Soranuma, 27. vii. 1965, K. Kusigemati leg. (KU).

**Distribution** (Fig. 1042). Japan (Hokkaido).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the Japanese word, “O” (= tail) plus “Naga” (= long), which means the long ovipositor.

**Remarks.** This species resembles *G. sculpturata* and *G. bifoveolata* in the slender body and the long ovipositor, but it can be distinguished by the ovipositor sheath 1.8 times as long as fore wing (1.3–1.7 times in *G. sculpturata* and *G. bifoveolata*) and the apex of hind tibia black (hind tibia entirely reddish-yellow in *G. sculpturata* and *G. bifoveolata*).

*Glypta pedata* Desvignes, 1856 (?)

(Figs. 587, 680, 681, 738, 794, 977-979)

*Glypta pedata* Desvignes, 1856: 74.

**Description. Female** (n=5). Body length 6.0–7.0 (HT: 7.0) mm.

Head 0.6–0.7 (HT: 0.6) times as long as wide. Clypeus 0.6–0.7 (HT: 0.6) times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 592), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.0–1.1 (HT: 1.1) times as long as OOL. Mandible slightly convex basally, with a narrow ventral flange. Upper part of occipital carina narrowly incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.8–0.9 (HT: 0.8) times as long as BWM. Antenna with 30–33 (HT: 33) flagellomeres. F1 1.6–1.7 (HT: 1.6) times as long as F2.

Mesosoma. Pronotum entirely punctate, with a weak epomia. Mesopleuron with a large speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum absent (Figs. 680, 681). Anterior transverse carina of propodeum sometimes present only lateral section as trace-like ridge (Figs. 680, 681). Posterior transverse carina of propodeum complete (Figs. 680, 681). Areae externa and dentipara of propodeum partly separated by trace-like carina or completely united into single area (HT: partly separated) (Figs. 680, 681). Fore wing length 4.5–5.5 (HT: 5.5) mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 5.0–5.8

(HT: 5.8) times as long as maximum depth in lateral view. Hind TS1 2.1 times as long as TS2. Hind tarsal claw longer than arolium.

**Metasoma.** T1 densely punctate (Fig. 979), 1.1 times as long as maximum width, its median dorsal carina present on basal ca. 0.5 of tergite (Fig. 738). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 738). T2 0.7–0.9 (HT: 0.7) times as long as maximum width. Punctures on T1–T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 0.9 times as long as fore wing, 2.6–2.8 (HT: 2.7) times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 794).

**Colouration** (Figs. 977–979). Body (excluding wings and legs) black, except for: apical part of clypeus, base of mandible, palpi, postero-dorsal corner of pronotum and tegula yellow to whitish-yellow; apical part of mandible tinged with dark reddish-brown; axillae and posterior part of subgenital plate tinged with dark yellowish-brown; membranous parts of sternites whitish-gray; ovipositor reddish-brown to yellowish-brown; posterior margin of each metasomal tergite slightly narrowly tinged with red. Wings hyaline; veins and pterostigma brown to yellowish-brown except for yellow wing base. Fore and mid legs reddish-yellow with whitish-yellow coxae, trochanters and trochanterelli, its mid tarsus tinged with brown apically. Hind coxa reddish-yellow, its dorsal surface usually paler than ventral surface. Hind trochanter and trochantellus yellowish-brown with small brown area. Hind femur reddish-yellow, its apical part with blackish-brown area with narrow white apex. Hind tibia whitish-yellow excluding blackish-brown to black subbasal band, apical part and ventral surface between subbasal band and apical part. Hind tibial spurs whitish-yellow. Hind tarsus blackish-brown to black each with a basal yellow area on TS1–TS3. Basal yellow areas of TS1 ca. 0.3 length of TS1.

**Male.** Unknown.

**Specimens examined.** JAPAN: 1F, Hokkaido Pref., Sapporo, 27. v. 1968, K. Kusigemati leg. (KU); 1F, Hokkaido Pref., Nopporo, 2. vi. 1968, M. Suwa leg. (KU); 1F, Aomori Pref., Ohwani Town, Akane-zawa, 11. vi. 1994, T. Ichita leg. (NIAES); 1F, Okayama Pref., Nimi City, Chiya-Ihara, 8. v. 2001, R. Matsumoto leg. (OMNH); 1F, Kochi Pref., Hongawa Vil., Kannarashi-ike, 13. vi. 2002, R. Matsumoto leg. (OMNH).

**Distribution** (Fig. 1038). Japan\* (Hokkaido, Honshu and Shikoku); widely distributed in Europe.

**Bionomics.** Unknown.

**Remarks.** This is the first record of this species from Japan. The Japanese specimens are apparently unseparable from European specimens in structure, but they can be

distinguished from European specimens by the clypeus and mandible each with a conspicuous yellow area (tinged with reddish-brown in European specimen of *G. pedata*). Therefore, more detail comparisons of European and Japanese specimens are necessary.

***Glypta rufata*** Bridgeman, 1887  
(Figs. 588, 682, 739, 795, 980-982)

*Glypta rufata* Bridgeman, 1887: 378.

**Description. Female** (n=13). Body length 4.5–6.5 mm.

Head 0.6 times as long as wide. Clypeus 0.6 times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 587), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.3–1.4 times as long as OOL. Mandible apparently without narrow ventral flange, with flat base. Upper part of occipital carina narrowly incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.7–0.8 times as long as BWM. Antenna with 31–33 flagellomeres. F1 1.5–1.6 times as long as F2.

Mesosoma. Pronotum entirely densely punctate, with small longitudinally striated area ventrally, with a weak epomia. Mesopleuron with a small speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum partly present (Fig. 682). Anterior transverse carina of propodeum present on lateral section (Fig. 682). Posterior transverse carina of propodeum complete (Fig. 682). Areae externa and dentipara of propodeum clearly separated by a complete carina (Fig. 682). Fore wing length 5.0–6.0 mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 4.6–5.2 times as long as maximum depth in lateral view. Hind TS1 2.0 times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 densely punctate (Fig. 982), 1.0 times as long as maximum width, its median dorsal carina present on basal ca. 0.5 of tergite (Fig. 738). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 738). T2 0.7–0.8 times as long as maximum width. Punctures on T1-T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 0.8–0.9 times as long as fore wing, 2.2–2.5 times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 795).

Colouration (Figs. 980-982). Body (excluding wings and legs) black, except for: apical part of clypeus and mandible excluding apex reddish-brown; antenna brown to blackish-brown, sometimes its ventral surface of pedicel and flagellum tinged with reddish-brown; palpi, postero-dorsal corner of pronotum, tegula, axillae and membranous parts of metasomal sternite whitish-yellow to yellowish-brown; T1-T3 and sometimes T4, subgenital plate and ovipositor reddish-brown to red, red area of tergites usually more or less tinged with black. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Fore and mid leg whitish-yellow to reddish-yellow. Hind coxa reddish-yellow. Hind trochanter and trochantellus yellow. Hind femur reddish-yellow, sometimes its apex narrowly tinged with black. Hind tibia yellow with subbasal and apical blackish-brown to black areas, its ventral surface sometimes slightly tinged with black. Hind tibial spurs yellow. Hind tarsus blackish-brown to black excluding basal yellow area of TS1-TS4 (but indistinct in TS4). Basal yellow area of TS1 ca. 0.6 length of TS1 but its border indistinct.

**Male.** No additional specimens available.

**Specimens examined.** JAPAN: 7F, Hokkaido Pref., Tomakomai City, Uenae, Utonai-ko, 5. viii. 2006, T. Yoshida leg. (KPMNH); 1F, Hokkaido Pref., Mt. Soranuma, 1. viii. 1968, K. Kushigemati leg. (KU); 1F, Hokkaido, Tomakomai City, Tomakomai, 31. vii. 1996, M. Sueyoshi leg. (OMNH); 1F, Hokkaido Pref, Toyotomi Town, 4. viii. 1996, T. Tachi leg. (OMNH); 1F, Hiroshima Pref., Geihoku Town, Kakezuyama, 17. vii. 1998, R. Matsumoto leg. (OMNH); 2F, Kumamoto Pref., Izumi Vil., Yamaingiri, 16–17. vii. 1994, R. Matsumoto leg. (OMNH).

**Distribution** (Fig. 1043). Japan\* (Hokkaido, Honshu and Kyushu); widely distributed in Eurasia.

**Bionomics.** Two hosts, *Homoeosoma* sp. [Pyralidae] in China (Sheng & Sun, 2010) and *Phalonidia manniana* (Fischer von Röslerstamm) [Tortricidae] in Europe (Bridgmann, 1887, 1889; Constantineau & Pisica, 1977), were recorded.

**Remarks.** This is the first record of this species from Japan. The red area of metasoma is often enlarged in the specimens collected from Honshu and Kyushu.

***Glypta sankaku* nom. nov.**

(Figs. 589, 683, 740, 796, 983-985)

*Glypta triangularis* Momoi, 1963: 115; Nakaya, 2009: 8. Name preoccupied by Schmiedeknecht (1935).

**Description. Female** (n=5). Body length 6.5–7.0 mm.

Head 0.6 times as long as wide. Clypeus 0.7 times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 588), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.0–1.1 times as long as OOL. Mandible slightly convex basally, with a narrow ventral flange. Upper part of occipital carina narrowly and slightly incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.8–0.9 times as long as BWM. Antenna with 34–36 flagellomeres. F1 1.6 times as long as F2.

Mesosoma. Pronotum entirely punctate, with a weak epomia. Mesopleuron with a large speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum absent (Fig. 683). Anterior transverse carina of propodeum absent (Fig. 683). Posterior transverse carina of propodeum complete (Fig. 683). Areae externa and dentipara of propodeum completely united into single area (Fig. 683). Fore wing length 5.0–5.5 mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 5.0–5.1 times as long as maximum depth in lateral view. Hind TS1 2.0–2.1 times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 punctate (Fig. 985), 1.1–1.2 times as long as maximum width, its median dorsal carina present on basal ca. 0.5 of tergite (Fig. 739). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 739). T2 0.6–0.7 times as long as maximum width. Posterior part of T1–T3 usually slightly concave. Ovipositor sheath 0.8–0.9 times as long as fore wing, 2.1 times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 796).

Colouration (Figs. 983–985). Body (excluding wings and legs) black, except for: clypeus excluding dorsal part, mandible excluding reddish-brown apex, palpi, postero-dorsal corner of pronotum, tegula and membranous parts of sternites yellow to whitish-yellow; apical part of flagellum sometimes tinged with reddish-brown; axillae, posterior margin of each metasomal tergite, posterior part of subgenital plate and ovipositor reddish-brown to yellowish-brown. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Fore and mid legs reddish-yellow excluding whitish-yellow trochanters and trochantelli. Hind coxa reddish-yellow. Hind trochanter and trochantellus whitish-yellow. Hind femur reddish-yellow, its apical part blackish-brown with whitish-yellow apex. Hind tibia whitish-yellow excluding blackish-brown to black subbasal band and apical part. Hind

tibial spurs whitish-yellow. Hind tarsus blackish-brown to black excluding basal whitish-yellow area of TS1-TS3. Basal yellow area of TS1 ca. 0.4 length of TS1 but its border indistinct.

**Male.** No additional specimens available.

**Specimens examined.** JAPAN: 1F (holotype), Hokkaido Pref., Daisetsu-zan, 22–26. vii. 1957, T. Uchida leg. (SEHU); 1F, Hokkaido Pref., Horonobe, Kamitoikan, Iwananosawa, 26. vi. – 12. vii. 1993, M. Inoue leg. (MsT) (NIAES); 1F, Hokkaido Pref., Mori Town, Oshironai river, 2. viii. – 8. viii. 1994, K. Takeuchi leg. (MsT) (NIAES); 1F, Kanagawa Pref., Mikuni-toge, 7. vi. 1970, H. Takizawa leg. (KU); 1F, Yamanashi Pref., Akaishi, 23. viii. 1937, Nagasawa leg. (NIAES).

**Distribution** (Fig. 1043). Japan (Hokkaido and Honshu).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the Japanese term, “Sankaku”, which means a triangle.

**Remarks.** The ovipositor of the holotype is damaged. Although the transverse impression(s) on metasomal tergites was an important character state for the identification of this species (Momoi, 1963), it occasionally appears in several other species (e.g., *G. konishii*, *G. japonica*, *G. murotai*) and this is intraspecifically varied. Therefore, this is not specific to *G. sankaku* and is not useful in identification.

### ***Glypta shibetsuensis* sp. nov.**

(Figs. 590, 684, 741, 797, 986-988)

**Description. Female** (n=1). Body length 6.0 mm.

Head 0.6 times as long as wide. Clypeus 0.6 times as long as wide, its apex without a small median notch. Face strongly convex medially (Fig. 589), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.3 times as long as OOL. Mandible flat basally, with a narrow ventral flange. Upper part of occipital carina incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.7 times as long as BWM. Antenna with 29 flagellomeres. F1 1.7 times as long as F2.

Mesosoma. Pronotum entirely punctate, with a weak epomia. Mesopleuron with a large speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum absent (Fig. 684). Anterior transverse carina of propodeum absent (Fig. 684). Posterior

transverse carina of propodeum complete (Fig. 684). Areae externa and dentipara of propodeum completely united into single area (Fig. 684). Fore wing length 5.0 mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 5.0 times as long as maximum depth in lateral view. Hind TS1 2.1 times as long as TS2. Hind tarsal claw longer than arolium.

**Metasoma.** T1 densely punctate (Fig. 988), 1.0 times as long as maximum width, its median dorsal carina present on basal ca. 0.6 of tergite (Fig. 740). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 740). T2 0.7 times as long as maximum width. Ovipositor sheath 1.2 times as long as fore wing, 3.7 times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 797).

**Colouration** (Figs. 986-988). Body (excluding wings and legs) black, except for: apical part of clypeus, apex of mandible, apical part of flagellum and pedicel reddish-brown; palpi, postero-dorsal corner of pronotum, tegula and membranous parts of sternites yellow to whitish-yellow; axillae, posterior margin of each metasomal tergite, posterior part of subgenital plate and ovipositor reddish-brown to yellowish-brown. Wings hyaline; veins and pterostigma yellowish-brown except for yellow wing base. Fore and mid legs reddish-yellow to reddish-brown excluding whitish-yellow trochanters, trochantelli and base of tibiae. Hind coxa reddish-brown. Hind trochanter and trochantellus whitish-yellow, former with reddish-brown spot. Hind femur reddish-brown, its apical part blackish-brown with whitish-yellow apex. Hind tibia whitish-yellow excluding white base and blackish-brown to black subbasal band and apical part. Hind tibial spurs whitish-yellow. Hind tarsus blackish-brown to black excluding basal whitish-yellow area of TS1-TS3. Basal yellow area of TS1 ca. 0.3 length of TS1 but its border indistinct.

**Male.** Unknown.

**Specimens examined.** JAPAN: [Holotype] F, Hokkaido Pref., Shibetsu Town, Motosakimui river, 13–23. viii. 1996, H. Kamei, T. Ito and A. Ohkawa leg. (NIAES).

**Distribution** (Fig. 1043). Japan (Hokkaido).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the type locality, Shibetsu Town.

**Remarks.** This species resembles *G. pedata* Desvignes, 1856, from Europe and *G. sankaku* in the body colouration, but it can be distinguished by the ovipositor sheath 1.2 times as long as hind tibia (0.8–0.9 times in *G. pedata* and *G. sankaku*).

***Glypta shimizui* sp. nov.**



(Figs. 591, 613, 685, 742, 798, 989-991)

**Description. Female** (n=1). Body length 6.0 mm.

Head 0.7 times as long as wide. Clypeus 0.6 times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 590), 0.7 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.2 times as long as OOL. Mandible flat basally, with a narrow ventral flange. Upper part of occipital carina incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.9 times as long as BWM. Antenna with 32 flagellomeres. F1 1.5 times as long as F2.

Mesosoma. Pronotum punctate dorsal 0.4, smooth ventral 0.6 with some shallow longitudinal wrinkles, with a weak epomia. Mesopleuron with a large speculum. Metapleuron punctate, its ventral area with a few transverse rugae. Lateral longitudinal carina of propodeum partly present (Fig. 685). Anterior transverse carina of propodeum present only lateral section (Fig. 685). Posterior transverse carina of propodeum complete, strongly raised at border of areas lateralis and densipara (Figs. 613, 685). Areae externa and dentipara of propodeum clearly separated by a complete carina (Fig. 685). Fore wing length 5.0 mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 5.0 times as long as maximum depth in lateral view. Hind TS1 2.0 times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 densely punctate (Fig. 991), 1.1 times as long as maximum width, its median dorsal carina present on basal ca. 0.6 of tergite (Fig. 741). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 741). T2 0.8 times as long as maximum width. Punctures on T1-T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 0.6 times as long as fore wing, 1.7 times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 798).

Colouration (Figs. 989-991). Body (excluding wings and legs) black, except for: apical part of clypeus and apical part of mandible reddish-brown; palpi, postero-dorsal corner of pronotum, tegula and membranous parts of sternites yellow to whitish-yellow; axillae, posterior margin of each metasomal tergite, subgenital plate and ovipositor reddish-brown to yellowish-brown. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Fore and mid legs whitish-yellow basally and reddish-brown apically. Hind coxa, trochanter and

trochantelli whitish-yellow excluding ventral reddish-brown spot of coxa. Hind femur reddish-brown, its dorsal surface whitish-yellow. Hind tibia whitish-yellow excluding blackish-brown to black subbasal band and apical part, subbasal black band small and absent in dorsal surface. Hind tibial spurs blackish-brown. Hind tarsus blackish-brown to black excluding basal whitish-yellow area of TS1. Basal yellow area of TS1 ca. 0.5 length of TS1 but its border indistinct.

**Male.** Unknown.

**Specimen examined.** JAPAN: [Holotype] F, Niigata Pref., Myoukou City, Suginosawa, Sasagamine (1300 m alt.), 7. viii. 2013, S. Shimizu leg. (KPMNH);

**Distribution** (Fig. 1043). Japan (Honshu).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the collector of holotype, Mr. Sou Shimizu, who is an excellent collector of ichneumonids.

**Remarks.** This species resembles *G. media* in the colouration of hind leg, but it can be distinguished by the body without dense punctures (covered with dense punctures in *G. media*) and the ovipositor sheath 0.6 times as long as fore wing (0.8–0.9 times in *G. media*). This species also resembles *G. aichiensis* and *G. kyushuensis* in the body colouration, but it can be distinguished by the ovipositor sheath 0.6 times as long as fore wing (0.7–0.8 times in *G. aichiensis* and *G. kyushuensis*) and the base of hind TS1 with a relatively large yellow area (at most with a small yellow area in *G. aichiensis* and *G. kyushuensis*).

### ***Glypta slenda* sp. nov.**

(Figs. 592, 687, 743, 799, 830, 831, 839-841, 992-994)

**Description. Female** (n=2). Body length 6.5 mm.

Head 0.7 times as long as wide. Clypeus 0.6 times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 591), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket, its area before median ocellus slightly convex. POL 1.0–1.1 (HT: 1.0) times as long as OOL. Mandible slightly convex basally, with a narrow ventral flange. Upper part of occipital carina incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 1.0 times as long as BWM. Antenna with 33–35 (HT: 33) flagellomeres. F1 1.8–1.9 (HT: 1.9) times as long as F2.

Mesosoma. Pronotum entirely densely punctate with small smooth area on collar, with a weak epomia. Mesopleuron with a large speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum absent (Fig. 686). Anterior transverse carina of propodeum absent (Fig. 686). Posterior transverse carina of propodeum complete (Fig. 686). Areae externa and dentipara of propodeum completely united into single area (Fig. 686). Fore wing length 5.0 mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 4.7–4.9 (HT: 4.9) times as long as maximum depth in lateral view. Hind TS1 2.1–2.2 (HT: 2.2) times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 densely punctate excluding its apex smooth area (Fig. 994), 1.4–1.5 (HT: 1.4) times as long as maximum width, its median dorsal carina present on basal ca. 0.4 of tergite (Fig. 742). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 742). T2 1.0–1.1 (HT: 1.0) times as long as maximum width. Ovipositor sheath 1.5–1.7 (HT: 1.7) times as long as fore wing, 4.3–4.7 (HT: 4.7) times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 799).

Colouration (Figs. 992-994). Body (excluding wings and legs) black, except for: apical part of clypeus dark reddish-brown; apex of pedicel, flagellum, subgenital plate and ovipositor reddish-brown to yellowish-brown; palpi, postero-dorsal corner of pronotum, tegula and membranous parts of sternites yellow to whitish-yellow; posterior margin of each metasomal tergite slightly and narrowly tinged with red. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Fore and mid legs reddish-yellow to reddish-brown. Hind coxa, trochanter and trochantellus reddish-brown (trochantellus more or less paler than two formers). Hind femur reddish-brown, its apical part tinged with blackish-brown. Hind tibia yellowish-brown excluding blackish-brown to black subbasal band and apical part (subbasal band weak in HT). Hind tibial spurs yellowish-brown. Hind tarsus blackish-brown to black excluding basal yellowish-brown area of TS1-TS3. Basal yellow area of TS1 ca. 0.8 length of TS1.

**Male** (n=2). Similar to female. Face 0.5–0.6 times as long as wide. MSL 0.7–0.8 times as long as BWM. Antenna with 36 flagellomeres. F1 1.4–1.5 times as long as F2. Hind basitarsus 1.9–2.0 times as long as second tarsal segment. Hind femur 5.4–5.5 times as long as maximum depth in lateral view. T2 1.1–1.3 times as long as maximum width. Posterior margin of subgenital plate slightly convex to nearly straight (Fig. 839). Apical margin of paramere roundly produced (Figs. 830, 831, 841). Dorsal margin of paramere with a convexity apically (Figs. 830, 841). Inner margin of paramere not concave near

basal inner angle (Fig. 830). Aedeagus weakly curved, its basal apodeme ca. 0.6 times total length of aedeagus (Fig. 840). Penis valve with a minute notch at posterior part of dorsal surface (Fig. 840). Basal margin of dorsal surface of penis valve not produced medially (Fig. 840).

**Material examined.** JAPAN: [Holotype] F, Hokkaido Pref., Sapporo, City, Nakayama-toge, 4. ix. 2003, T. Yoshida leg. (KPMNH). [Paratypes] 1F and 2M, Hokkaido Pref., Sapporo City, Haruka-yama, 4. ix. 2003, T. Yoshida leg. (KPMNH).

**Distribution** (Fig. 1043). Japan (Hokkaido).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the English word, slender.

**Remarks.** This species resembles *G. sculpturata* and *G. bifoveolata* in the slender body and the long ovipositor, but it can be distinguished by the hind tibia yellowish-brown with a conspicuous apical black area (entirely reddish-brown in *G. sculpturata* and *G. bifoveolata*), the hind tarsus blackish-brown to black with a basal yellowish-brown area (entirely reddish-brown in *G. sculpturata* and *G. bifoveolata*), and the body length shorter than 7.0 mm (more than 1.0 mm in *G. sculpturata*).

#### ***Glypta tomuraushiensis* sp. nov.**

(Figs. 593, 687, 744, 800, 995-997)

**Description. Female** (n=1). Body length 7.5 mm.

Head 0.6 times as long as wide. Clypeus 0.7 times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 593), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.3 times as long as OOL. Mandible slightly convex basally, with a narrow ventral flange. Upper part of occipital carina incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 1.0 times as long as BWM. Antenna with 34 flagellomeres. F1 1.5 times as long as F2.

Mesosoma. Pronotum entirely punctate excluding small smooth area along collar, with a weak epomia. Mesopleuron with a small speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum absent (Fig. 687). Anterior transverse carina of propodeum partly present on lateral section as trace-like ridge (Fig. 687). Posterior transverse carina of propodeum partly obsolete (Fig. 687). Areae externa and dentipara of propodeum apparently united into single area (Fig. 687). Fore wing length 6.0 mm.

Fore coxa curved to outward, without a convexity above socket of trochanter. Hind femur 5.0 times as long as maximum depth in lateral view. Hind TS1 2.1 times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 punctate (Fig. 997), 1.1 times as long as maximum width, its median dorsal carina present on basal ca. 0.5 of tergite (Fig. 744). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 744). T2 0.7 times as long as maximum width. Ovipositor sheath 0.8 times as long as fore wing, 2.3 times as long as hind tibia. Apical part of upper valve of ovipositor with a slightly convex dorsal tubercle before subapical notch (Fig. 800).

Colouration (Figs. 995-997). Body (excluding wings and legs) blackish-brown and partly tinged with reddish-brown (especially scutellum and metasoma: perhaps originated from teneral condition), except for: apical part of clypeus, palpi, apex of pedicel, and flagellum yellowish-brown to reddish-brown; mandible slightly tinged with red; postero-dorsal corner of pronotum, tegula, axillae, membranous parts of sternites and posterior part of subgenital plate yellow to yellowish-brown; posterior margin of T1-T3 and ovipositor reddish-brown. Wings hyaline; veins and pterostigma yellowish-brown except for yellow wing base. Fore and mid legs reddish-yellow to yellowish-brown. Hind coxa reddish-yellow. Hind trochanter and trochantellus yellow. Hind femur reddish-yellow, its apical part slightly tinged with blackish-brown. Hind tibia yellowish-brown excluding whitish-yellow base and blackish-brown to black subbasal band and apical part. Hind tibial spurs whitish-yellow. Hind tarsus blackish-brown to black each with a basal yellow area on TS1-TS3. Basal yellow areas of TS1 ca. 0.4 length of TS1 but its border indistinct.

**Male.** Unknown.

**Specimen examined.** JAPAN: [Holotype] F, Hokkaido Pref., Tokachi, Kamikawa gun, Tomuraushi spa, 6-8. vii. 1988, K. Konishi leg. (NIAES).

**Distribution** (Fig. 1048). Japan (Hokkaido).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the type locality, Tomuraushi spa.

**Remarks.** This species resembles *G. pedata* Desvignes, 1856, from Europe and *G. sankaku* in the body colouration, but it can be distinguished by the posterior transverse carina of propodeum partly obsolete (complete in *G. pedata* and *G. sankaku*).

***Glypta uenaensis* sp. nov.**

(Figs. 594, 688, 745, 801, 998-1000)

**Description. Female** (n=2). Body length 6.5–8.5 (HT: 6.5) mm.

Head 0.7 times as long as wide. Clypeus 0.7 times as long as wide, its apex without a small median notch. Face weakly convex medially (Figs. 594), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.0–1.3 (HT: 1.0) times as long as OOL. Mandible flat basally, with a narrow ventral flange. Upper part of occipital carina incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.9–1.0 (HT: 0.9) times as long as BWM. Antenna with 36 flagellomeres. F1 1.6 times as long as F2.

Mesosoma. Pronotum entirely punctate dorsally, its on collar sparse and shallow, with a weak epomia. Mesopleuron with a small speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum absent (Fig. 688). Anterior transverse carina of propodeum present only lateral section as weak carina (Fig. 688). Posterior transverse carina of propodeum complete except for narrowly indistinct medially (Fig. 688). Areae externa and dentipara of propodeum broadly separated by weak carina (Fig. 688). Fore wing length 5.5–7.5 (HT: 5.5) mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 5.0–5.1 (HT: 5.1) times as long as maximum depth in lateral view. Hind TS1 2.0 times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 densely punctate (Fig. 1000), 1.0 times as long as maximum width, its median dorsal carina present on basal ca. 0.5 of tergite (Fig. 745). Both lateral sides of T1 with a convexity just after the base of median dorsal carina (Fig. 745). T2 0.8 times as long as maximum width. Punctures on T1–T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 0.7–0.9 (HT: 0.9) times as long as fore wing, 2.2–2.3 (HT: 2.3) times as long as hind tibia. Apical part of upper valve of ovipositor with a slightly convex dorsal tubercle before subapical notch (Fig. 801).

Colouration (Fig. 998–1000). Body (excluding wings and legs) black, except for: apical part of clypeus reddish-brown; mandible slightly tinged with red; palpi dark yellowish-brown; postero-dorsal corner of pronotum, tegula and axillae yellow to yellowish-brown; posterior margin of T1–T3, membranous parts of metasomal sternite, posterior part of subgenital plate and ovipositor reddish-brown to yellowish-brown. Wings hyaline; veins and pterostigma yellowish-brown except for yellow wing base. Fore and mid legs reddish-brown except for: trochanters, trochantelli, tibiae and tarsi more or less yellow. Hind leg yellowish-brown, except for: coxa and part of trochanter dark reddish-brown; black to blackish-brown; apex of femur, subbasal band and apical

part of tibia, apical parts of TS1-TS4 and TS5 blackish-brown; femur excluding black area reddish-brown. Basal yellow areas of TS1 ca. 0.5 length of TS1 and of TS2-TS3 slightly shorter than each black area.

**Male.** Unknown.

**Specimens examined.** JAPAN: [Holotype] F, Hokkaido Pref., Tomakomai City, Uenae, 19. vi. 2006, K. Watanabe leg. (KPMNH). [Paratype] 1F, Yamanashi Pref., Sutama Town, Mizugakiyama, 16. vii. 1996, T. Tachi leg. (OMNH).

**Distribution** (Fig. 1048). Japan (Hokkaido and Honshu).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the type locality, Uenae.

**Remarks.** This species resembles *G. femorator* Desvignes, 1856, from Eurasia in the body colouration, but it can be distinguished by the ovipositor sheath shorter than fore wing (longer than fore wing in *G. femorator*) and the metasomal tergite without red area (sometimes with a red area in *G. femorator*).

***Glypta yamagishii* sp. nov.**

(Figs. 595, 689, 746, 802, 1001-1003)

**Description. Female** (n=1). Body length 7.0 mm.

Head 0.6 times as long as wide. Clypeus 0.5 times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 595), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.3 times as long as OOL. Mandible flat basally, with a narrow ventral flange. Upper part of occipital carina incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.8 times as long as BWM. Antenna with 33 flagellomeres. F1 1.7 times as long as F2.

Mesosoma. Pronotum punctate dorsally, largely smooth ventrally, with a weak epomia. Both sides of mesoscutum near tegula pointly obtusely produced posteriorly. Mesopleuron with a small speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum absent (Fig. 689). Anterior transverse carina of propodeum absent (Fig. 689). Posterior transverse carina of propodeum complete (Fig. 689). Areae externa and dentipara of propodeum completely united into single area (Fig. 689). Fore wing length 5.5 mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 5.3 times as long as maximum depth in lateral view. Hind TS1

2.1 times as long as TS2. Hind tarsal claw longer than arolium.

**Metasoma.** T1 punctate (Fig. 1003), 1.3 times as long as maximum width, its median dorsal carina present on basal ca. 0.4 of tergite (Fig. 746). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 746). T2 1.0 times as long as maximum width. Punctures on T1-T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 1.2 times as long as fore wing, 3.4 times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 802).

**Colouration** (Figs. 1001-1003). Body (excluding wings and legs) black, except for: clypeus excluding dorsal part, mandible excluding brown apex, palpi, postero-dorsal corner of pronotum, tegula, axillae, membranous parts of sternites and ovipositor whitish-yellow; pedicel and flagellum blackish-brown to reddish-brown; posterior margin of each metasomal tergite and subgenital plate reddish-brown to yellowish-brown. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Fore and mid legs whitish-yellow. Hind coxa whitish-yellow dorsally, reddish-yellow ventrally. Hind trochanter and trochantellus whitish-yellow. Hind femur reddish-yellow, its apex whitish-yellow and area before it slightly tinged with blackish-brown. Hind tibia whitish-yellow excluding blackish-brown to black subbasal band and apical part. Hind tibial spurs whitish-yellow. Hind tarsus blackish-brown to black excluding basal whitish-yellow area of TS1-TS3. Basal yellow area of TS1 ca. 0.5 length of TS1.

**Male.** Unknown.

**Specimen examined.** JAPAN: [Holotype] F, Aichi Pref., Shitara, Uradani (beech forest), 23-29. v. 1994, K. Yamagishi leg. (NIAES).

**Distribution** (Fig. 1048). Japan (Honshu).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the collector of holotype, Prof. Kenzou Yamagishi of Meijyo University, who has contributed to the taxonomy of Japanese parasitoid wasps.

**Remarks.** This species resembles *G. pedata* in the body colouration, but it can be distinguished by the ovipositor sheath 1.2 times as long as fore wing (0.6–0.8 times in *G. pedata*).

***Glypta yamato* sp. nov.**

(Figs. 596, 690-693, 747, 803, 832, 833, 842-844, 1004-1007)



**Description. Female** (n=56). Body length 5.5–8.0 (HT: 7.0) mm.

Head 0.6 times as long as wide. Clypeus 0.6–0.7 (HT: 0.6) times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 596), 0.5–0.6 (HT: 0.6) times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 0.7–1.1 (HT: 1.0) times as long as OOL. Mandible slightly convex basally, with a narrow ventral flange. Upper part of occipital carina incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.7–1.0 (HT: 1.0) times as long as BWM. Antenna with 33–36 (HT: 34) flagellomeres. F1 1.4–1.7 (HT: 1.6) times as long as F2.

Mesosoma. Pronotum entirely densely punctate, with a weak epomia. Mesopleuron with a small speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum absent (Figs. 690–693). Anterior transverse carina of propodeum absent (Figs. 690–693). Posterior transverse carina of propodeum complete (Figs. 690–693). Areae externa and dentipara of propodeum completely united into single area (Figs. 690–693). Fore wing length 6.0–6.5 (HT: 6.5) mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 5.1–6.3 (HT: 5.1) times as long as maximum depth in lateral view. Hind TS1 2.0–2.1 (HT: 2.1) times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 punctate (Fig. 1007), 1.2–1.4 (HT 1.3) times as long as maximum width, its median dorsal carina present on basal ca. 0.4 of tergite (Fig. 747). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 747). T2 0.8–1.0 (HT: 1.0) times as long as maximum width. Punctures on T1–T4 sometimes partly longitudinally striated by coalescent punctures. Ovipositor sheath 0.6–0.8 (HT: 0.6) times as long as fore wing, 1.9–2.4 (HT: 1.9) times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 803).

Colouration (Figs. 1004–1007). Body (excluding wings and legs) black, except for: clypeus excluding dorsal part, mandible excluding reddish-brown apex and black base, palpi, postero-dorsal corner of pronotum, tegula and membranous parts of sternites yellow to whitish-yellow; apical part of flagellum sometimes tinged with reddish-brown; axillae, posterior margin of subgenital plate and ovipositor reddish-brown to yellowish-brown; posterior margin of each metasomal tergite slightly narrowly tinged with reddish-brown. Wings hyaline; veins and pterostigma yellowish-brown to brown except for yellow wing base. Fore and mid legs

reddish-yellow excluding whitish-yellow trochanters and trochantelli. Hind coxa reddish-yellow. Hind trochanter and trochantellus whitish-yellow to yellow. Hind femur reddish-yellow, its apical part blackish-brown with whitish-yellow apex. Hind tibia whitish-yellow excluding blackish-brown to black subbasal band and apical part, sometimes ventral surface between subbasal band and apical part tinged with blackish-brown to black. Hind tibial spurs whitish-yellow. Hind tarsus blackish-brown to black excluding basal whitish-yellow area of TS1-TS4 (but indistinct in TS4). Basal yellow area of TS1 0.2–0.4 (HT: 0.4) length of TS1 but its border sometimes indistinct.

**Male** (n=8). Similar to female. Propodeum with all carinae except for anterior transverse carina and lateral longitudinal carina partly absent. Hind basitarsus 1.8–2.0 times as long as second tarsal segment. T1 1.2–1.3 times as long as maximum width, its median dorsal carina slightly longer and stronger than female. Posterior margin of subgenital plate slightly convex to slightly concave (Fig. 842). Apical margin of paramere roundly produced (Figs. 832, 833, 844). Dorsal margin of paramere without a convexity apically (Figs. 832, 844). Inner margin of paramere concave near basal inner angle (Fig. 832). Aedeagus weakly curved, its basal apodeme ca. 0.5 times total length of aedeagus (Fig. 843). Penis valve without a minute notch at posterior part of dorsal surface (Fig. 843). Basal margin of dorsal surface of penis valve not produced medially (Fig. 843).

**Specimens examined.** JAPAN: [Holotype] F, Tochigi Pref., Nasushiobara City, Shiobara, Utou-sawa, 22-28. v. 2008, T. Matsumura leg. (MsT) (KPMNH). [Paratypes] 1F, Hokkaido Pref., Mt. Soranuma, 17. vi. 1967, K. Kusigemati leg. (KU); 1F, same locality and collector, 26. vi. 1965 (KU); 1F, Hokkaido Pref., Yukomanbetsu, 14. vii. 1965, K. Kusigemati leg. (KU); 1F, Hokkaido Pref., Mt. Muineyama, 29. vi. 1962, H. Takada leg. (KU); 1F, Hokkaido Pref., Horonobe, Kamitoikan, Iwananosawa, 26. vi.-12. vii. 1993, M. Inoue leg. (MsT) (NIAES); 1F, Hokkaido Pref., Sapporo City, Hitsujigaoka (GPS: N43-00/ E 141-24), 30. vii.-6. viii. 2003, K. Konishi leg. (MsT) (KPMNH); 1F, same locality and collector, 8-15. vi. 2010, (MsT) (KPMNH); 1F, Ibaraki Pref., Mt. Tsukuba-san, J. Yoshioka leg. (NSMT); 4F, Ibaraki Pref., Kita-Ibaraki, Ogawa forest reserve, 27. v.-11. vi. 1996, K. Maeto leg. (MsT) (NIAES); 5F, same locality and collector, 11-27. vi. 1996 (MsT) (NIAES); 3F, same locality and collector, 27. vi.-9. vii. 1996 (MsT) (NIAES); 1F, same locality and collector, 9-25. vii. 1996 (MsT) (NIAES); 1F, same locality and collector, 6-25. viii. 1996 (MsT) (NIAES); 8F, same locality and collector, 20. viii.-4. ix. 1996 (MsT) (NIAES); 1F, Tochigi Pref., Nikko City, Tamo-zawa, 5-7. vi. 2008, T. Nakamura leg. (MsT) (TPM); 1F, same locality and collector, 10-23. vii, 2008 (MsT) (TPM); 2F, Tochigi Pref., Yaita, 11-22. viii.

1989, K. Konishi leg. (MsT) (NIAES); 1F, same locality and collector, 22. viii.-4. ix. 1989 (MsT) (NIAES); 1F, Saitama Pref., Mt. Kasa, 26. v. 1967, H. Takizawa leg. (KU); 1F, Saitama Pref., Sayama, 20. iv. 1968, H. Takizawa leg. (KU); 1F, Kanagawa Pref., Hadano City, Tanzawa, Terayama, Yabitsu-toge to Oyama, 16. vi. 2000, I. Waki leg. (NSMT); 1F, Ishikawa Pref., Hakusan, Sannomiya, 24. iv.-2. v. 2009, H. Fukutomi and S. Nakagawa leg. (MsT) (MU); 1F, same locality and collector, 24-30. v. 2009 (MsT) (MU); 1F, Yamanashi Pref., Koushu City, Yanagisawa-toge, 1480 - 1580m alt. (GPS: N 35-46-44/ E 138-48-10), 8. viii. 2008, M. Gunji leg. (KPMNH); 1F, Nagano Pref., Namiai Vil., Ja-tougeyama, Umanose, 5. viii. 1999, R. Matsumoto leg. (OMNH); 1F, Shizuoka Pref., Shubashiri, 31. v. 1959, K. Kamijo leg. (KU); 1F, Ehime Pref., Mts. Odamiyama, Namakusadani, 29. vi. 1994, E. Yamamoto leg. (NIAES); 1F, same locality and collector, 9. v. 1995 (NIAES); 1M, same locality and collector, 13. v. 1995 (NIAES); 5M, same locality and collector, 24. v. 1995 (NIAES); 2M, Ehime Pref., Mts. Odamiyama, Hontani, 28. v. 1995, E. Yamamoto leg. (NIAES); 1F, Ehime Pref., Omogo Vil., Tsuchigoya, 15. vii. 1998, R. Matsumoto leg. (OMNH); 5F, Oita Pref., Mts. Kuju, Mt. Daisen, 19. vii. 1978, K. Setoya leg. (NIAES); 1F, Oita Pref., Mt. Sobo (1768 m alt.), 17-24. vii. 1980, R. Noda leg. (NIAES)..

**Distribution** (Fig. 1048). Japan (Hokkaido, Honshu, Shikoku and Kyushu).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the Japanese word, “Yamato”, which is an old name of Japan.

**Remarks.** The length of hind femur of the specimens collected from Kyushu is longer than that of the specimens from Hokkaido to Shikoku (6.0-6.3 times as long as maximum depth in the former but 5.1-5.7 times in the latter). This species is very similar to *G. parvicaudata*, but can be distinguished from the frons without a projection (with a minute horn in *G. parvicaudata*). This species also resembles *G. pedata* in the body colouration, but it can be distinguished by the ovipositor sheath 0.6–0.8 times as long as fore wing (0.6–0.8 times in *G. pedata*), the metasoma black (sometimes tinged with red in *G. pedata*), and the clypeus and mandible each with a conspicuous yellow area (at most tinged with reddish-brown in *G. pedata*).

***Glypta yashajinensis* sp. nov.**

(Figs. 597, 694, 748, 804, 1008-1010)

**Description. Female** (n=1). Body length 7.0 mm.

Head 0.7 times as long as wide. Clypeus 0.6 times as long as wide, its apex

without a small median notch. Face weakly convex medially (Fig. 597), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 1.0 times as long as OOL. Mandible flat basally, with a narrow ventral flange. Upper part of occipital carina incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.7 times as long as BWM. Antenna with damaged flagellomeres, its apical part broken. F1 1.7 times as long as F2.

Mesosoma. Pronotum punctate dorsally, smooth antero-ventrally and longitudinally rugose postero-ventrally, with a weak epomia. Both sides of mesoscutum near tegula pointly produced posteriorly. Mesopleuron with a large speculum. Metapleuron punctate. Lateral longitudinal carina of propodeum partly present (Fig. 694). Anterior transverse carina of propodeum present on lateral section as trace-like carina (Fig. 694). Posterior transverse carina of propodeum complete (Fig. 694). Areae externa and dentipara of propodeum partly separated by trace-like carina (Fig. 694). Fore wing length 6.0 mm. Fore coxa slightly curved to outward, without a convexity above socket of trochanter. Hind femur 4.6 times as long as maximum depth in lateral view. Hind TS1 2.5 times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 densely punctate (Fig. 1010), 1.4 times as long as maximum width, its median dorsal carina present on basal ca. 0.5 of tergite (Fig. 748). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 748). T2 1.0 times as long as maximum width. Ovipositor sheath 1.5 times as long as fore wing, 4.0 times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 804).

Colouration (Figs. 1008-1010). Body (excluding wings and legs) black, except for: apical part of clypeus, apex of mandible, apex of pedicel, and flagellum reddish-brown to yellowish-brown; palpi, postero-dorsal corner of pronotum, tegula and membranous parts of sternites yellow; axillae, posterior margin of each metasomal tergite, subgenital plate and ovipositor reddish-brown to yellowish-brown. Wings hyaline; veins and pterostigma yellowish-brown except for yellow wing base. Fore and mid legs reddish-yellow to reddish-brown excluding brown mid TS5. Hind coxa, trochanter and trochantellus reddish-brown (trochantellus more or less paler than two formers). Hind femur reddish-brown, its apical part blackish-brown. Hind tibia yellowish-brown excluding blackish-brown to black subbasal band and apical part. Hind tibial spurs yellowish-brown. Hind tarsus blackish-brown to black excluding basal whitish-yellow area of TS1-TS4 (but indistinct in TS4). Basal yellow area of TS1 ca.

0.8 length of TS1.

**Male.** Unknown.

**Specimen examined.** JAPAN: [Holotype] F, Yamanashi Pref., Yashajin-toge, 13. ix. 1970, T. Kocha leg. (KU).

**Distribution** (Fig. 1048). Japan (Honshu).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the type locality, Yashajin-toge.

**Remarks.** This species resembles *G. sculpturata* and *G. bifoveolata* in the slender body and the long ovipositor, but it can be distinguished by the apex of hind tibia black (hind tibia entirely reddish-yellow in *G. sculpturata* and *G. bifoveolata*), the MSL 0.7 times as long as BWM (1.0 times in *G. sculpturata* and *G. bifoveolata*), and the body length 7.0 mm (more than 1.0 mm in *G. sculpturata*). This species also resembles *G. hayachinensis* in the body colouration, but it can be distinguished by several character states (see Remarks of *G. hayachinensis*).

***Glypta yoshidai* sp. nov.**

(Figs. 598, 695, 749, 805, 1011-1013)

**Description. Female** (n=3). Body length 7.5–8.0 (HT: 8.0) mm.

Head 0.7 times as long as wide. Clypeus 0.6 times as long as wide, its apex without a small median notch. Face weakly convex medially (Fig. 598), 0.5 times as long as wide. Frons densely punctate with transverse creases above each antennal socket, with a pair of longitudinal creases between each antennal socket. POL 0.9–1.0 (HT: 0.9) times as long as OOL. Mandible slightly convex basally, with a narrow ventral flange. Upper part of occipital carina incomplete behind posterior ocelli. Lower end of occipital carina connected to hypostomal carina at base of mandible. Lower part of gena slightly narrower than dorsal part. MSL 0.7–0.8 (HT: 0.8) times as long as BWM. Antenna with 28–29 (HT: 29) flagellomeres. F1 1.7–1.8 (HT: 1.8) times as long as F2.

Mesosoma. Pronotum entirely densely punctate, its epomia slightly present ventrally or apparently absent. Mesopleuron densely punctate, with small smooth area around episternal scrobe. Metapleuron densely punctate. Lateral longitudinal carina of propodeum absent (Fig. 695). Anterior transverse carina of propodeum absent (Fig. 695). Posterior transverse carina of propodeum complete (Fig. 695). Areae externa and dentipara of propodeum completely united into single area (Fig. 695). Fore wing length 6.0–6.5 (HT: 6.5) mm. Fore coxa not curved to outward, without a convexity above socket of trochanter. Hind femur 5.2–5.4 (HT: 5.4) times as long as maximum depth in

lateral view. Hind TS1 2.4–2.5 (HT: 2.4) times as long as TS2. Hind tarsal claw longer than arolium.

Metasoma. T1 densely punctate (Fig. 1013), 1.1–1.2 (HT: 1.1) times as long as maximum width, its median dorsal carina present on basal ca. 0.4 of tergite (Fig. 749). Both lateral sides of T1 without convexity just after the base of median dorsal carina (Fig. 749). T2 0.8–0.9 (HT: 0.8) times as long as maximum width. Punctures on T1-T4 partly longitudinally striated by coalescent punctures. Ovipositor sheath 0.5 times as long as fore wing, 1.3 times as long as hind tibia. Apical part of upper valve of ovipositor without a distinct dorsal tubercle before subapical notch (Fig. 805).

Colouration (Figs. 1011-1013). Body (excluding wings and legs) black, except for: clypeus, mandible excluding apex, ventral surface of pedicel, palpi, posterior part of propleuron, postero-dorsal corner and postero-ventral margin of pronotum, tegula, subalar prominence, axillae, posterior part of subgenital plate and membranous parts of metasomal sternite whitish-yellow to yellowish-brown; ovipositor reddish-brown; posterior margin of each metasomal tergite slightly tinged with red. Wings hyaline; veins and pterostigma yellowish-brown except for yellow wing base. Fore and mid leg whitish-yellow to reddish-yellow. Hind coxa reddish-yellow with whitish-yellow dorsal area. Hind trochanter and trochantellus whitish-yellow. Hind femur reddish-yellow excluding apical part tinged with blackish-brown. Hind tibia yellowish-brown with subbasal and apical blackish-brown to black area, ventral surface of it more or less tinged with blackish-brown. Hind tibial spurs whitish-yellow. Hind tarsus blackish-brown to black excluding basal yellow area of TS1-TS4 (but indistinct in TS3 and TS4). Basal yellow area of TS1 ca. 0.3 length of TS1 but its border indistinct.

**Male.** Unknown.

**Specimens examined.** JAPAN: [Holotype] F, Hokkaido Pref., Sapporo City, Maruyama, 8. viii. 2001, T. Yoshida leg. (KPMNH). [Paratypes] 1F, Hokkaido Pref., Kumaishi, Kenichi-gawa, Iwafuchi-zawa, 29. ix.-10. x. 1995, Y. Ito and T. Ito leg. (MsT) (NIAES); 1F, Hokkaido Pref., Sapporo, 12. viii. 1967, K. Kusigemati leg. (KU).

**Distribution** (Fig. 1048). Japan (Hokkaido).

**Bionomics.** Unknown.

**Etymology.** The specific name is from the collector of holotype, Mr. Takuma Yoshida, who is a Japanese ichneumonologist.

**Remarks.** This species resembles *G. breviterebra* and *G. densa* in the short ovipositor, the body with dense punctures, and the shallow and narrow ovipositor sheath, but it can be distinguished by the ovipositor sheath 1.3 times as long as hind tibia (1.1–1.2 times in *G. breviterebra* and *G. densa*), the upper margin of lateral part of pronotum yellow

(black excluding posterior end in *G. braviterebra*), and the whitish-yellow area of hind TS1 shorter than 0.5 of TS1 (more than 0.8 in *G. densa*).

### **Japanese species of the *Glypta* species group not examined in this study**

The following species of the *Glypta* species group recorded from Japan by Kasparyan *et al.* (2012) were not examined in the present study.

#### ***Glypta clypeata* Kuslitzky, 2007**

*Glypta (Glypta) clypeata* Kuslitzky, 2007: 444.

**Distribution** (Fig. 1048). Japan (Kunashiri Is., Etorofu Is. and Shikotan Is.).

**Remarks.** I could not find the specimens in ZIS. According to the original description by Kuslitzky (2007), this species may belong to the *media* subgroup.

#### ***Glypta kunashirica* Kuslitzky, 2007**

*Glypta (Glypta) kunashirica* Kuslitzky, 2007: 441.

**Distribution** (Fig. 1048). Japan (Kunashiri Is.).

**Remarks.** I could not find the specimens in ZIS. According to the original description by Kuslitzky (2007), this species may belong to the *media* subgroup.

#### ***Glypta parvicaudata* Bridgman, 1889**

*Glypta parvicaudata* Bridgman, 1889: 435.

*Glypta crassitarsis* Thomson, 1889: 1327, 1346.

*Glypta tenuitarsis* Thomson, 1889: 1327, 1346.

*Glypta breviventris* Thomson, 1889: 1327, 1347.

**Distribution** (Fig. 1048). Japan (Kunashiri Is.); widely distributed in Eurasia.

**Remarks.** This species may be classified into the *media* subgroup or less probably into the *Conoblata* species group. I have examined some specimens determined as this species or its closely related species, *G. consimilis* Holmgren, 1860, but not examined any true specimens from Japan. The relationships among this species, *G. consimilis*, and

*G. yamato*, should be revised in a future study.

### **Discussion about the *Glypta* species group**

I have recognized 58 species of the *Glypta* species group from Japan, including 42 new species and 4 species new to Japan. Among them, three species previously recorded by Kasparyan *et al.* (2012) were not examined in this study. The number of Japanese species is nearly same to European species (71) and about 1/4 of Nearctic species (317) (Yu *et al.*, 2012).

Japanese species of the *Glypta* species group can be classified into four subgroups. In the *maruyamensis* subgroup, *G. elegans* is distinct from other species. Some of its character states are unique in *Glypta* and show intermediate conditions between *Glypta* and New World genus *Zaglyptomorpha*. *G. kusigematii* of the *maruyamensis* subgroup is also unique in having a characteristic lower part of occipital carina. Kuslitzky (1973, 2007) has demonstrated that the shape of fore coxa is variable and useful for the classification of *Glypta* s. lat. (including *Diblastomorpha*). The curved fore coxa is certainly useful to discriminate *D. cylindrator* and two species of the *Glypta* species group, *G. rufa* and *G. kuslitzkii*, from other species of *Glypta*. *G. rufa* is also one of characteristic species in *Glypta*. As a single member of its own subgroup, it shows two unique character states, i.e., the female clypeus with a small median notch and the face and clypeus not separated by the concavity in lateral view. However, the former is present only in female and is apparently different from the large notch in *Teleutaea* and *Cephaloglypta* and the latter is an extreme of continuous conditions of face and clypeus in *Glypta*. Thus, I conclude here that *G. rufa* is a very distinctive species but should be classified into *Glypta* s. str.

The character states of male genitalia are more or less stable in *Glypta* and are similar to those of *Apophua*, *Diblastomorpha* and *Glyptopimpla*. The aedeagus of *G. glypta* of the *glypta* subgroup is unique in the posterior dorsal end of penis valve apparently produced (Figs. 810, 819), but additional observations on other species are necessary for more discussion.

Although host records of the *Glypta* species group are poor, *G. maruyamensis* and *G. media* use tortricids belonging to the Olethreutinae, whereas *G. mame* and *G. rufata* use tortricids belonging to the Tortricinae. In addition, a host record of *G. rufata* from the Pyralidae was reported in China (Sheng & Sun, 2010).

The species richness of the *Glypta* species group reduces gradually from eastern (northern) Japan to western (southern) Japan, and markedly reduced in Ryukyus,



having only three species, *G. densa*, *G. momoi* and *G. elegans*. This geographical pattern of species richness of *Glypta* in Japan is apparently same to that in North America (Dasch, 1988). Although *Glypta* is replaced by the closely related genus *Zaglyptomorpha* in the area near to the equator in North America, no such a replacement to any subtropical genera is known in Asia.

### 3. Nomenclatural summary

Nomenclatural treatments of Japanese taxa in the present study are summarized as below (\* new to Japan), whereas all the nomenclatural changes are invalid as shown in the “Nomenclatural treatments in this thesis ” in Chapter II.

#### *Apophua* Morley, 1913

*aquilonia* (Momoi, 1963)

*bipunctoria* (Thunberg, 1822)

*elegans* **sp. nov.**

*evanescens* (Ratzeburg, 1848)

*honmai* Momoi, 1978

*kikuchii* (Uchida, 1932)

*maetai* Momoi, 1978

*genalis kasparyani* Kuslitzky, 2007 **syn. nov.**

*stena* (Momoi, 1963)

*sugarai* Momoi, 1978

*tobensis* (Uchida, 1928)

*yamato* **sp. nov.**

#### *Cephaloglypta* Obrtel, 1956

*murinanae* (Bauer, 1941)

#### *Diblastomorpha* Förster, 1869 **stat. rev.**

*cylindrator* (Fabricius, 1787) \* **comb. nov.**

#### *Glypta* Gravenhorst, 1829 (subgeneric division is not accepted)

*acares* Momoi, 1965

*adachii* Uchida, 1928 \*

*aichiensis* **sp. nov.**

*aino* **sp. nov.**

*akahige* **sp. nov.**

*akiuensis* **sp. nov.**

*aomoriensis* sp. nov.  
*biauriculata* Strobl, 1901  
*biwakuboensis* sp. nov.  
*breviterebra* Momoi, 1963  
*breviungulata* Kuslitzky, 1976 \*  
*clypeata* Kuslitzky, 2007 (not examined)  
*cognata* sp. nov.  
*cymolomiae* Uchida, 1932  
*daisensis* sp. nov.  
*daisetsuzana* sp. nov.  
*delicatula* Kuslitzky, 2007 (not examined)  
*densa* Momoi, 1970  
*densepunctata* sp. nov.  
*elegans* sp. nov.  
*erythronota* sp. nov.  
*extincta* Ratzeberg, 1852 \*  
*ezoensis* sp. nov.  
*flavitarsus* sp. nov.  
*fujisana* sp. nov.  
*glypta* (Ashmead, 1906)  
*hayachinensis* sp. nov.  
*ichitai* sp. nov.  
*iriei* sp. nov.  
*japonica* sp. nov.  
*kamijoi* Momoi, 1966  
*karasawensis* sp. nov.  
*kasparyani* Kuslitzky, 1976  
*kochai* sp. nov.  
*konishii* sp. nov.  
*kumaishiensis* sp. nov.  
*kunashirica* Kuslitzky, 2007 (not examined)  
*kusigematii* sp. nov.  
*kuro* sp. nov.  
*kuslitzkyi* sp. nov.  
*kyushuensis* sp. nov.  
*lapponica* Holmgren, 1860 \*

*chinensis* (Uchida, 1952) **syn. nov.**  
*maetoi* **sp. nov.**  
*makiharai* **sp. nov.**  
*mame* **sp. nov.**  
*matsumotoi* **sp. nov.**  
*minamikawai* **sp. nov.**  
*maruyamensis* Uchida, 1928  
*media* Momoi, 1963  
*momoii* Kuslitzky, 2007  
*murotai* **sp. nov.**  
*nagasei* **sp. nov.**  
*nakamurai* **sp. nov.**  
*niigatensis* **sp. nov.**  
*nipponica* **sp. nov.**  
*onaga* **sp. nov.**  
*parvicaudata* Bridgman, 1889 (not examined)  
*pedata* Desvignes, 1856  
*rufa* Uchida, 1928  
*bisinuata* Momoi, 1963 **syn. nov.**  
*rufata* Bridgman, 1887 \*  
*sankaku* **nom. nov.**  
*triangularis* Momoi, 1963 (homonym)  
*shibetsuensis* **sp. nov.**  
*shigaensis* **sp. nov.**  
*shimizui* **sp. nov.**  
*slenda* **sp. nov.**  
*sudai* **sp. nov.**  
*suwai* **sp. nov.**  
*tamanukii* Uchida, 1928 \*  
*tomuraushiensis* **sp. nov.**  
*touyaensis* **sp. nov.**  
*tumor* Momoi, 1970  
*uenaensis* **sp. nov.**  
*yamagishii* **sp. nov.**  
*yamamotoi* **sp. nov.**  
*yamato* **sp. nov.**

*yashajinensis* **sp. nov.**  
*yoshidai* **sp. nov.**  
*zenibakoensis* **sp. nov.**  
***Glyptopimpla*** Morley, 1913  
*babai* (Momoi, 1978)  
*iwatai* (Momoi, 1963)  
*kusigematii* **sp. nov.**  
*macrofossa* (Momoi, 1963)  
*momoii* **sp. nov.**  
*uchidai* (Momoi, 1963)  
***Orientoglypta*** Kuslitzky, 1973 **stat. rev.**  
*watanabei* (Momoi, 1963) **comb. nov.**  
***Teleutaea*** Förster, 1869  
*brischkei* (Holmgren, 1860) \*  
*diminuta* Momoi, 1978  
*kasparyani* Kuslitzky, 1979 **syn. nov.**  
*minamikawai* Momoi, 1963  
*mishae* Kuslitzky, 1973 \*  
*nigra* Momoi, 1978  
*nigricoxalis* (Uchida, 1928) **stat. rev.**  
*longiterebra* Kuslitzky, 1973 **syn. nov.**  
*orientalis* Kuslitzky, 1973  
*sachalinensis* Uchida, 1928  
*striata* (Gravenhorst, 1829)  
*corniculata* Momoi, 1978 **syn. nov.**  
*ussuriensis* (Golovisnin, 1928)  
***Townesion*** Kasparyan, 1993  
*japonicus* Kasparyan, 1999

In total, eight genera (including two status revised from subgenus) and 109 species (including six synonyms, one new name for a homonym, 57 new species and ten newly recorded species) of the Glyptini are recognized from Japan.

# **Chapter IV**

## **PHYLOGENY**

## 1. Introduction

### 1.1. Phylogenetic position of the Glyptini

The tribe Glyptini is one of three tribes of the subfamily Banchinae. Wahl (1988) suggested that this tribe was the sister clade of the tribes Atrophini + Banchini. The Glyptini is most probably a well defined monophyletic group by a conspicuous autapomorphy, i.e., a pair of oblique grooves on metasomal tergites (Townes, 1970b; Wahl, 1988). According to Short (1978) and Wahl (1988), however, the larvae of the Glyptini show no derived states and presumably represent the ground plan of the Banchinae (Wahl, 1988). Recently, Quicke *et al.* (2009) proposed some phylogenetic trees based on the molecular and morphological data among ichneumonids. However, no strict consensus tree was demonstrated for the phylogenetic relationships of the tribe Glyptini.

In this chapter, I analyze the phylogenetic relationships of genera in the Glyptini, following the assumption of Wahl (1988) that the Glyptini is a monophyletic sister group of Atrophini + Banchini.

See Chapter II (Materials and Methodology) about methodology, morphological, terminology, and phylogenetic procedures, as well as Chapter III (Taxonomy) for the taxa investigated.

### 1.2. Choice of taxa

Among 109 described species of Japanese Glyptini, five unexamined species of *Glypta*, *G. delicatula*, *G. kaspanyani*, *G. clypeata*, *G. kunashirica* and *G. parvicaudata*, were excluded and other 104 Japanese species were used to analyze the phylogenetic relationships. Two species of the tribe Atrophini, *Tossinola ryukyuensis* Watanabe, Ishikawa & Konishi, 2010, and *Amphirhachis tertia* (Momoi, 1970), were used as out-group taxa for the phylogenetic analyses.

### 1.3. Characters and character states

Character states of 51 morphological characters were scored as below. Then, presumed autapomorphies for the genera (e.g., *Cephaloglypta*) containing a single species were removed. I presumed 12 such autapomorphies and thus the 40 characters were used in the following analyses. The character state matrix is shown in Table 9.

[Head]

#1 Clypeal notch

0) absent, 1) small, present in female only, 2) large, present in both sexes.

#2 Lateral profile of clypeus

0) weakly convex, 1) strongly convex.

#3 Subocular groove

0) absent, 1) present.

#4 Lower margin of mandible

0) at most with a narrow flange, 1) with a wide flange.

#5 Base of mandible

0) flat or slightly convex, 1) strongly convex.

#6 Anterior tentorial pit

0) not enlarged, 1) enlarged.

#7 Face

0) punctate, 1) weakly striated, 2) strongly striated.

#8 Antennal socket

0) simple, 1) produced dorsally.

#9 Transverse carina of frons above anterior socket

0) absent, 1) present, 2) present and produced as a horn.

#10 Smooth area on frons

0) less than 0.5 length of frons, 1) more than 0.5 length of frons.

#11 Frons

0) without horns, excluding those originated from transverse carina, 1) with a pair of horns.

#12 A pair of longitudinal carinae between antennal sockets

0) absent, 1) present.

#13 Area of frons anterior to median ocellus

0) flat or slightly convex, 1) strongly convex.

#14 Dorsal part of occipital carina

0) widely absent, 1) narrowly absent or slight though present, 2) complete and strong.

#15 Lower end of occipital carina

0) connected with hypostomal carina at base of mandible, 1) distant from base of mandible. In *Glyptopimpla macrofossa* and *Cephaloglypta murinanae*, this character state is “absent” while the direction and angle of lower end indicate that it can be classified into “1”.

#16 Lower part of gena

0) not strongly narrowed, 1) strongly narrowed, its width less than 0.6 length of maximum width.

#17 Occiput

0) flat to slightly concave, 1) strongly concave with tubercles.

#18 Ocellar area

0) simple, 1) with a pit.

#19 Number of flagellomeres

0) less than 31 segments, 1) more than 30 segments.

[Mesosoma]

#20 Mesosoma

0) more or less elongate, 1) globe-like.

#21 Epomia

0) strong and long, 1) weak and short, 2) absent.



#22 Pronotum

0) entirely punctate or transversely striated in lower part, 1) at least largely smooth in lower part.

#23 Lateral side of mesoscutum near tegula

0) obtusely produced posteriorly, 1) pointedly produced posteriorly.

#24 Scutellum

0) black or at most partly tinged with red, 1) with a conspicuous yellow marking.

#25 Epicnemial carina

0) complete, 1) absent laterally.

#26 Median section of anterior transverse carina of propodeum

0) absent or at most sometimes present as intraspecific variation, 1) always present.

#27 Posterior transverse carina of propodeum

0) complete, 1) partly (less than 70%) obsolete, 2) nearly entirely obsolete.

#28 Propodeal areas excluding basalis and postero

0) more or less separated, 1) completely united into a single area.

#29 Propodeal spiracle

0) rounded, 1) distinctly elongated.

[Wings]

#30 Areolet

0) absent, 1) present.

#31 Hind wing with a part of 1-*cu* between *M* and *cu-a*

0) distinctly longer than *cu-a*, 1) as long as or shorter than *cu-a*.

[Legs]

#32 Fore coxa

0) not curved, 1) strongly curved outward.

#33 Fore tibial spur

0) shorter than 0.5 length of TS1, 1) longer than 0.5 length of TS1.

#34 Hind coxa

0) nearly entirely or entirely black, 1) at least with any other colourations.

#35 Tarsal claw

0) short and not strongly twisted, 1) long and strongly twisted.

[Metasoma]

#36 Base of metasoma and hind coxa

0) closed to each other, 1) distant from each other.

#37 Basal yellow area of hind TS1

0) absent or very short, at most 0.1 length of TS1, 1) short to long, more than 0.2 length of TS1 (even if darkened at least tinged with yellow).

#38 Metasomal tergites

0) composed of five or more visible tergites, 1) composed of four visible tergites in appearance.

#39 Median dorsal carina of T1

0) present on more than 0.7 length of T1, 1) present on 0.4 to 0.7 length of T1, 2) present on shorter than 0.4 length of T1.

#40 Base of T1

0) without triangular teeth laterally, 1) with a pair of triangular teeth laterally.

#41 T2-T3

0) without a median longitudinal keel, 1) with a median longitudinal keel, but partly absent, 2) with a strong and complete median longitudinal keel.

#42 T2 length

0) shorter than 1.0 times maximum width, 1) more than 1.1 times maximum width.

#43 Lateral longitudinal keel on T2 and T3

0) absent, 1) present.

#44 Posterior margin of T4

0) without spines, 1) with spines.

#45 T5

0) without oblique grooves, 1) with oblique grooves.

#46 Metasomal tergites

0) without clearly defined white or yellow bands, at most partly tinged with reddish-brown, 1) with clearly defined white or yellow bands.

#47 T2-T3

0) without oblique grooves, 1) with oblique grooves.

#48 Length of ovipositor

0) less than 3.45 times as long as hind tibia, 1) more than 3.45 times as long as hind tibia

#49 Apex of ovipositor

0) without tubercle before notch, 1) with a distinct convexity or tubercle before notch, 2) needle-like with a minute notch.

#50 Male subgenital plate

0) with a long apodema sternalis, more than 0.3 times as long as subgenital plate, 1) with a short apodema sternalis, less than 0.4 times as long as subgenital plate.

#51 Inner margin of paramere

0) produced at basal as an inner angle and with a concavity near the angle, 1) produced at basal as an inner angle but without a concavity, 2) not produced at base and without a concavity.

## 1.4. Cladistic analysis

Maximum parsimony (MP) analyses were performed using PAUP v4b10 (Swofford, 2003). The procedures mostly follow Gauld & Dubois (2006) and Mita & Konishi (2010). In the assumption block, multi state characters were treated here as ordered (TYPESET  $\times$  UNTITLED = ord: number of multi state characters (# 9 21, 39, 41)). In the PAUP block, variable characters, e.g., inner margin of paramere (#52), were treated as polymorphic (Pset MSTaxa = polymorph). The number of trees stored in memory during analysis was automatically increased up to 200 (SET maxtrees = 200 increase = auto autoinc = 200). A heuristic search was run with 1000 replications of random additional sequences (Hsearch addseq = random nrep = 1000) implemented. Default options were used for other settings.

We carried out an analysis based on the all genera of Glyptini, except for some species of *Glypta*, to demonstrate the monophyly and intergeneric relationships of genera (see 1.2. choice of taxa).

## 2. Results

### 2. 1. Monophyly and sister-group relationships of genera

The following 13 autapomorphies were presumed prior to the parsimony analyses: *Glypta rufa* #1 (1); *Glypta biauriculata* #2 (1), #23 (1); *Diblastomorpha cylindrator* #11 (1), #35 (1); *Cephaloglypta murinanae* #17 (1); *Glyptopimpla babai* #18 (1); *Townesion japonicus* #3 (1), #20 (1), #36 (1), #38 (1), #44 (1), #49 (2) (Table 9). Also, *Apophua* has a single autapomorphy #33 (1) and *Teleutaea* has three autapomorphies #31 (1), #50 (1), #51 (1) (Table 9).

The strict consensus tree given by equally weighted parsimony analysis demonstrated the monophyly of every genus except for *Glypta*, the monophyly of which was not supported by any autoapomorphy (Fig. 1045). *Glyptopimpla* and *Orientoglypta* were each placed into the separate monophyletic groups (Fig. 1045). *Townesion* and *Teleutaea* were made up to a single clade while including an out group (Fig. 1045).

### 2.2. Intrageneric relationships

The results of analyses showed four clades in *Apophua*, i.e., (1) all *Apophua* except for *A. maetai*, (2) *A. aquilonia* + *A. evanescens*, (3) *A. sugaharai* + *A. elegans* + *A. kikuchii*,

and (4) *A. elegans* + *A. kikuchii*, a single clade in *Teleutaea*, i.e., *T. minamikawai* + *T. sachalinensis*, a single clade in *Glyptopimpla*, i.e., *G. iwatai* + *G. kusigematii* + *G. momoi*, and five clades in *Glypta* and *Diblastomorpha*, i.e., (1) *G. japonica* + *G. maruyamensis* + *D. cylindrator* + *G. kuslitzkii* + *G. rufa*, (2) *D. cylindrator* + *G. kuslitzkii* + *G. rufa*, (3) *G. kuslitzkii* + *G. rufa*, (4) *G. biauriculara* + *G. kamijoi* + *G. tamanukii*, and (5) *G. kamijoi* + *G. tamanukii* (Fig. 1045).

### 3. Discussion

The present phylogenetic analyses based on morphological data virtually support the generic classification of the tribe Glyptini proposed in Chapter III, except for *Glypta*. Monophyly of the largest genus *Glypta* and its species groups could not be demonstrated, and thus the classification of *Glypta* is challenged and should be revised. To solve these phylogenetic problems, especially of *Glypta*, molecular information would be convenient and required.

## **Chapter V**

# **GENERAL DISCUSSION AND CONCLUSION**

## 1. Evaluation of morphological characters for classification

In this study, I have evaluated morphological characters of adult wasps for the classification and identification of the Glyptini. Some findings and suggestions are summarised as follows:

- (1) The length/width of head is stable within species and is also rather stable in each genus.
- (2) The length/width of face is stable within species.
- (3) MSL is one of useful characters to descrimate species.
- (4) OOL/OD and POL/OD are somewhat largely varied intraspecifically, and thus they are usually not useful for the identification of species.
- (5) The structures of frons and antennal socket are stable within species.
- (6) The size of the yellow area(s) of dorsal margin of pronotum and/or collar is usually variable within species. However, if the yellow area is represented by a small spot at the postero-dorsal corner, it is intraspecifically stable.
- (7) Propodeal carinae, excluding pleural carina and posterior transverse carina, are frequently varied intraspecifically in strength or presence/absence. Therefore, the classification and thus identification of species based only on propodeal carinae should be avoided. Although the condition of propodeal carinae is often used for the classification of the Ichneumonidae, it is not applicable in the Glyptini.
- (8) The length/width of T1 is rather stable within species, but that of T2 and following tergites are often unstable due to cuticle deformation.
- (9) It is often very difficult to make accurate measurements of the length of median dorsal carina of T1 under stereoscopic microscopes. Thus, the identification of species based only on this character should be avoided.
- (10) The posterior transverse impression or groove of T2 has been used in the classification of *Glypta*, but it is often varied intraspecifically.
- (11) If the length of ovipositor sheath is accurately measured, it is the most useful character for the classification and identification of the Glyptini. However, its accurate measurements can be made only by the careful method (see Chapter II).
- (12) Although male genitalia is sometimes useful in the classification of ichneumonids (e.g., Konishi, 2005), it cannot be used for species identification of Japanese Glyptini. However, the length of apodema sternalis and the structure of inner margin and apex of paramere are valid for the generic classification.

## 2. Species diversity and zoogeography

### 2.1. Distribution pattern of each genus

I have updated the faunal information about all Japanese genera and species of the Glyptini. Based on that, I will discuss their species diversity and zoogeography, excluding *Glypta*. I have recognized many species of *Glypta* from Japan, but this genus is almost unknown in adjacent Asian areas, except for Russian Far East (Kuslitzky, 2007), even in which many undetermined species are present (W. S. Kuslitzky, pers. comn.). Therefore, it is difficult to make a good discussion on the diversity and zoogeography of *Glypta* at the present time.

The genera composed of a single species, *Cephaloglypta* and *Diblastomorpha*, are both widely distributed through the Palaearctic region (Yu *et al.*, 2012). The distribution of *Cephaloglypta* is apparently closely associated with the range of coniferous forests. In fact, it is commonly collected in Hokkaido while only sparsely in Honshu. *Diblastomorpha* is also a common and widely distributed genus in Eurasia (Yu *et al.*, 2012), but its distribution in Japan is restricted to Hokkaido and its adjacent islands. The similar distribution pattern in the northern territory is recognized in some other Japanese ichneumonids, e.g., *Eremotylus* Förster (Ophioninae) (Townes *et al.*, 1965; Yu *et al.*, 2012).

The genera *Apophua* and *Teleutaea* consist of the species widely distributed in Eurasia and those endemic to Far East Asia (Yu *et al.*, 2012). In both genera, the number of Japanese species endemic to Far East Asia are about three times of the number of widely distributed species (Table 8). Some Japanese species widely distributed in Eurasia (e.g., *A. bipunctoria*, *A. evanescens*, *T. striata*) are frequently collected in Japan. In particular, *A. bipunctoria* and *A. evanescens* are common and rather dominant throughout Japan, from Hokkaido to Kyushu, contrasting with the species of *Cephaloglypta* and *Diblastomorpha*. The similar pattern of distribution is also known in some other Japanese ichneumonids, e.g., *Sympherta* Förster (Ctenopelmatinae) (Hinz, 1991; Yu *et al.*, 2012).

The genera *Glyptopimpla* and *Orientoglypta* are both widely distributed from Russian Far East to Indochina (Yu *et al.*, 2012), excluding a species, *G. minor* (Seyrig, 1935), distributed in Kenya (Seyrig, 1935). Their distribution range seems to be corresponded to the Sino-Japanese realm (Holt *et al.*, 2013). The similar geographical pattern is recognized in *Ishigakia* Uchida (Acaenitinae) and some other Japanese ichneumonids (Uchida, 1928; Momoi, 1970; Yu *et al.*, 2012). Most species of



*Glyptopimpla* are frequently collected in Japan, including the Ryukyus and Izu islands, especially in deciduous or evergreen broadleaf forests. In fact, *G. uchidai* uses the tortricid hosts feeding on broadleaf deciduous plants and thus the distribution of *Glyptopimpla* may be related with that of broadleaf-feeding hosts. On the other hand, the species of *Orientoglypta*, *O. watanabei*, is also frequently collected in Japan but its habitat is various from coniferous forests to deciduous broadleaf forests with a wide vertical distribution.

The distribution of *Townesion* is restricted to Far East Asia, showing the two species ectopically distributed in Russian Far East and Japan (Kasparyan, 1993; Kasparyan & Tolkanitz, 1999). According to Gauld & Wahl (2000), the distribution pattern of *Townesion* and its sister group, *Sachtrebernia*, distributed in the Oriental region can be explained as ice age relics. Many other ice age relics, e.g., *Aplomerus* Provancher, and *Rodrigama* Gauld, are also found from New World and their distribution seems disjunctive (Watanabe & Matsumoto, 2010; Broad & Matsumoto, 2011), and thus *Townesion* may be found from North America.

In the Japanese Glyptini excluding *Glypta*, only seven endemic species, *Apophua aquilonia*, *A. yamato*, *Glyptopimpla babai*, *G. kusigematii*, *G. momoi*, *Teleutaeta nigra* and *Townesion japonicus*, are known whereas some of them may be found later from China, Taiwan or Korea. Such small number of endemic species suggests that the speciation of Glyptini in the Japanese Archipelago in the Pleistocene was relatively less than that of other insects.

## 2.2. Species diversity of Japanese Glyptini

In this study, the regional-scale distribution pattern of Japanese Glyptini through from Hokkaido to the Ryukyus shows that its species richness is declined from north to south. This is consistent with the theoretical prediction by many authors (Townes, 1969; Owen & Owen, 1974; Janzen, 1981; Askew & Shaw, 1986; Gauld, 1986; Noyes, 1989; Askew, 1990; Skillen *et al.*, 2000; Santos & Quicke, 2011), proposed for the similar trend observed in American ichneumonids.

Hokkaido, the most northern island of Japan, has a remarkably high species richness of the Glyptini. Mixed coniferous and deciduous broadleaf forests of Hokkaido are similar to those of Russian Far East, except for the absence of *Larix gmelinii* in Hokkaido (Okitsu, 2000). Out of 24 species of the Glyptini (excluding *Glypta*) in Hokkaido, 19 species (79 %) are also found in Russian Far East (Kuslitzky, 2007; Kasparyan *et al.*, 2012). This figure may indicate that the present fauna of both regions

had mostly formed before the division of Japan and Russian Far East by the sea.

The Glyptini is markedly poor in the Ryukyus, especially in Yaeyama Islands (including Ishigakijima Is. and Iriomotejima Is.). No endemic species is found from these islands and only one species common with Taiwan, *Apophua kikuchii*, is recorded. The number of genera within the Ryukyus increases from south to north, i.e., Yaeyama Islands with one genus (*Apophua*), Okinawa Islands with three genera (*Apophua*, *Glypta* and *Glyptopimpla*), and Amami Islands with four genera (*Apophua*, *Glypta*, *Glyptopimpla* and *Teleutaea*) (Table 8). Furthermore, at most two species per genus are found from individual islands. It is interesting that the body size of the paired species in such cases never overlap each other, i.e., *Glypta densa* or *momoi* / *tumor* and *Apophua kikuchii* / *elegans* (small species/ large species). Four endemic species, *Glypta densa*, *Apophua elegans*, *Glyptopimpla kusigematii* and *Glyptopimpla momoi*, are shared with the closely related species in mainlands of Japan or Taiwan (*Glypta breviterebra*, *Apophua formosana* and *Glyptopimpla iwatai*, respectively). Their speciation may have occurred rather recently in the Ryukyus. The knowledge of ichneumonids in the Ryukyus is still poor, whereas the same pattern of distribution is also recognized in the closely related group Atrophini (Momoi, 1970; Watanabe *et al.*, 2010; Watanabe & Maeto, 2012b).

### 2.3. Comparison with other regions

Before this study, total 105 species of the Glyptini had been recognized from the Eastern Palaearctic region (Yu *et al.*, 2012). In this study, total 55 new species (not including *Glyptopimpla kusigematii* and *G. momoi*, because they are endemic to the Oriental region) have been added to the fauna and thus eight genera and 161 species of the Glyptini are known from the Eastern Palaearctic region. This number of species is about twice from Europe (five genera and 79 species) and 1/3 from North America (four genera and 324 species, excluding introduced species) (Yu *et al.*, 2012).

This tribe has a large species richness in the Nearctic region (Dasch, 1988; Yu *et al.*, 2012), but its generic diversity is relatively poor in the region, i.e., more than 95 % of the species belong to a single genus *Glypta* and the remainders are classified into only three genera, *Apophua* (one species), *Sphelodon* Townes (four species; endemic to New World), and *Zaglyptomorpha* (one species; endemic to New World) (Dasch, 1988). Therefore, the Eastern Palaearctic region including Japan is fairly rich with the higher generic diversity of the Glyptini, contrasting with the Nearctic region.

The Neotropical region is the most studied area on the Glyptini in last three

decades. Many species have been recently described from Costa Rica (Gauld *et al.*, 2002) and two endemic genera, *Levibasis* Townes from Peru (Townes, 1970) and *Valdiviglypta* Broad *et al.* from Chile (Broad *et al.*, 2011), are known. At the present time, 57 species of six genera, *Glypta* (19 species), *Levibasis* (one species), *Sphelodon* (10 species), *Teleutaea* (one species), *Valdiviglypta* (one species), and *Zaglyptomorpha* (25 species) are recorded in the Neotropical region (Yu *et al.*, 2012). Although the ichneumonid diversity of this region is nearly unknown except for Costa Rica, the past studies indicate that the huge diversity of Glyptini is present.

In the Oriental region, 35 species of seven genera, *Apophua* (11 species; three of them are found from Japan and one of them is also endemic to Japan), *Avnia* Gupta, 2002 (one species; endemic to India), *Glypta* (eight species; three of them are distributed in Japan and two are endemic to Japan), *Glyptopimpla* (eight species; two of them are endemic to Japan), *Orientoglypta* (two species), *Sachtrebenia* (one species; endemic to Taiwan and southern China), and *Teleutaea* (four species; one of them is found from Japan), are recorded. The taxonomic study on the Oriental Glyptini is relatively poor and thus many new taxa will be found from this region.

In the Afrotropical region, three genera, *Apophua* (13 species), *Glyptopimpla* (one species), and *Sjostedtiella* Szépliget (21 species), are recorded (Yu *et al.*, 2012). *Sjostedtiella* is endemic to this region and would be closely related to *Townesion* + *Sachtrebenia* (Gauld & Wahl, 2000). All described species of this region were found before 1960's and thus many undescribed species must be present in this region. In the Australasian region, two genera, *Australoglypta* Gauld (one species: endemic to Australia) and *Apophua* (two species), are recorded, whereas many undescribed species of *Australoglypta* from this region are deposited in AEI. Thus, the true diversity of the Glyptini in the Afrotropical and Australasian regions is difficult to be estimated.

In the Palaearctic region, eight genera of the Glyptini including three endemic genera, *Cephaloglypta*, *Diblastomorpha* and *Townesion*, are known and this is the highest number of endemic genera in the world. One of them, *Townesion*, is also endemic to the Eastern Palaearctic region, and thus this region has the highest generic diversity (eight genera) in the world. All the genera recorded in the Palaearctic region are also distributed in Japan, which has the highest generic richness of the Glyptini in the world in spite of its small area.

### **3. Bionomics**

The host preference of Japanese Glyptini is virtually confined to the family Tortricidae

(Lepidoptera). Two exceptional records are known, i.e., *Teleutaea striata* from the Nymphalidae and Lycaenidae (Lepidoptera) and *Glyptopimpla uchidai* from the cradle case of the Attelabidae (Coleoptera). The latter case, however, is doubtful because the cradle cases of attelabids are sometimes secondarily used by the lepidopterous larvae including tortricids (C. Kobayashi, pers. comm.). The host preference of Glyptini is relatively narrower than its related subfamilies, Campopleginae and Cremastinae, namely nearly all hosts of Glyptini are mostly restricted within the belong to the single family Tortricidae but the latter subfamilies use a wide range of Lepidoptera (Minamikawa, 1969; Momoi, 1973).

According to the host records in Japan, some host species are parasitized by two or more glyptine species, e.g., a tortricid host *Pandemis heparana* is used by three species of *Apophua*, *A. evanescens*, *A. honmai*, and *A. sugaharai*. The larvae of tortricids make variously shaped shelters. Their steric structure, being changed by the growth of larva, may enable a single host species used by several glyptine species. The similar cases are reported on several koinobiont endoparasitoids, e.g., the gypsy moth is used by two species of *Phobocampe* Thomson (Campopleginae) in the same place (Gupta, 1983). In such cases, interspecific larval competition within the host body should be expected, whereas it is unknown for the Glyptini.

In the genera with several host records in Japan, *Apophua*, *Glypta* and *Teleutaea*, different species tend to use broadleaf-feeding hosts or conifer-feeding hosts separately without overlapping (Tables 5, 7). Namely, the host specialization between broadleaf-feeding hosts and conifer-feeding hosts can be recognized. Among these three genera, *Glypta* mainly use the tortricid hosts of the subfamily Olethreutinae, whereas the hosts of *Apophua* and *Teleutaea* are strongly biased toward the subfamily Tortricinae. Therefore, host preference should have evolved characteristically in each genus of Glyptini. It is known that the host-plant specificity of the Olethreutinae is higher than that of the Tortricinae (Dr. U. Jinbo, pers. comm.). This may be a reason for the marked species richness of *Glypta*, which mostly depends on the Olethreutinae.

#### **4. Phylogenetic problems**

The monophyly of each Japanese genus of the Glyptini, except for *Glypta*, was well demonstrated by the strict consensus tree given by equally weighted parsimony analysis based on morphological characters, therefore broadly supporting the generic classification proposed in this study.

However, the present analysis based on many OTUs and only morphological

data without weighting could not resolve the phylogenetic structure of the huge and highly diverse genus *Glypta*. Recent phylogenetic analyses of many insects are performed based on both morphological and molecular data (e.g., Quicke *et al.*, 2009). Therefore, additional phylogenetic analyse based on molecular data should be taken for the Glyptini. Molecular data (DNA) can not be extracted from most specimens deposited in museums or institutes by the effect of fumigation. Thus, fresh specimens of the Glyptini for molecular analyses should be intensively collected and stored in museums without chemical fumigation.

## 5. Conclusion

Total eight genera and 109 species of the Glyptini are recognized from Japan. These numbers indicate that Japan is one of the richest areas having high generic and species richness of Glyptini in the world. In Japan, the species richness of this group is remarkably high in Hokkaido, where 72 of 109 species are distributed. In this study, I described 57 new species, 53 of which belong to the huge genus *Glypta*.

The host records of Japanese Glyptini indicate that marked specialization among host tortricids and among host plants has evolved within the Glyptini. New host records containing forest or agricultural pests and updated keys to Japanese genera and species will make a practical contribution to applied entomology and biocontrol studies in Asia.

We should get more host records and additional distribution records in the world to elucidate the whole diversity and evolution of the tribe Glyptini. Especially for understanding the Asian diversity of the Glyptini, we need more faunal information in China, Indochina, and the island parts of Southeast Asia. My present study of Japanese Glyptini would enable us to promote world-wide researches on this highly diverse and practically important group of parasitic Hymenoptera.

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Table 1. The tribe-level classification of Banchinae.

Tribes proposed by Townes (1970)	Taxonomic status in the present study
Banchini	Tribe Banchini
Glyptini	Tribe Glyptini (incl. Townesioninae Kasparyan, 1993)
Lissonotini	Tribe Atrophini
Lycorinini	Subfamily Lycorininae
Stilbopini	Subfamily Stilbopinae
Neorhacodini	Subfamily Neorhacodinae

Table 2. Numbers of valid species and host elucidation of the genera of Glyptini before this study.

Genus	Valid species	Host
<i>Apophua</i> Morley, 1913	35	Relatively well-known
<i>Australogypta</i> Gauld, 1977	1	Poorly known
<i>Avnia</i> Gupta, 2002	1	Unknown
<i>Cephalogypta</i> Obrtel, 1956	1	Relatively well-known
<i>Glypta</i> Gravenhorst, 1829	443	Relatively well-known
<i>Glyptopimpla</i> Morley, 1913	12	Unknown
<i>Levibasis</i> Townes, 1970	1	Unknown
<i>Sachtlebenia</i> Townes, 1963	1	Unknown
<i>Sjostedtiella</i> Szépligeti, 1908	21	Unknown
<i>Sphelodon</i> Townes, 1966	13	Relatively well-known
<i>Teleutaea</i> Förster, 1869	20	Relatively well-known
<i>Townesion</i> , Kasparyan, 1993	2	Unknown
<i>Valdiviglypta</i> Broad, Notton, Sääksjärvi & Veijalainen, 2011	1	Unknown
<i>Zaglyptomorpha</i> Viereck, 1913	25	Poorly known

Table 3. Character states of *Glyptopimpla*, *Orientogypta* and *Teleutaea*.

	<i>Glyptopimpla</i>	<i>Orientogypta</i>	<i>Teleutaea</i>
1) Apical margin of clypeus	convex	convex	concave medially
2) Dorsal tubercle of antennal socket	absent	absent	sometimes present
3) Smooth area on frons	large	small	large
4) Joint of occipital carina and hypostomal carina	distad from base of mandible	close to base of mandible	distad from base of mandible
5) Dorsal part of occipital carina	broadly obliterated	complete or nearly so	complete
6) Areolet	present	present but partly weak	present
7) Apex of paramere	weakly produced posteriorly	weakly produced posteriorly	strongly produced posteriorly
8) Inner margin of paramere	concave near basal inner angle	not concave	not concave

Table 4. Measurements of morphological characters in Japanese *Apophua* (female).  
MSL: length of malar space, BWM: basal width of mandible, L: length, D: depth, W:  
width.

Species	MSL/BWM	Number of flagellomeres	Forewing L (mm)	Hind femur L/D	T1 L/W	T2 L/W	Ovipositor sheath L / hind tibia L
<i>aquilonia</i>	0.9-1.0	41-43	7.0	6.0-6.2	1.4	0.9-1.0	2.1-2.2
<i>bipunctoria</i>	0.7	44-49	6.5-8.5	6.0-6.4	1.2-1.3	0.9-1.0	2.1-2.4
<i>elegans</i>	0.8-1.0	43-46	7.5-9.0	5.8-6.0	1.4	1.0	2.3-2.5
<i>evanescens</i>	0.7	45-47	6.5-8.5	6.4-6.7	1.6-1.8	1.1-1.3	2.1-2.4
<i>honmai</i>	0.9	44-45	7.0-9.0	6.4-6.6	1.6-1.8	1.0-1.1	1.9-2.1
<i>kikuchii</i>	0.9	36-37	4.0-6.0	6.0	1.4-1.5	0.9-1.0	3.0-3.7
<i>maetai</i>	1.0	43-45	6.0-7.0	5.5-6.0	1.1-1.2	0.9	2.2-2.3
<i>stena</i>	0.8	44-47	6.5-7.5	6.0-6.4	1.4-1.5	1.0	2.0-2.2
<i>sugaharai</i>	0.7	44-47	7.5-8.5	6.4-6.5	1.4	1.0	2.2-2.3
<i>tobensis</i>	0.7	47-48	8.0-8.5	6.5-6.6	1.4	0.9-1.0	2.9-3.0
<i>yamato</i>	0.8	49-50	8.5	6.3-6.9	1.5	1.0	1.9-2.0

Table 5. Hosts and their host plants of the Japanese species of *Apophya*. Host plants in bold are conifers. T: Tortricinae. Records of host plants after “An Identification Guide of Japanese Moths Compiled by Everyone” (<http://www.jpmoth.org/>).

Species	Host moth	Host plant family	References
	<i>Acleris askolana</i> [T]	Caprifoliaceae, Saxifragaceae	Nakaya (2009)
<i>bitruncatoria</i>	<i>Choristoneura longicellana</i> [T]	Betulaceae, Ericaceae, Fagaceae, Hamamelidaceae, Juglandaceae, Oleaceae, Rosaceae, Salicaceae	Present study
	<i>Psycholoma lecheana circumclusana</i> [T]	Aceraceae, Betulaceae, Hamamelidaceae, Rosaceae, Salicaceae, Ulmaceae	Momoi <i>et al.</i> (1975)
<i>evanescens</i>	<i>Pandemis cinnamomeana</i> [T]	Berberidaceae, Betulaceae, Caprifoliaceae, Ericaceae, Lauraceae, <b>Pinaceae</b> , Rosacea, Thiacaeae, Ulmaceae	Nakaya (2009)
	<i>Pandemis heparana</i> [T]	Betulaceae, Fagaceae, Moraceae, Poaceae, Rosaceae, Salicaceae	Present study
	<i>Acleris</i> sp. [T]	Ericaceae	Nakaya (2009)
<i>hormai</i>	<i>Homonopsis illotiana</i> [T]	Aceraceae, Betulaceae, Caprifoliaceae, Ebenaceae, Elaeagnaceae, Fagaceae, Lauraceae, Polygonaceae, Rhamnaceae, Rosaceae, Salicaceae	Nakaya (2009)
	<i>Pandemis heparana</i> [T]	Betulaceae, Fagaceae, Moraceae, Poaceae, Rosaceae, Salicaceae	Momoi (1978)
	<i>Acleris ahivora</i> [T]	Betulaceae, Juglandaceae, Ulmaceae	Nakaya (2002)
<i>sugaharai</i>	<i>Adoxophyes orana fasciata</i> [T]	Araliaceae, Betulaceae, Ericaceae, Euphorbiaceae, Fabaceae, Fagaceae, Moraceae, Oleaceae, <b>Pinaceae</b> , Polygonaceae, Rosaceae, Salicaceae, Ulmaceae	Nakaya (2009)
	<i>Pandemis heparana</i> [T]	Betulaceae, Fagaceae, Moraceae, Poaceae, Rosaceae, Salicaceae	Momoi (1978)
	<i>Psycholoma lecheana circumclusana</i> [T]	Aceraceae, Betulaceae, Hamamelidaceae, Rosaceae, Salicaceae, Ulmaceae	Momoi (1978)
	<i>Archips oporamus</i> [T]	<b>Pinaceae</b> , <b>Taxaceae</b> , <b>Taxodiaceae</b>	Momoi (1965)
	<i>Archips pulcher</i> [T]	<b>Pinaceae</b> , <b>Taxaceae</b>	Momoi (1965)
<i>tobensis</i>	<i>Choristoneura diversana</i> [T]	Betulaceae, Cercidiphyllaceae, Fagaceae, Moraceae, <b>Pinaceae</b> , Rosaceae, Salicaceae, Ulmaceae	Kamijo (1973)
	<i>Homona issiki</i> [T]	<b>Taxodiaceae</b>	Momoi (1965)

Table 6. Major character states to separate *Glypta cymolomiae* and its allied species. L: large; S: small; P: pointed; R: rounded.

Species	Size of frontal horn	Apex of frontal horn	MSL / BWM	Hind femur L/D	Basal yellow area of TS1	T1 L/W	Ovipositor sheath L / hind tibia L
<i>cymolomiae</i>	L	R	1.0-1.1	5.2-5.8	0.5	1.2	2.1-2.2
<i>daisetsuzana</i>	S	P	0.8	6.5	0.1	1.4	2.5
<i>densepunctata</i>	L	P	1.0	5.7	0.5	1.1	2.8
<i>extincta</i>	L	P	1.0-1.1	6.0	0.3	1.3-1.4	1.7-1.9
<i>flavitorsus</i>	L	R	1.0	6.0	0.8	1.2	2.4
<i>karasawensis</i>	S	P	0.8	6.2	0.2	1.2	2.4
<i>nipponica</i>	L	R	0.8	5.5	0.5	1.2	2.5
<i>shigaensis</i>	L	P	1.0	5.8	0.6	1.2	2.5
<i>suwai</i>	L	P	1.0	5.1	0.5	1.1	2.3
<i>touyaensis</i>	L	P	1.0	5.4	0.5	1.3	2.9
<i>zenibakoensis</i>	S	P	1.1	5.5-6.0	0.5	1.2-1.3	2.1-2.2

Table 7. Hosts and their host plants of the Japanese species of the *Conoblasta* group of *Glypta*. Host plants in bold are conifers. T: Tortricinae; O: Olethreutinae. Records of host plants after “An Identification Guide of Japanese Moths Compiled by Everyone” (<http://www.jpmoth.org/>). \* I did not confirm the identification of *G. cymolomiae*.

Species	Host moth	Host plant family	Reference
<i>biauriculata</i>	<i>Olethreutes sideranus</i> [O]	Rosaceae, Saxifragaceae	Present study
	<i>Acleris enitescens</i> [T]	Fabaceae, Rosaceae	Nakaya (2009)*
	<i>Acleris ulmicana</i> [T]	Ulmaceae	Momoi (1963)
<i>cymolomiae</i>	<i>Grapholita molesta</i> [O]	Rosaceae	Uchida (1933), Haeussler (1940) Momoi (1963)
	<i>Hedya dimidiana</i> [O]	Rosaceae, Rutaceae	Nakaya (2009)*
	<i>Olethreutes mori</i> [O]	Moraceae	Uchida (1932), Momoi (1963) Kusigemati (1987)
<i>kamijoi</i>	<i>Lozotaenia coniferana</i> [T]	<b>Pinaceae</b>	Momoi (1966)
	<i>Cymolomia hartigiana</i> [O]	<b>Pinaceae</b>	Momoi (1966)
<i>shigaensis</i>	<i>Olethreutes moderatus</i> [O]	Betulaceae, Ericaceae, Fagaceae, Rosaceae	Present study

Table 8. Japanese Glyptini. Black and gray parts indicate new records and new species, respectively. W PAL: Western Palaerctic region; RUS FE: Russian Far East; HOK: Hokkaido (including Kunashiri, Etorofu, Shikotan, Rishiri and Okushiri islands); HON: Honshu (including Sado Island); SHI: Shikoku; KYU: Kyushu (including Tsushima and Yakushima islands); RYU: Ryukyu islands; FOR: Taiwan; CHI: China.

Taxon	Host	Male	W PAL	RUS FE	HOK	HON	SHI	KYU	IZU	RYU	FOR	CHI
<b>Townesion</b>		○		○	○	○	○					
1 <i>Townesion japonicus</i> Kasparyan, 1999		○		○	○	○	○					
<b>Teleutaea</b>	○	○	○	○	○	○	○	○	○	○		○
2 <i>Teleutaea brischkei</i> (Holmgren, 1860)	○	○	○	○	○	○	○	○	○	○		○
3 <i>Teleutaea diminuta</i> Momoi, 1978	○	○		○	○	○	○					○
4 <i>Teleutaea minamikawai</i> Momoi, 1963	○	○		○	○	○	○	○		○		
5 <i>Teleutaea mishae</i> Kuslitzky, 1973	○	○		○	○	○	○	○				
6 <i>Teleutaea nigra</i> Momoi, 1978	○	○		○	○	○	○	○				
7 <i>Teleutaea nigricoxalis</i> (Uchida, 1928)	○	○		○	○	○	○	○				
8 <i>Teleutaea orientalis</i> Kuslitzky, 1973	○	○		○	○	○	○					○
9 <i>Teleutaea sachalinensis</i> Uchida, 1928	○	○		○	○	○	○					○
10 <i>Teleutaea striata</i> (Gravenhorst, 1829)	○	○	○	○	○	○	○	○				○
11 <i>Teleutaea ussuriensis</i> (Golovisnin, 1928)	○	○		○	○	○	○					○
<b>Glyptopimpla</b>	○	○		○	○	○	○	○	○	○	○	
12 <i>Glyptopimpla babai</i> (Momoi, 1978)	○	○		○	○	○	○					
13 <i>Glyptopimpla iwatai</i> (Momoi, 1963)	○	○		○	○	○	○					
14 <i>Glyptopimpla kusigematii</i> sp. nov.												
15 <i>Glyptopimpla macrofossa</i> (Momoi, 1963)	○	○		○	○	○	○	○	○			
16 <i>Glyptopimpla momoi</i> sp. nov.												
17 <i>Glyptopimpla uchidai</i> (Momoi, 1963)	○	○		○	○	○	○					
<b>Orientoglypta</b>		○		○	○	○	○	○				○
18 <i>Orientoglypta watanabei</i> (Momoi, 1963)		○		○	○	○	○	○				○
<b>Cephaloglypta</b>	○	○	○	○	○	○						
19 <i>Cephaloglypta murinanae</i> (Bauer, 1941)	○	○	○	○	○	○						
<b>Apophua</b>	○	○	○	○	○	○	○	○	○	○	○	○
20 <i>Apophua aquilonia</i> (Momoi, 1963)	○	○	○	○	○	○	○	○	○	○	○	○
21 <i>Apophua bipunctoria</i> (Thunberg, 1822)	○	○	○	○	○	○	○	○				
22 <i>Apophua elegans</i> sp. nov.												
23 <i>Apophua evanescens</i> (Ratzeburg, 1848)	○	○	○	○	○	○	○	○				
24 <i>Apophua honmai</i> Momoi, 1978	○	○			○	○	○	○				
25 <i>Apophua kikuchii</i> (Uchida, 1932)	○	○			○	○	○	○				
26 <i>Apophua maetai</i> Momoi, 1978	○	○		○	○	○	○	○		○	○	
27 <i>Apophua stena</i> (Momoi, 1963)	○	○		○	○	○	○	○				○
28 <i>Apophua sugaharai</i> Momoi, 1978	○	○			○	○	○	○				
29 <i>Apophua tobensis</i> (Uchida, 1928)	○	○		○	○	○	○	○				
30 <i>Apophua yamato</i> sp. nov.												
<b>Diblastomorpha</b>	○	○	○	○	○							
31 <i>Diblastomorpha cylindrator</i> (Fabricius, 1787)	○	○	○	○	○							

Table 8. Japanese Glyptini (continued). Black and gray parts indicate new records and new species, respectively. W PAL: Western Palaerctic region; RUS FE: Russian Far East; HOK: Hokkaido (including Kunashiri, Etorofu, Shikotan, Rishiri and Okushiri islands); HON: Honshu (including Sado Island); SHI: Shikoku; KYU: Kyushu (including Tsushima and Yakushima islands); RYU: Ryukyu islands; FOR: Taiwan; CHI: China.

Taxon	Host	Male	W PAL	RUS FE	HOK	HON	SHI	KYU	IZU	RYU	FOR	CHI
<i>Glypta</i>	○	○	○	○	○	○	○	○	○	○	○	○
<b>(Conoblasta group)</b>												
32 <i>Glypta acares</i> Momoi, 1965						○		○				
33 <i>Glypta biauriculata</i> Strobl, 1901	○	○	○	○	○	○						
34 <i>Glypta cognata</i> sp. nov.					○							
35 <i>Glypta cymolomiae</i> Uchida, 1932	○	○			○	○						
36 <i>Glypta daisetsuzana</i> sp. nov.					○							
37 <i>Glypta densepunctata</i> sp. nov.								○				
38 <i>Glypta delicatula</i> Kuslitzky, 2007				○	○							
39 <i>Glypta extincta</i> Ratzeberg, 1852	○	○	○	○		○						
40 <i>Glypta flavitarsus</i> sp. nov.					○							
41 <i>Glypta ichitai</i> sp. nov.		○			○	○						
42 <i>Glypta kamijoi</i> Momoi, 1966	○	○			○							
43 <i>Glypta karasawensis</i> sp. nov.								○				
44 <i>Glypta lapponica</i> Holmgren, 1860	○	○	○	○	○	○						○
45 <i>Glypta nipponica</i> sp. nov.					○							
46 <i>Glypta shigaensis</i> sp. nov.	○					○						
47 <i>Glypta suwai</i> sp. nov.					○							
48 <i>Glypta tamanukii</i> Uchida, 1928	○	○		○	○							
49 <i>Glypta touyaensis</i> sp. nov.					○							
50 <i>Glypta tumor</i> Momoi, 1970		○						○	○	○		
51 <i>Glypta zenibakoensis</i> sp. nov.					○							
<b>(Glypta group: mariyamensis subgr.)</b>												
52 <i>Glypta elegans</i> sp. nov.		○			○	○	○			○		
53 <i>Glypta kusigematii</i> sp. nov.					○							
54 <i>Glypta mariyamensis</i> Uchida, 1928	○				○	○						
55 <i>Glypta yamamotoi</i> sp. nov.					○	○	○					
<b>(Glypta group: glypta subgr.)</b>												
56 <i>Glypta adachii</i> Uchida, 1928		○		○	○							
57 <i>Glypta akiuensis</i> sp. nov.						○						
58 <i>Glypta glypta</i> (Ashmead, 1906)		○			○	○	○	○				
59 <i>Glypta kasparyani</i> Kuslitzky, 1976				○	○							
60 <i>Glypta kochai</i> sp. nov.					○	○						
61 <i>Glypta kumaishiensis</i> sp. nov.					○							
62 <i>Glypta kuro</i> sp. nov.					○							
63 <i>Glypta maetoi</i> sp. nov.					○	○						
64 <i>Glypta minamikawai</i> sp. nov.					○	○						
65 <i>Glypta murotai</i> sp. nov.					○	○	○					
66 <i>Glypta nagasei</i> sp. nov.					○	○						
67 <i>Glypta nakamurai</i> sp. nov.					○	○						
68 <i>Glypta sudai</i> sp. nov.					○	○						
<b>(Glypta group: rufa subgr.)</b>												
69 <i>Glypta rufa</i> Uchida, 1928		○		○	○	○						

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Taxon	Host	Male	W PAL	RUS FE	HOK	HON	SHI	KYU	IZU	RYU	FOR	CHI
<i>Glypta</i>	○	○	○	○	○	○	○	○	○	○	○	○
( <i>Glypta</i> group: media subgr.)												
70 <i>Glypta aichiensis</i> sp. nov.						○	○					
71 <i>Glypta aino</i> sp. nov.					○							
72 <i>Glypta akahige</i> sp. nov.					○							
73 <i>Glypta aomoriensis</i> sp. nov.						○						
74 <i>Glypta biwakuboensis</i> sp. nov.						○						
75 <i>Glypta breviterebra</i> Momoi, 1963					○	○						
76 <i>Glypta breviungulata</i> Kuslitzky, 1976				○	○							
77 <i>Glypta daisensis</i> sp. nov.					○	○	○					
78 <i>Glypta densa</i> Momoi, 1970		○								○		
79 <i>Glypta erythronota</i> sp. nov.					○							
80 <i>Glypta ezoensis</i> sp. nov.					○							
81 <i>Glypta fujisana</i> sp. nov.						○						
82 <i>Glypta hayachinensis</i> sp. nov.						○						
83 <i>Glypta iriei</i> sp. nov.					○	○						
84 <i>Glypta japonica</i> sp. nov.					○	○						
85 <i>Glypta konishii</i> sp. nov.					○	○						
86 <i>Glypta kuslitzkii</i> sp. nov.					○	○						
87 <i>Glypta kyushuensis</i> sp. nov.	○				○	○		○				
88 <i>Glypta makiharai</i> sp. nov.	○				○	○		○				
89 <i>Glypta mame</i> sp. nov.	○					○						
90 <i>Glypta matsumotoi</i> sp. nov.							○	○				
91 <i>Glypta media</i> Momoi, 1963	○				○	○						
92 <i>Glypta momoi</i> Kuslitzky, 2007		○		○						○		
93 <i>Glypta niigatensis</i> sp. nov.						○						
94 <i>Glypta onaga</i> sp. nov.					○							
95 <i>Glypta rufata</i> Bridgman, 1887	○	○	○	○	○							○
96 <i>Glypta sankaku</i> nom. nov.						○	○					
97 <i>Glypta shibetsuensis</i> sp. nov.					○							
98 <i>Glypta shimizui</i> sp. nov.						○						
99 <i>Glypta slenda</i> sp. nov.		○			○							
100 <i>Glypta pedata</i> Desvignes, 1856					○	○	○					
101 <i>Glypta tomuraushiensis</i> sp. nov.					○							
102 <i>Glypta uenaensis</i> sp. nov.					○	○						
103 <i>Glypta yamagishii</i> sp. nov.						○						
104 <i>Glypta yamato</i> sp. nov.		○			○	○	○	○				
105 <i>Glypta yashajinensis</i> sp. nov.						○						
106 <i>Glypta yoshidai</i> sp. nov.					○							
107 <i>Glypta clypeata</i> Kuslitzky, 2007					○							
108 <i>Glypta kunashirica</i> Kuslitzky, 2007					○							
109 <i>Glypta parvicaudata</i> Bridgman, 1889	○				○							

Table 9. Character and character state matrix.

	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15	#16	#17	#18	#19	#20	#21	#22	#23	#24	#25	#26
Gta_aichiensis	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	1	0	1	0	0	0	0	0
Gta_aino	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	1	0	1	0	0	0	0	0
Gta_akahige	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Gta_aomoriensis	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	(0,1)	0	1	0	0	0	0	0
Gta_biwakuboensis	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Gta_breviterebra	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Gta_breviungulata	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	2	0	0	0	0	0
Gta_daisensis	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Gta_densa	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Gta_erythronota	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Gta_ezoensis	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	1	0	0	0	0
Gta_fujisana	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Gta_hayachinensis	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Gta_iriei	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Gta_japonica	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	1	0	1	1	0	0	0	0
Gta_konishii	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	0	0	0
Gta_matsumotoi	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	(0,1)	0	1	0	0	0	0	0
Gta_kuslitzkyi	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Gta_kyushuensis	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	1	0	0	0	0
Gta_makiharai	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	1	0	1	1	0	0	0	0
Gta_mame	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Gta_media	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	(0,1)	0	1	0	0	0	0	0
Gta_momoi	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Gta_niigatensis	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	1	0	0	0	0
Gta_onaga	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	1	0	0	0	0
Gta_rufata	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Gta_sankaku	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Gta_shibetsuensis	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Gta_shimizui	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	1	0	0	0	0
Gta_slenda	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	1	0	1	1	0	0	0	0
Gta_tadaoi	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Gta_tomuraushiensis	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	1	0	0	0	0
Gta_uenensis	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Gta_yamagishii	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	1	0	0	0	0
Gta_yamato	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Gta_yashajinensis	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	1	0	0	0	0
Gta_yoshidai	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Gta_elegans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	1	0	1
Gta_kusigematii	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	1	0	0	1	0	1	1	0	1	0	1
Gta_maruyamensis	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	(0,1)	0	1	0	0	1	0	0
Gta_yamamotoi	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0
Gta_adachii	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Gta_akiensis	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Gta_glypta	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Gta_kochai	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Gta_kumaishiensis	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Gta_kuro	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Gta_maetoi	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Gta_minamikawai	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Gta_murotai	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Gta_nagasei	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Gta_nakamurai	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	1	0	1	0	0	0	0	0
Gta_sudai	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0



Table 9. Character and character state matrix (continued).

	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15	#16	#17	#18	#19	#20	#21	#22	#23	#24	#25	#26	
Gta_rufa	1	0	0	1	0	0	0	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	0	0	0	
Gta_acares	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	
Gta_biauriculata	0	1	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	1	0	1	0	1	0	0	0	
Gta_cognata	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	
Gta_cymolomiae	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	
Gta_daisetsuzana	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	
Gta_densepunctata	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	
Gta_extincta	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	
Gta_flavitarus	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	
Gta_ichitai	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	
Gta_kamijoi	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	1	0	1	1	0	0	0	0	
Gta_karasawensis	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	
Gta_lapponica	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	
Gta_nipponica	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	
Gta_shigaensis	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	
Gta_suwai	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	
Gta_tamanukii	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	1	0	1	1	0	0	0	0	
Gta_touyaensis	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	1	0	1	1	0	0	0	0	
Gta_tumor	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	
Gta_zenbakoensis	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	1	0	1	1	0	0	0	0	
Dib_cylindror	0	0	0	0	0	0	0	0	1	0	1	1	0	1	(0,1)	0	0	0	1	0	1	0	0	0	0	0	
Ap_aquilonia	0	0	0	0	1	0	1	0	1	0	0	1	0	0	0	0	0	0	1	0	1	1	0	0	1	0	
Ap_bipunctoria	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	1	0	1	1	0	1	0	0	
Ap_elegans	0	0	0	0	0	0	2	0	1	0	0	0	1	0	0	0	0	0	1	0	1	1	0	1	0	1	
Ap_evaneszens	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	1	0	1	1	0	1	1	0	
Ap_honmai	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	1	0	1	1	0	1	0	0	
Ap_kikuchii	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	1	0	1	1	0	1	0	1	
Ap_maetai	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	1	0	1	1	0	1	0	0	
Ap_stena	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	1	0	1	1	0	1	0	0	
Ap_sugaharai	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	1	0	1	1	0	1	0	0	
Ap_tobensis	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	1	0	1	1	0	1	0	0	
Ap_yamato	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	1	0	1	1	0	1	0	0	
Cep_murinanae	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	1	0	1	0	0	0	0	1	0
Gto_babai	0	0	0	0	1	1	0	0	0	1	0	0	1	0	1	0	0	1	1	0	0	1	0	1	0	0	
Gto_iwatai	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	1	0	1	0	0	
Gto_kusigematii	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	
Gto_macrofossa	0	0	0	0	1	1	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	1	0	1	0	0	
Gto_momoi	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	1	0	1	0	0	
Gto_uchidai	0	0	0	0	1	0	0	0	0	1	0	0	1	0	1	0	0	0	1	0	0	1	0	1	0	0	
Ori_watanabei	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0	1	
Tel_brischkei	2	0	0	0	0	0	0	1	0	1	0	0	0	1	1	0	0	0	1	0	1	0	0	0	0	0	
Tel_diminuta	2	0	0	0	0	0	0	1	0	1	0	0	0	1	1	0	0	0	1	0	1	(0,1)	0	(0,1)	0	0	
Tel_minamikawai	2	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	0	1	0	0	1	1	0	
Tel_mishae	2	0	0	0	0	0	0	1	0	1	0	0	0	1	1	0	0	0	1	0	1	0	0	1	0	0	
Tel_nigra	2	0	0	0	0	0	0	1	0	1	0	0	0	1	1	0	0	0	1	0	1	0	0	0	0	0	
Tel_nigrigoxalis	2	0	0	0	0	0	0	1	0	1	0	0	0	1	1	0	0	0	1	0	1	0	0	1	0	0	
Tel_orientalis	2	0	0	0	0	0	0	1	0	1	0	0	0	1	1	0	0	0	1	0	1	0	0	1	0	0	
Tel_sachalinensis	2	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	0	1	0	0	1	1	0	
Tel_striata	2	0	0	0	0	0	0	1	0	1	0	0	0	1	1	0	0	0	1	0	1	1	0	1	0	0	
Tel_ussuriensis	2	0	0	0	0	0	0	1	0	1	0	0	0	1	1	0	0	0	1	0	1	0	0	1	0	0	
Tow_japonicus	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	2	0	0	0	0	0	
Tos_ryukyuensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0	0	
Amp_tertia	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	1	0	0	1	0	0	

Table 9. Character and character state matrix (continued).

	#27	#28	#29	#30	#31	#32	#33	#34	#35	#36	#37	#38	#39	#40	#41	#42	#43	#44	#45	#46	#47	#48	#49	#50	#51	#52	
Gta_aichiensis	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	?	?	?	
Gta_aino	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	?	?	?
Gta_akahige	0	0	0	0	0	0	0	1	0	0	1	0	1	1	0	0	0	0	0	0	1	0	1	?	?	?	
Gta_aomoriensis	0	(0,1)	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	?	?	?	
Gta_biwakuboensis	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	?	?	?	
Gta_breviterebra	(0,1)	1	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	?	?	?	
Gta_breviungulata	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	?	?	?	
Gta_daisensis	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	?	?	?	
Gta_densa	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Gta_erythronota	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	?	?	?	
Gta_ezoensis	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	1	?	?	?	
Gta_fujisana	0	0	0	0	0	0	0	1	0	0	1	0	1	1	0	0	0	0	0	0	1	1	0	?	?	?	
Gta_hayachinensis	0	1	0	0	0	0	0	1	0	0	1	0	1	0	0	1	0	0	0	0	1	1	0	?	?	?	
Gta_iriei	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	?	?	?	
Gta_japonica	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	(0,1)	0	?	?	?	
Gta_konishii	0	(0,1)	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	?	?	?	
Gta_matsumotoi	0	0	0	0	0	0	0	1	0	0	1	0	1	1	0	0	0	0	0	0	1	1	0	?	?	?	
Gta_kuslitzkyi	0	0	0	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	?	?	?	
Gta_kyushuensis	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	?	?	?	
Gta_makiharai	0	1	0	0	0	0	0	1	0	0	1	0	1	0	0	1	0	0	0	0	1	0	0	?	?	?	
Gta_mame	1	1	0	0	0	0	0	1	0	0	1	0	2	0	0	0	0	0	0	0	1	0	0	?	?	?	
Gta_media	0	(0,1)	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	?	?	?	
Gta_momoi	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0
Gta_niigatensis	0	1	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	?	?	?	
Gta_onaga	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	1	1	?	?	?	
Gta_rufata	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Gta_sankaku	0	1	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	?	?	?	
Gta_shibetsuensis	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	?	?	?	
Gta_shimizui	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	?	?	?	
Gta_slenda	0	1	0	0	0	0	0	1	0	0	1	0	1	0	0	1	0	0	0	0	1	1	0	0	0	1	
Gta_tadaoi	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	?	?	?	
Gta_tomuraushiensis	1	1	0	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	1	?	?	?	
Gta_uenaensis	0	0	0	0	0	0	0	1	0	0	1	0	1	1	0	0	0	0	0	0	1	0	1	?	?	?	
Gta_yamagishii	0	1	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	?	?	?	
Gta_yamato	0	(0,1)	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Gta_yashajinensis	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	?	?	?	
Gta_yoshidai	0	1	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	?	?	?	
Gta_elegans	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	?	?	?	
Gta_kusigematii	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	?	?	?	
Gta_maruyamensis	0	0	0	0	0	0	0	1	0	0	1	0	1	1	0	0	0	0	0	0	1	0	0	?	?	?	
Gta_yamamotoi	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	?	?	?	
Gta_adachii	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Gta_akuensis	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	1	?	?	?	
Gta_glypta	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0
Gta_kochai	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	1	1	0	0	0	1	1
Gta_kumaishiensis	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	?	?	?	
Gta_kuro	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	(0,1)	1	?	?	?	
Gta_mactoi	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	?	?	?	
Gta_minamikawai	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	?	?	?	
Gta_murotai	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	?	?	?	
Gta_nagasei	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	?	?	?	
Gta_nakamurai	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	?	?	?	
Gta_sudai	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	?	?	?	

Table 9. Character and character state matrix (continued).

	#27	#28	#29	#30	#31	#32	#33	#34	#35	#36	#37	#38	#39	#40	#41	#42	#43	#44	#45	#46	#47	#48	#49	#50	#51	#52
Gta_rufa	0	0	0	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
Gta_acares	0	0	0	0	0	0	0	0	0	0	?	0	1	0	0	0	0	0	0	0	0	1	0	0	?	?
Gta_biauriculata	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
Gta_cognata	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	?	?
Gta_cymolomiae	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
Gta_daisetsuzana	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	?	?
Gta_densepunctata	0	1	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	?	?
Gta_extincta	0	1	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
Gta_flavitarisus	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	?	?
Gta_ichitai	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
Gta_kamijoi	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	?	?
Gta_karasawensis	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	?	?
Gta_lapponica	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	?	?
Gta_nipponica	0	1	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	?	?
Gta_shigaensis	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	?	?
Gta_suwai	0	1	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	?	?
Gta_tamanukii	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	(0,1)	0	0	0
Gta_touyaensis	0	1	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	?	?
Gta_tumor	(1,2)	0	0	0	0	0	0	1	0	0	1	0	2	0	0	0	0	0	0	0	0	1	0	0	?	?
Gta_zenbakoensis	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	?	?
Dib_cylindratior	0	1	1	0	0	1	0	(0,1)	1	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
Ap_aquilonia	(0,1)	1	0	0	0	0	1	1	0	0	0	0	2	0	1	0	0	0	0	0	0	1	0	0	?	0
Ap_bipunctoria	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0
Ap_elegans	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2	0	0	0	0	0	0	1	1	0	0	?
Ap_evanesceus	0	1	0	0	0	0	1	1	0	0	0	0	1	0	(0,1)	1	0	0	0	0	0	1	0	0	0	0
Ap_honmai	0	0	0	0	0	0	1	1	0	0	0	0	0	0	(0,1)	1	0	0	0	0	0	1	0	0	0	0
Ap_kikuchii	0	0	0	0	0	0	1	1	0	0	1	0	0	0	(0,1)	0	0	0	0	0	0	1	1	0	0	0
Ap_maetai	0	0	0	0	0	0	1	1	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
Ap_stena	0	0	0	0	0	0	1	1	0	0	0	0	0	0	(0,1)	0	0	0	0	0	0	1	0	0	0	0
Ap_sugarharai	0	0	0	0	0	0	1	1	0	0	0	0	(0,1)	0	(0,1)	0	0	0	0	0	1	1	0	0	0	0
Ap_tobensis	0	0	0	0	0	0	1	1	0	0	0	0	(0,1)	0	1	0	0	0	0	0	0	1	0	0	?	0
Ap_yamato	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	?	0
Cep_murinanae	2	1	0	0	0	0	0	1	0	0	1	0	2	0	0	0	0	0	0	0	0	1	0	0	0	2
Gto_babai	0	0	0	1	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0
Gto_iwatai	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	(0,1)	1	0	0	0	1	1	0	0	0	0
Gto_kusigematii	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0
Gto_macrofossa	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	(0,1)	0	0	0	0	1	1	0	0	0	0
Gto_momoi	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0
Gto_uchidai	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0
Ori_watanabei	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2
Tel_brischkei	0	1	0	1	1	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	1	1	0	0	?	1
Tel_diminuta	0	1	0	1	1	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	1	1	0	0	?	1
Tel_minamikawai	0	1	0	1	1	0	0	1	0	0	0	0	1	0	0	1	0	0	1	1	1	0	0	1	1	2
Tel_mishae	0	1	0	1	1	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	1	1	0	0	?	1
Tel_nigra	0	1	0	1	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	1	0	0	?	1
Tel_nigricoxalis	0	1	0	1	1	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	1	1	1	0	?	1
Tel_orientalis	0	1	0	1	1	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	1	1	0	0	1	1
Tel_sachalinensis	0	1	0	1	1	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	1	1	0	0	?	1
Tel_striata	(1,2)	1	0	1	1	0	0	1	0	0	0	0	1	0	0	1	0	0	1	1	1	0	0	1	1	2
Tel_ussuriensis	0	1	0	1	1	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	1	1	0	0	1	1
Tow_japonicus	2	1	1	1	0	0	0	1	0	1	0	1	0	0	0	0	0	1	0	0	1	1	0	2	0	2
Tos_ryukyuensis	0	1	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
Amp_tertia	2	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	2

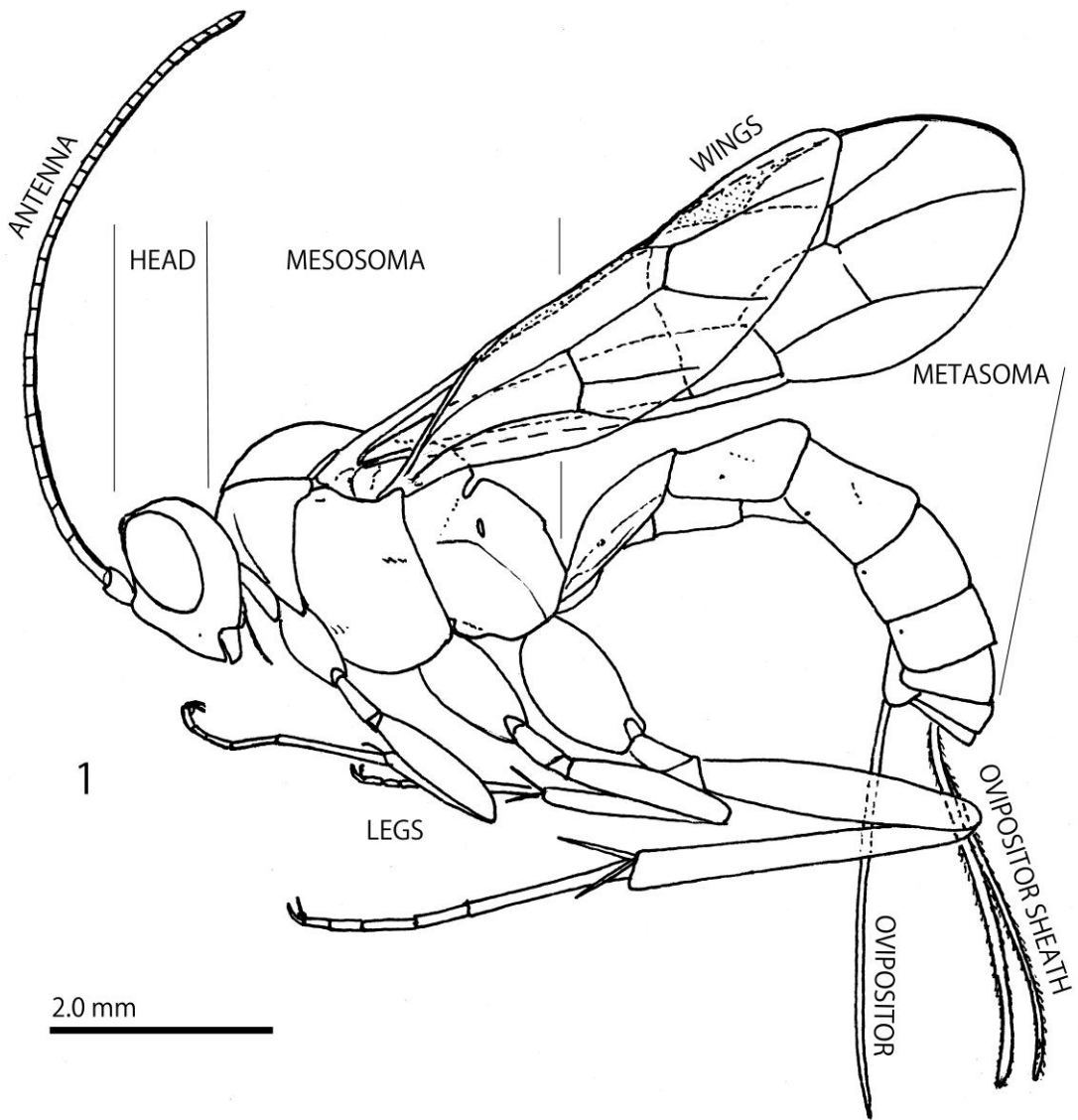
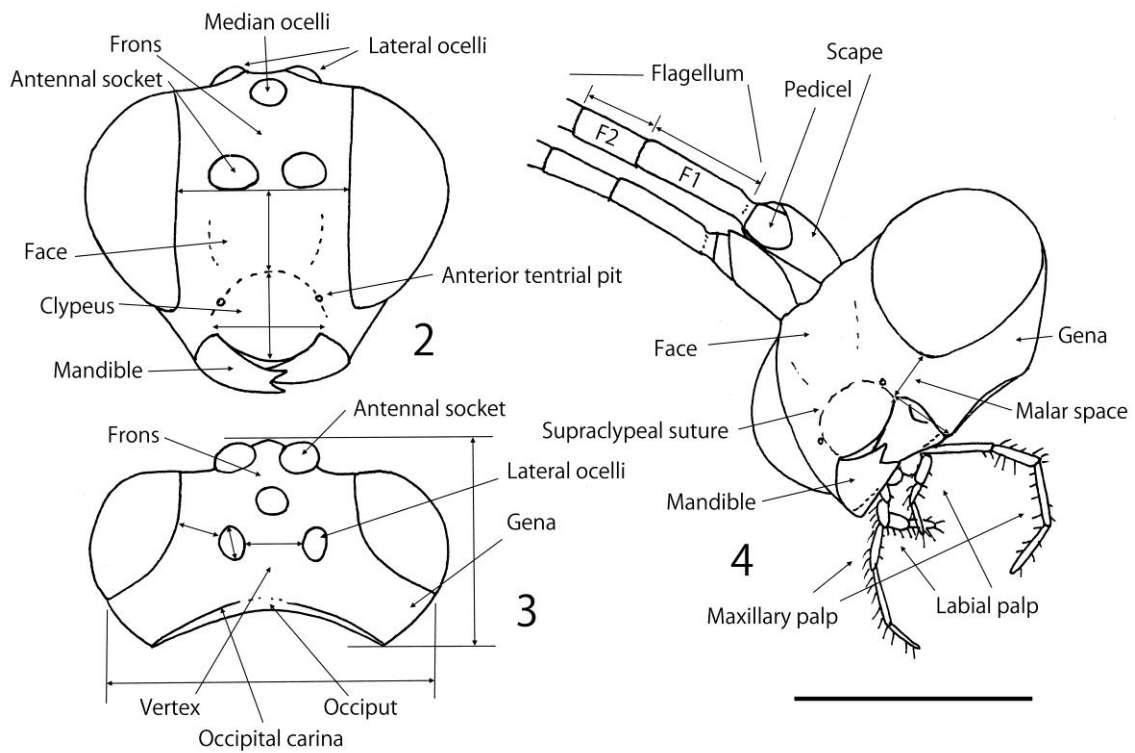
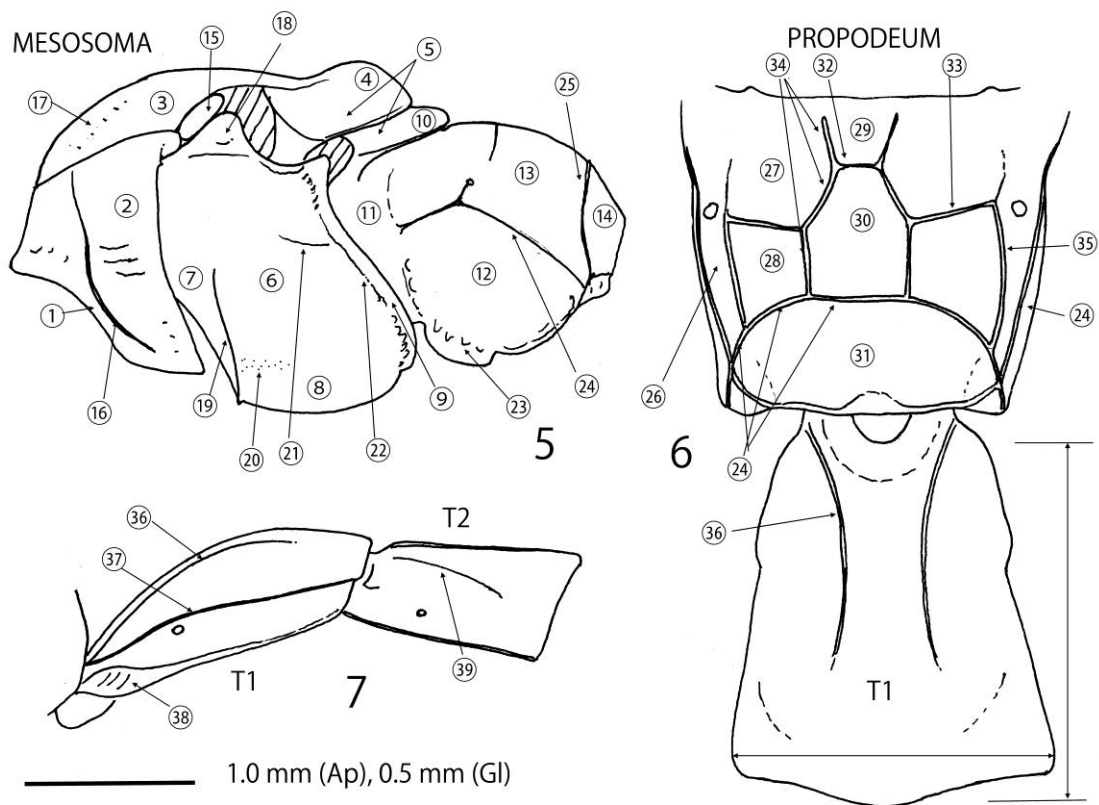


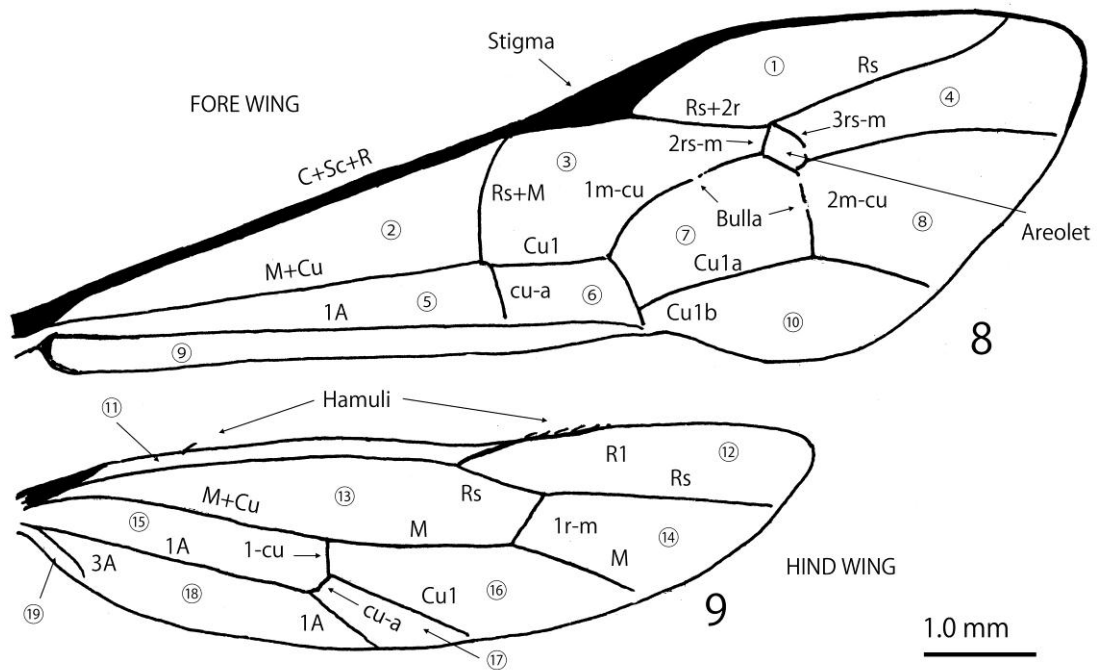
Figure 1. *Cephaloglypta murinanae*, female, lateral view.



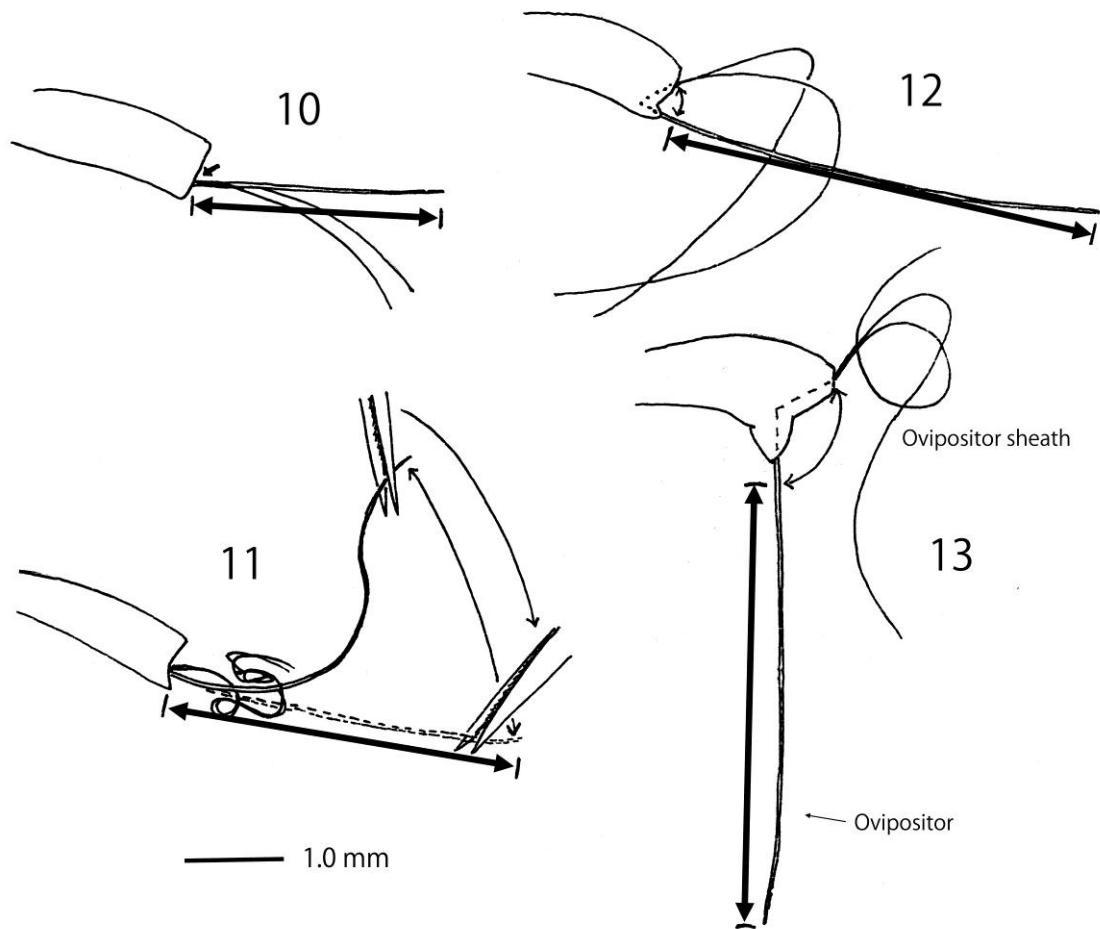
Figures 2–4. Head of Glyptini — 2, 3, *Glypta fujisana* sp. nov., female (holotype), frontal (2) and dorsal (3) view; 4, *Glypta media*, female, ventro-lateral view.



Figures 5–7. Mesosoma and metasoma of Glyptini — 5, mesosoma of *Apophua bipunctoria*, female, lateral view; 6, propodeum and T1 of *Glypta kyushuensis* sp. nov., female (paratype), dorsal view; 7, T1 and T2 of *A. bipunctoria*, female, lateral view. Number in the circle as: 1, collar; 2, lateral area of pronotum; 1+2, pronotum; 3, mesoscutum; 4, scutellum; 3+4, mesonotum; 5, axilla; 6, mesopleuron; 7, epicnemium; 8, mesepimeron; 9, mesosternum; 10, postscutellum; 11, upper division of metapleuron; 12, lower division of metapleuron; 11+12, metapleuron; 13, area dentipara + area lateralis of propodeum; 14, area postero pf propodeum; 15, tegula; 16, epomia; 17, notaulus; 18, aubalar prominence; 19, epicnemial carina; 20, sternaulus; 21, episternal scrobe; 22, mesopleural suture; 23, submetapleural carina; 24; pleural carina; 25, posterior transverse carina of propodeum; 26, area lateralis of propodeum; 27, area externa of propodeum; 28, area dentipara of propodeum; 29, area basalis of propodeum; 30, area superomedia of propodeum; 31, area postero of propodeum; 32, median section of anterior transverse carina of propodeum; 33, lateral section of anterior transverse carina of propodeum; 32+33, anterior transverse carina of propodeum; 34, lateromedian longitudinal carina of propodeum; 35, lateral longitudinal carina of propodeum; 36, median dorsal carina of T1; 37, dorsolateral carina of T1; 38, glymma; 39, oblique groove.

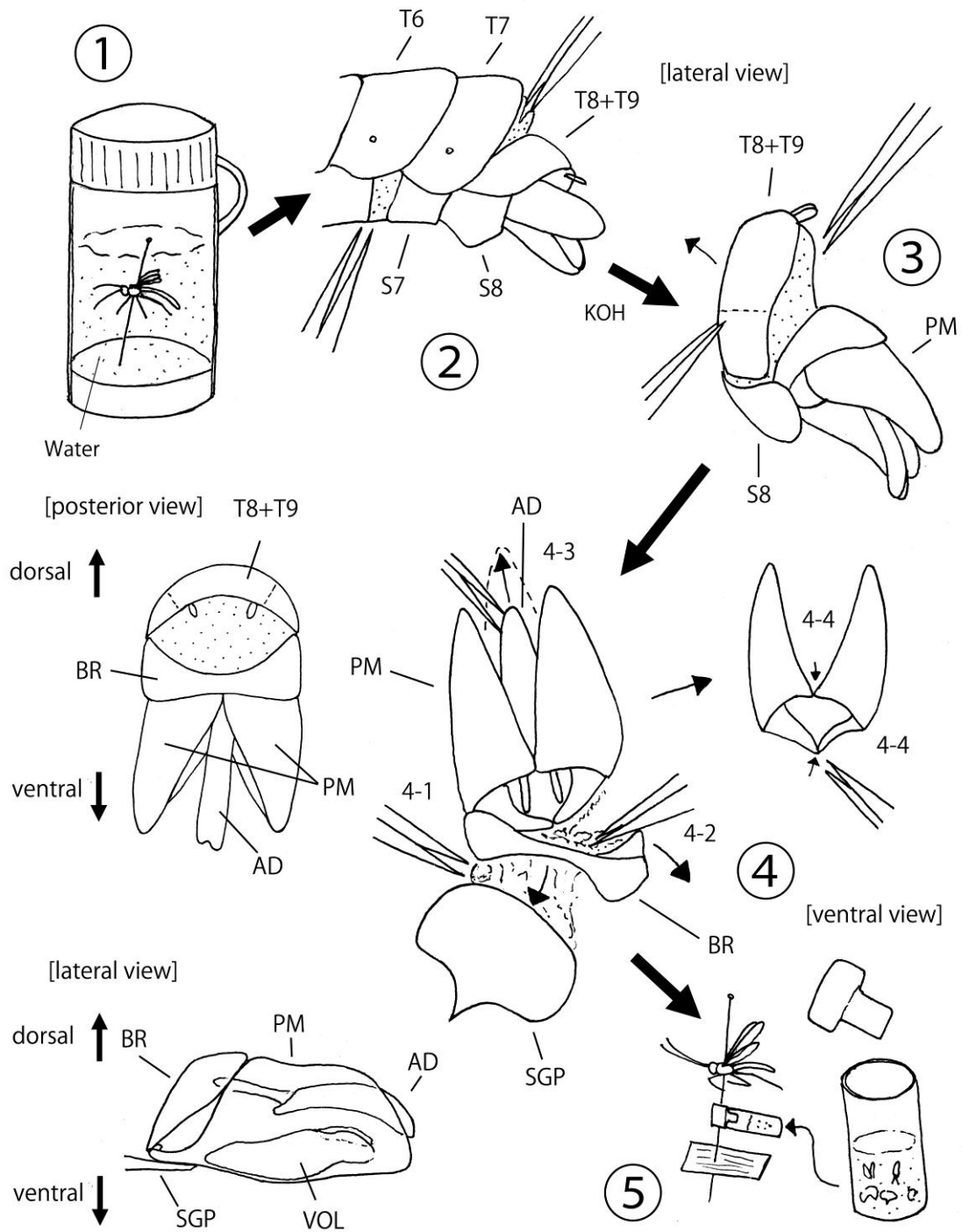


Figures 8 and 9. Wings of *Teleutaea minamikawai*, female — 8, fore wing; 9, hind wing. Number in the circle as: 1, marginal cell; 2, basal cell; 3, discosubmarginal cell; 4, subbasal cell; 5, first subdiscal cell; 6, second discal cell.



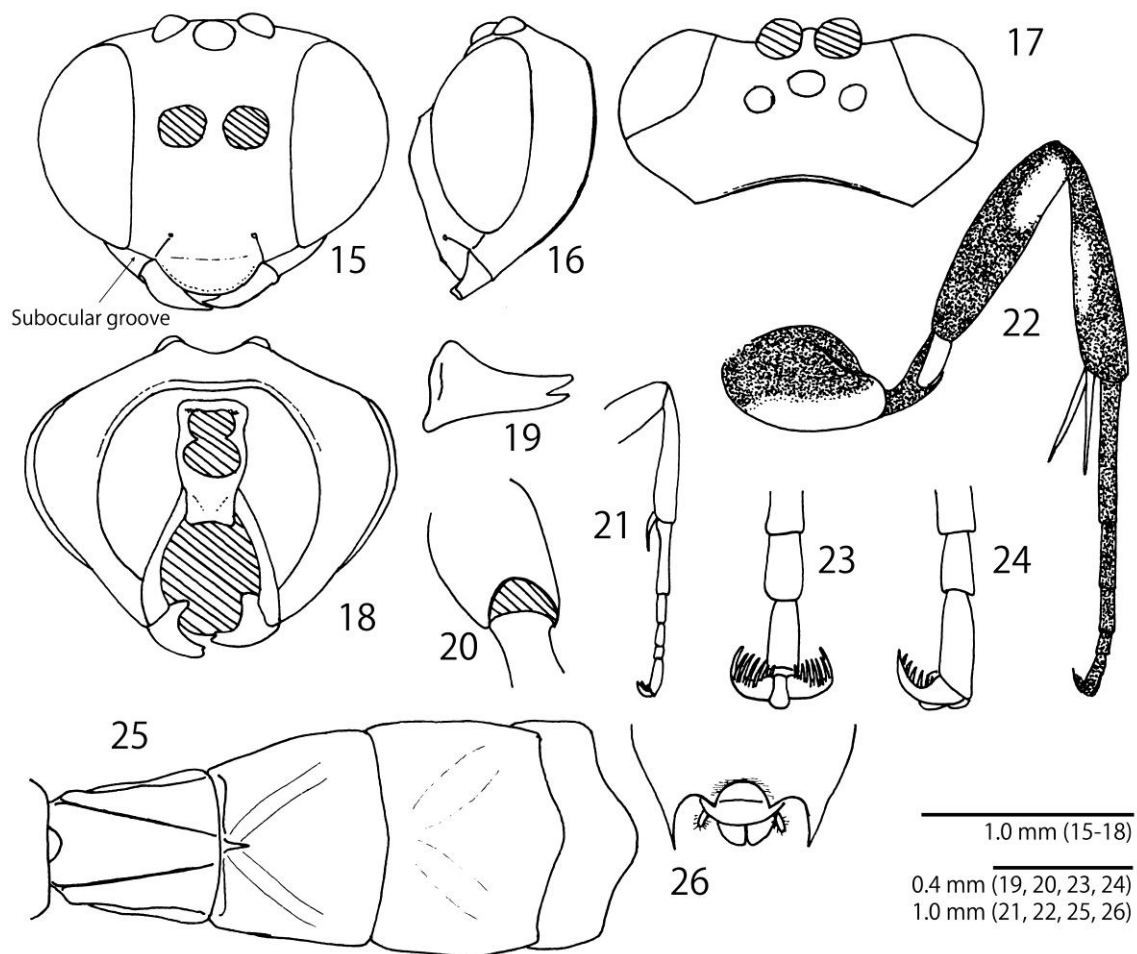
Figures 10–13. Measurements of ovipositor sheath, lateral view — 10, bases of ovipositor sheath and exposed part of ovipositor are same point in *Glypta breviterebra*; 11, strongly sinuated ovipositor in *Glypta elegans* sp. nov. (holotype); 12, 13, bases of ovipositor sheath and exposed part of ovipositor are slightly (12) or strongly (13) distant from each other in *Glypta kyushuensis* sp. nov. (paratypes).



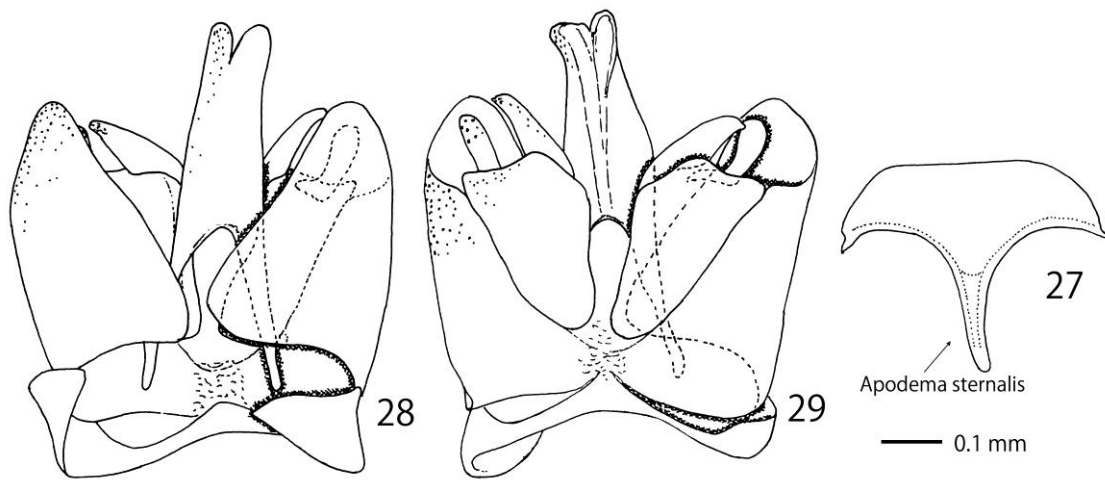


14

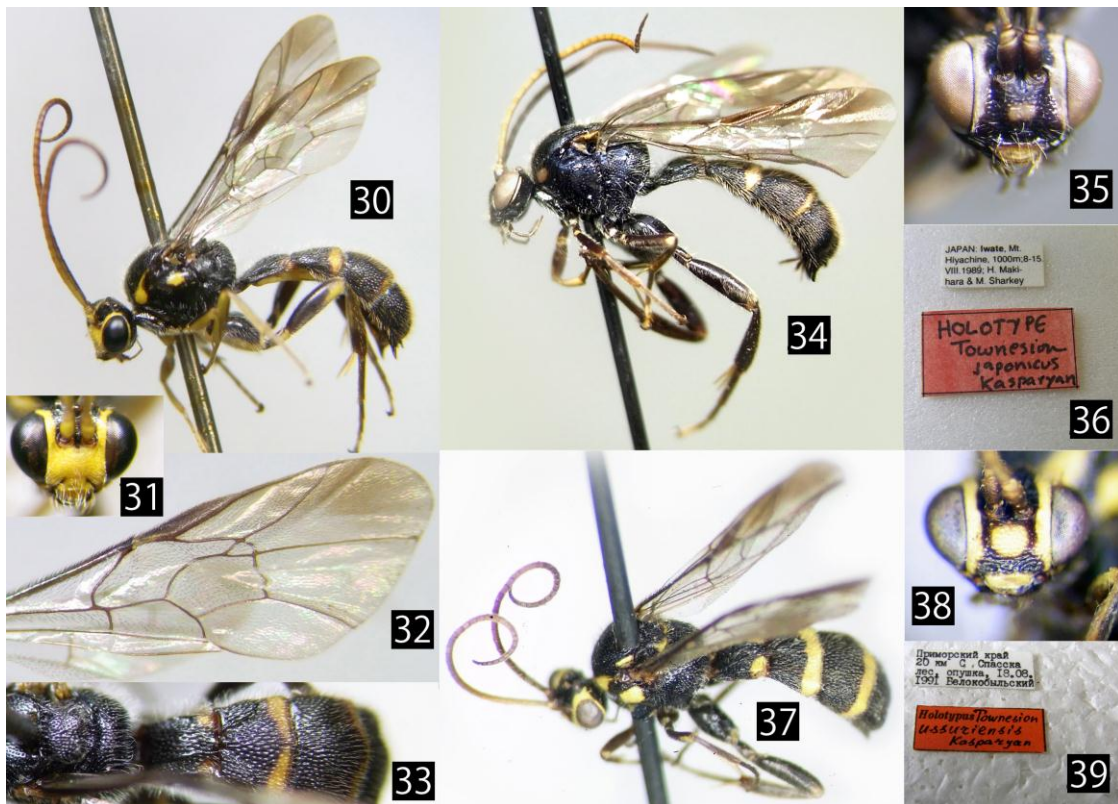
Figure 14. Methods of the dissection of male terminalia. SGP, subgenital plate; BR, basal ring; AD, aedeagus; PM, paramere.



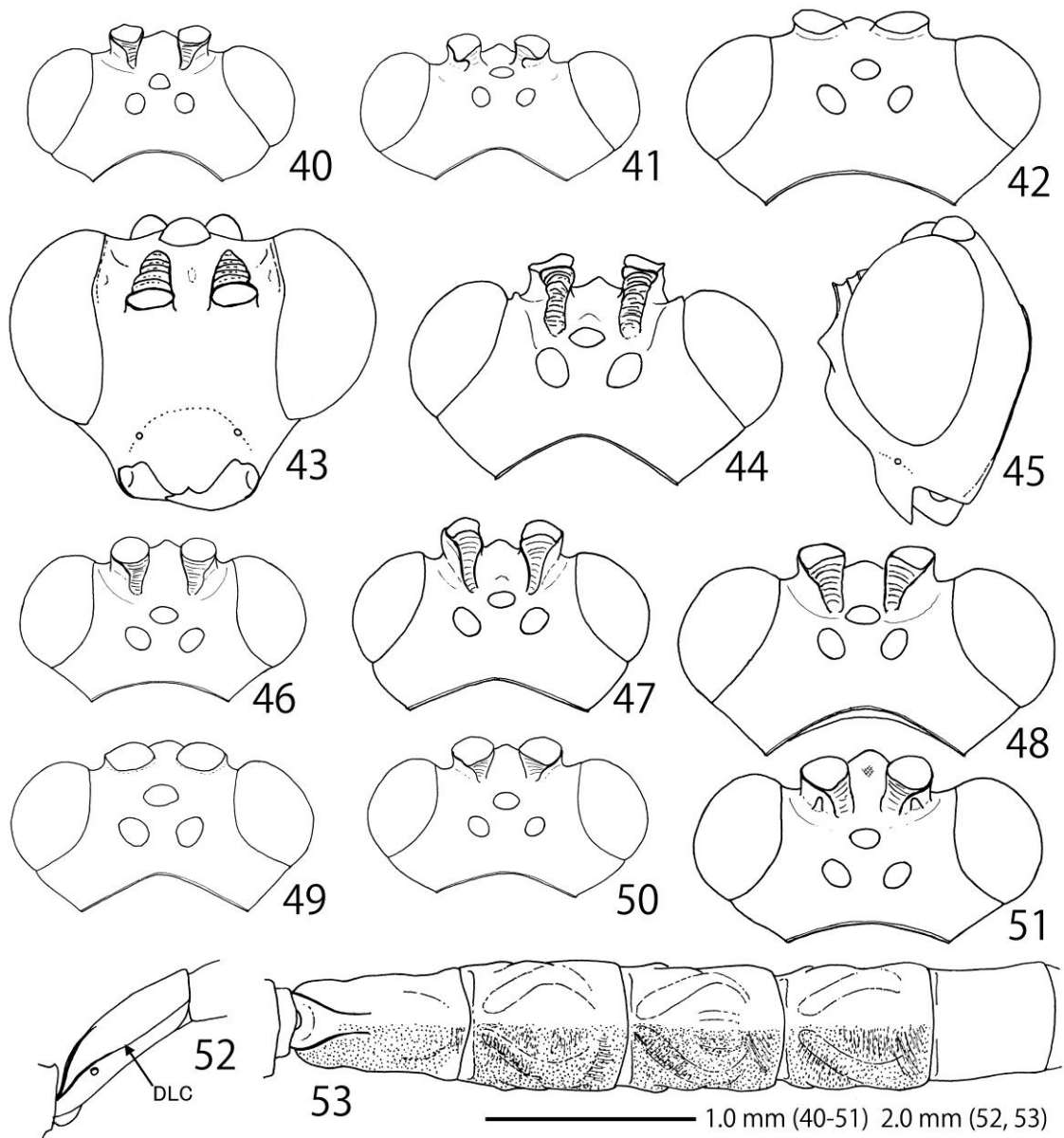
Figures 15–26. *Townesion japonicus*, male — 15–18, head, frontal (15), lateral (16), dorsal (17) and posterior (18) view; 19, outer aspect of mandible; 20, fore coxa, posterolateral view; 21, fore tibia and tarsus, anterior view; 22, hind leg, anterior view; 23, 24, hind tarsal claw(s), ventral (23) and anterior (24) views; 25, metasoma, dorsal view; 26, apical portion of metasoma, dorsal view.



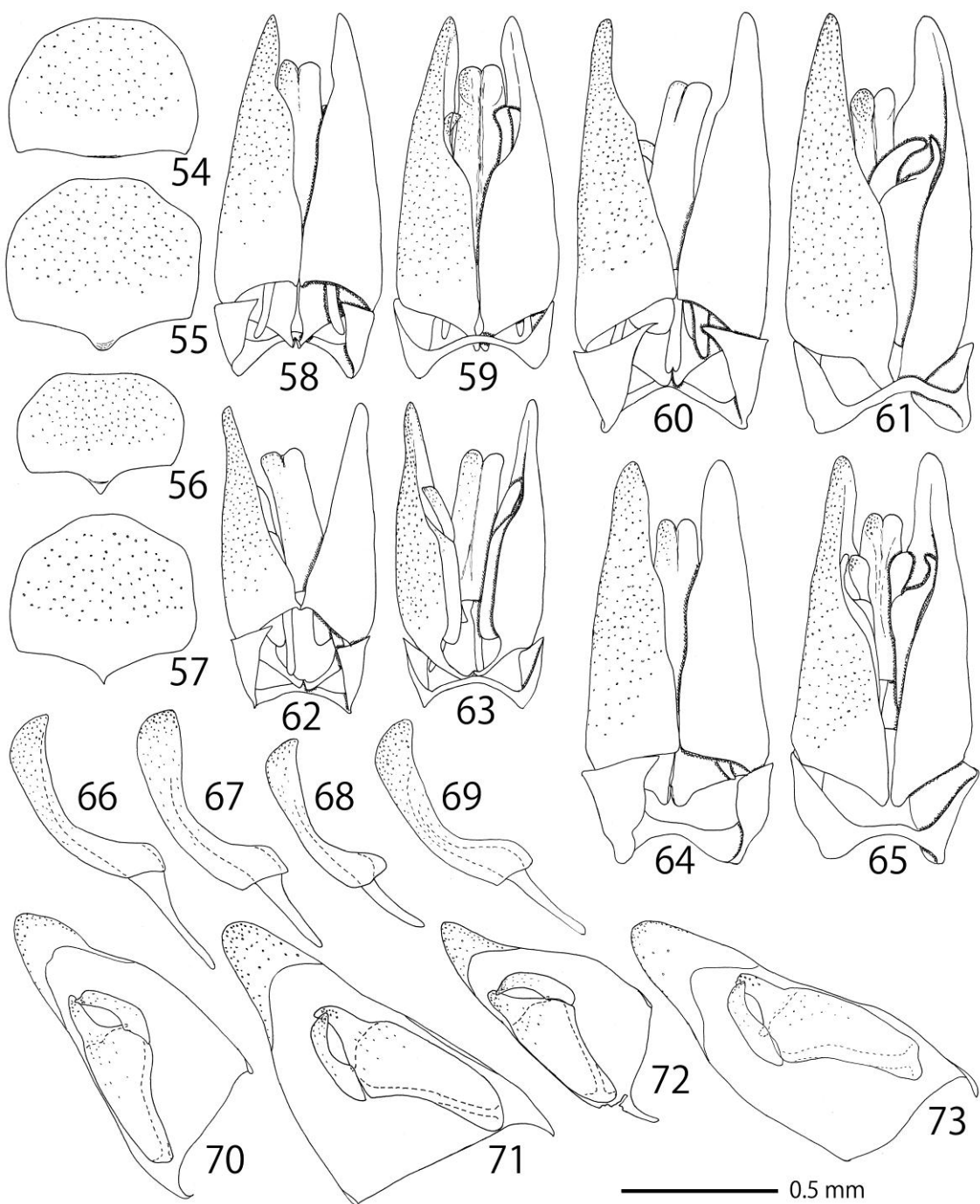
Figures 27–29. Male terminalia of *Townesion japonicus* — 27, subgenital plate, ventral view; 28, 29, genitalia, dorsal (28) and ventral (29) view.



Figures 30–39. *Townesion japonicus*, male (30–33) and female (holotype, 34, 35; deposited in AEI), and *Townesion ussuriensis*, female (holotype, 37, 38; deposited in Zoological Institute, Russian Academy of Sciences) — 30, 34, 37, lateral habitus; 31, 35, 38, head, frontal view; 32, right fore wing; 33, propodeum and metasoma, dorsal view; 36, 37, labels of holotype of *T. japonicus* (36) and *T. ussuriensis* (39).

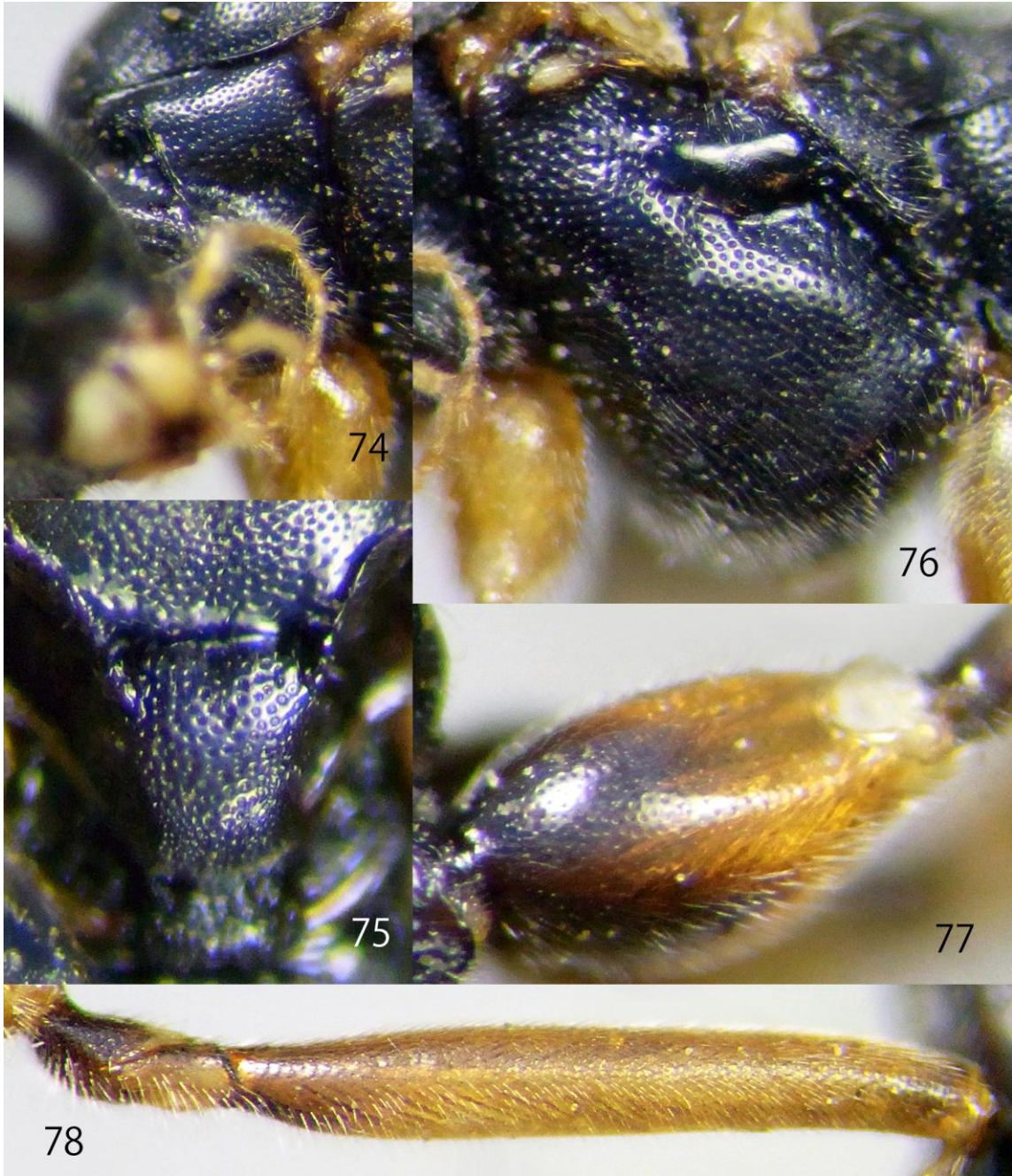


Figures 40–53. Head of *Teleutaea* spp., female (40–51), dorsal (40–42, 44, 46–51), frontal (43) and lateral (45) view, T1, female, lateral view (52) and metasomal tergites, female, dorsal view (53) — 40, *T. brisckei*; 41, *T. diminuta*; 42, *T. minamikawai*; 43–45, 52, 53, *T. mishae*; 46, *T. nigra*; 47, *T. nigricoxalis*; 48, *T. orientalis*; 49, *T. sachalinensis*; 50, *T. striata*; 51, *T. ussuriensis*.



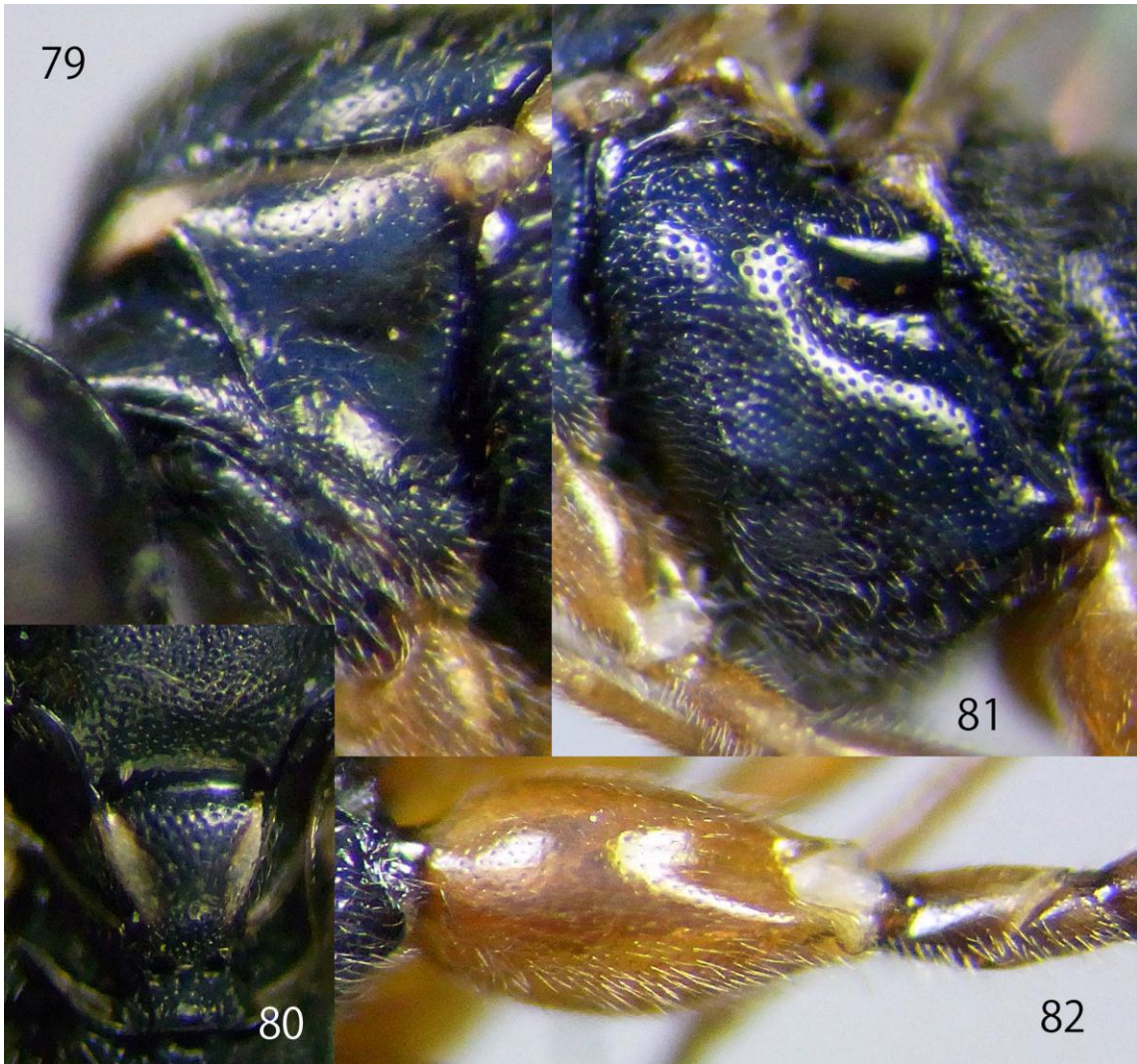
Figures 54–73. Terminalia of *Teleutaea* spp., male — 54–57, subgenital plates, ventral view; 58–65, genital cups, dorsal (58, 60, 62, 64) and ventral (59, 61, 63, 65) view; 66–69, left aedeagi, lateral view; 70–73, right (Q, S) and left (R, T) parameres, inner view. 54, 58, 59, 66, 70, *T. minamikawai*; 55, 60, 61, 67, 71, *T. orientalis*; 56, 62, 63, 68, 72, *T. striata*; 57, 64, 65, 69, 73, *T. ussuriensis*.



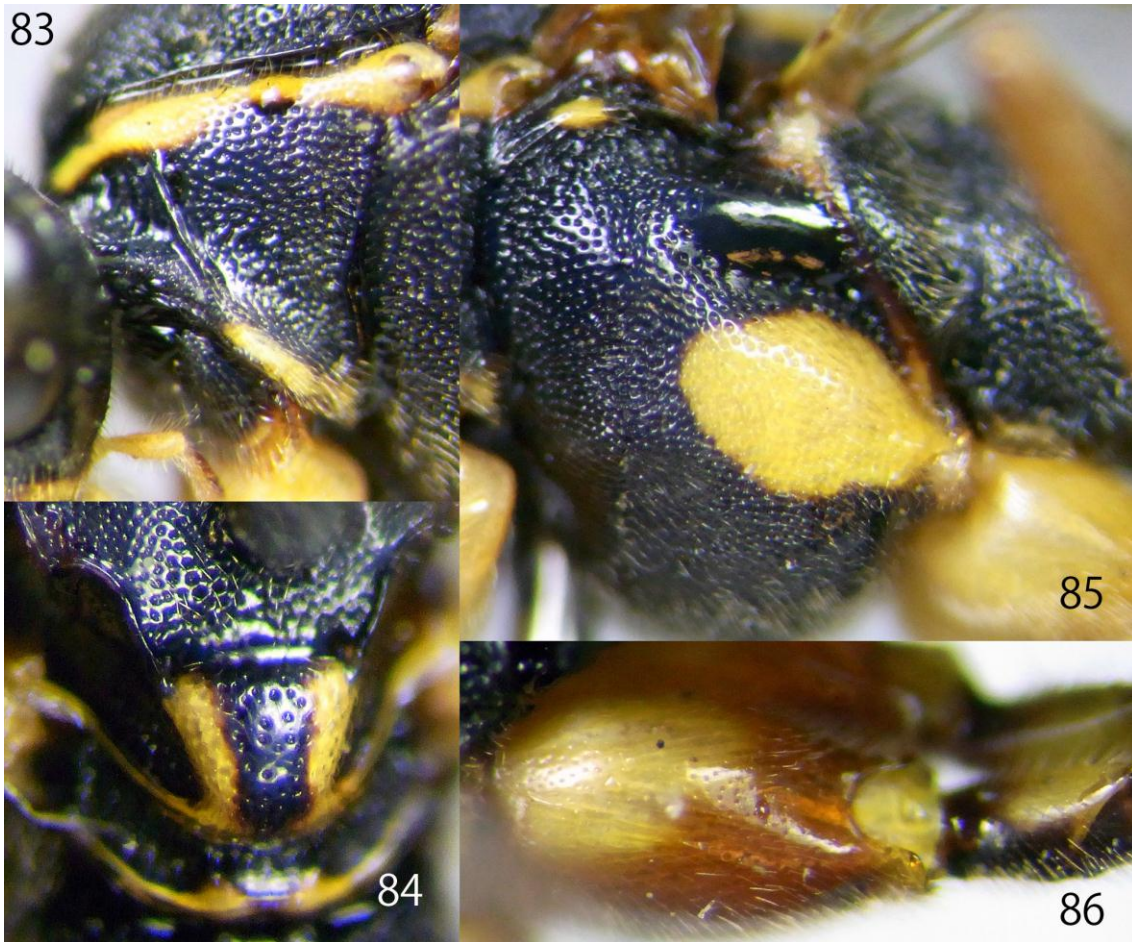


Figures 74–78. *Teleutaea brisckei*, female — 74, pronotum, lateral view; 75, scutellum and postscutellum, dorsal view; 76, mesopleuron, lateral view; 77, hind coxa, dorsal view; 78, hind femur, lateral view.





Figures 79–82. *Teleutaea diminuta*, female — 79, pronotum, lateral view; 80, scutellum and postscutellum, dorsal view; 81, mesopleuron, lateral view; 82, hind coxa, dorsal view.

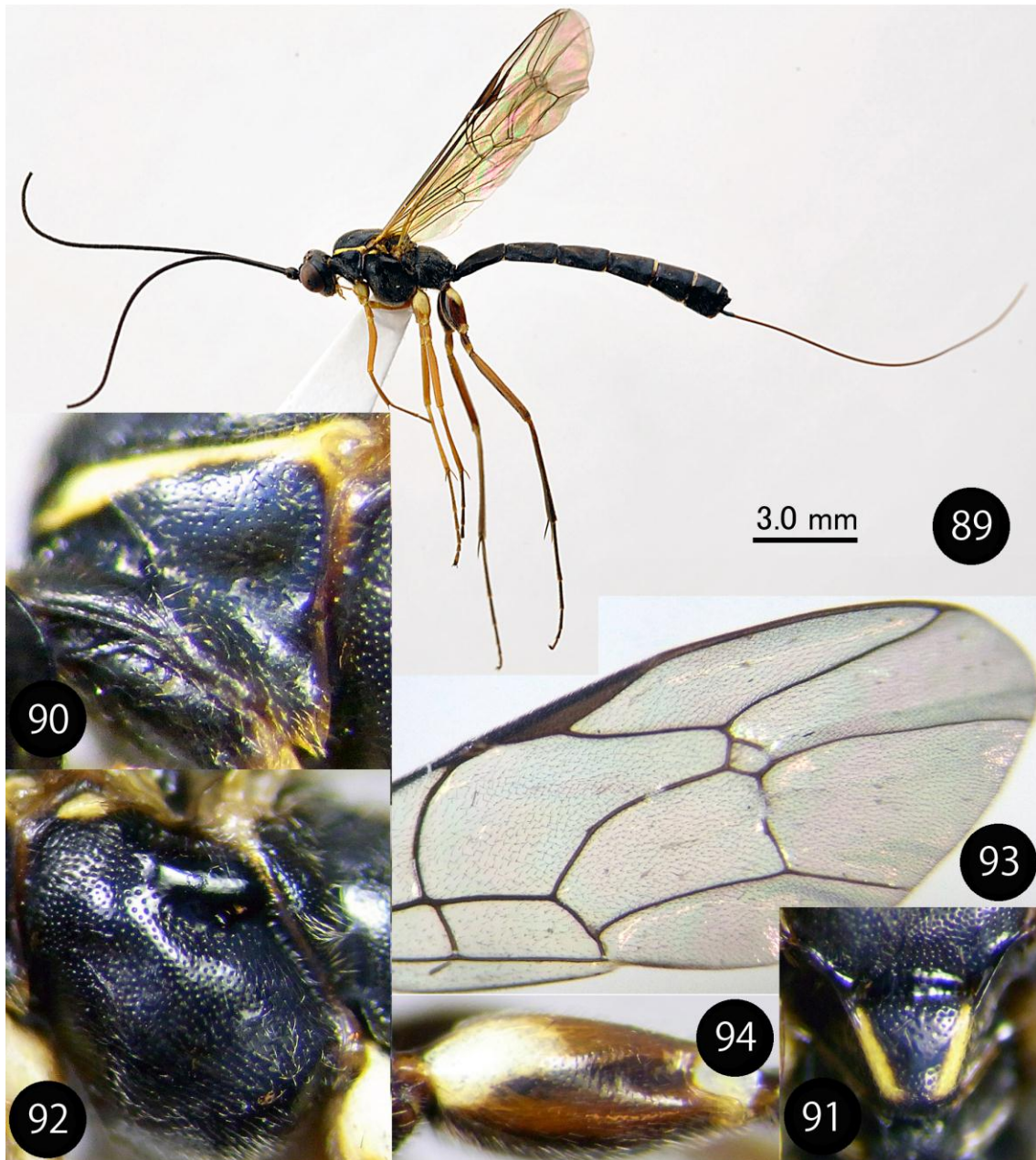


Figures 83–86. *Teleutaea minamikawai*, female — 83, pronotum, lateral view; 84, scutellum and postscutellum, dorsal view; 85, mesopleuron, lateral view; 86, hind coxa, dorsal view.





Figures 87 and 88. *Teleutaea mishae*, female (specimen from Russian Far East, holotype deposited in ZIS) — 87, habitus, lateral view; 88, pronotum and mesopleuron, lateral view.

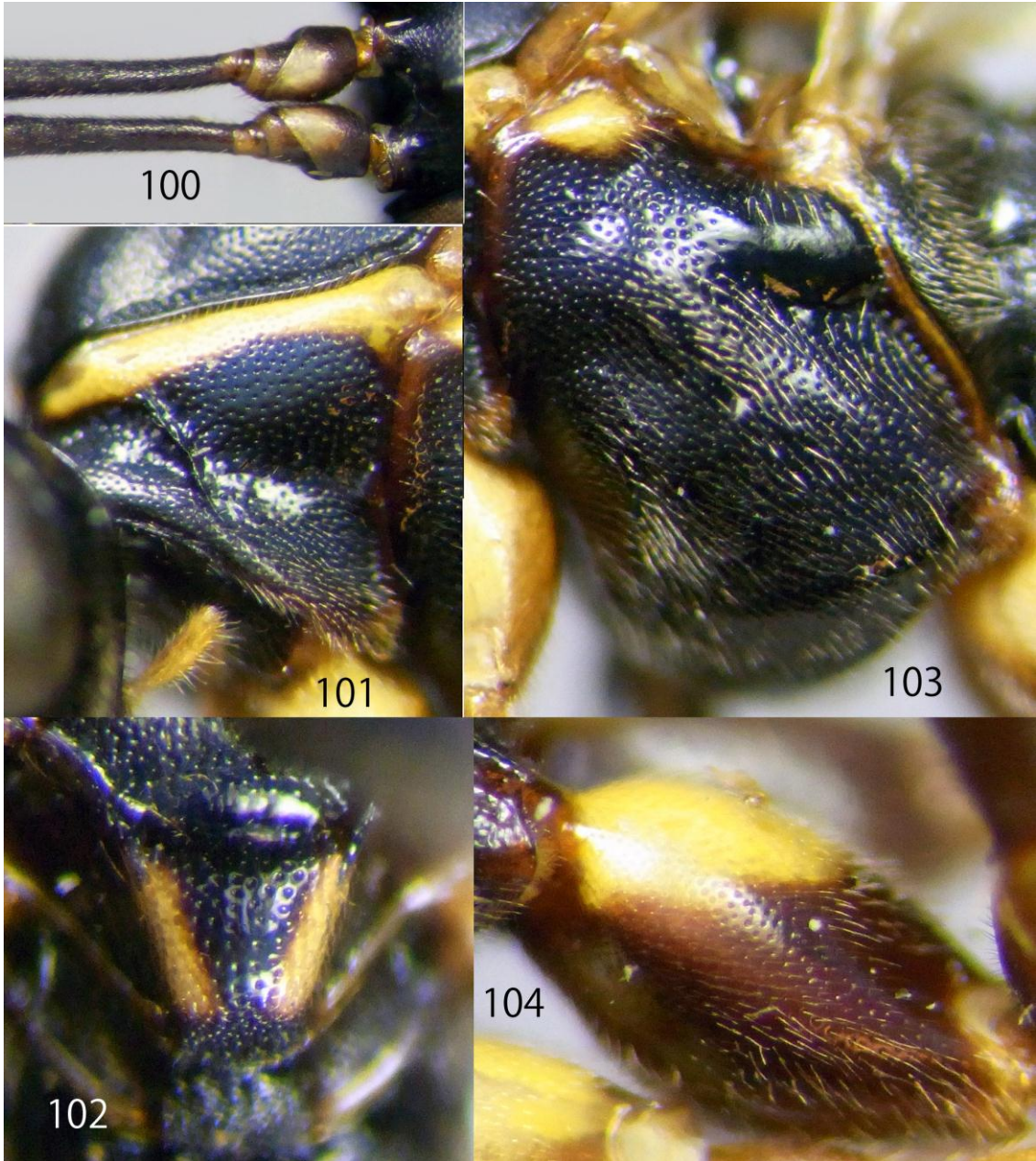


Figures 89–94. *Teleutaeta mishae*, female (specimen from central Japan, Nagano Pref.) — 89, habitus, lateral view; 90, pronotum, lateral view; 91, scutellum and postscutellum, dorsal view; 92, mesopleuron, lateral view; 93, apical part of fore wing; 94, hind coxa, dorsal view.



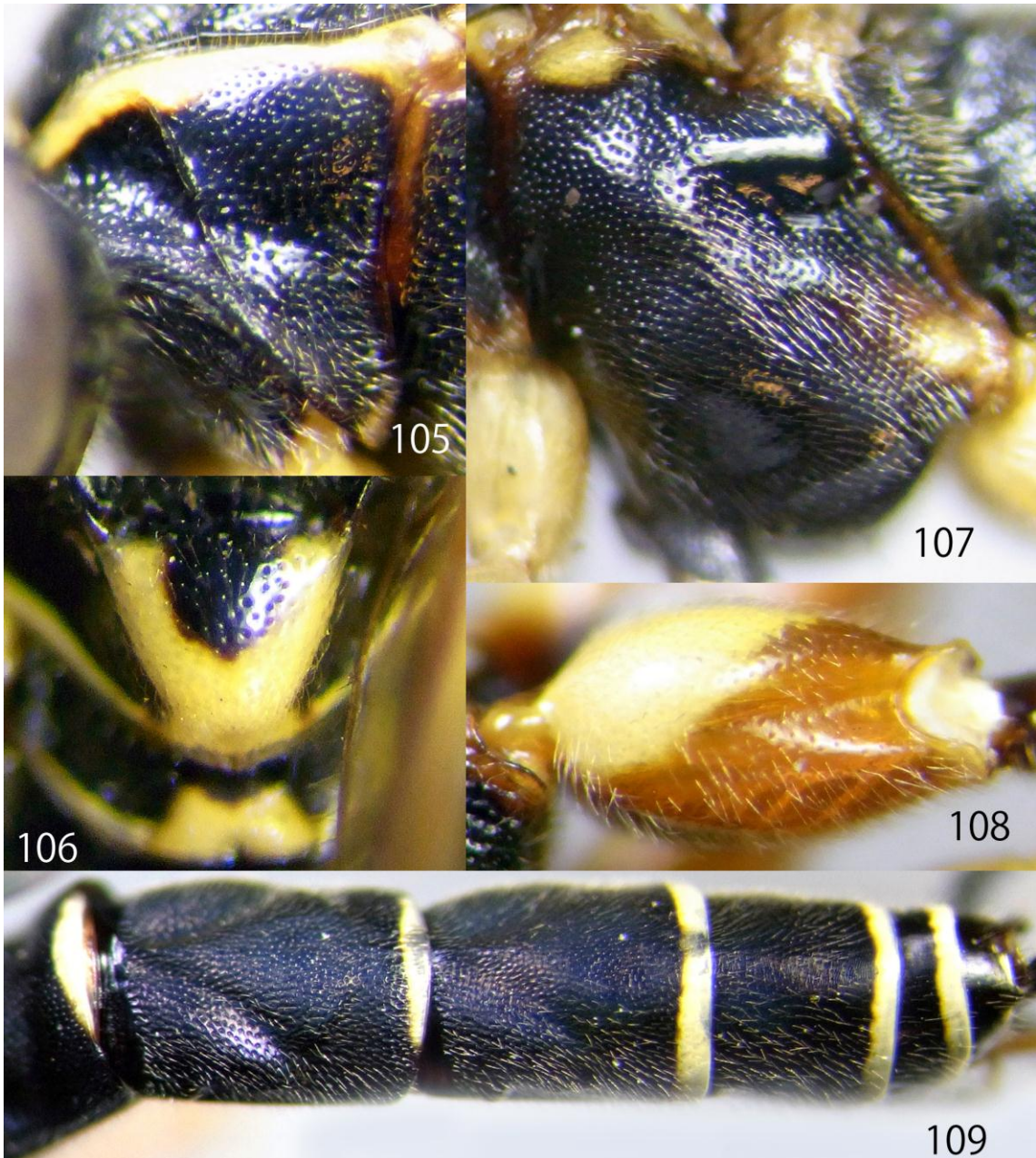
Figures 95–99. *Teleutaea nigra*, female — 95, pronotum, lateral view; 96, scutellum and postscutellum, dorsal view; 97, mesopleuron, lateral view; 98, hind coxa, dorsal view; 99, hind tibia and femur, lateral view.





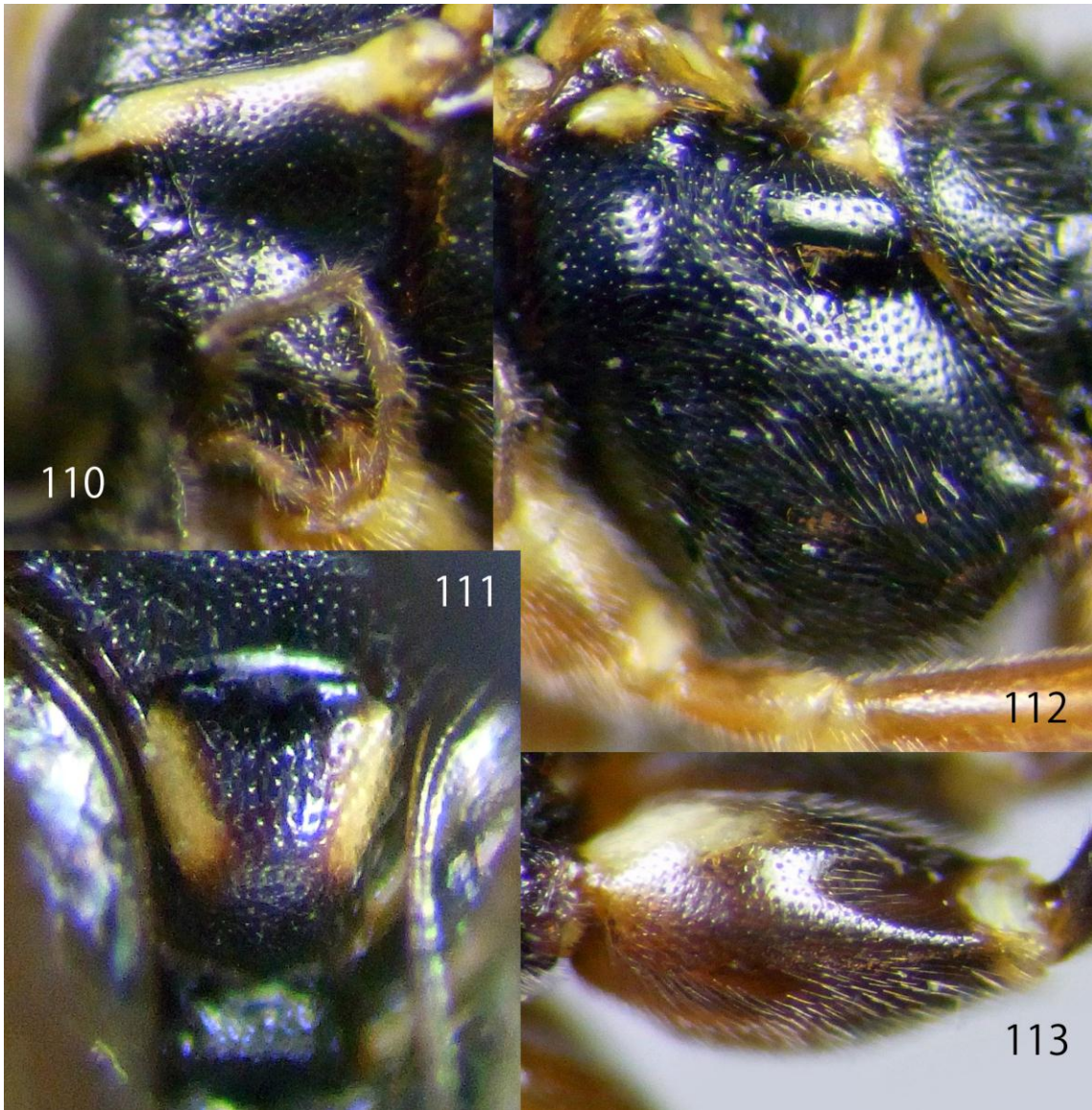
Figures 100–104. *Teleutaea nigricoxalis*, male (100) and female (101–104) — 100, base of antenna, ventral view; 101, pronotum, lateral view; 102, scutellum and postscutellum, dorsal view; 103, mesopleuron, lateral view; 104, hind coxa, dorsal view.





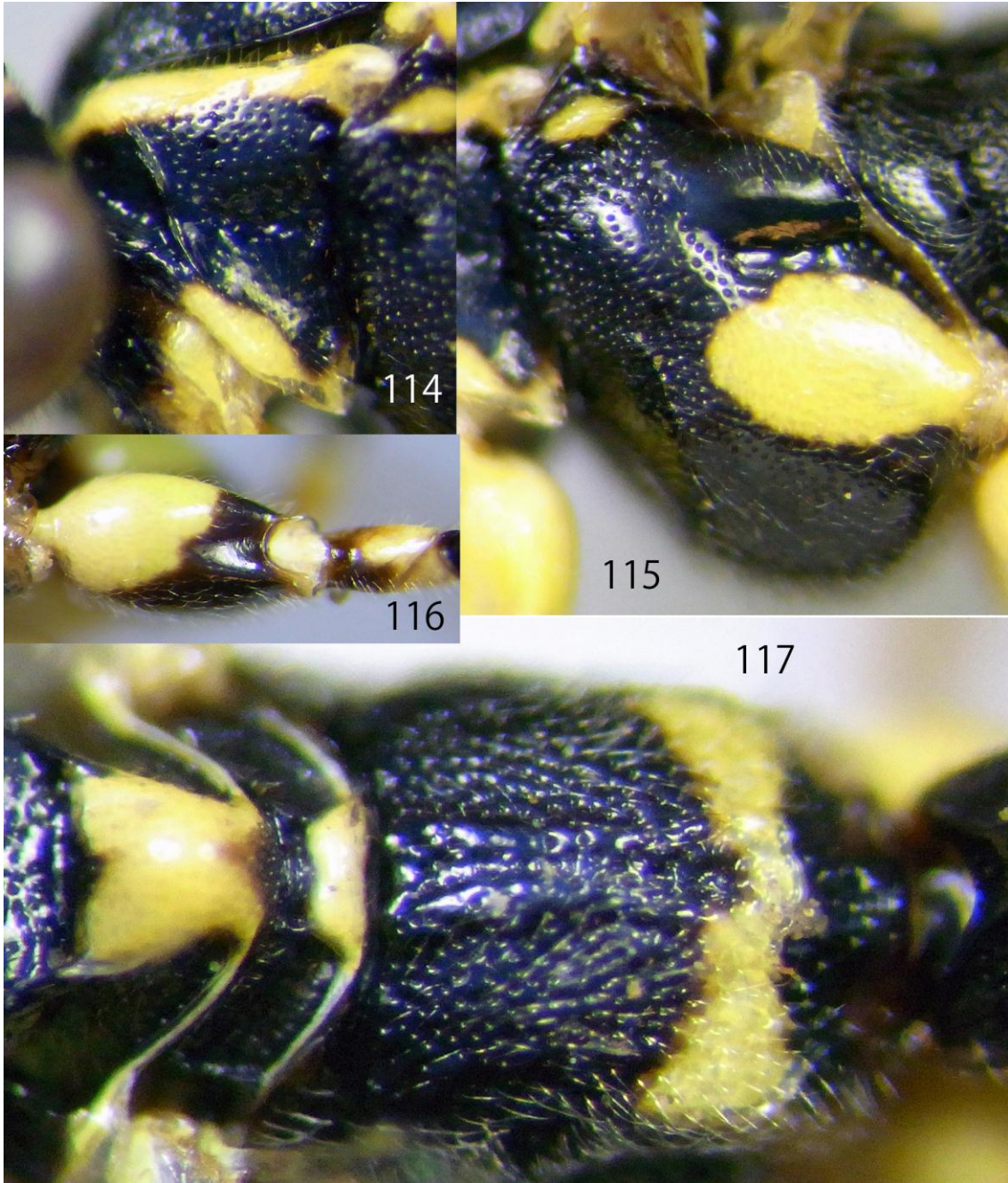
Figures 105–109. *Teleutaea orientalis*, female — 105, pronotum, lateral view; 106, scutellum and postscutellum, dorsal view; 107, mesopleuron, lateral view; 108, hind coxa, dorsal view; 109, metasoma except for base of T1, dorsal view.





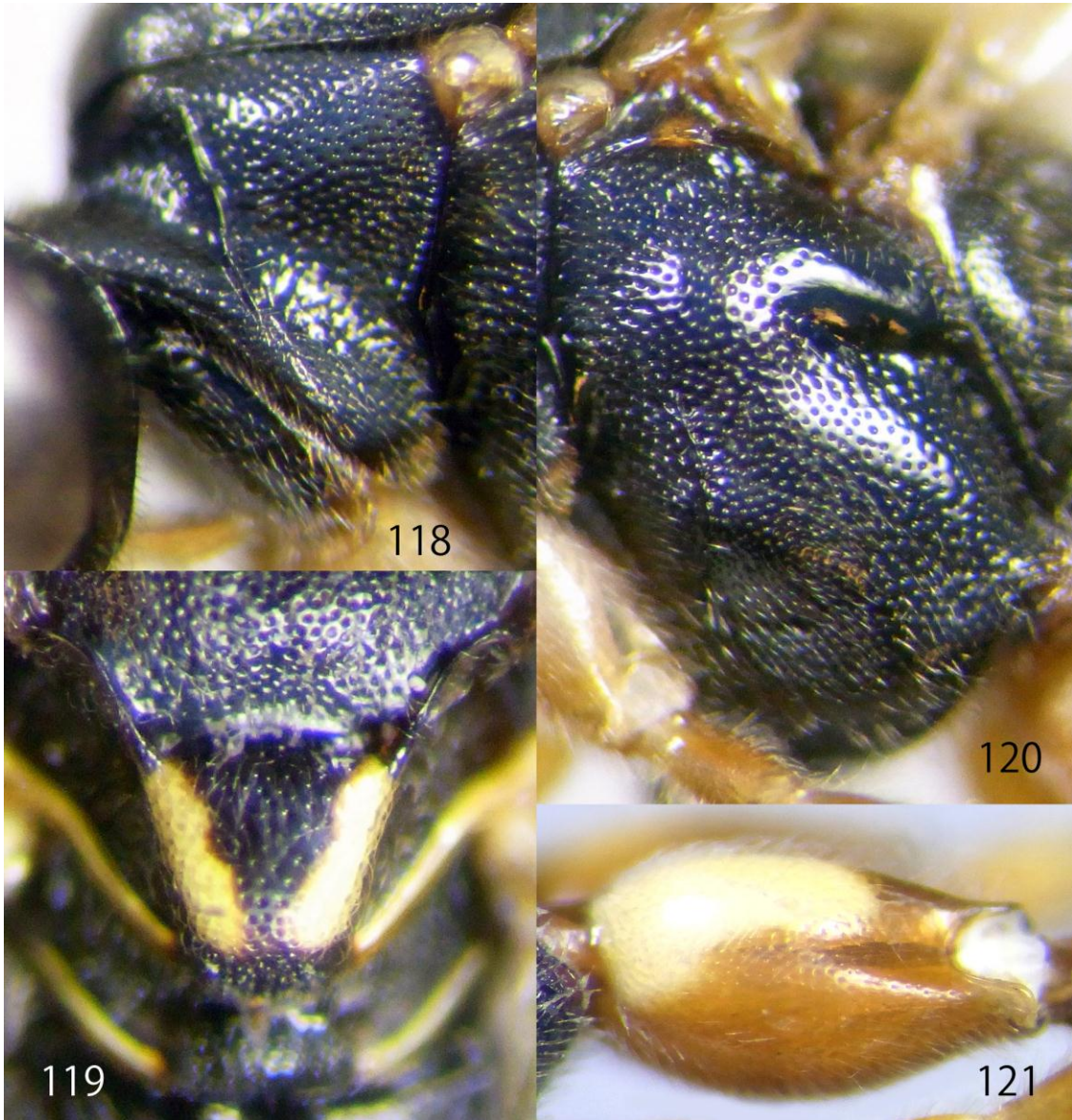
Figures 110–113. *Teleutaea sachalinensis*, female — 110, pronotum, lateral view; 111, scutellum and postscutellum, dorsal view; 112, mesopleuron, lateral view; 113, hind coxa, dorsal view.





Figures 114–117. *Teleutaea striata*, female — 114, pronotum, lateral view; 115, scutellum, postscutellum and propodeum, dorsal view; 116, mesopleuron, lateral view; 117, hind coxa, dorsal view.



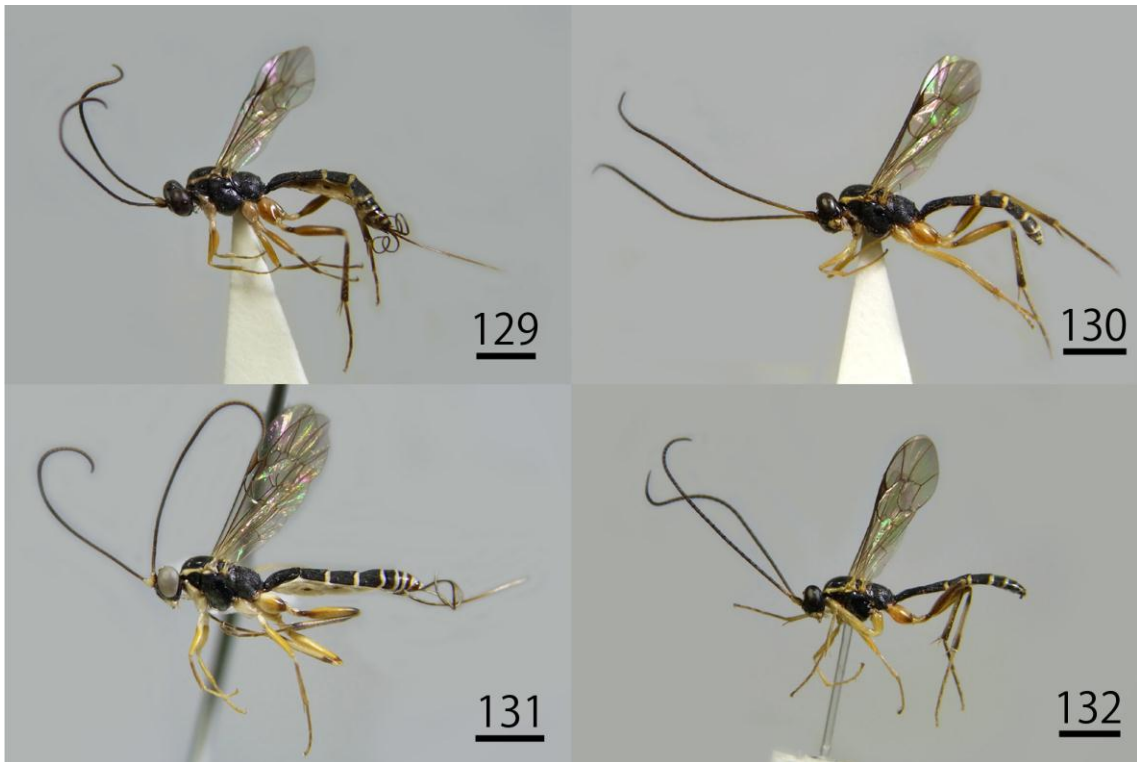


Figures 118–121. *Teleutaeta ussuriensis*, female — 118, pronotum, lateral view; 119, scutellum and postscutellum, dorsal view; 120, mesopleuron, lateral view; 121, hind coxa, dorsal view.

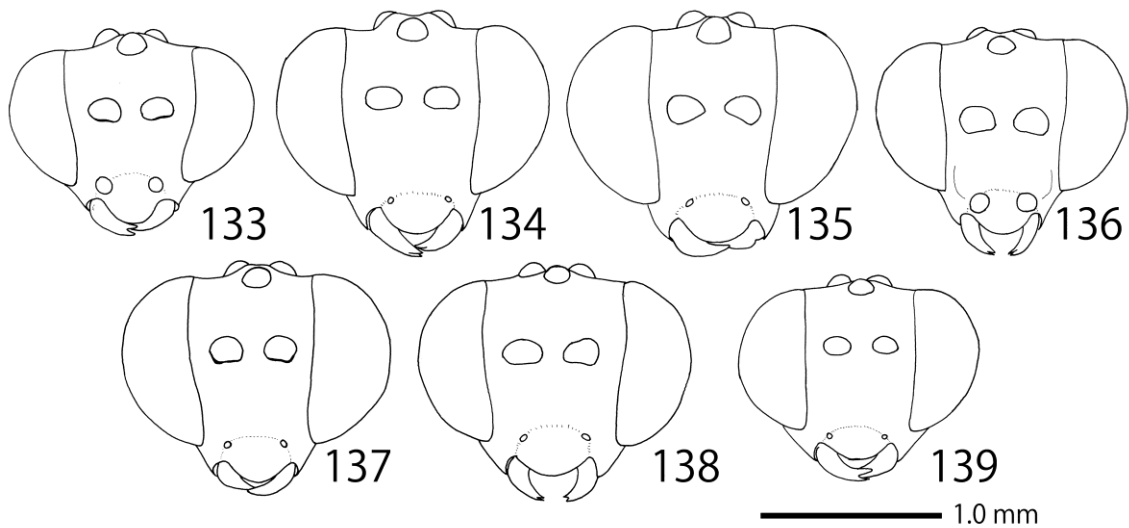




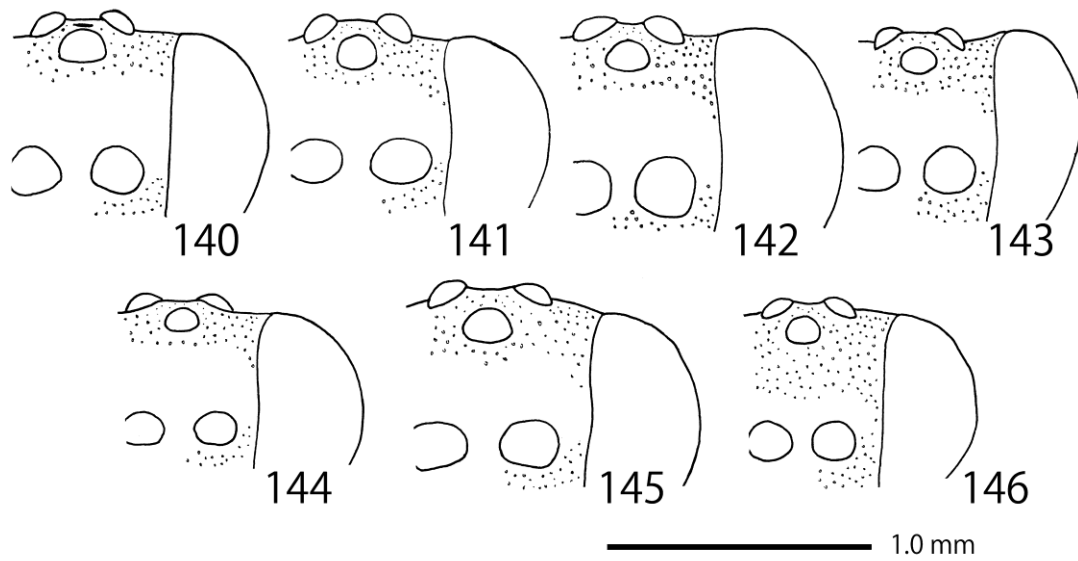
Figures 122–128. Head, Mesosoma and Metasomata of *Glyptopimpla* (122–127) and *Orientoglypta* (128), dorsal view — 122, *G. babai*; 123, *G. iwatai*; 124, *G. kusigematii* sp. nov. (paratype); 125, *G. macrofossa*; 126, *G. momoi* sp. nov. (paratype); 127, *G. uchidai*; 128, *O. watanabei*.



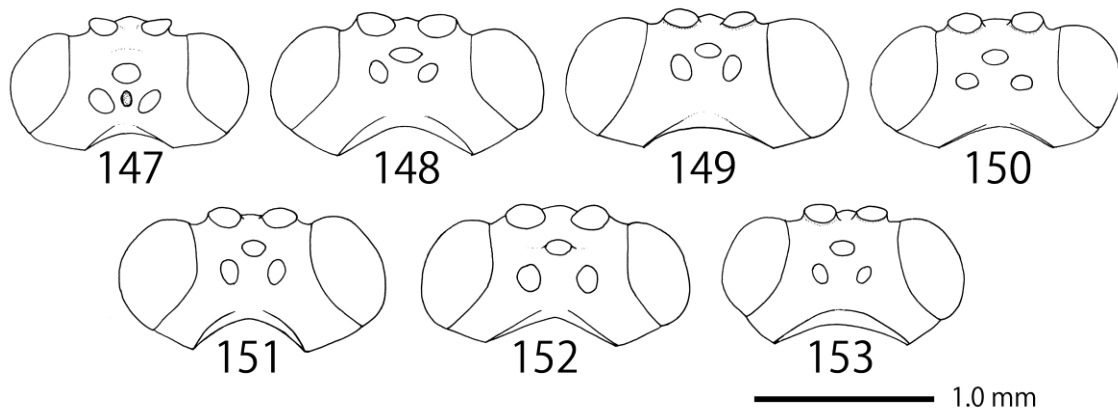
Figures 129–132. Lateral habitus of *Glyptopimpla* — 129, 130, *G. kusigematii* sp. nov. (paratypes: 129, female; 130, male); 131, 132, *G. momoii* sp. nov. (paratypes: 131, female; 132, male). Scale 1.0 mm.



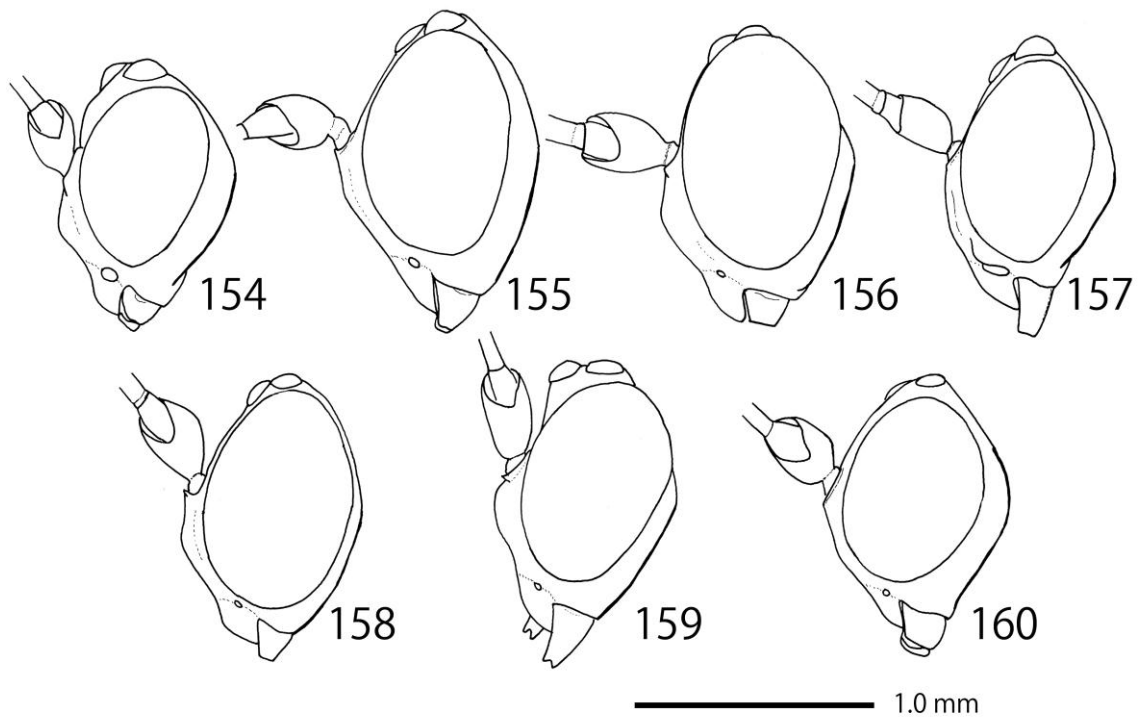
Figures 133–139. Head of *Glyptopimpla* (133–138) and *Orientoglypta* (139), frontal view — 133, *G. babai*; 134, *G. iwatai*; 135, *G. kusigematii* sp. nov. (paratype); 136, *G. macrofossa*; 137, *G. momoii* sp. nov. (paratype); 138, *G. uchidai*; 139, *O. watanabei*.



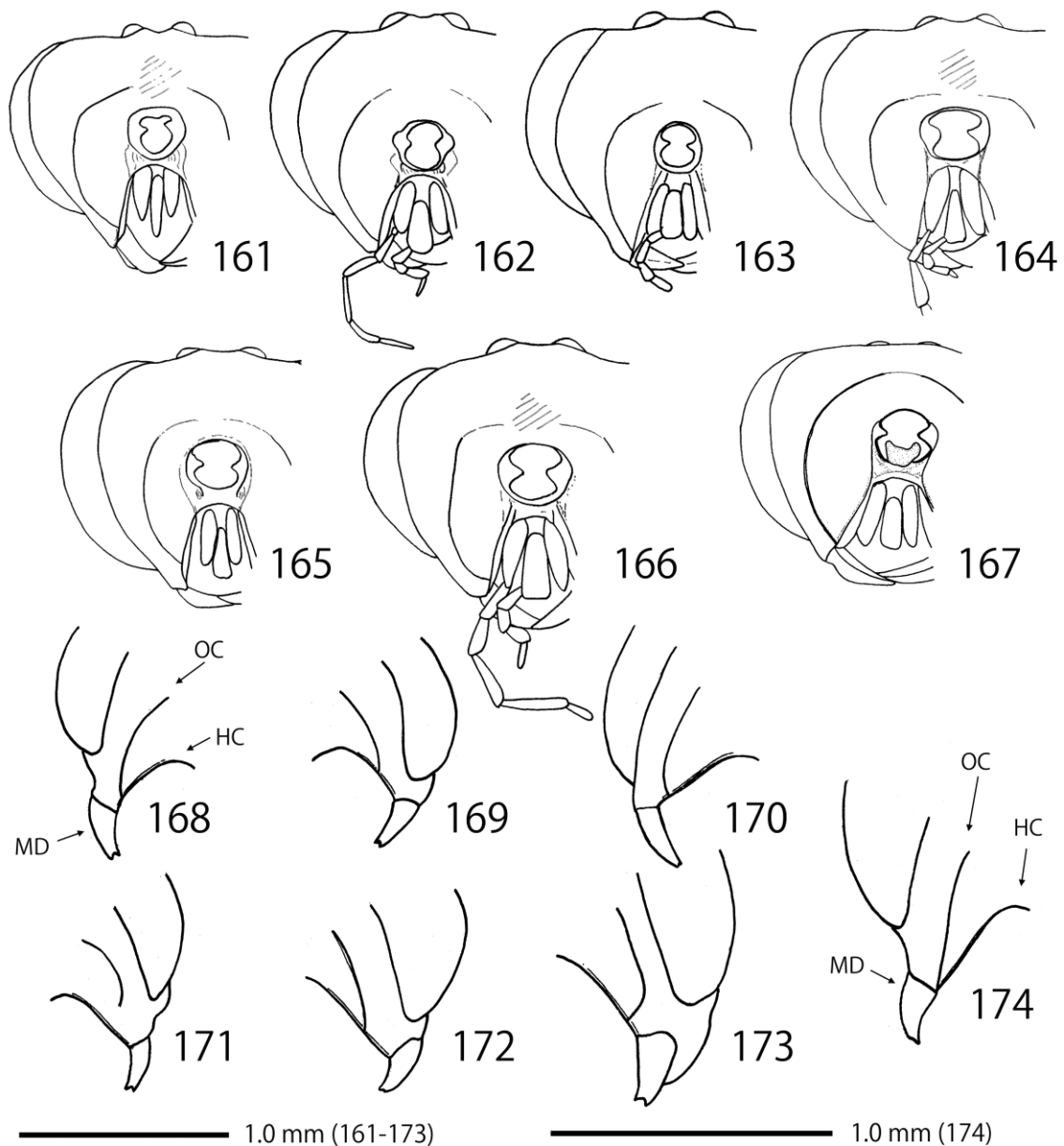
Figures 140–146. Punctuation on frons of *Glyptopimpla* (140–145) and *Orientoglypta* (146), frontal view — 140, *G. babai*; 141, *G. iwatai*; 142, *G. kusigematii* sp. nov. (paratype); 143, *G. macrofossa*; 144, *G. momoi* sp. nov. (paratype); 145, *G. uchidai*; 146, *O. watanabei*.



Figures 147–153. Head of *Glyptopimpla* (147–152) and *Orientoglypta* (153), dorsal view — 147, *G. babai*; 148, *G. iwatai*; 149, *G. kusigematii* sp. nov. (paratype); 150, *G. macrofossa*; 151, *G. momoi* sp. nov. (paratype); 152, *G. uchidai*; 153, *O. watanabei*.



Figures 154–160. Head of *Glyptopimpla* (154–159) and *Orientoglypta* (160), lateral view — 154, *G. babai*; 155, *G. iwatai*; 156, *G. kusigematii* sp. nov. (paratype); 157, *G. macrofossa*; 158, *G. momoi* sp. nov. (paratype); 159, *G. uchidai*; 160, *O. watanabei*.

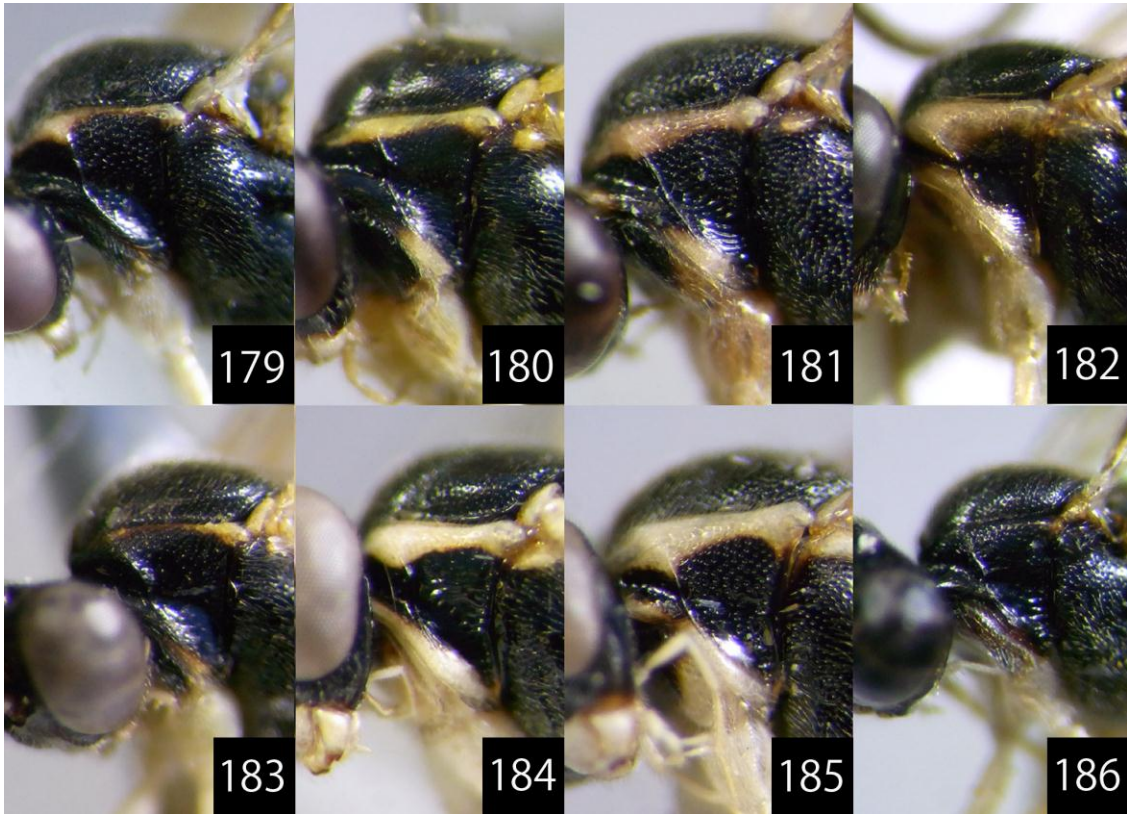


Figures 161–174. Head of *Glyptopimpla* (161–166, 168–173) and *Orientoglypta* (167, 174), posterior (161–167) and posterolateral (168–174) view — 161, 168, *G. babai*; 162, 169, *G. iwatai*; 163, 170, *G. kusigematii* sp. nov. (paratype); 164, 171, *G. macrofossa*; 165, 172, *G. momoi* sp. nov. (paratype); 166, 173, *G. uchidai*; 167, 174, *O. watanabei*. OC: occipital carina; HC: hypostomal carina; MD: mandible.

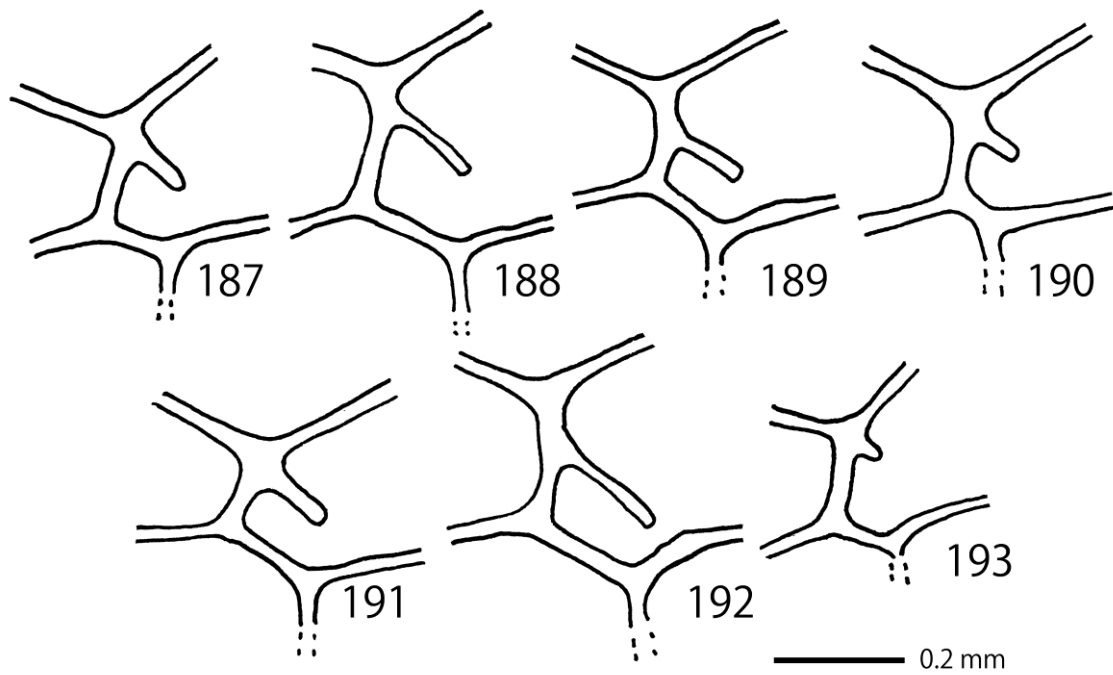


Figures 175–178. Mesosoma of *Glyptopimpla*, Dorsal (175, 176) and lateral (177, 178) views — 175, 177, *G. kusigematii* sp. nov. (paratype); 176, 178, *G. momoi* sp. nov. (paratype).



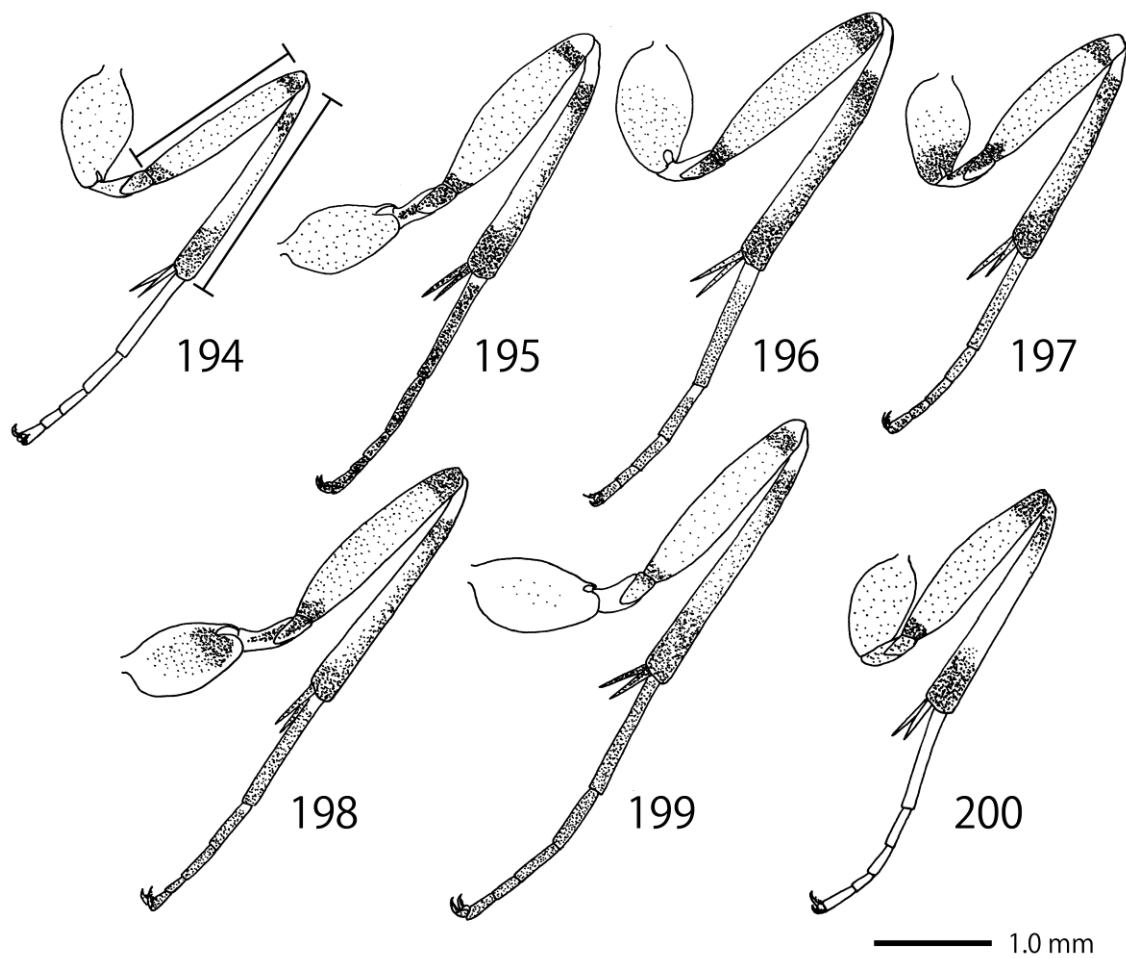


Figures 179–186. Pronota of *Glyptopimpla* (179–185) and *Orientoglypta* (186), lateral view — 179, *G. babai*; 180, *G. iwatai*; 181, *G. kusigematii* sp. nov. (paratype); 182, 183, *G. macrofossa*; 184, *G. momoi* sp. nov. (paratype); 185, *G. uchidai*; 186, *O. watanabei*.

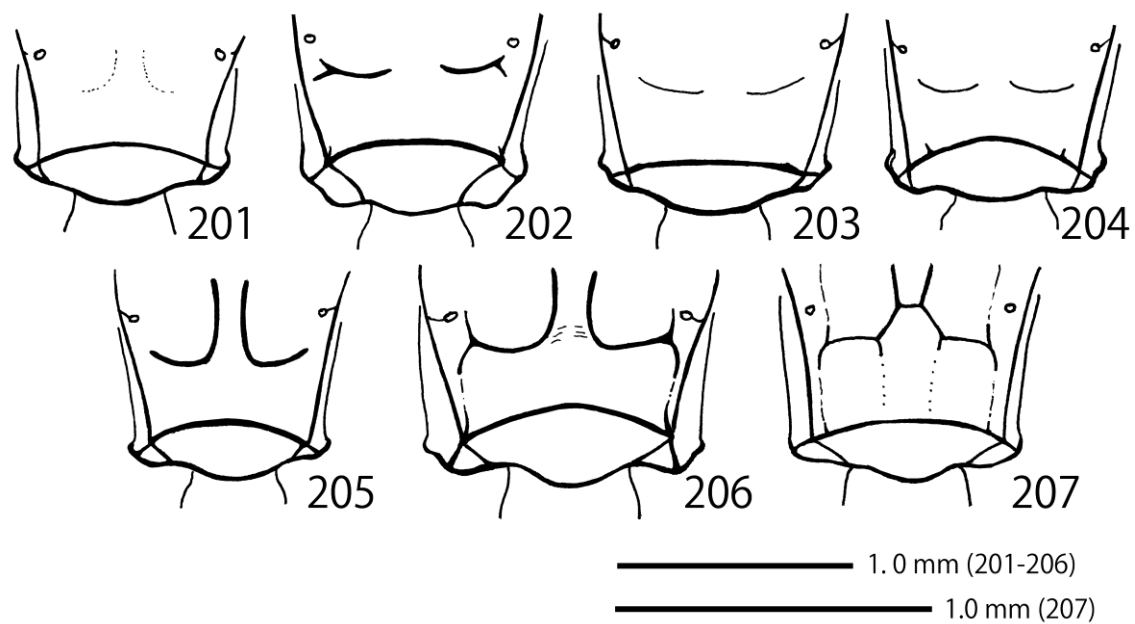


Figures 187–193. Areolet of *Glyptopimpla* (187–192) and *Orientoglypta* (193), dorsal view — 187, *G. babai*; 188, *G. iwatai*; 189, *G. kusigematii* sp. nov. (paratype); 190, *G. macrofossa*; 191, *G. momoii* sp. nov. (paratype); 192, *G. uchidai*; 193, *O. watanabei*.

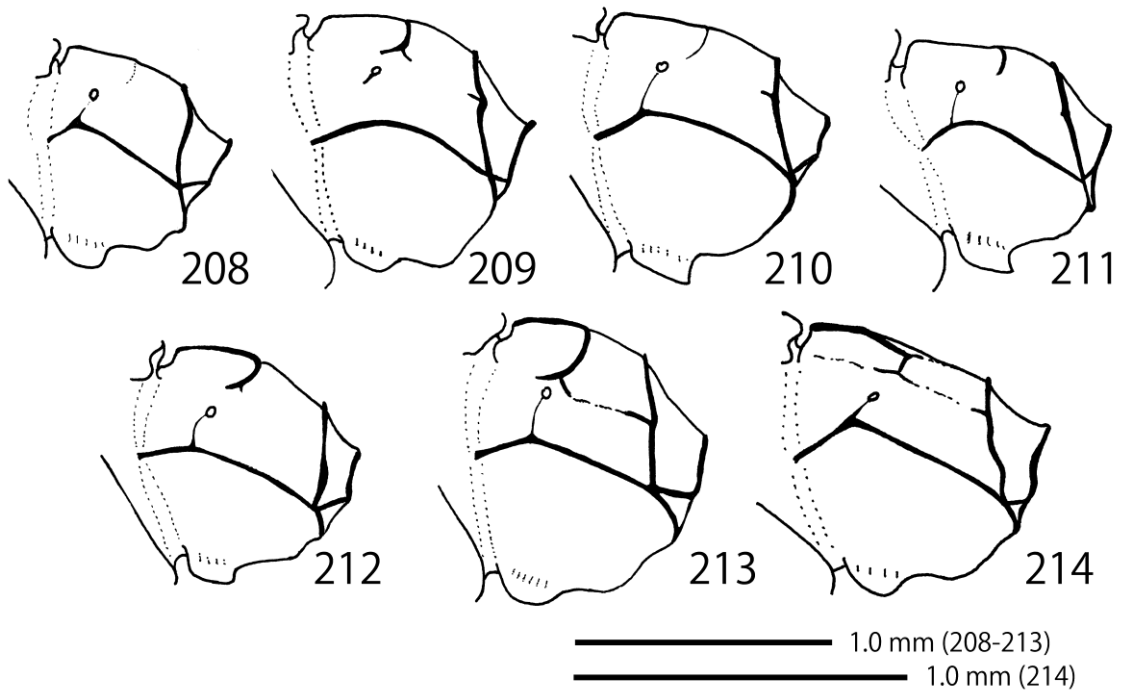




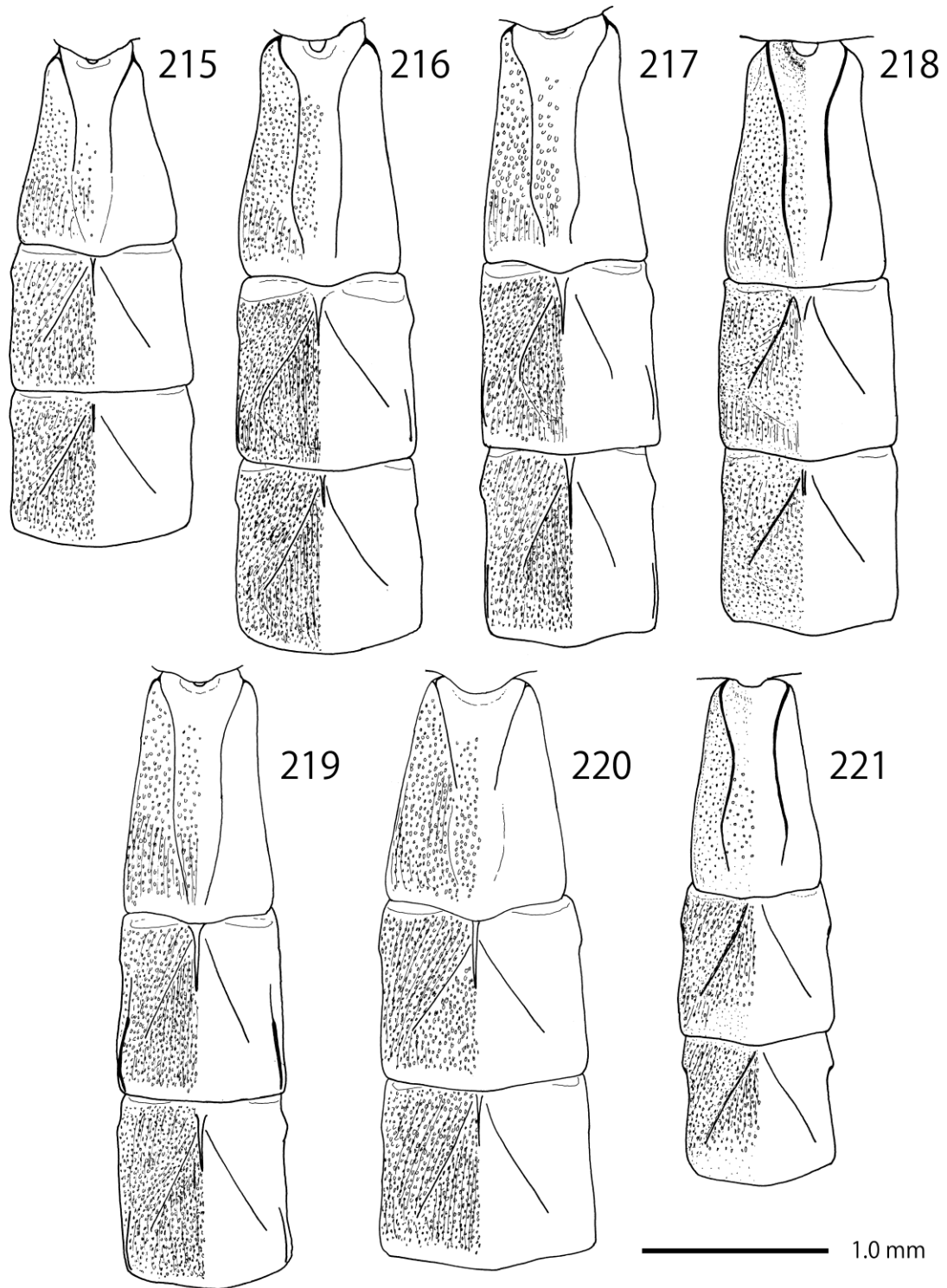
Figures 194–200. Left hind leg of *Glyptopimpla* (194–199) and *Orientoglypta* (200), lateral view — 194, *G. babai*; 195, *G. iwatai*; 196, *G. kusigematii* sp. nov. (paratype); 197, *G. macrofossa*; 198, *G. momoi* sp. nov. (paratype); 199, *G. uchidai*; 200, *O. watanabei*. Bars in 194 indicates measuring range.



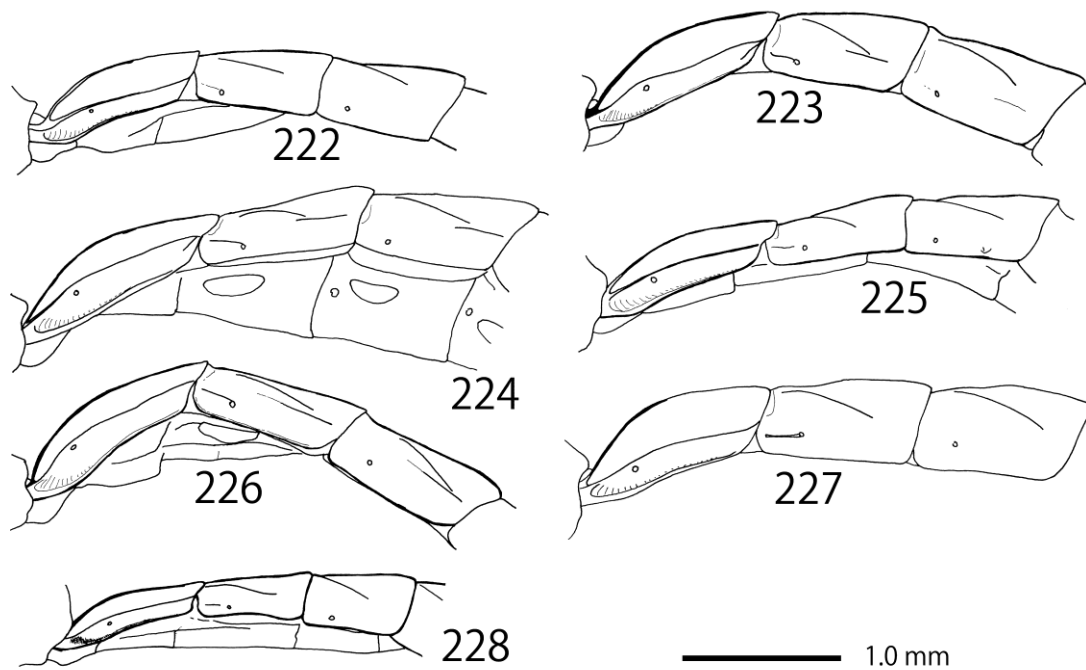
Figures 201–207. Propodeum of *Glyptopimpla* (201–206) and *Orientoglypta* (207), dorsal view — 201, *G. babai*; 202, *G. iwatai*; 203, *G. kusigematii* sp. nov. (paratype); 204, *G. macrofossa*; 205, *G. momoi* sp. nov. (paratype); 206, *G. uchidai*; 207, *O. watanabei*.



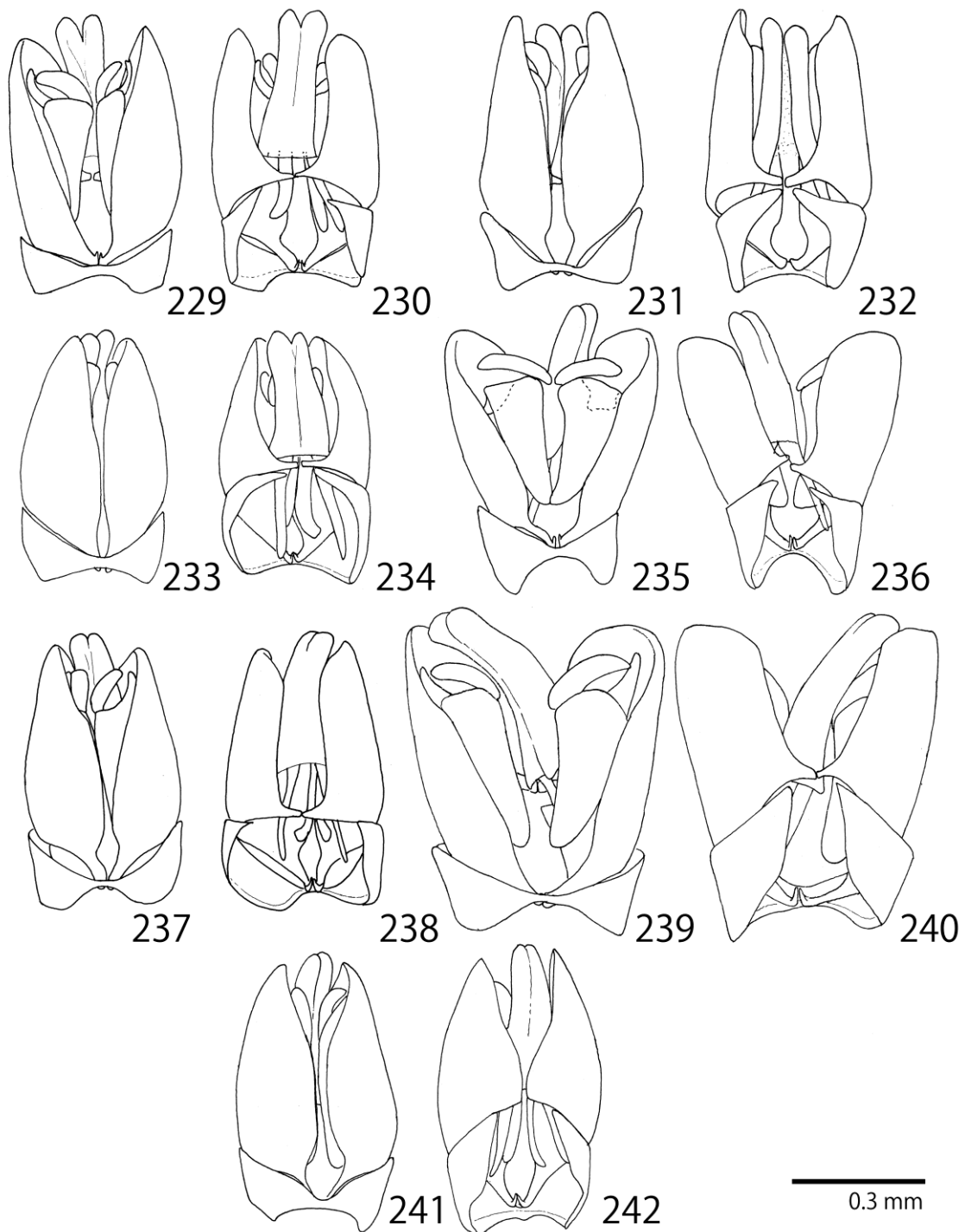
Figures 208–214. Propodeum of *Glyptopimpla* (208–213) and *Orientoglypta* (214), lateral view — 208, *G. babai*; 209, *G. iwatai*; 210, *G. kusigematii* sp. nov. (paratype); 211, *G. macrofossa*; 212, *G. momoi* sp. nov. (paratype); 213, *G. uchidai*; 214, *O. watanabei*.



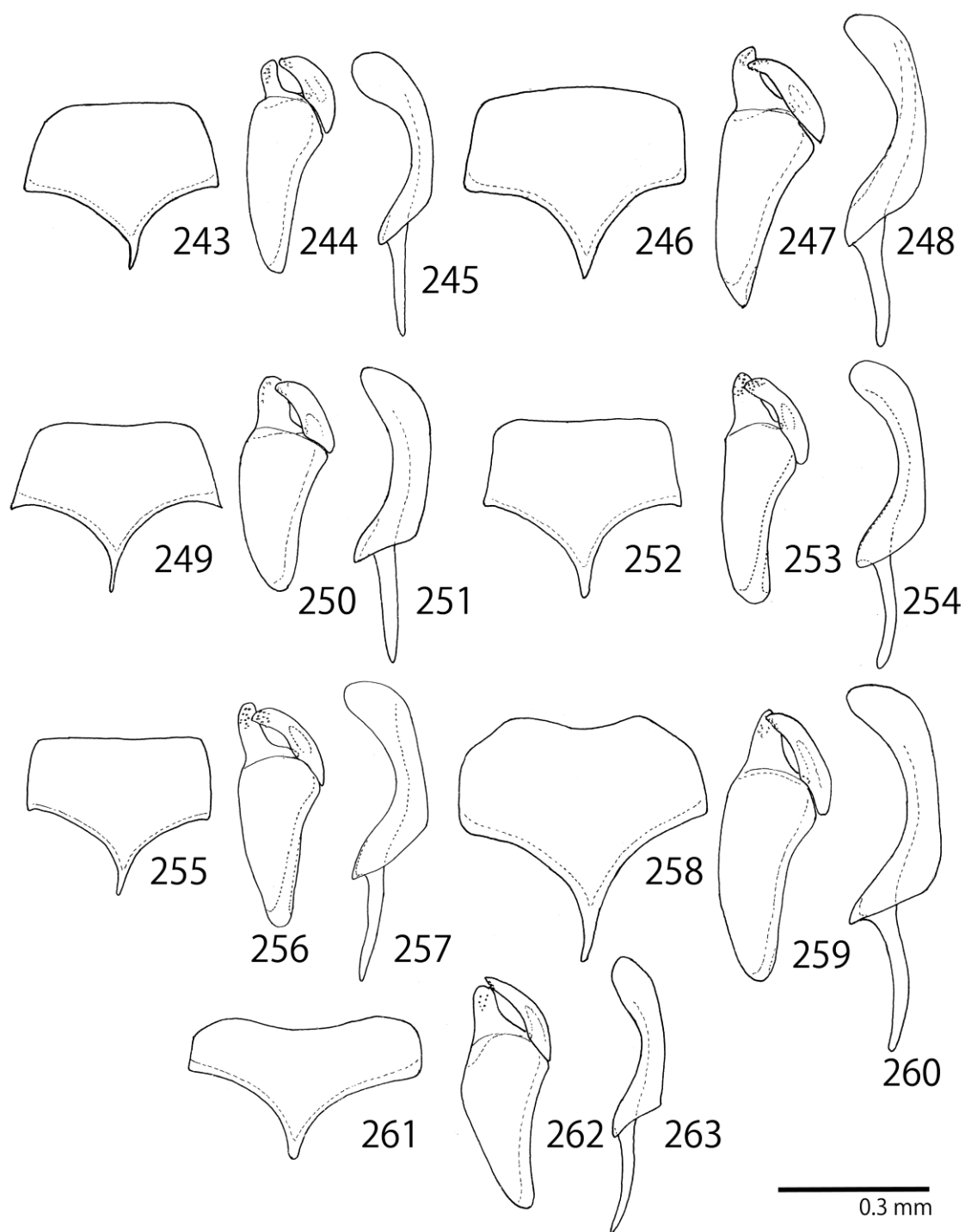
Figures 215–221. T1-T3 of *Glyptopimpla* (215–220) and *Orientoglypta* (221), dorsal view — 215, *G. babai*; 216, *G. iwatai*; 217, *G. kusigematii* sp. nov. (paratype); 218, *G. macrofossa*; 219, *G. momoi* sp. nov. (paratype); 220, *G. uchidai*; 221, *O. watanabei*.



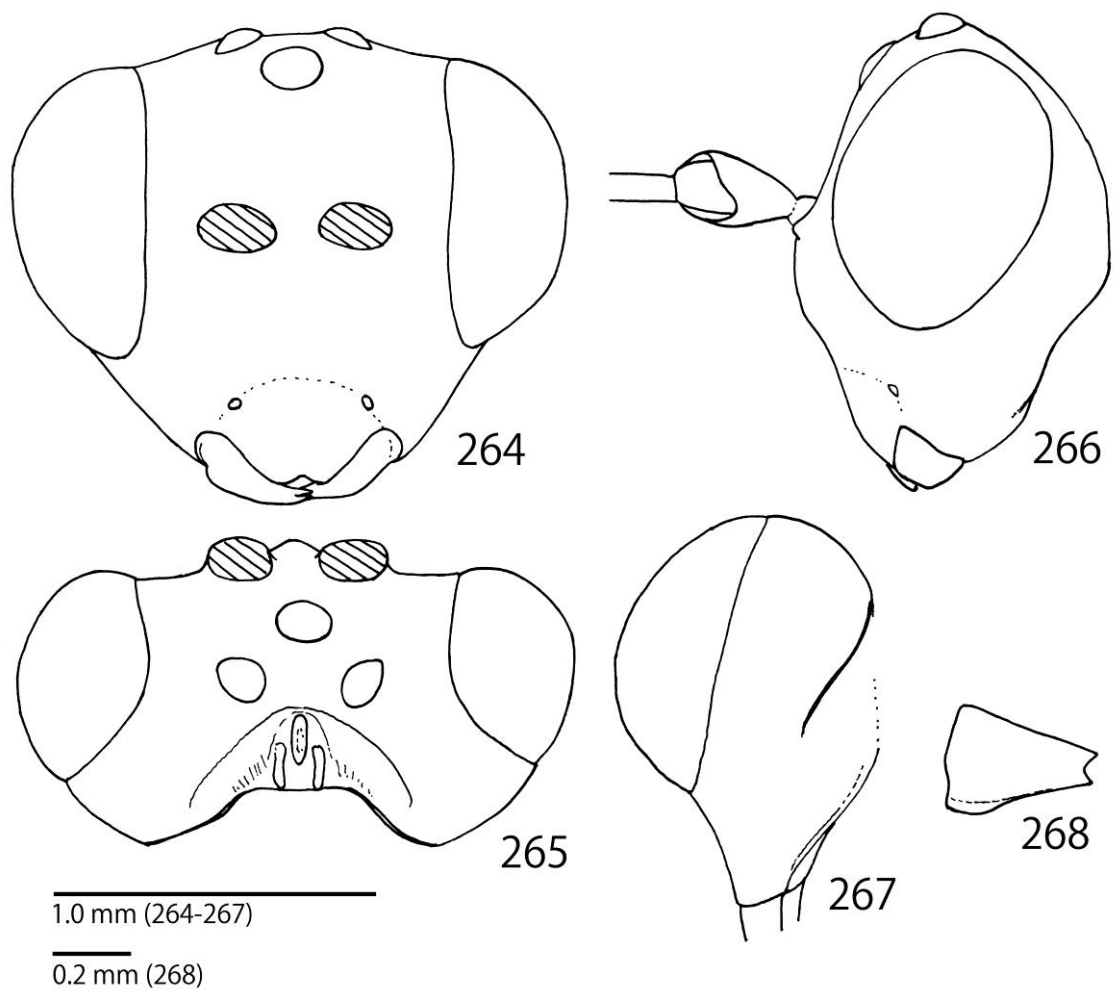
Figures 222–228. T1-T3 of *Glyptopimpla* (222–227) and *Orientoglypta* (228), lateral view — 222, *G. babai*; 223, *G. iwatai*; 224, *G. kusigematii* sp. nov. (paratype); 225, *G. macrofossa*; 226, *G. momoi* sp. nov. (paratype); 227, *G. uchidai*; 228, *O. watanabei*.



Figures 229–242. Male genitalia of *Glyptopimpla* (229–240) and *Orientoglypta* (241, 242), ventral (229, 231, 233, 235, 237, 239, 241) and dorsal (230, 232, 234, 236, 238, 240, 242) view — 229, 230, *G. babai*; 231, 232, *G. iwatai*; 233, 234, *G. kusigematii* sp. nov. (paratype); 235, 236, *G. macrofossa*; 237, 238, *G. momoi* sp. nov. (paratype); 239, 240, *G. uchidai*; 241, 242, *O. watanabei*.

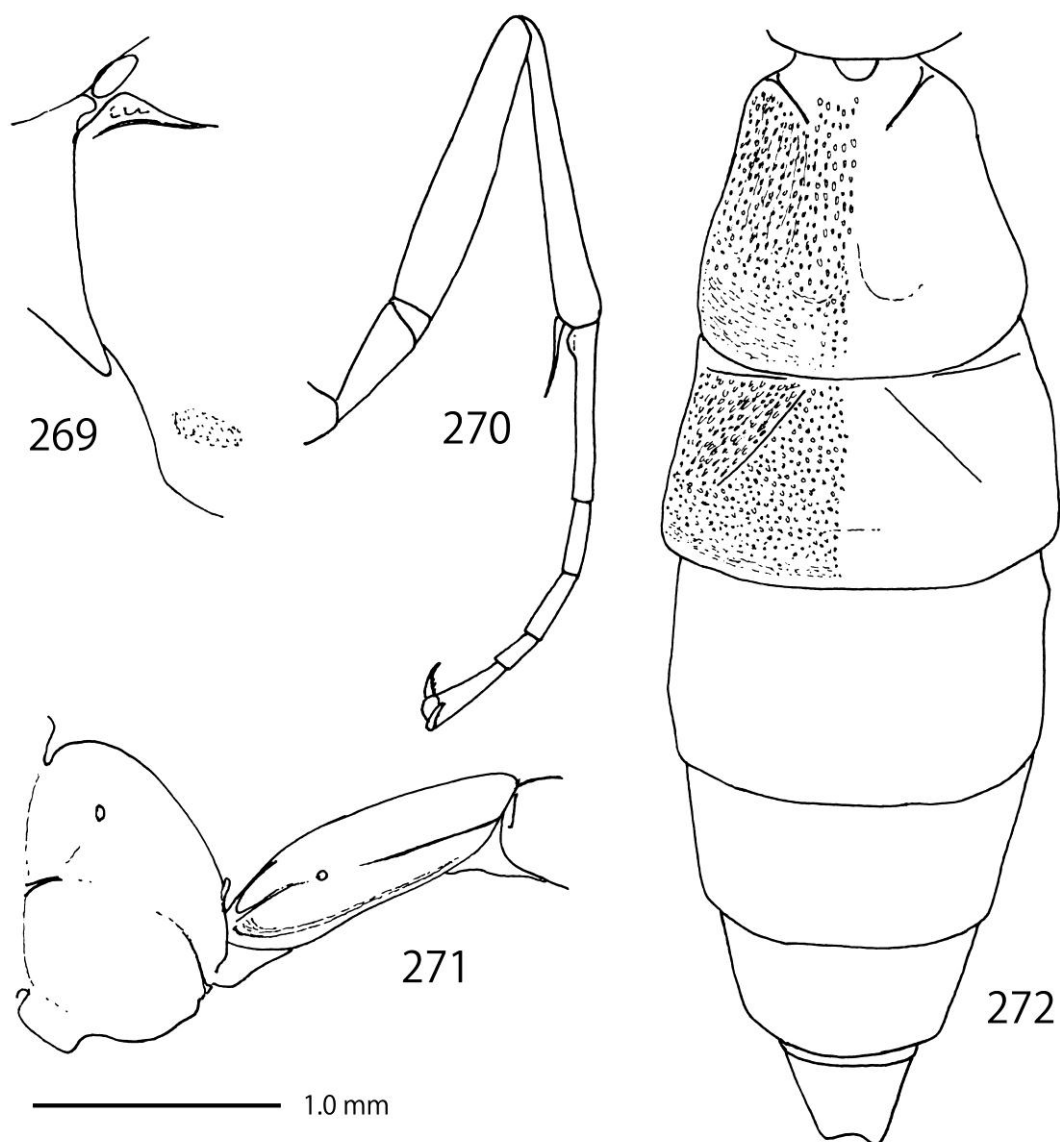


Figures 243–263. Male subgenital plate (ventral view: 243, 246, 249, 252, 255, 258, 261), right volsella (mesal view: 244, 247, 250, 253, 256, 259, 262) and right aedeagi (lateral view: 245, 248, 251, 254, 257, 260, 263) of *Glyptopimpla* (243–260) and *Orientoglypta* (261–263) — 243–245, *G. babai*; 246–248, *G. iwatai*; 249–251, *G. kusigematii* sp. nov. (paratype); 252–254, *G. macrofossa*; 255–257, *G. momoii* sp. nov. (paratype); 258–260, *G. uchidai*; 261–263, *O. watanabei*.

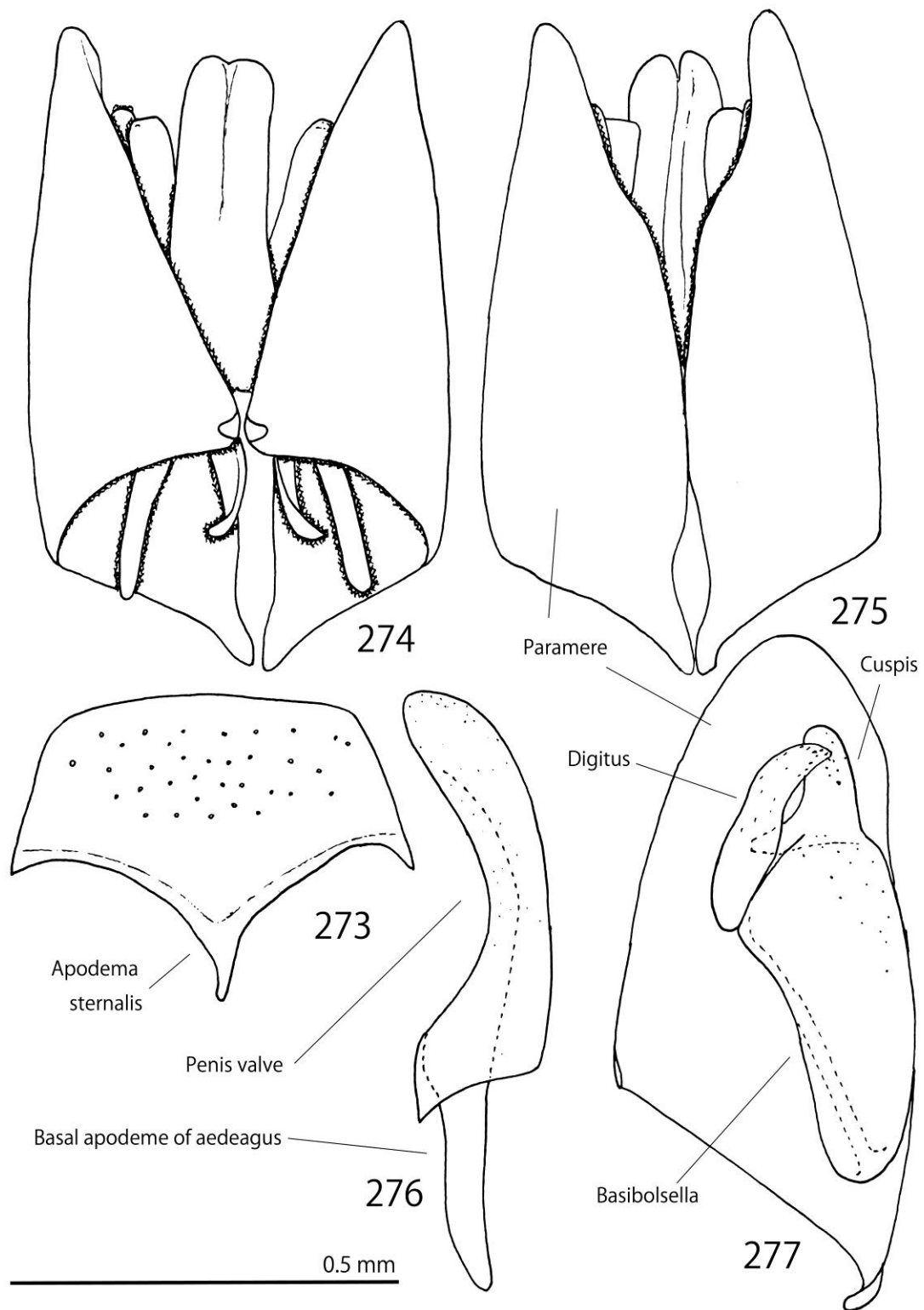


Figures 264–268. *Cephaloglypta murinanae*, female — 264–267, head, frontal (264), dorsal (265), lateral (266) and posterolateral (267) view; 268, outer aspect of mandible.

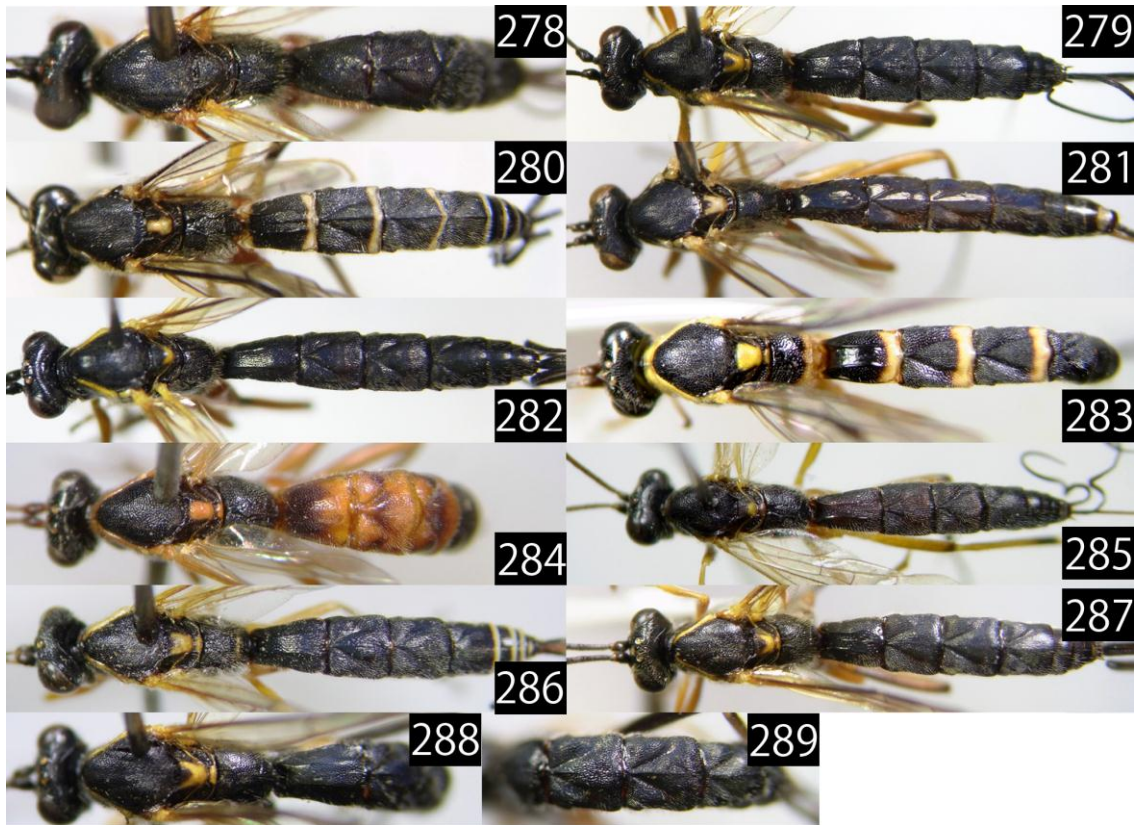




Figures 269–272. *Cephaloglypta murinanae*, female — 269, anterior part of mesopleuron; 270, fore leg, anterior view; 271, propodeum and T1, lateral view; 272, metasomal tergites, dorsal view, surface sculptures omitted except for left of T1 and T2.



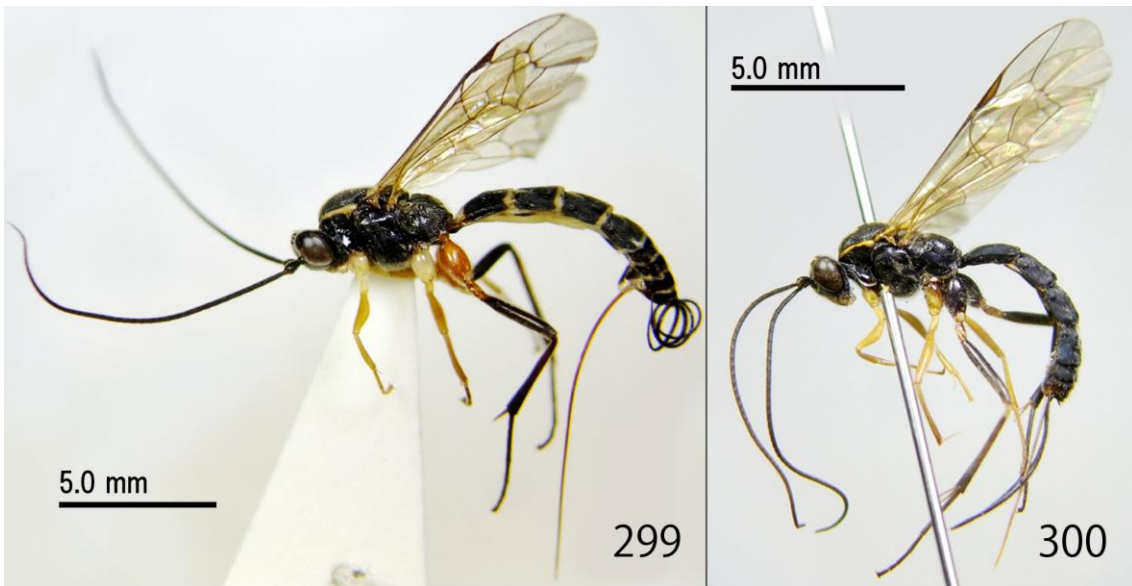
Figures 273–277. Male terminalia of *Cephaloglypta murinanae* — 273, subgenital plate, ventral view; 274, 275, genitalia, dorsal (274) and ventral (275) view, basal ring damaged; 276, right aedeagus, lateral view; 277, left paramere, inner view.



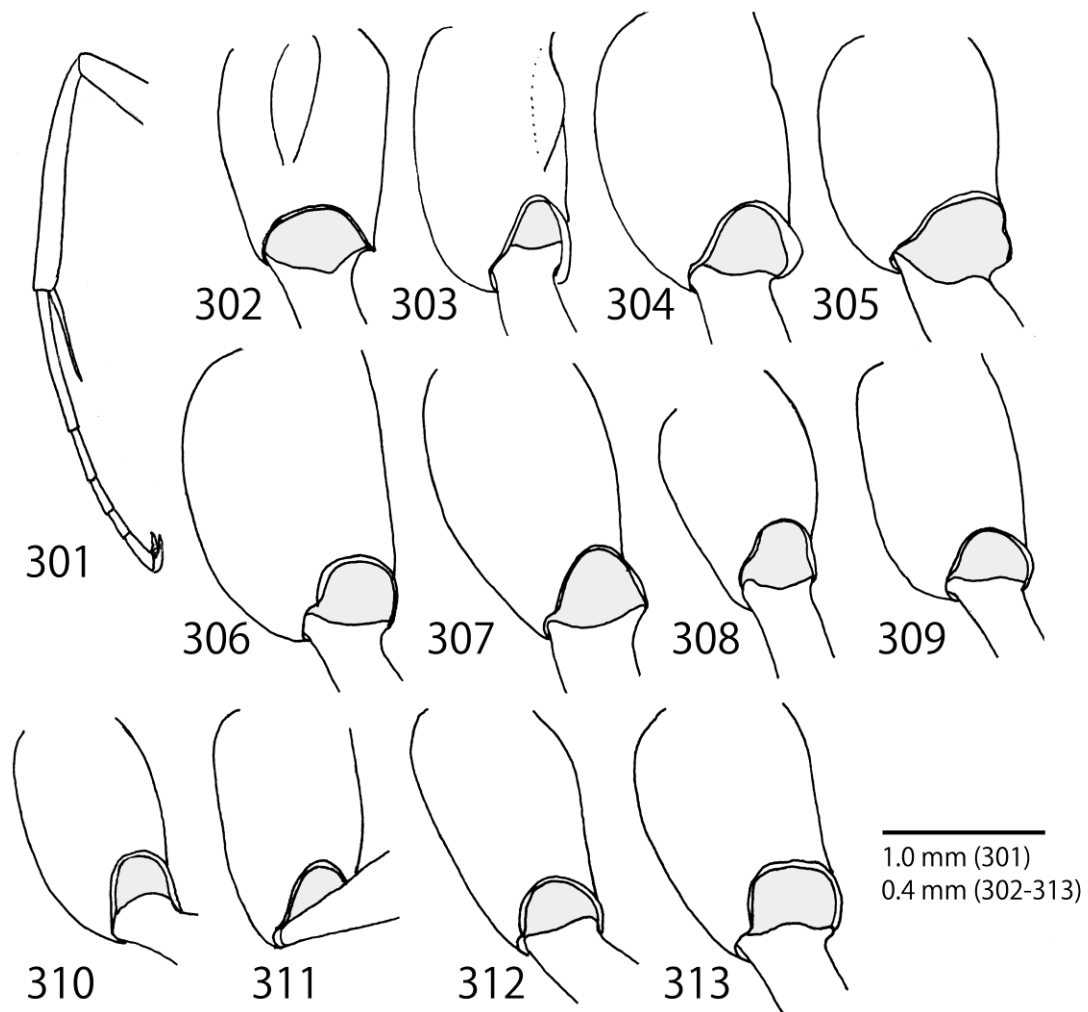
Figures 278–289. Head, mesosoma and metasomata of *Apophua*, dorsal view, female — 278, *A. aquilonia*; 279, *A. bipunctoria*; 280, *A. elegans* sp. nov. (holotype); 281, *A. evanescens*; 282, *A. honmai*; 283, *A. kikuchii*; 284, *A. maetai*; 285, *A. stena*; 286, *A. sugaharai*; 287, *A. tobensis*; 288, 289, *A. yamato* sp. nov. (holotype).



Figures 290–298. Head, mesosoma, coxa and metasoma of *Apophua*, lateral view, female — 290, *A. aquilonia*; 291, *A. bipunctoria*; 292, *A. evanescens*; 293, *A. honmai*; 294, *A. kikuchii*; 295, *A. maetai*; 296, *A. stena*; 297, *A. sugaharai*; 298, *A. tobensis*.



Figures 299 and 300. Lateral habitus of *Apophua*, female — 299, *A. elegans* sp. nov. (holotype); 300, *A. yamato* sp. nov. (holotype).

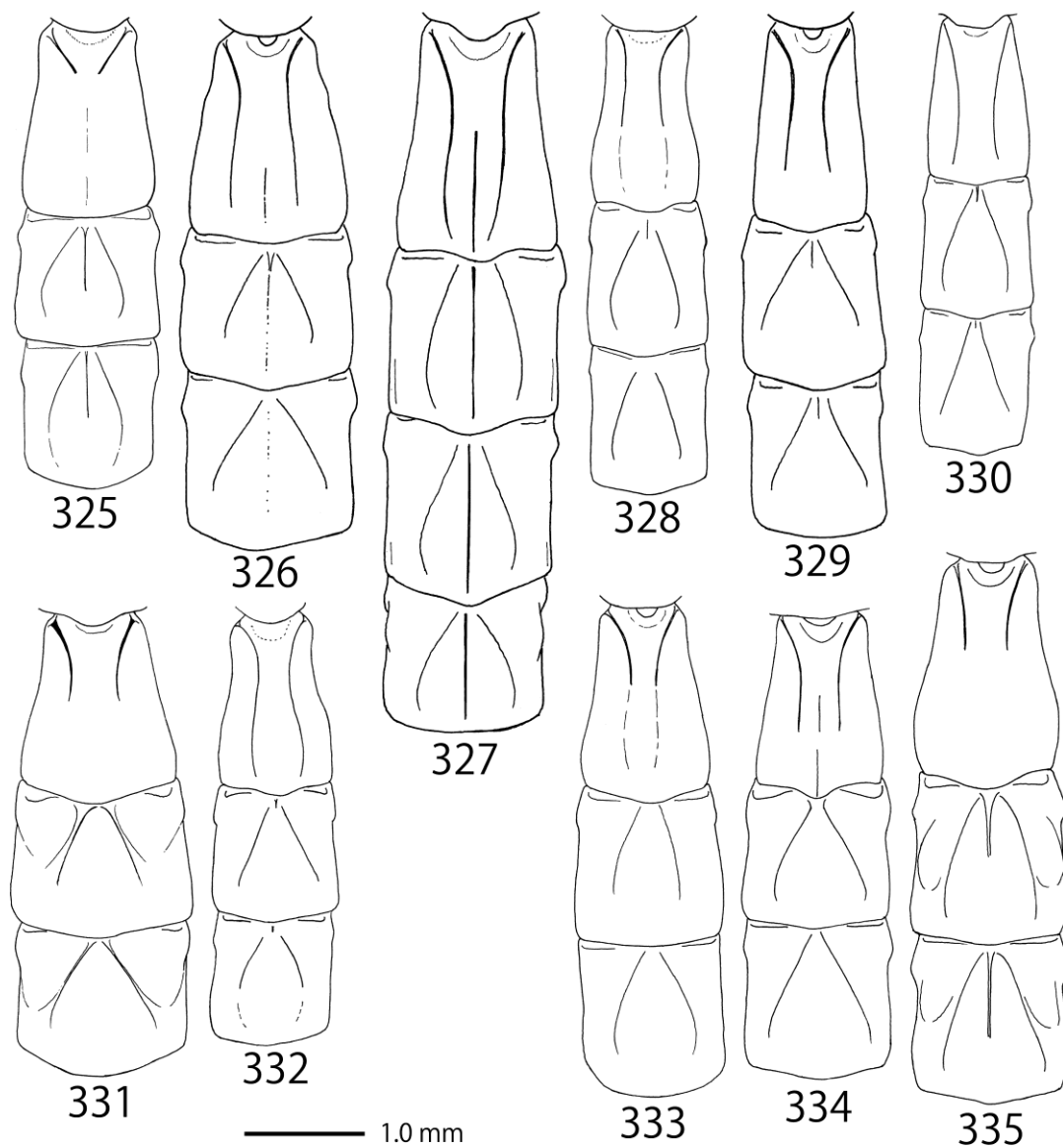


Figures 301–313. Fore tibia (301) and coxa (302–313) of *Apophua*, anterior (301) and antero-dorsal (302–313) view, female — 302, 303, *A. aquilonia*; 304, *A. bipunctoria*; 305, *A. elegans* sp. nov. (holotype); 306, *A. evanescens*; 307, *A. honmai*; 308, *A. kikuchii*; 309, *A. maetai*; 310, *A. stena*; 311, *A. sugaharai*; 312, *A. tobensis*; 313, *A. yamato* sp. nov. (holotype).

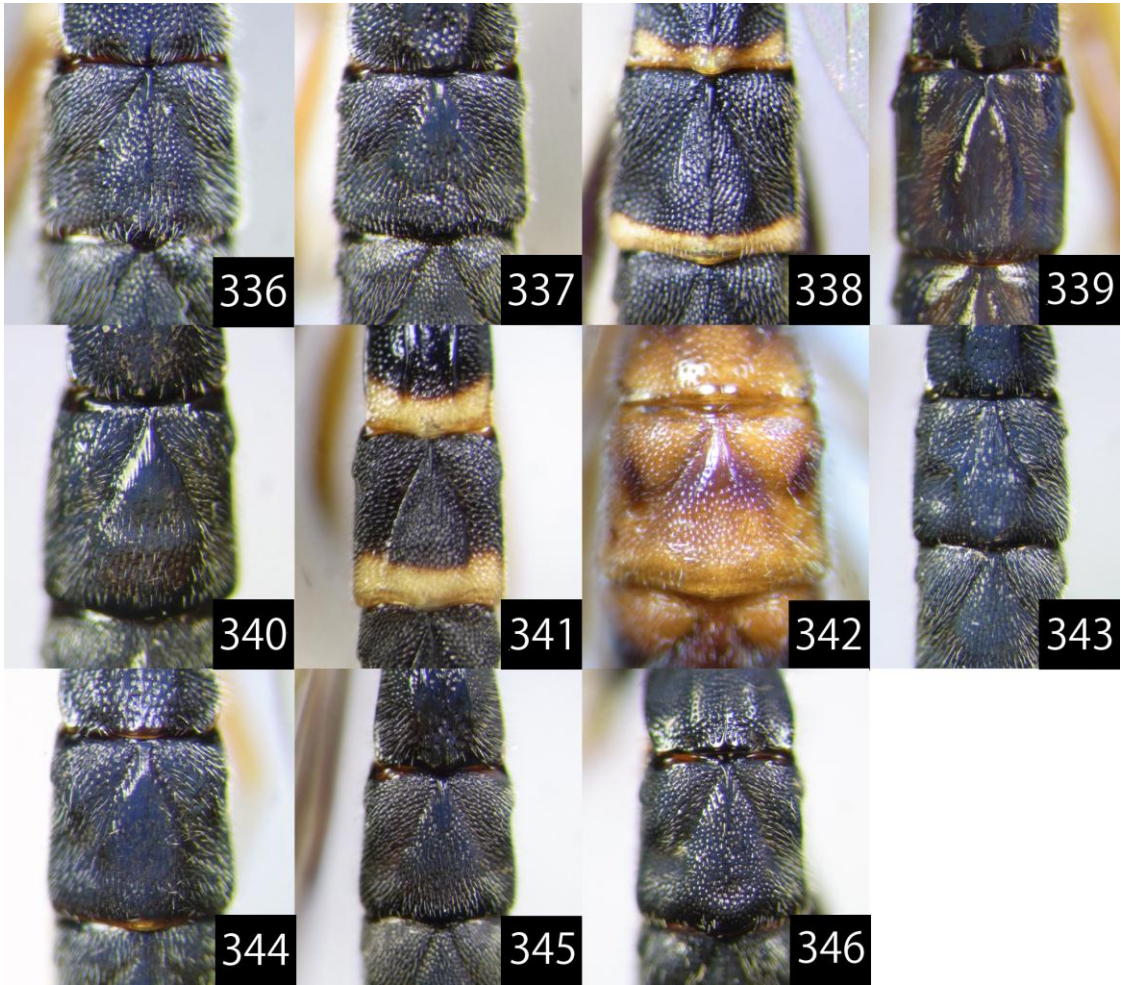




Figures 314–324. Hind leg of *Apophua*, anterior (314–324) and dorsal (323, 324: coxae) view, female — 314, *A. aquilonia*; 315, *A. bipunctoria*; 316, *A. elegans* sp. nov. (paratype); 317, *A. evanescens*; 318, *A. honmai*; 319, *A. kikuchii*; 320, *A. maetai*; 321, *A. stena*; 322, *A. sugaharai*; 323, *A. tobensis*; 324, *A. yamato* sp. nov. (paratype).

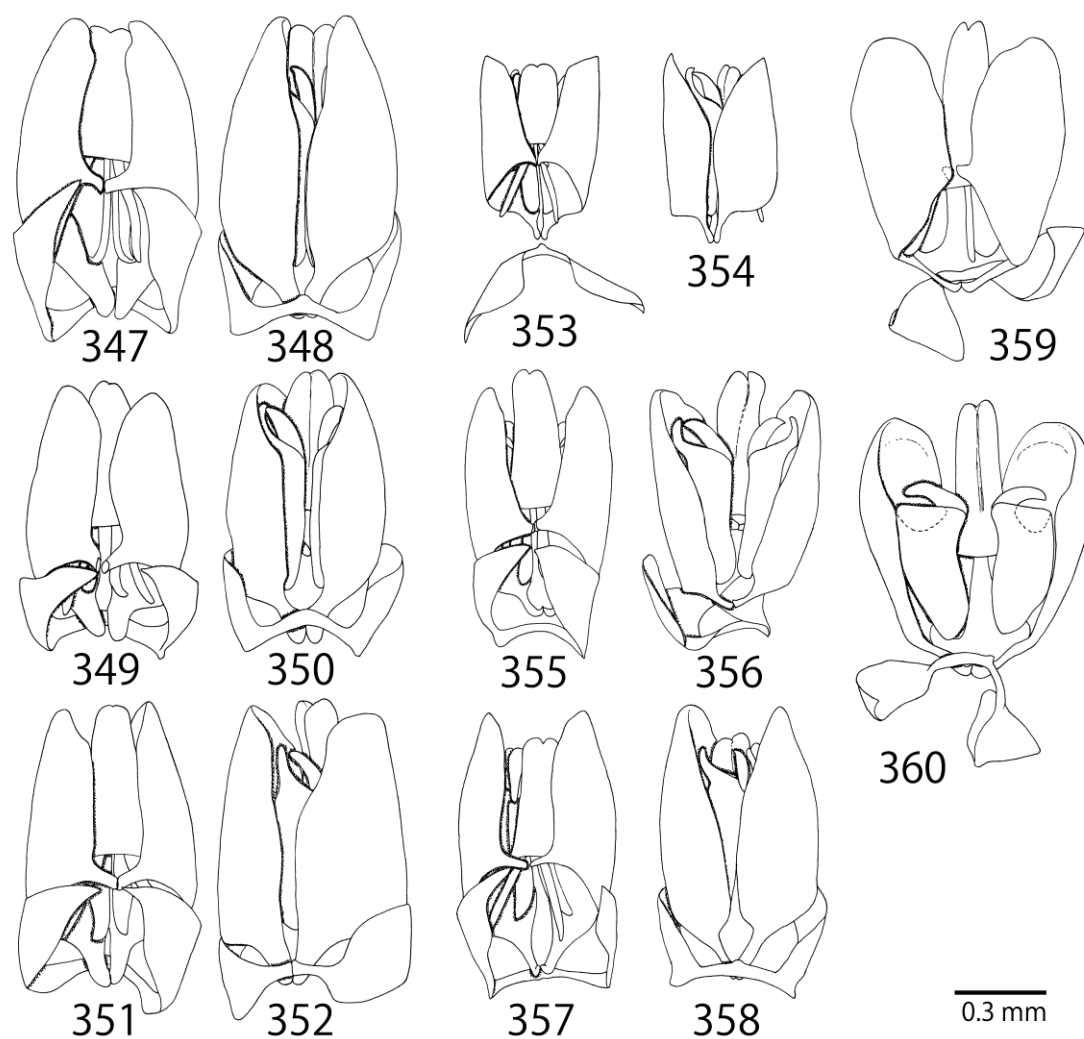


Figures 325–335. Metasomal tergite of *Apophua*, dorsal view, female — 325, *A. aquilonia*; 326, *A. bipunctoria*; 327, *A. elegans* sp. nov. (holotype); 328, *A. evanescens*; 329, *A. honmai*; 330, *A. kikuchii*; 331, *A. maetai*; 332, *A. stena*; 333, *A. sugaharai*; 334, *A. tobensis*; 335, *A. yamato* sp. nov. (holotype).

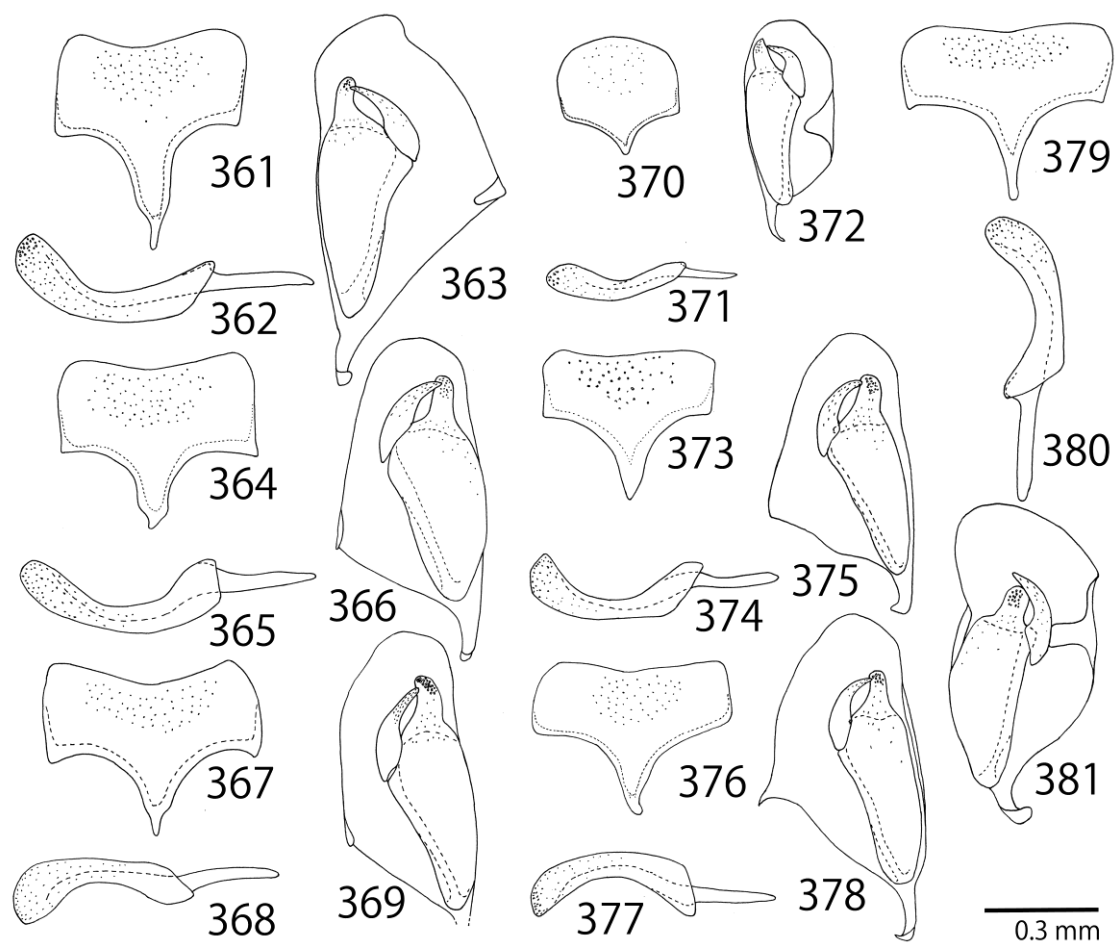


Figures 336–346. T2 of *Apophua*, dorsal view, female — 336, *A. aquilonia*; 337, *A. bipunctoria*; 338, *A. elegans* sp. nov. (holotype); 339, *A. evanescens*; 340, *A. honmai*; 341, *A. kikuchii*; 342, *A. maetai*; 343, *A. stena*; 344, *A. sugaharai*; 345, *A. tobensis*; 346, *A. yamato* sp. nov. (holotype).

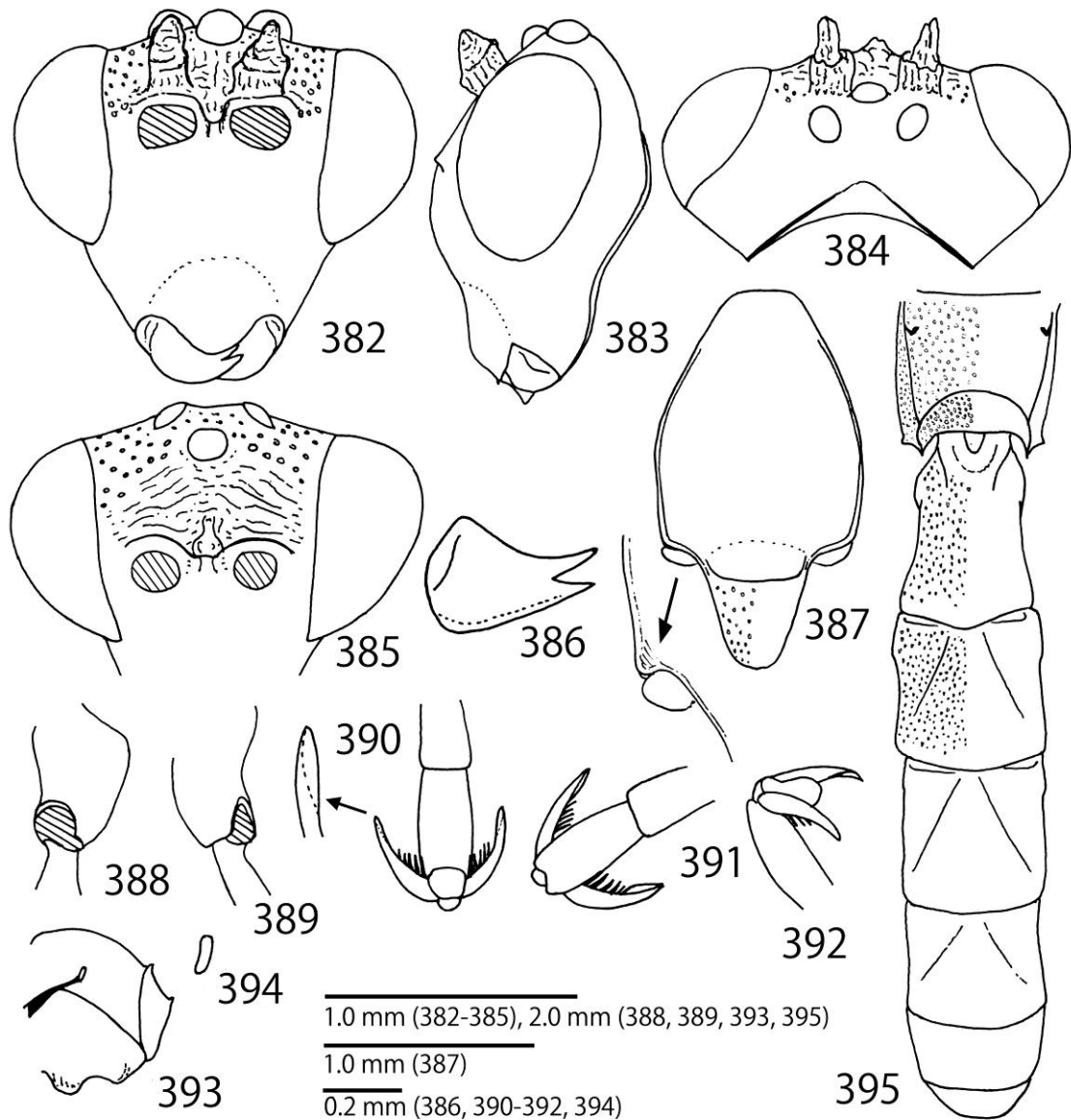




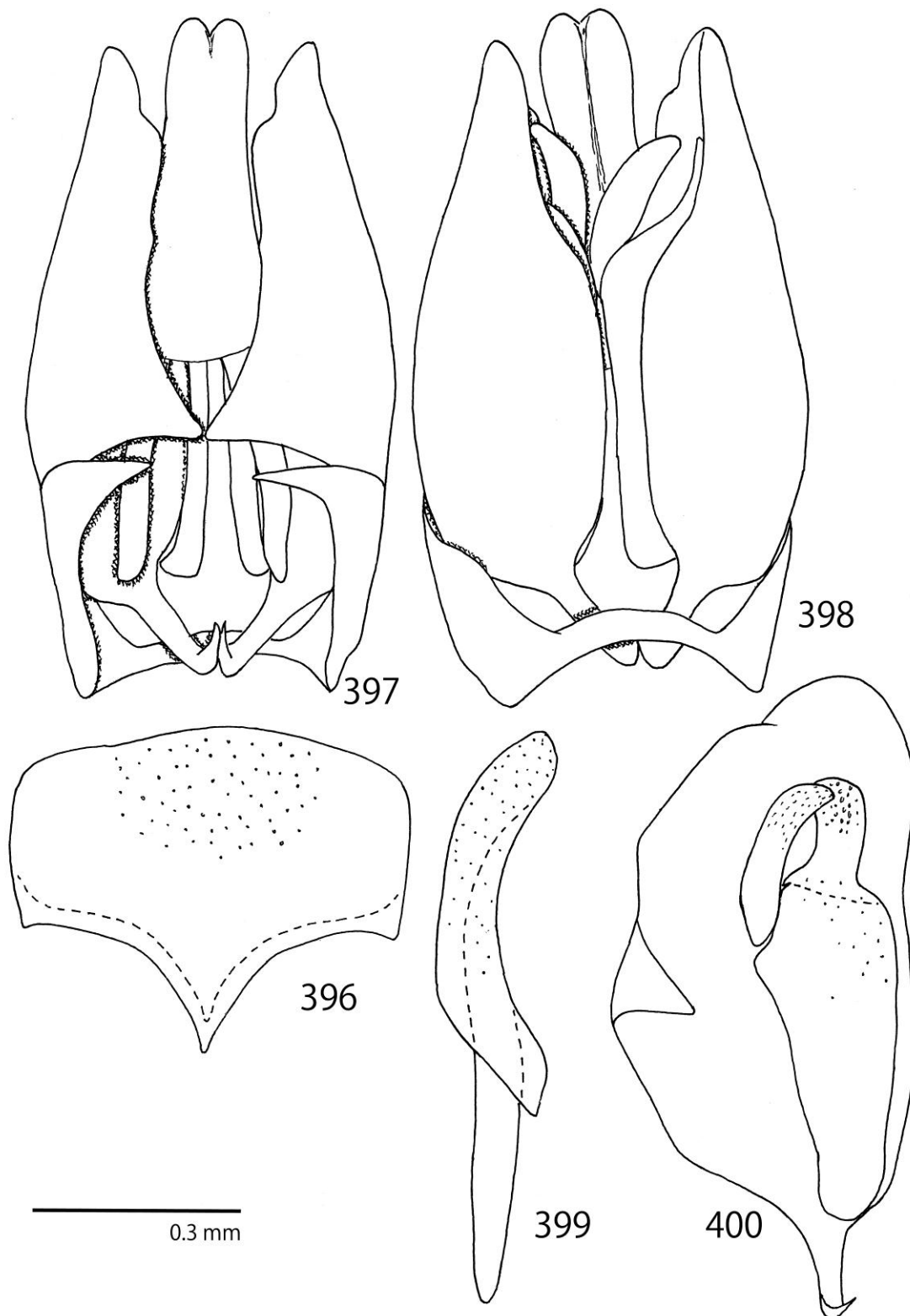
Figures 347–358. Male genitalia of *Apophua*, dorsal (347, 349, 351, 353, 355, 357, 359) and ventral (348, 350, 352, 354, 356, 358, 360) views. — 347, 348, *A. bipunctoria*; 349, 350, *A. evanescens*; 351, 352, *A. honmai*; 353, 354 (basal ring removed), *A. kikuchii*; 355, 356, *A. maetai*; 357, 358, *A. stena*; 359, 360, *A. sugaharai*.



Figures 361–381. Male subgenital plate (ventral view: 361, 364, 367, 370, 373, 376, 379), left (ventral view: 362, 365, 371, 374) and right (lateral view: 368, 377, 380) aedeagi and left (mesal view: 366, 369, 375, 378) and right (mesal view: 363, 372, 381) parameres and volsellae of *Apophua* — 361–363, *A. bipunctoria*; 364–366, *A. evanescens*; 367–369, *A. honmai*; 370–372, *A. kikuchii*; 373–375, *A. maetai*; 376–378, *A. stena*; 379–381, *A. sugaharai*.



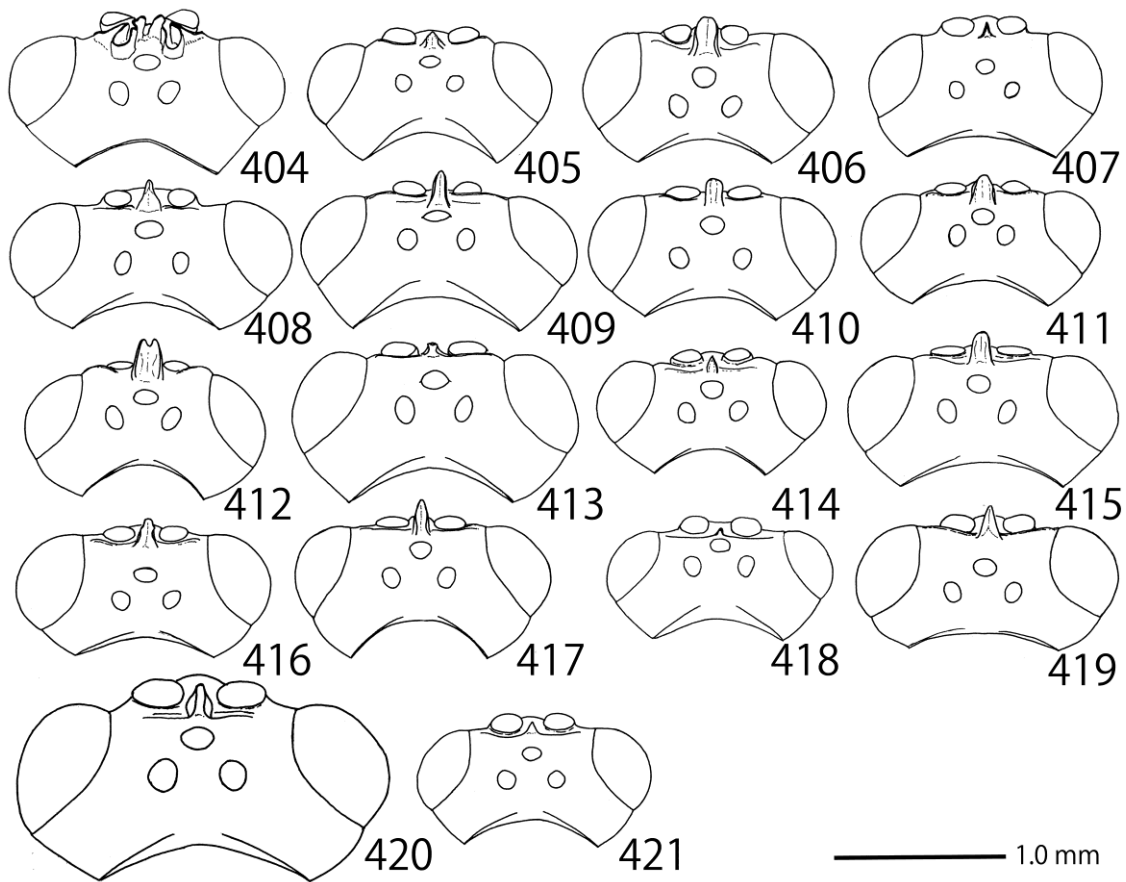
Figures 382–395. *Diblalomorpha cylindrator*, female (382–384, 386–395, Russia; 385, Japan) —382–385, Head, frontal (382, 385), lateral (383) and dorsal (384) view; 386, outer aspect of mandible; 387, mesoscutum and its postero-lateral projection, dorsal view; 388, 389, fore coxa, posterolateral (388) and anterolateral (389) view; 390–392, apical part of hind tarsus and tarsal claw, ventral (390), dorsal (391) and lateral (392) views; 393, propodeum, lateral view; 394, propodeal spiracle; 395, propodeum and metasoma, dorsal view. Surface sculpture depicted only frons (382, 384, 385), scutellum (387) and propodeum, T1 and T2 (395).



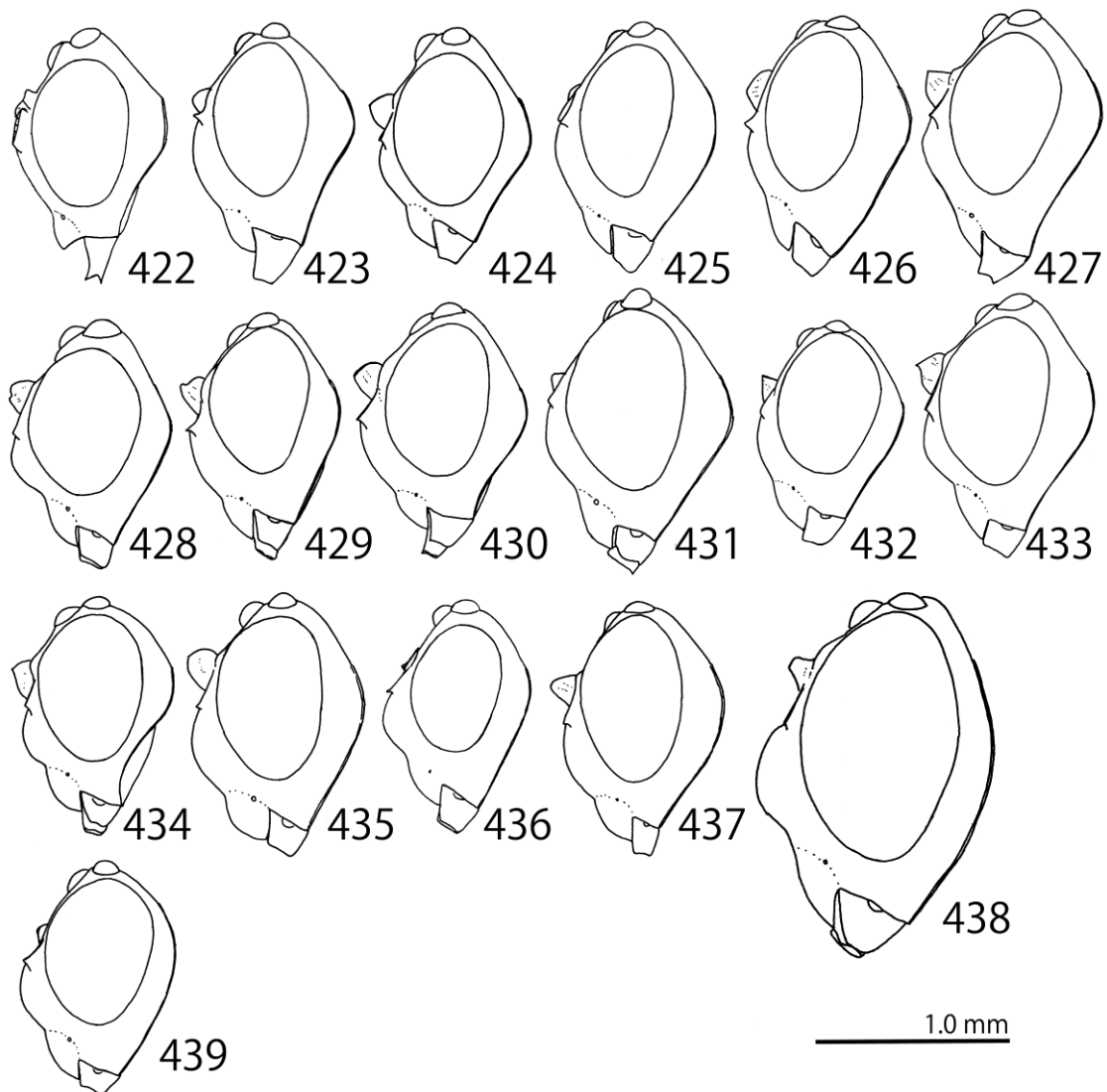
Figures 396–400. Male terminalia of *Diblastomorpha cylindrator* — 396, subgenital plate, ventral view; 397, 398, genitalia, dorsal (397) and ventral (398) view; 399, left aedeagus, lateral view; 277, left paramere, inner view.



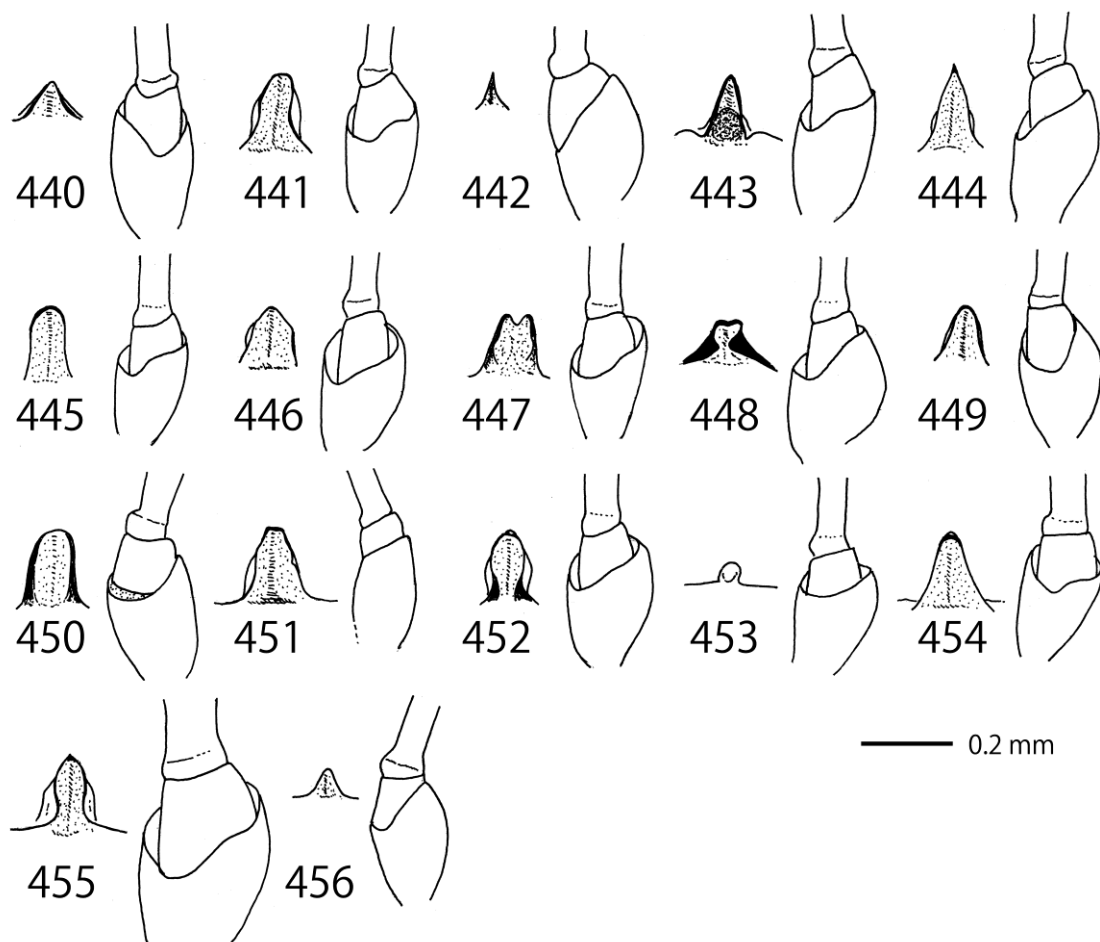
Figures 401–403. Lateral habitus (401, 403) and head, frontal view (402) of *Dblastomorpha cylindrator*, female, Japan (401, 402) and Russia (403).



Figures 404–421. Head of *Glypta*, dorsal view — 404, *G. biauriculata*; 405, *G. cognata* sp. nov. (holotype); 406, *G. cymolomiae*; 407, *G. daisetsuzana* sp. nov. (holotype); 408, *G. densepunctata* sp. nov. (holotype); 409, *G. extincta*; 410, *G. flavitarsus* sp. nov. (holotype); 411, *G. ichitai* sp. nov. (holotype); 412, *G. kamijoi*; 413, *G. karasawensis* sp. nov. (holotype); 414, *G. lapponica*; 415, *G. nipponica* sp. nov. (holotype); 416, *G. shigaensis* sp. nov. (holotype); 417, *G. suwai* sp. nov. (holotype); 418, *G. tamanukii*; 419, *G. touyaensis* sp. nov. (holotype); 420, *G. tumor*; 421, *G. zenibakoensis* sp. nov. (holotype).

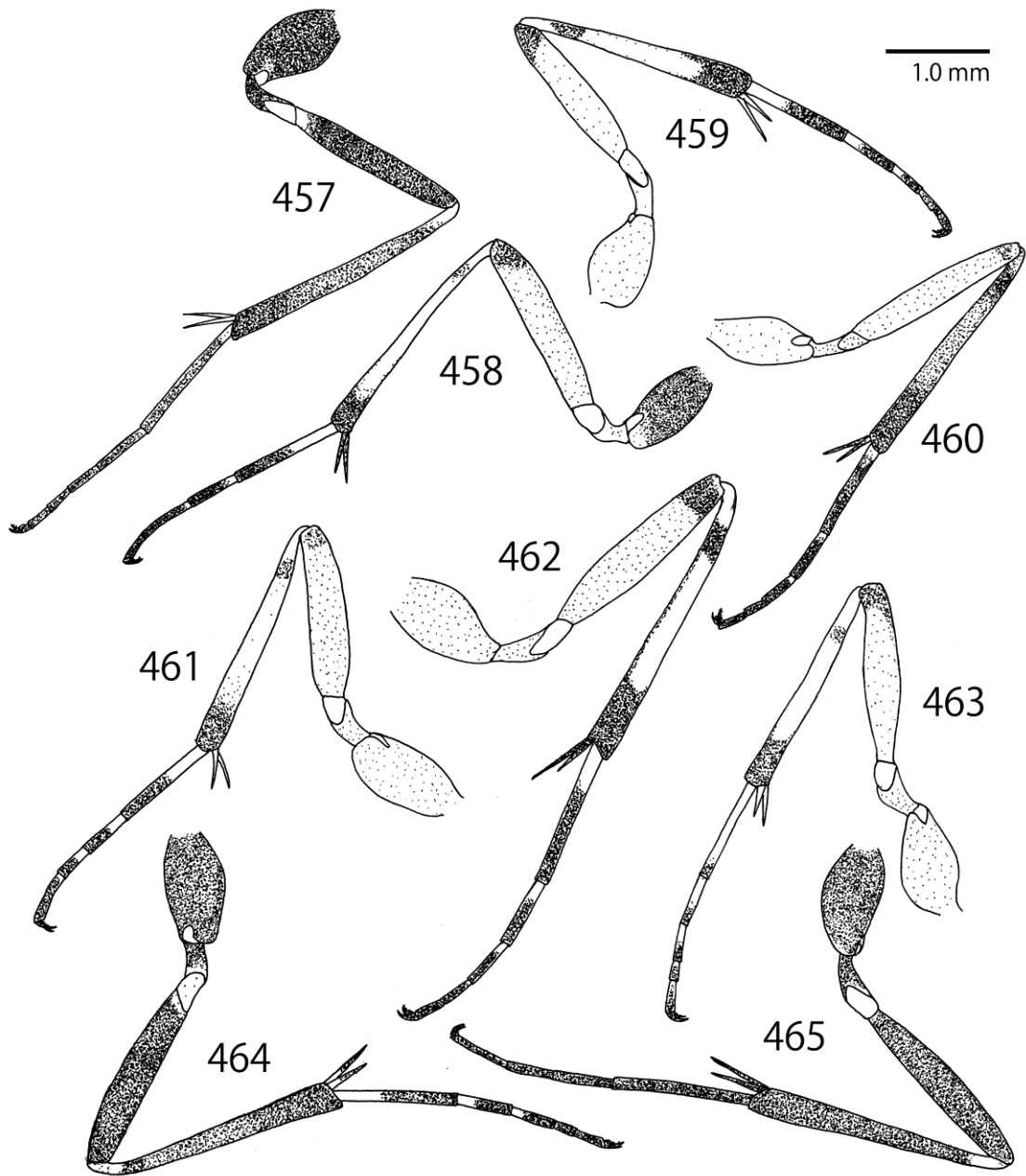


Figures 422–439. Head of *Glypta*, lateral view — 422, *G. biauriculata*; 423, *G. cognata* sp. nov. (holotype); 424, *G. cymolomiaae*; 425, *G. daisetsuzana* sp. nov. (holotype); 426, *G. densepunctata* sp. nov. (holotype); 427, *G. extincta*; 428, *G. flavitarsus* sp. nov. (holotype); 429, *G. ichitai* sp. nov. (holotype); 430, *G. kamijoi*; 431, *G. karasawensis* sp. nov. (holotype); 432, *G. lapponica*; 433, *G. nipponica* sp. nov. (holotype); 434, *G. shigaensis* sp. nov. (holotype); 435, *G. suwai* sp. nov. (holotype); 436, *G. tamanukii*; 437, *G. touyaensis* sp. nov. (holotype); 438, *G. tumor*; 439, *G. zenibakoensis* sp. nov. (holotype).

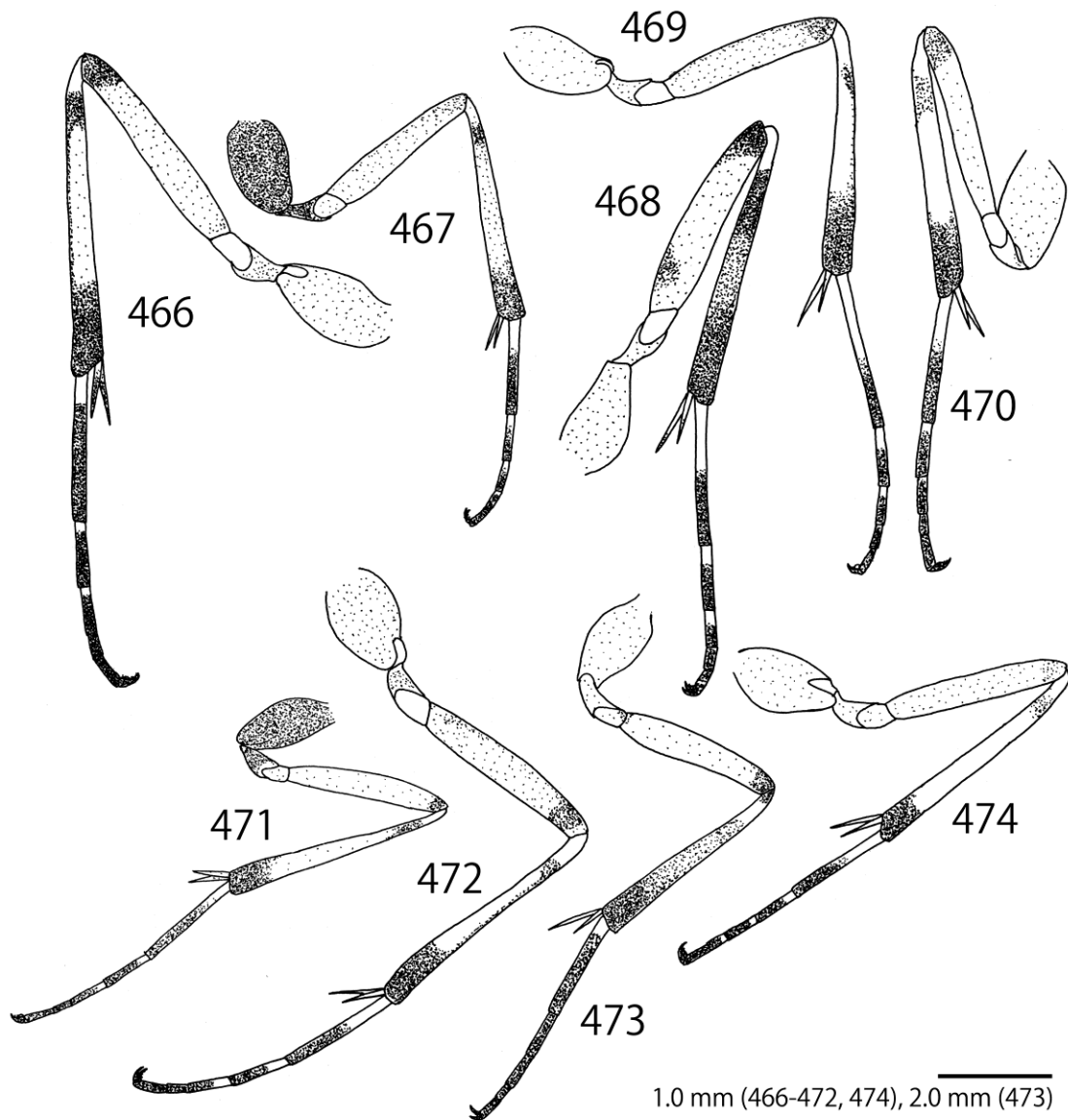


Figures 440–456. Frontal horns (left) and base of antennae (right) of *Glypta*, dorsal (horn) and lateral (antenna) view — 440, *G. cognata* sp. nov. (holotype); 441, *G. cymolomiaae*; 442, *G. daisetsuzana* sp. nov. (holotype); 443, *G. densepunctata* sp. nov. (holotype); 444, *G. extincta*; 445, *G. flavitarsus* sp. nov. (holotype); 446, *G. ichitai* sp. nov. (holotype); 447, *G. kamijoi*; 448, *G. karasawensis* sp. nov. (holotype); 449, *G. lapponica*; 450, *G. nipponica* sp. nov. (holotype); 451, *G. shigaensis* sp. nov. (holotype); 452, *G. suwai* sp. nov. (holotype); 453, *G. tamanukii*; 454, *G. touyaensis* sp. nov. (holotype); 455, *G. tumor*; 456, *G. zenibakoensis* sp. nov. (holotype).

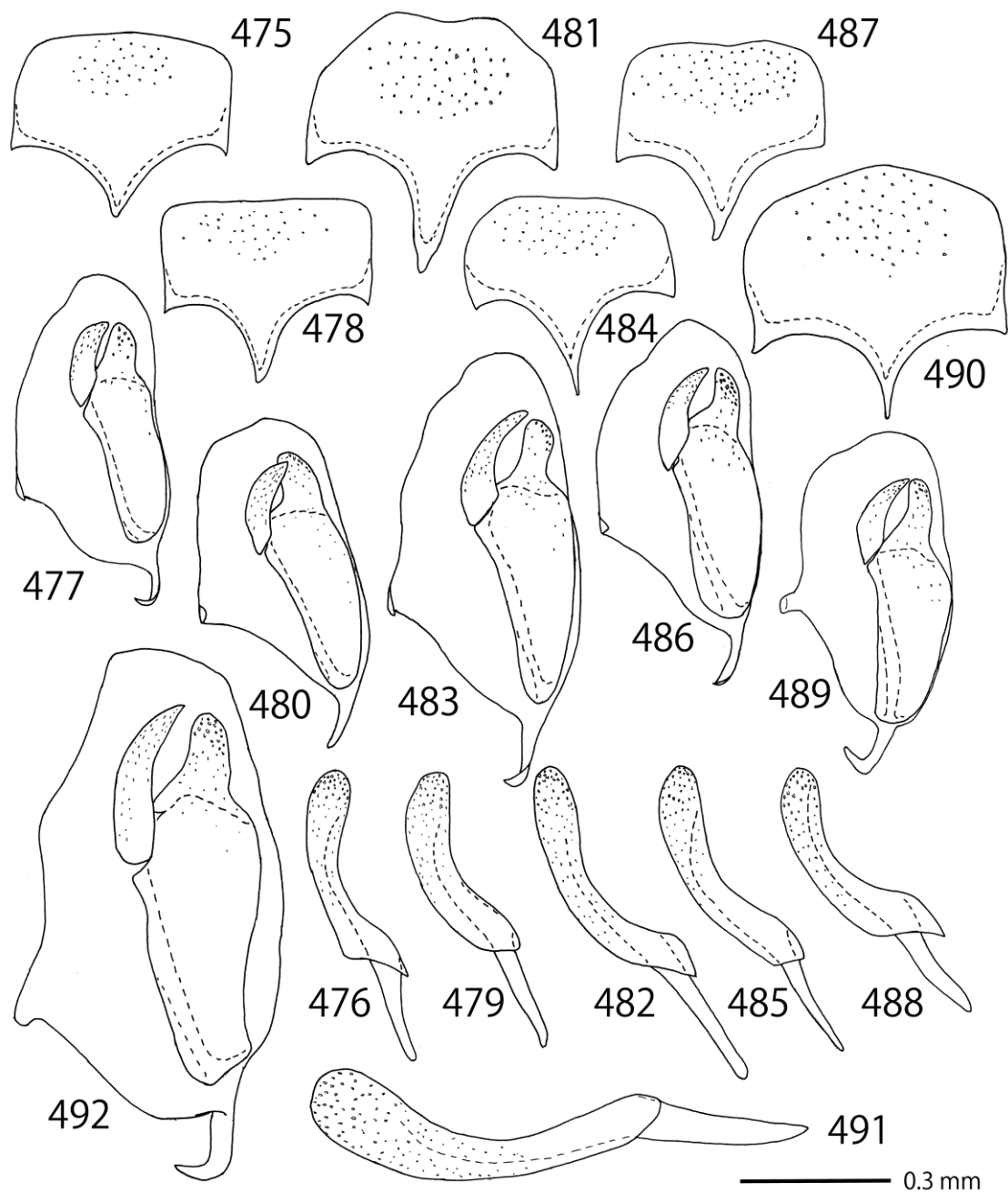




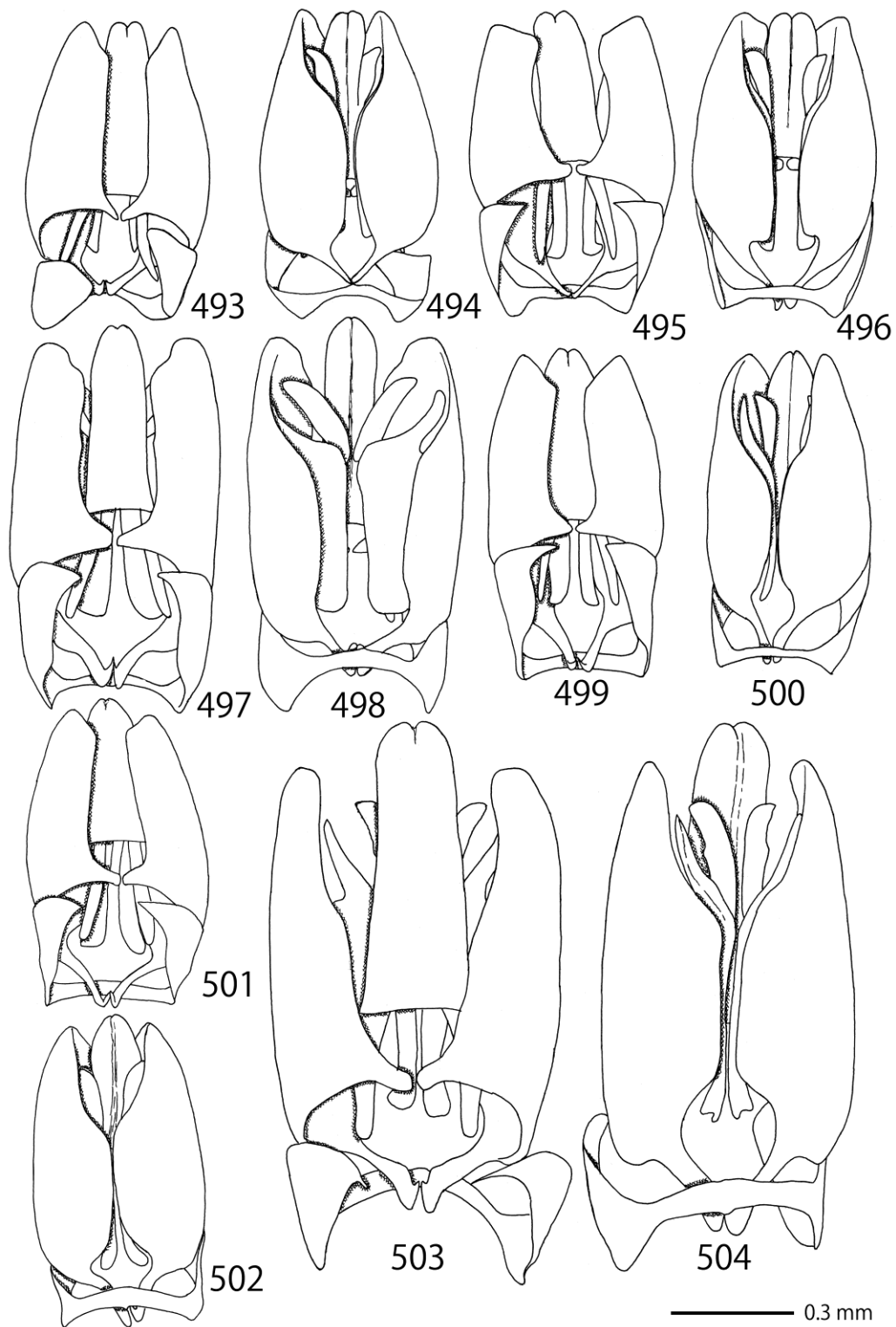
Figures 457–465. Hind leg of *Glypta*, anterior aspect, lateral view — 457, *G. biauriculata*; 458, *G. cognata* sp. nov. (holotype); 459, *G. cymolomiaae*; 460, *G. daisetsuzana* sp. nov. (holotype); 461, *G. densepunctata* sp. nov. (holotype); 462, *G. extincta*; 463, *G. flavitarsus* sp. nov. (holotype); 464, *G. ichitai* sp. nov. (holotype); 465, *G. kamijoi*.



Figures 466–474. Hind leg of *Glypta*, anterior aspect, lateral view — 466, *G. karasawensis* sp. nov. (holotype); 467, *G. lapponica*; 468, *G. nipponica* sp. nov. (holotype); 469, *G. shigaensis* sp. nov. (holotype); 470, *G. suwai* sp. nov. (holotype); 471, *G. tamanukii*; 472, *G. touyaensis* sp. nov. (holotype); 473, *G. tumor*; 474, *G. zenibakoensis* sp. nov. (holotype).



Figures 475–492. Male subgenital plate (ventral view: 475, 478, 481, 484, 487, 490), right volsellae (mesal view: 477, 480, 483, 486, 489, 492) and right aedeagi (lateral view: 476, 479, 482, 485, 488, 491) of *Glypta*. — 475–477, *G. biauriculata*; 478–480, *G. cymolomiae*; 481–483, *G. extincta*; 484–486, *G. ichitai* sp. nov. (paratype); 487–489, *G. tamanukii*; 490–492, *G. tumor*.



Figures 493–504. Male genitalia of *Glypta*, dorsal (493, 495, 497, 499, 501, 503) and ventral (494, 496, 498, 500, 502, 504) view. — 493, 494, *G. biauriculata*; 495, 496, *G. cymolomiae*; 497, 498, *G. extincta*; 499, 500, *G. ichitai* sp. nov. (paratype); 501, 502, *G. tamanukii*; 503, 504, *G. tumor*.



Figures 505 and 506. Lateral habitus (505) and head, frontal view (506) of *Glypta biauriculata*, female, collected from Japan.



Figures 507 and 508. Lateral habitus (507) and head, frontal view (508) of *Glypta cognata*, female (holotype).



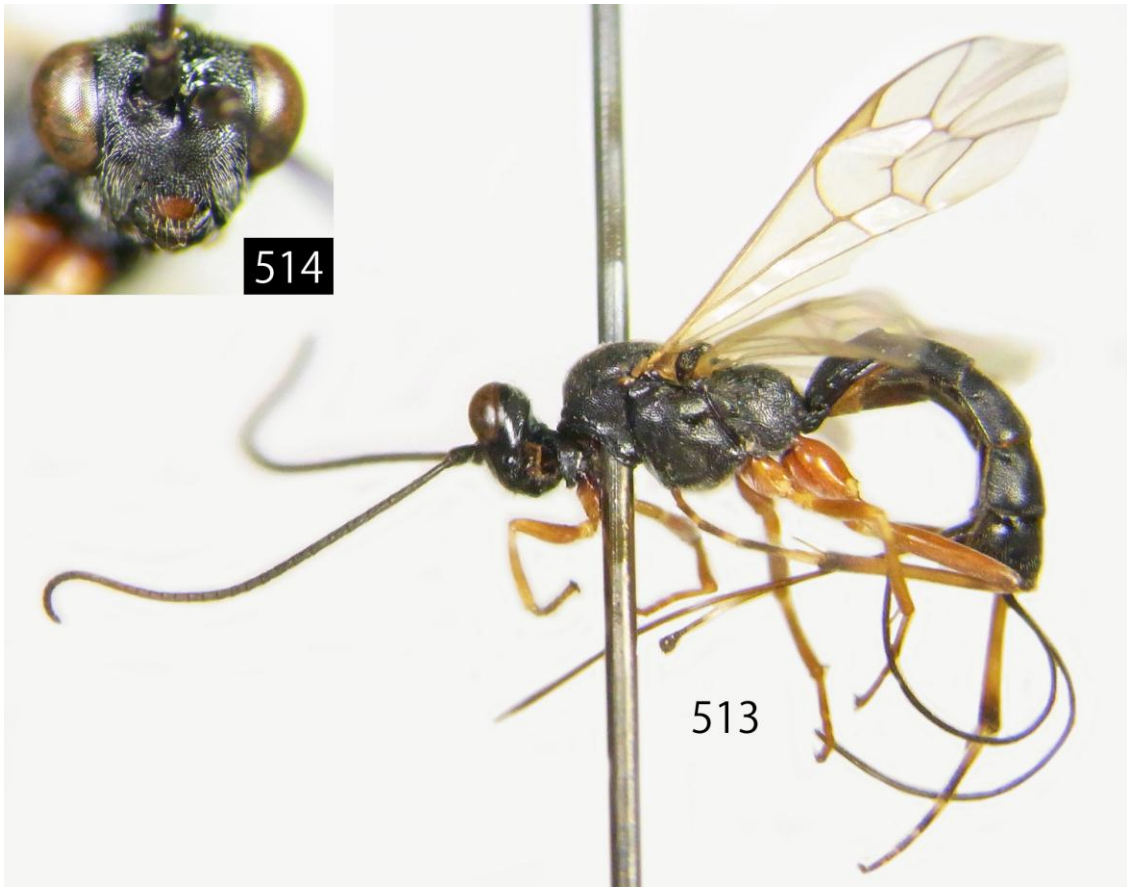
Figures 509 and 510. Lateral habitus (509) and head, frontal view (510) of *Glypta cymolomiae*, female.



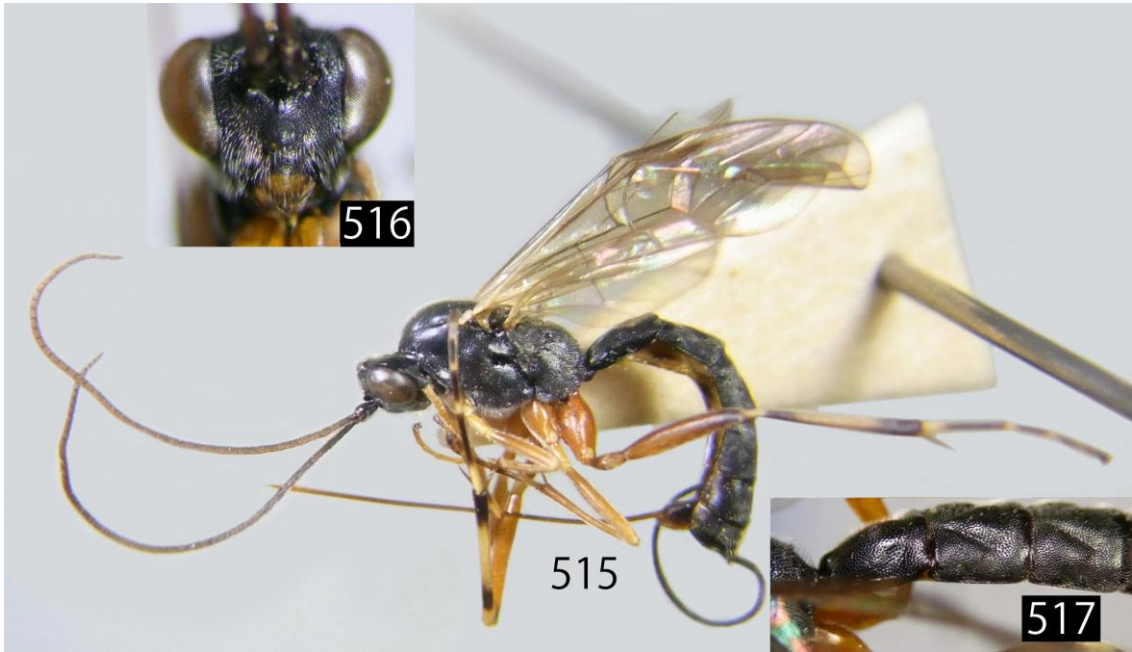


Figures 511 and 512. Lateral habitus (511) and head, frontal view (512) of *Glypta daisetsuzana*, female (holotype).

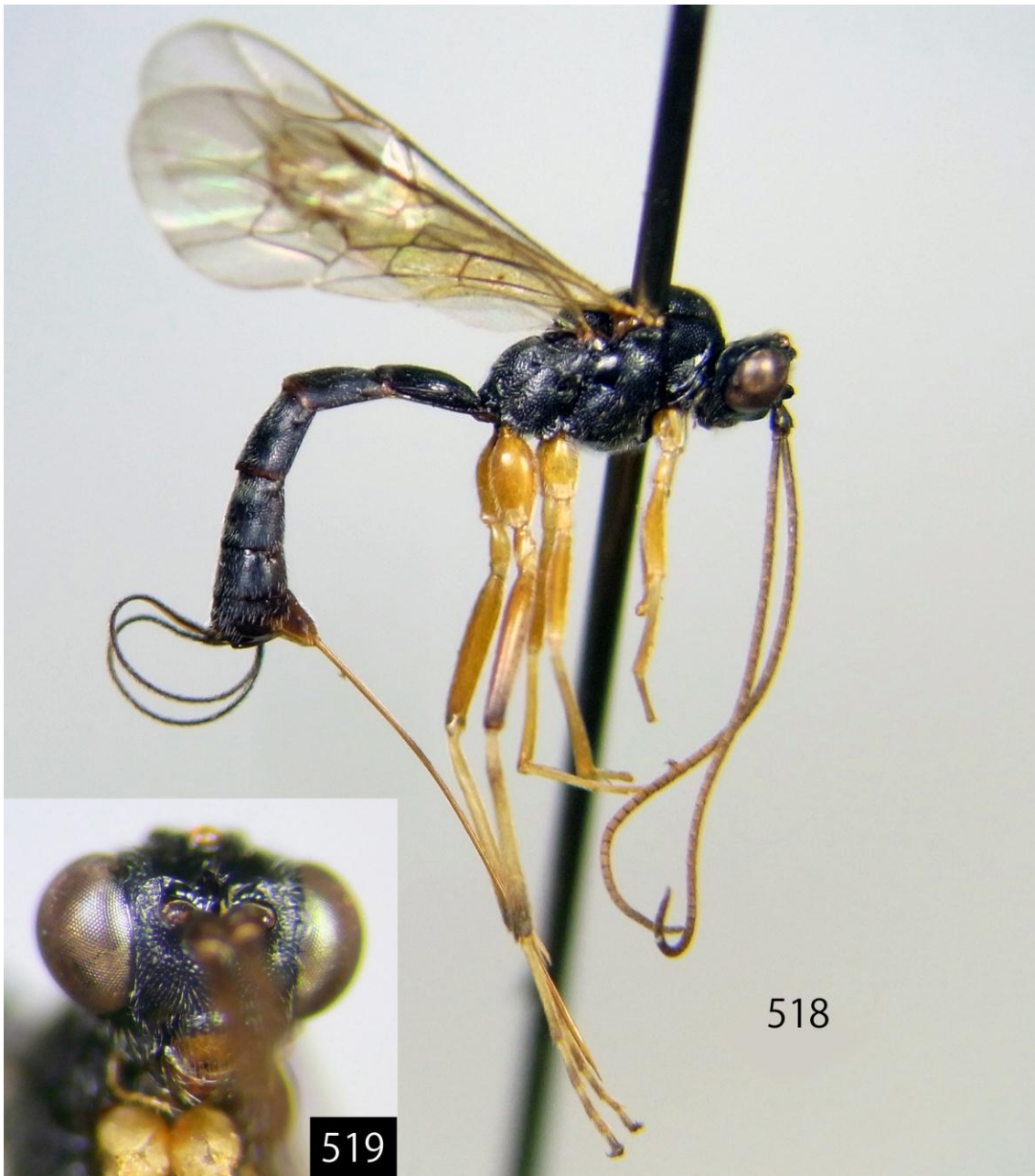




Figures 513 and 514. Lateral habitus (513) and head, frontal view (514) of *Glypta densepunctata*, female (holotype).



Figures 515–517. Lateral habitus (515), head, frontal view (516) and T1-T3, dorsolateral view (517) of *Glypta extincta*, female, collected from Japan.



Figures 518 and 519. Lateral habitus (518) and head, frontal view (519) of *Glypta flavitarsus*, female (holotype).

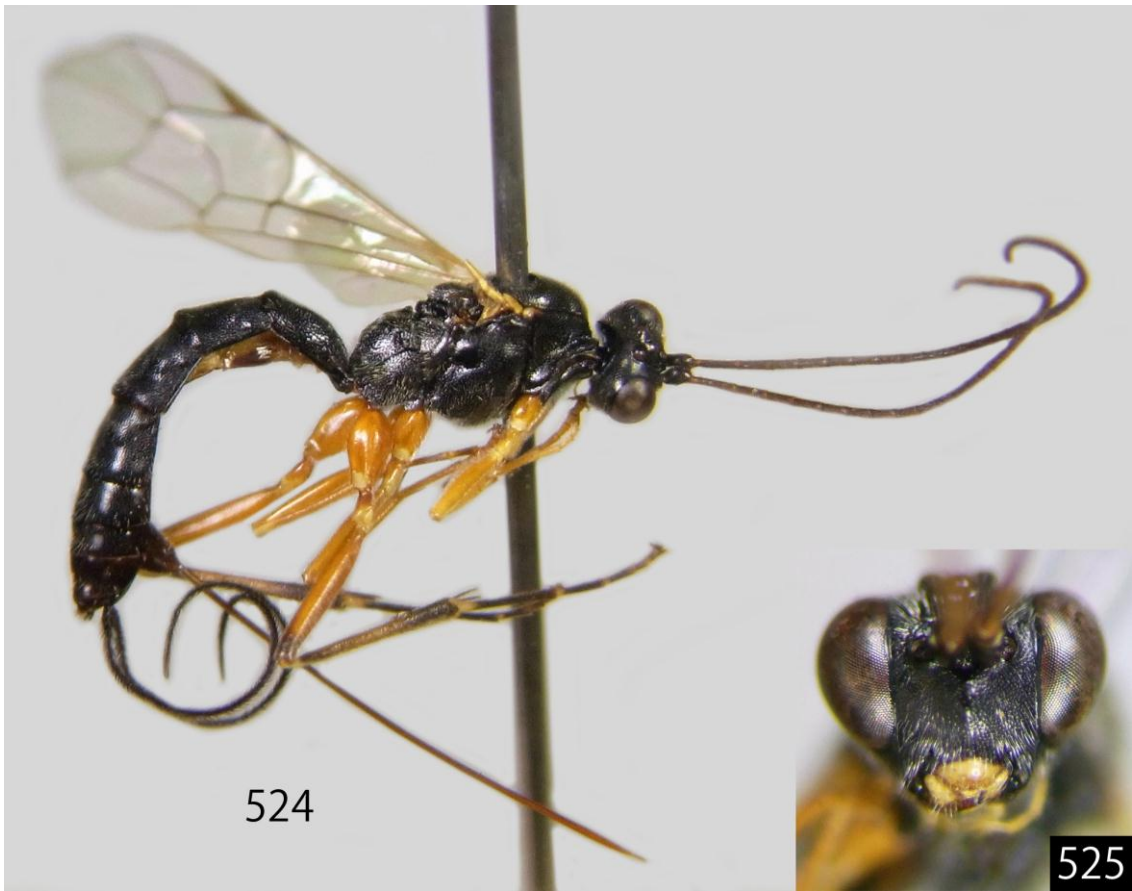


Figures 520 and 521. Lateral habitus (520) and head, frontal view (521) of *Glypta ichitai*, female (holotype).



Figures 522 and 523. Lateral habitus (522) and head, frontal view (523) of *Glypta kamijoi*, female.

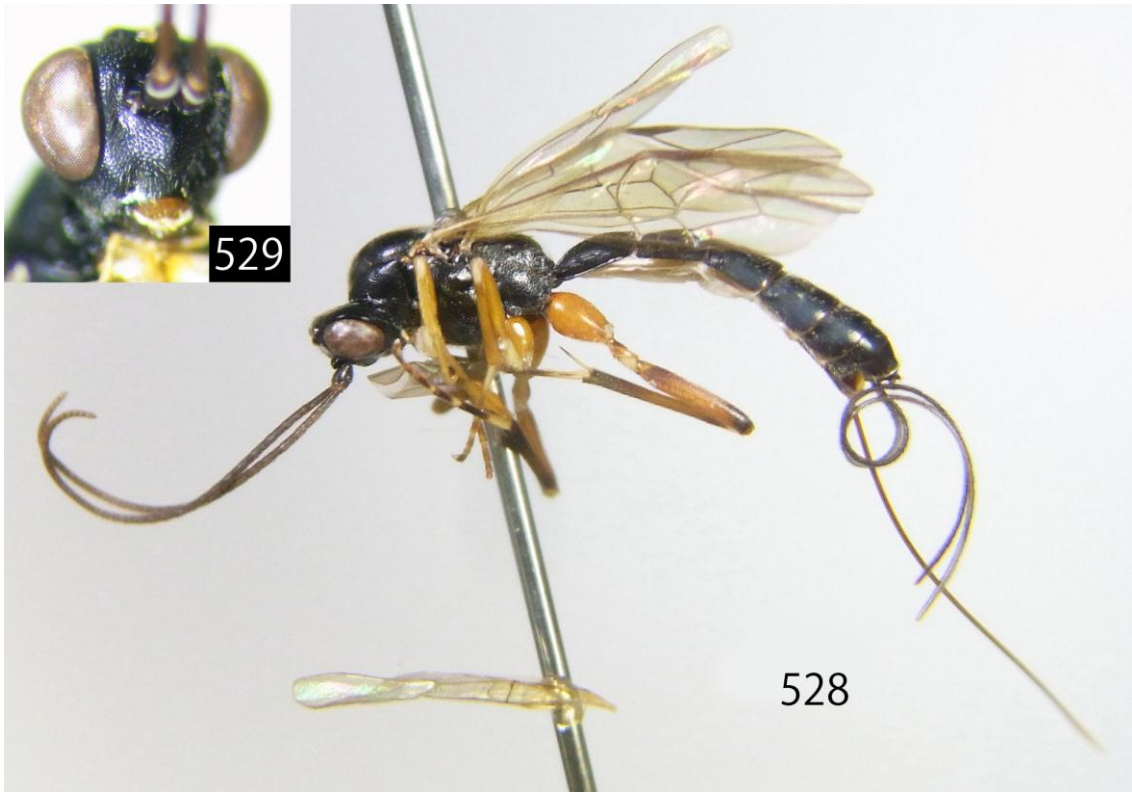




Figures 524 and 525. Lateral habitus (524) and head, frontal view (525) of *Glypta karasawensis*, female (holotype).



Figures 526 and 527. Lateral habitus (526) and head, frontal view (527) of *Glypta lapponica*, female, collected from Japan.



Figures 528 and 529. Lateral habitus (528) and head, frontal view (529) of *Glypta nipponica*, female (holotype).





Figures 530 and 531. Lateral habitus (530) and head, frontal view (531) of *Glypta shigaensis*, female (holotype).



Figures 532 and 533. Lateral habitus (532) and head, frontal view (533) of *Glypta suwai*, female (holotype).

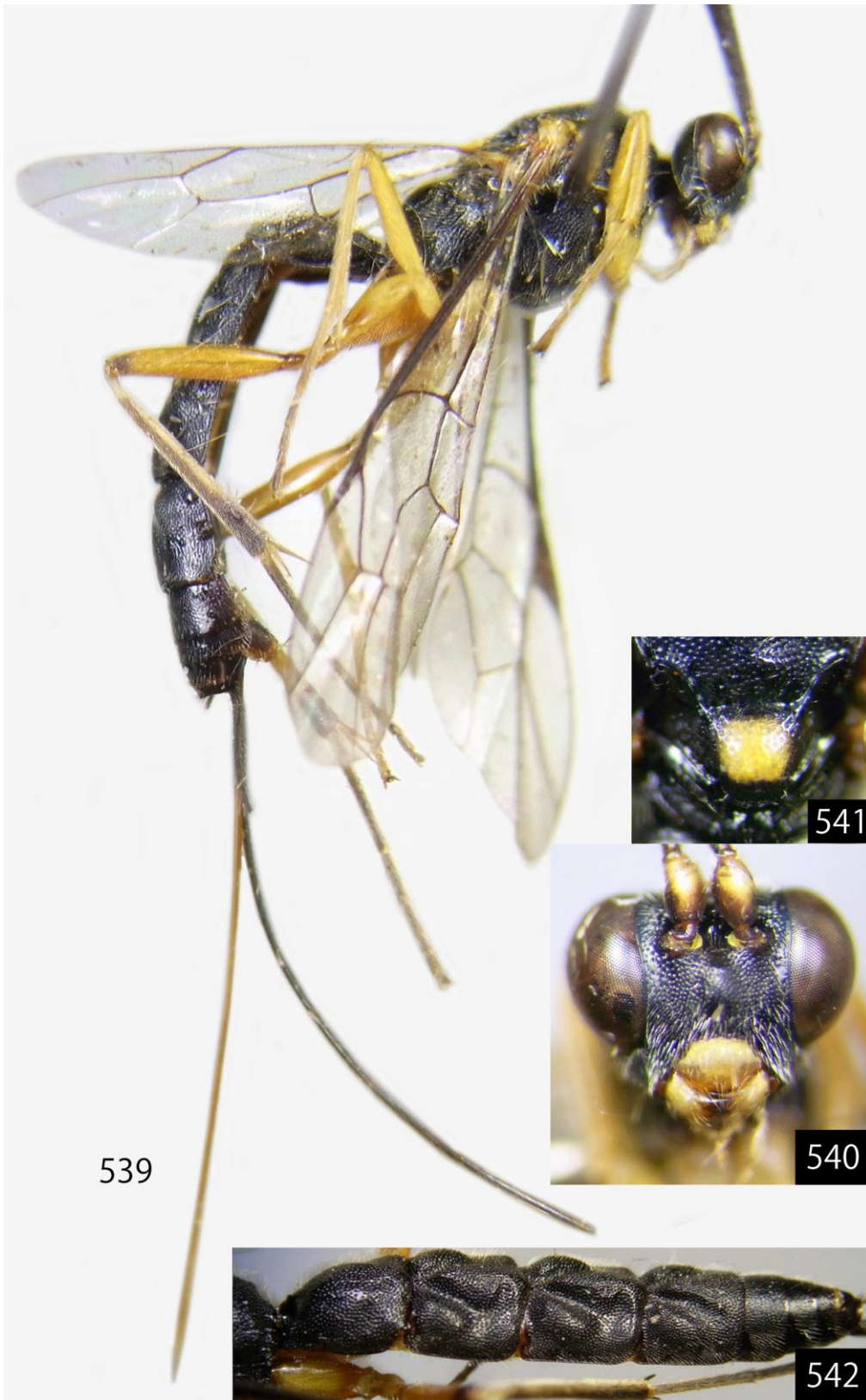


Figures 534–536. Lateral habitus (534), head, frontal view (535) and coxae, lateral view (536) of *Glypta tamanukii*, female, collected from Japan.



Figures 537 and 538. Lateral habitus (537) and head, frontal view (538) of *Glypta touyaensis*, female (holotype).

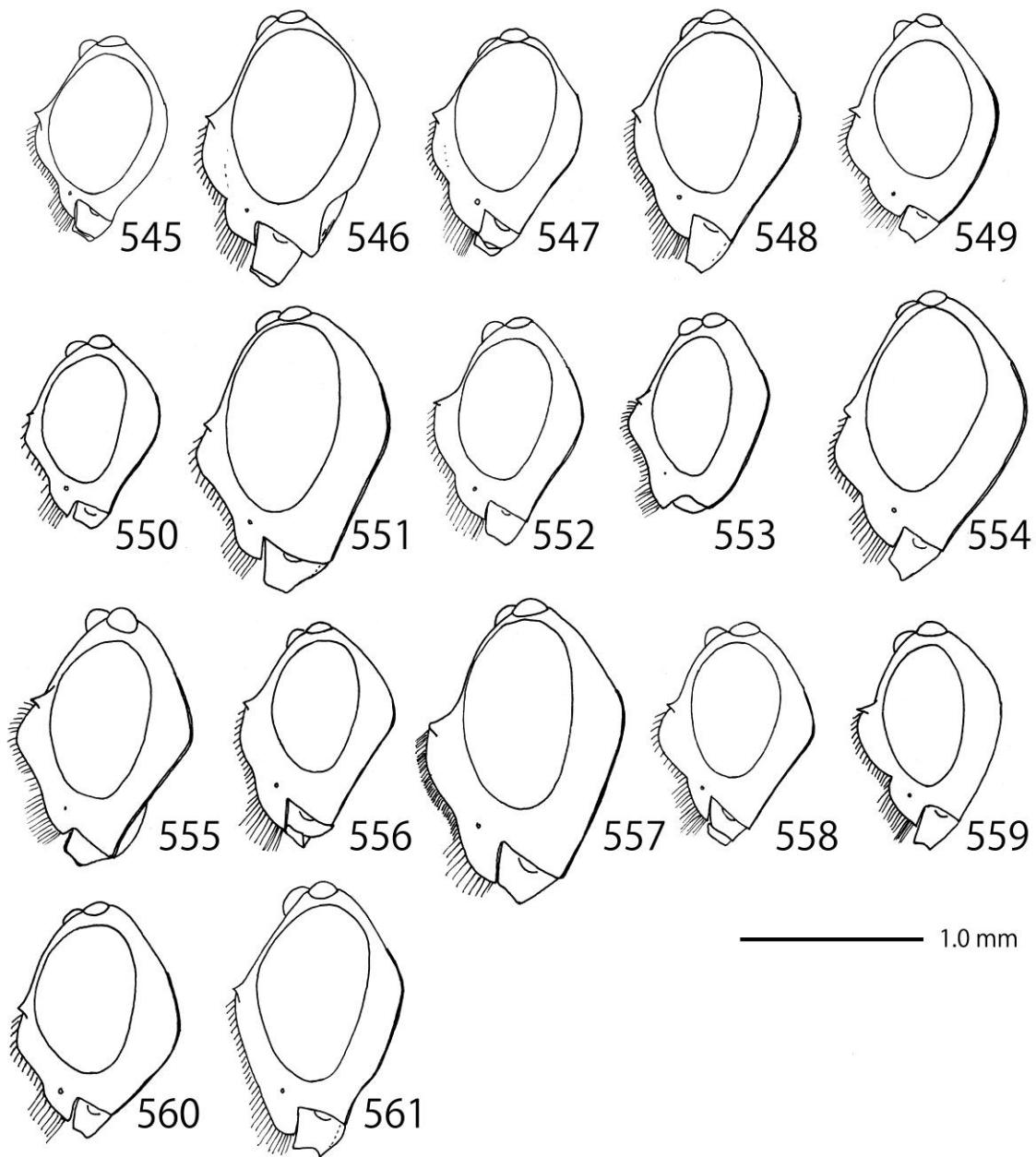




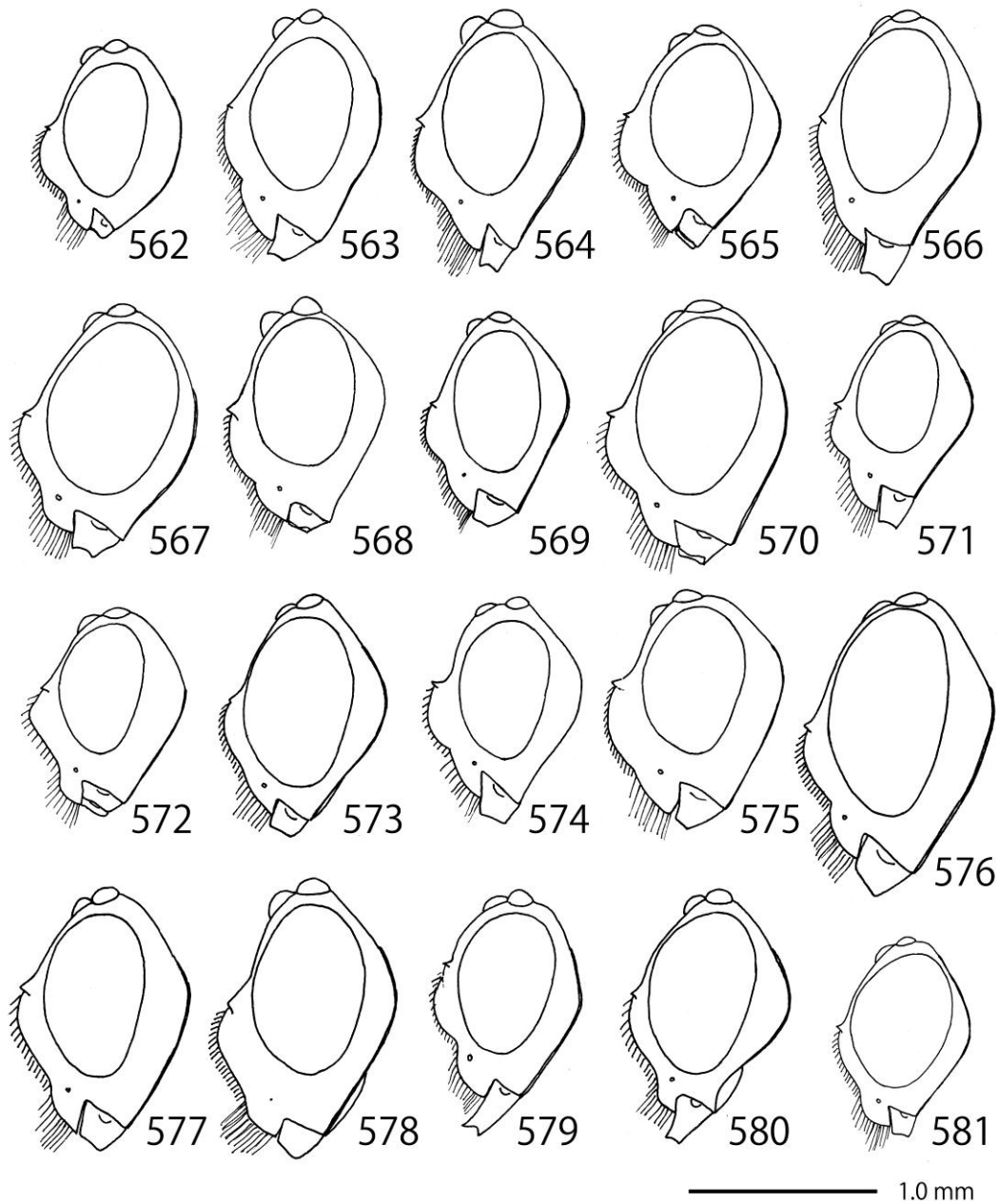
Figures 539–542. Lateral habitus (539), head, frontal view (540), scutellum, dorsal view (541) and metasomal tergites, dorsolateral view (542) of *Glypta tumor*, female.



Figures 543 and 544. Lateral habitus (543) and head, frontal view (544) of *Glypta zenibakoensis*, female (holotype).

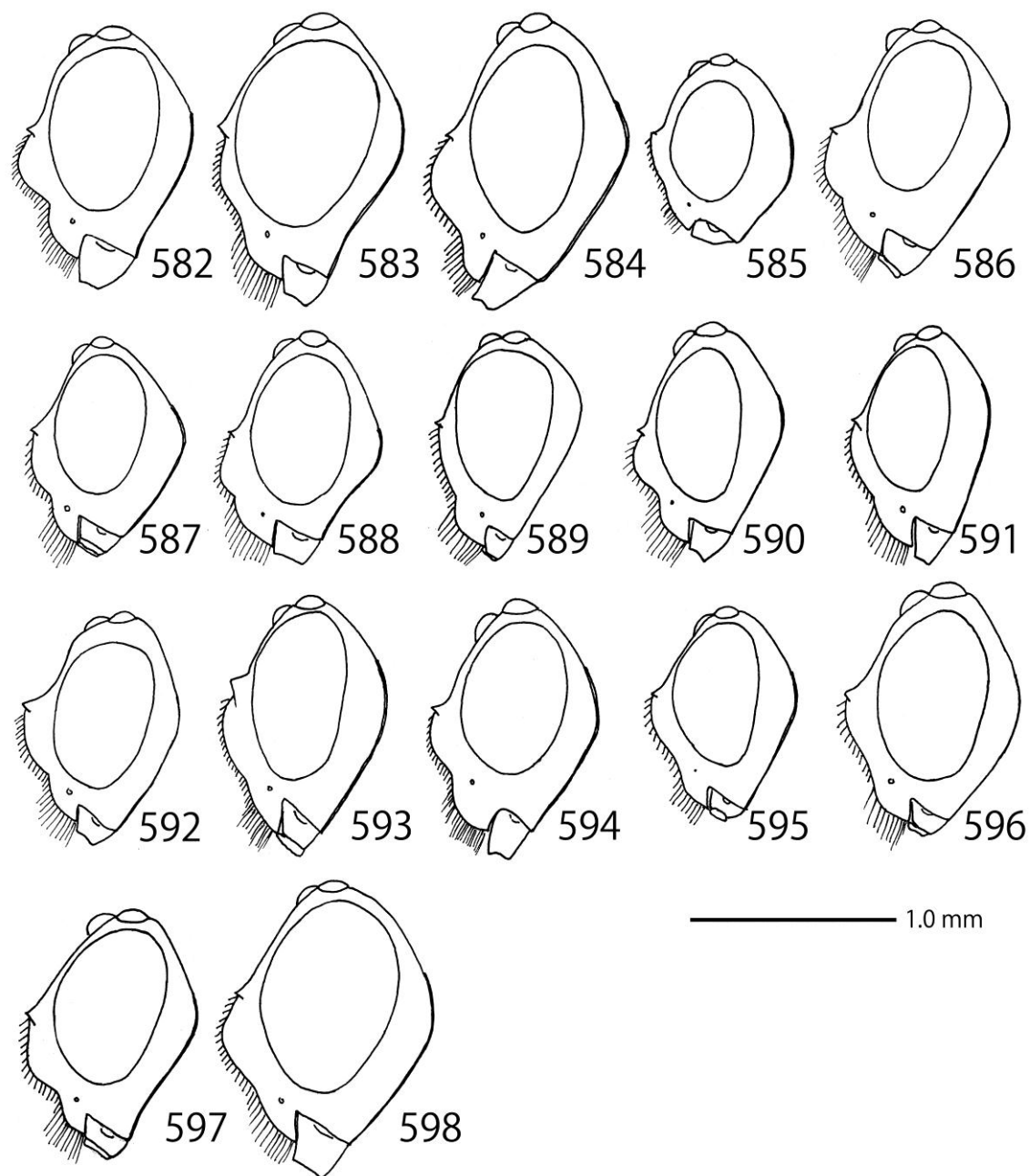


Figures 545–561. Head of *Glypta*, lateral view — 545, *G. elegans* sp. nov. (holotype); 546, *G. kusigematii* sp. nov. (holotype); 547, *G. maruyamensis*; 548, *G. yamamotoi* sp. nov. (holotype); 549, *G. adachii*; 550, *G. akiuensis* sp. nov. (holotype); 551, *G. glypta*; 552, *G. kochai* sp. nov. (holotype); 553, *G. kumaishiensis* sp. nov. (holotype); 554, *G. kuro* sp. nov. (holotype); 555, *G. maetoi* sp. nov. (holotype); 556, *G. minamikawai* sp. nov. (holotype); 557, *G. murotai* sp. nov. (holotype); 558, *G. nagasei* sp. nov. (holotype); 559, *G. nakamurai* sp. nov. (holotype); 560, *G. sudai* sp. nov. (holotype); 561, *G. rufa*.

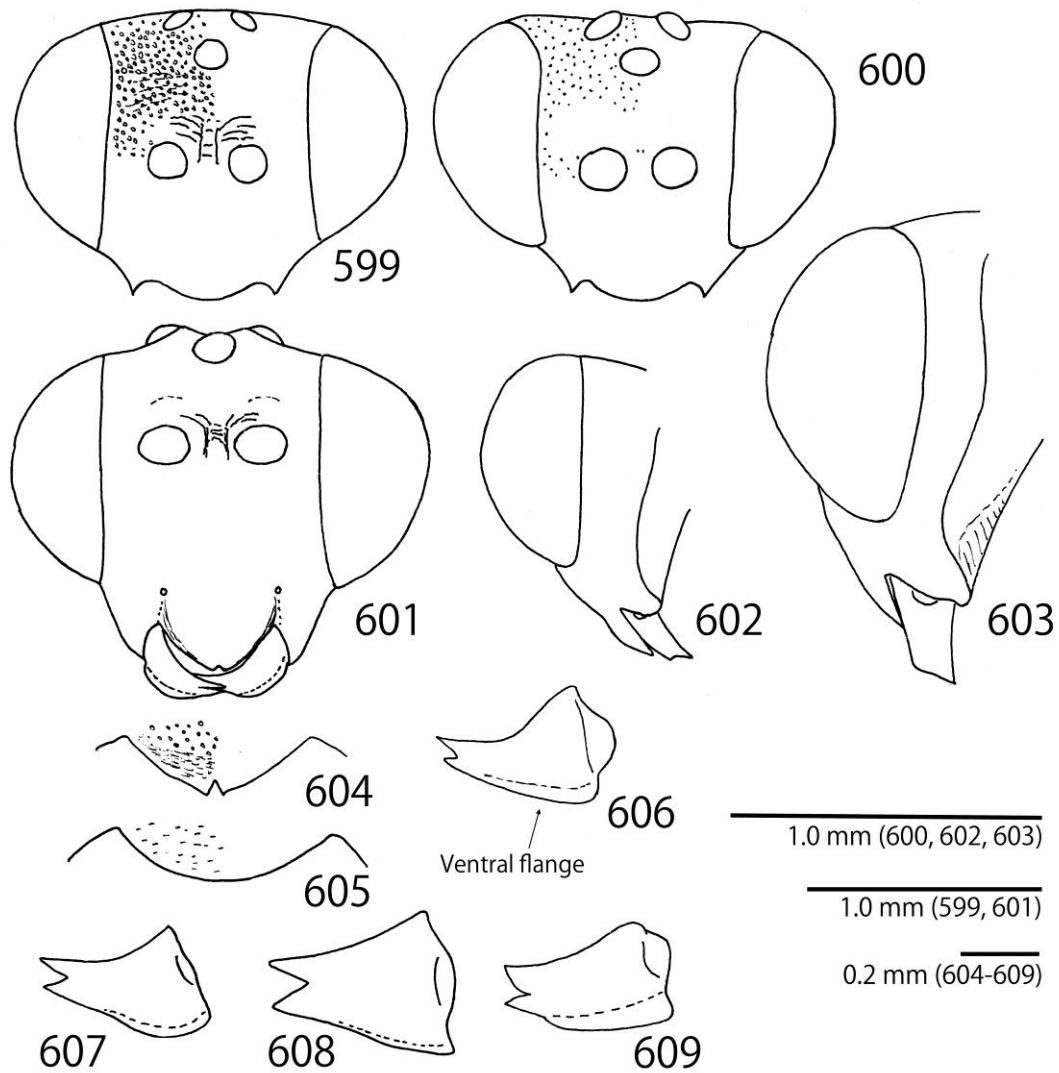


Figures 562–581. Head of *Glypta*, lateral view — 562, *G. aichiensis* sp. nov. (holotype); 563, *G. aino* sp. nov. (holotype); 564, *G. akahige* sp. nov. (holotype); 565, *G. aomoriensis* sp. nov. (holotype); 566, *G. biwakuboensis* sp. nov. (holotype); 567, *G. breviterebra*; 568, *G. breviungulata*; 569, *G. daisensis* sp. nov. (holotype); 570, *G. densa*; 571, *G. erythronota* sp. nov. (holotype); 572, *G. ezoensis* sp. nov. (holotype); 573, *G. fujisana* sp. nov. (holotype); 574, *G. hayachinensis* sp. nov. (holotype); 575, *G. iriei* sp. nov. (holotype); 576, *G. japonica* sp. nov. (holotype); 577, *G. konishii* sp. nov. (holotype); 578, *G. kuslitzkii* sp. nov. (holotype); 579, *G. kyushuensis* sp. nov. (holotype); 580, *G. makiharai* sp. nov. (holotype); 581, *G. mame* sp. nov. (holotype).

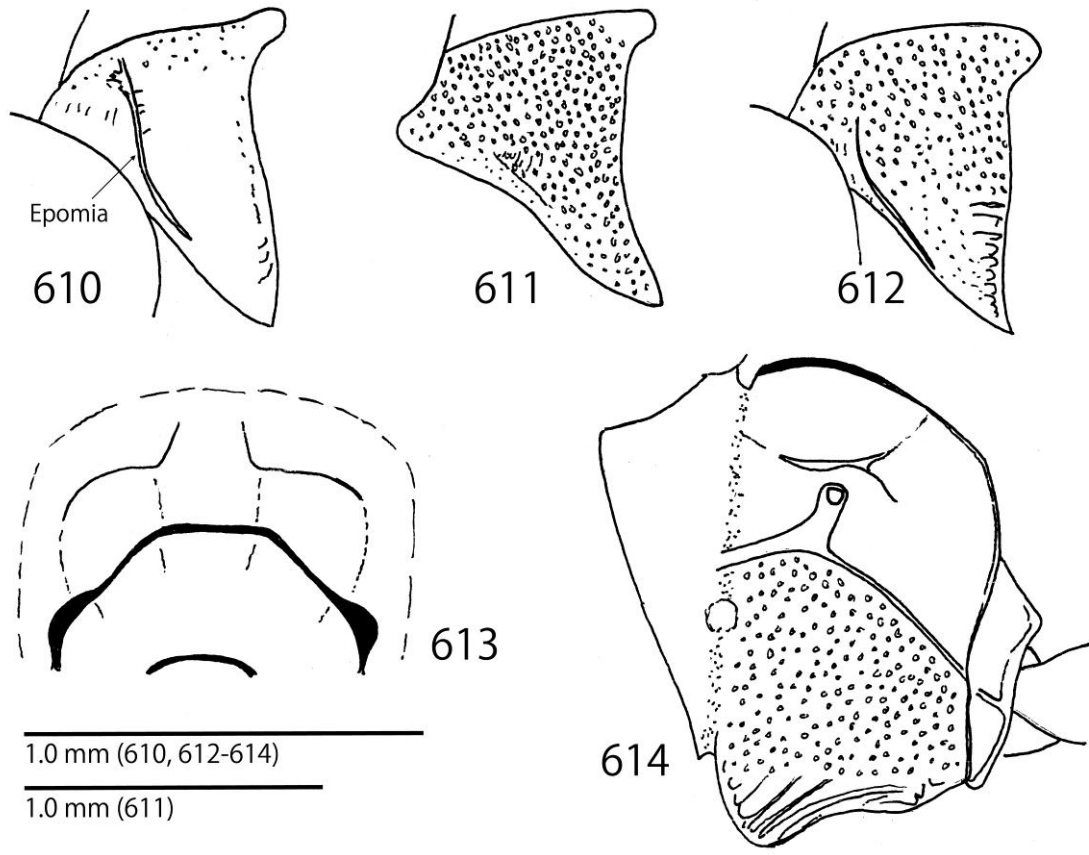




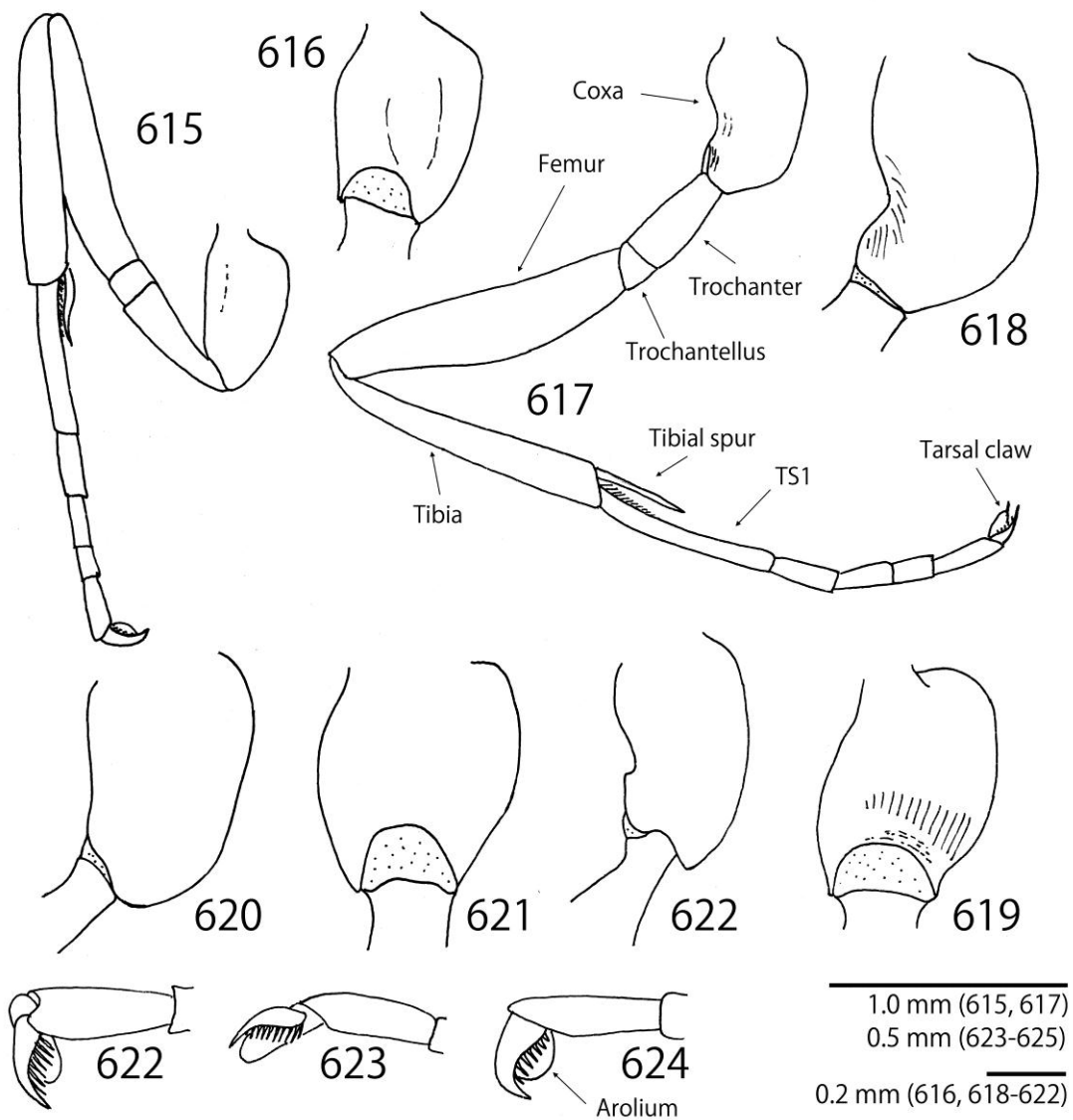
Figures 582–598. Head of *Glypta*, lateral view — 582, *G. matsumotoi* sp. nov. (holotype); 583, *G. media*; 584, *G. momoi*; 585, *G. niigatensis* sp. nov. (holotype); 586, *G. onaga* sp. nov. (holotype); 587, *G. pedata*; 588, *G. rufata*; 589, *G. sankaku*; 590, *G. shibetsuensis* sp. nov. (holotype); 591, *G. shimizui* sp. nov. (holotype); 592, *G. slenda* sp. nov. (holotype); 593, *G. tomuraushiensis* sp. nov. (holotype); 594, *G. uenaensis* sp. nov. (holotype); 595, *G. yamagishii* sp. nov. (holotype); 596, *G. yamato* sp. nov. (holotype); 597, *G. yashajinensis* sp. nov. (holotype); 598, *G. yoshidai* sp. nov. (holotype).



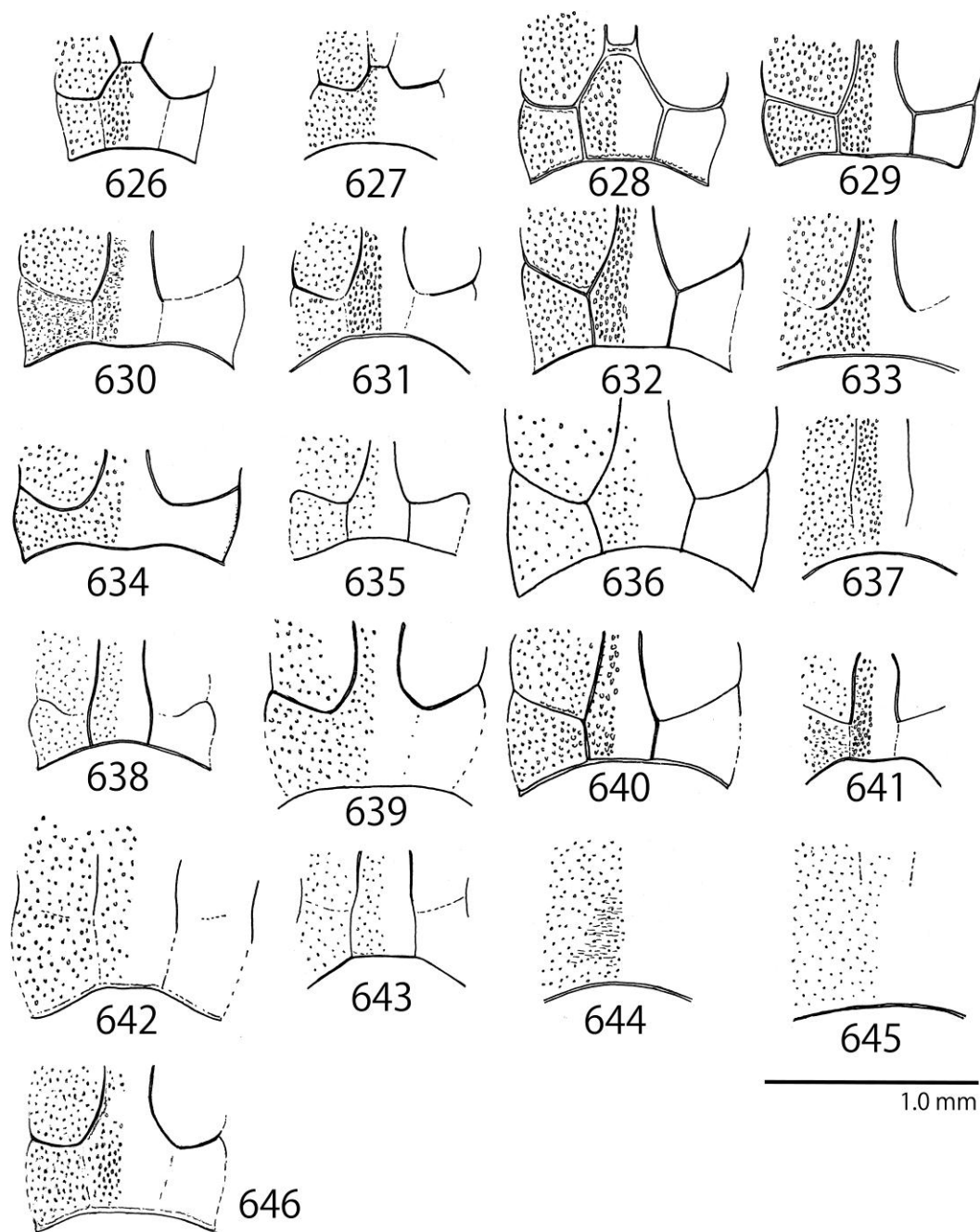
Figures 599–609. Head, antero-dorsal (599, 600), frontal (601) and postero-lateral (602, 603) view, ventral margin of clypeus (604, 605) and outer aspect of mandible (606–609) of *Glypta* — 599, *G. breviterebra*; 600, 602, *G. elegans* sp. nov. (holotype); 601, 604, 606, *G. rufa*; 603, *G. kusigematii* sp. nov. (holotype); 605, 608, *G. japonica* sp. nov. (holotype); 607, *G. fujisana* sp. nov. (holotype); 609, *G. kuslitzkii* sp. nov. (holotype).



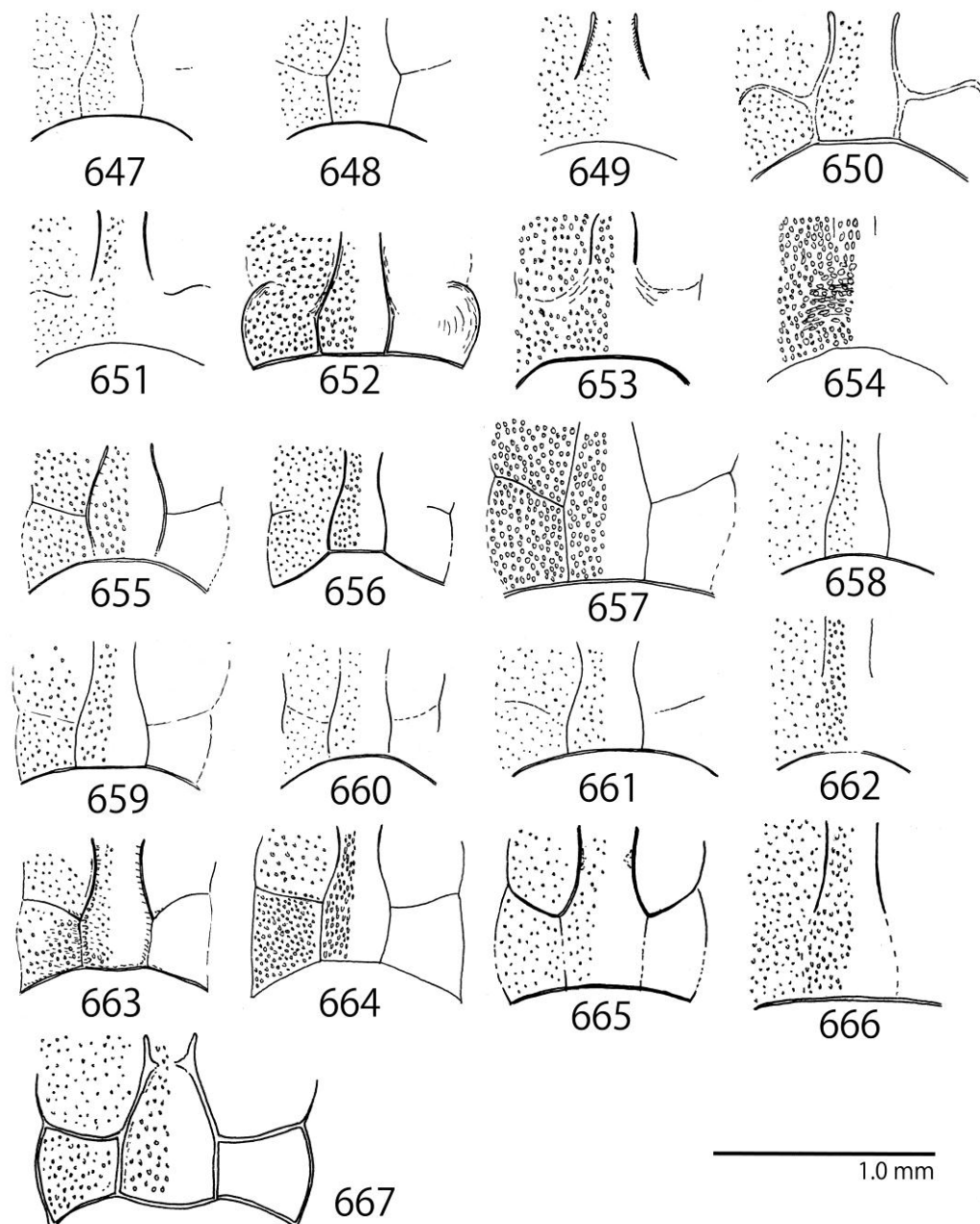
Figures 610–614. Pronotum, lateral view (610–612) and propodeum, posterior (613) and lateral (614) view of *Glypta* — 610, *G. elegans* sp. nov. (holotype); 611, *G. breviterebra*; 612, *G. mame* sp. nov. (holotype); 613, *G. shimizui* sp. nov. (holotype); 614, *G. matsumotoi* sp. nov. (holotype).



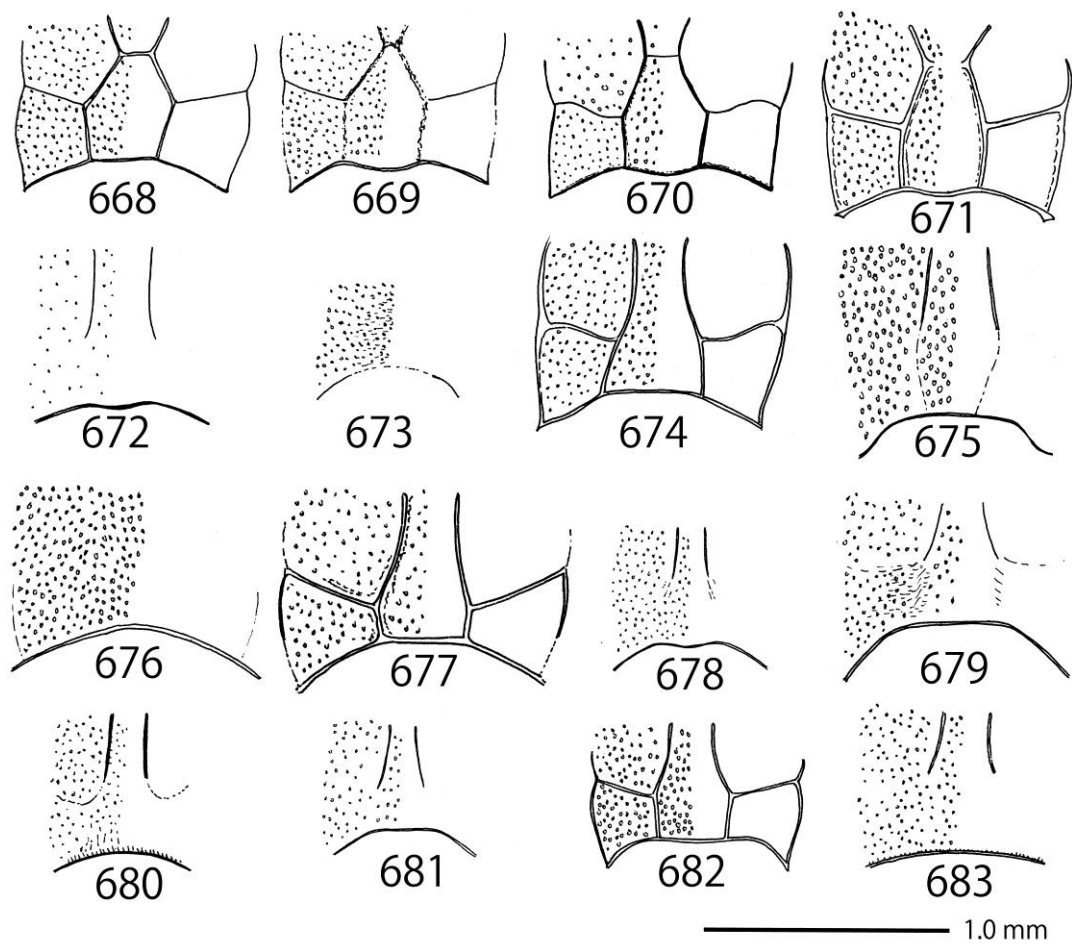
Figures 615–625. Fore leg, anterior view (615, 617), coxae, outer (616, 619, 621) and lateral (618, 620, 622) view, and right hind tarsal claws, lateral view (623–625) of *Glypta* — 615, 616, *G. media*; 617–619, *G. rufa*; 620, 621, *G. japonica* sp. nov. (holotype); 622, 625, *G. kuslitzkii* sp. nov. (holotype); 623, *G. akahige* sp. nov. (holotype); 624, *G. breviungulata*.



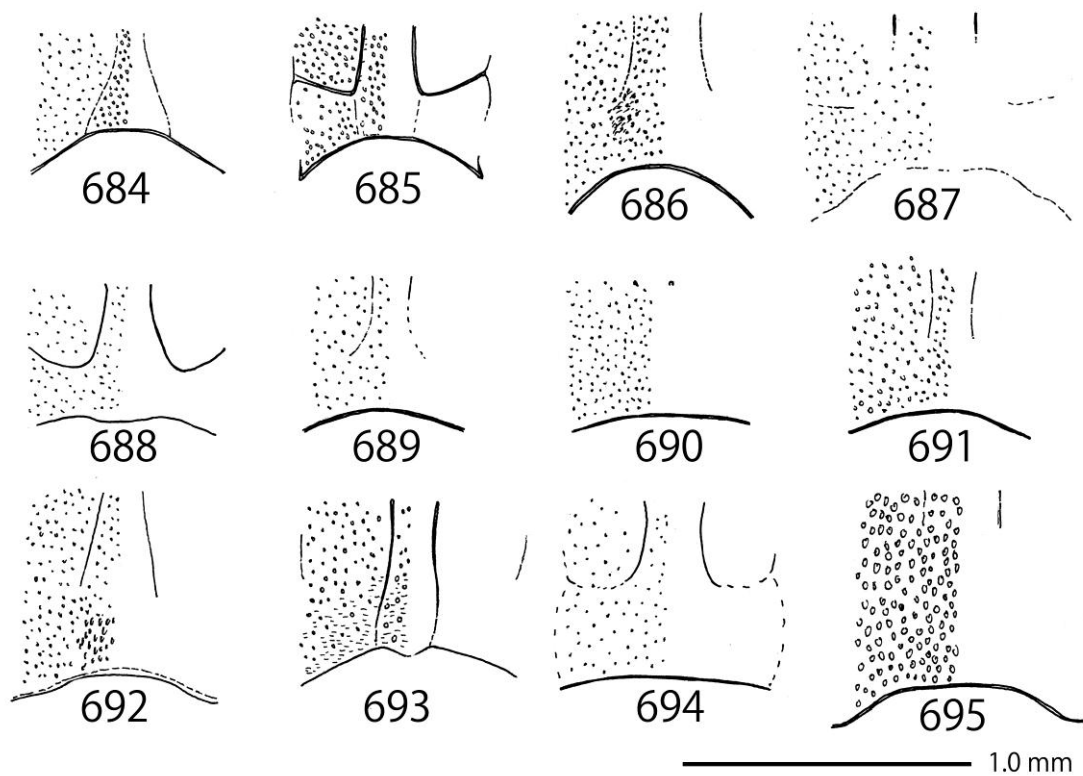
Figures 626–646. Propodeum of *Glypta*, dorsal view — 626, 627, *G. elegans* sp. nov. (626, holotype; 627, paratype); 628, *G. kusigematii* sp. nov. (holotype); 629–631, *G. maruyamensis*; 632, 633, *G. yamamotoi* sp. nov. (632, holotype; 633, paratype); 634, *G. adachii*; 635, *G. akiuensis* sp. nov. (holotype); 636, *G. glypta*; 637, *G. kochai* sp. nov. (holotype); 638, *G. kumaishiensis* sp. nov. (holotype); 639, *G. kuro* sp. nov. (holotype); 640, *G. maetoi* sp. nov. (holotype); 641, *G. minamikawai* sp. nov. (holotype); 642, *G. murotai* sp. nov. (holotype); 643, *G. nagei* sp. nov. (holotype); 644, *G. nakamurai* sp. nov. (holotype); 645, *G. sudai* sp. nov. (holotype); 646, *G. rufa*.



Figures 647–667. Propodeum of *Glypta*, dorsal view — 647, 648, *G. aichiensis* sp. nov. (647, holotype; 648, paratype); 649, *G. aino* sp. nov. (holotype); 650, 651, *G. akahige* sp. nov. (650, holotype; 651, paratype); 652, *G. aomoriensis* sp. nov. (holotype); 653, *G. biwakuboensis* sp. nov. (holotype); 654, *G. breviterebra*; 655, *G. breviungulata*; 656, *G. daisensis* sp. nov. (holotype); 657, *G. densa*; 658, 659, *G. erythronota* sp. nov. (658, holotype; 659, paratype); 660, *G. ezoensis* sp. nov. (holotype); 661, *G. fujisana* sp. nov. (holotype); 662, *G. hayachinensis* sp. nov. (holotype); 663, 664, *G. iriei* sp. nov. (663, holotype; 664, paratype); 665, *G. japonica* sp. nov. (holotype); 666, *G. konishii* sp. nov. (holotype); 667, *G. kuslitzkii* sp. nov. (holotype).

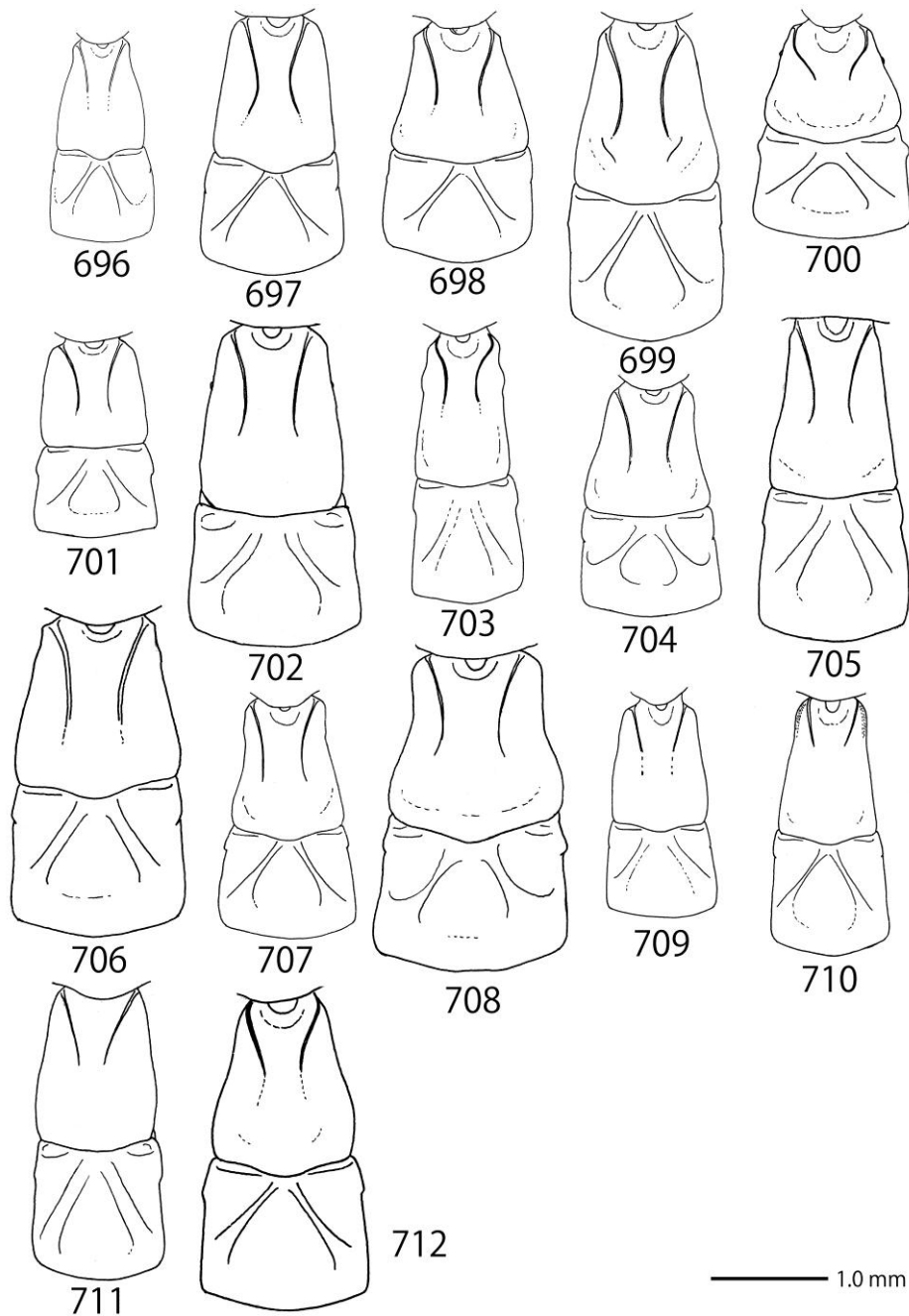


Figures 668–683. Propodeum of *Glypta*, dorsal view — 668–671, *G. kyushuensis* sp. nov. (668, holotype; 669–671, paratypes); 672, *G. makiharai* sp. nov. (holotype); 673, *G. mame* sp. nov. (holotype); 674, *G. matsumotoi* sp. nov. (holotype); 675, 676, *G. media*; 677, *G. momoi*; 678, *G. niigatensis* sp. nov. (holotype); 679, *G. onaga* sp. nov. (holotype); 680, 681, *G. pedata*; 682, *G. rufata*; 683, *G. sankaku*.

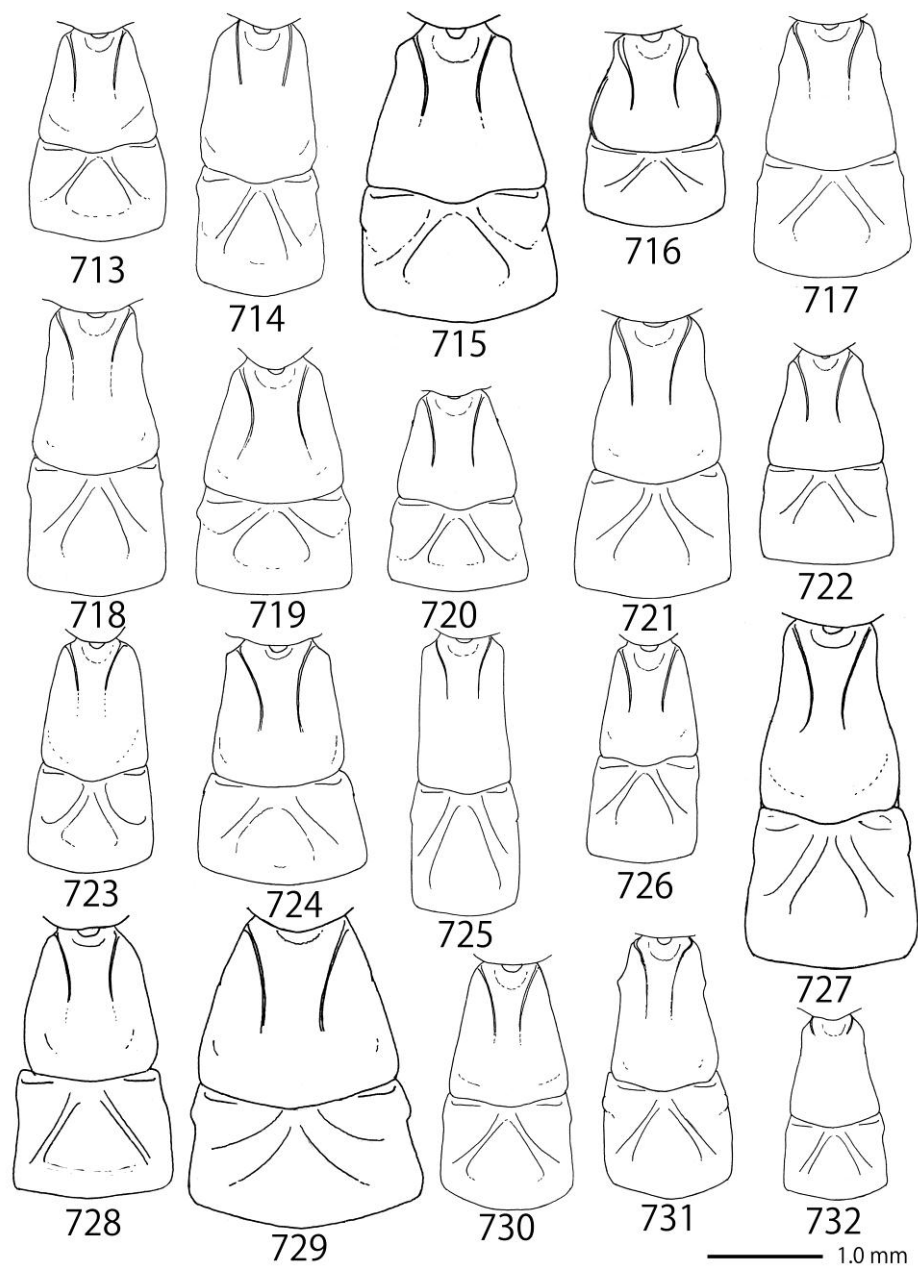


Figures 684–695. Propodeum of *Glypta*, dorsal view —684, *G. shibetsuensis* sp. nov. (holotype); 685, *G. shimizui* sp. nov. (holotype); 686, *G. slenda* sp. nov. (holotype); 687, *G. tomuraushiensis* sp. nov. (holotype); 688, *G. uenaensis* sp. nov. (holotype); 689, *G. yamagishii* sp. nov. (holotype); 690–693, *G. yamato* sp. nov. (690, holotype; 691–693, paratypes); 694, *G. yashajinensis* sp. nov. (holotype); 695, *G. yoshidai* sp. nov. (holotype).

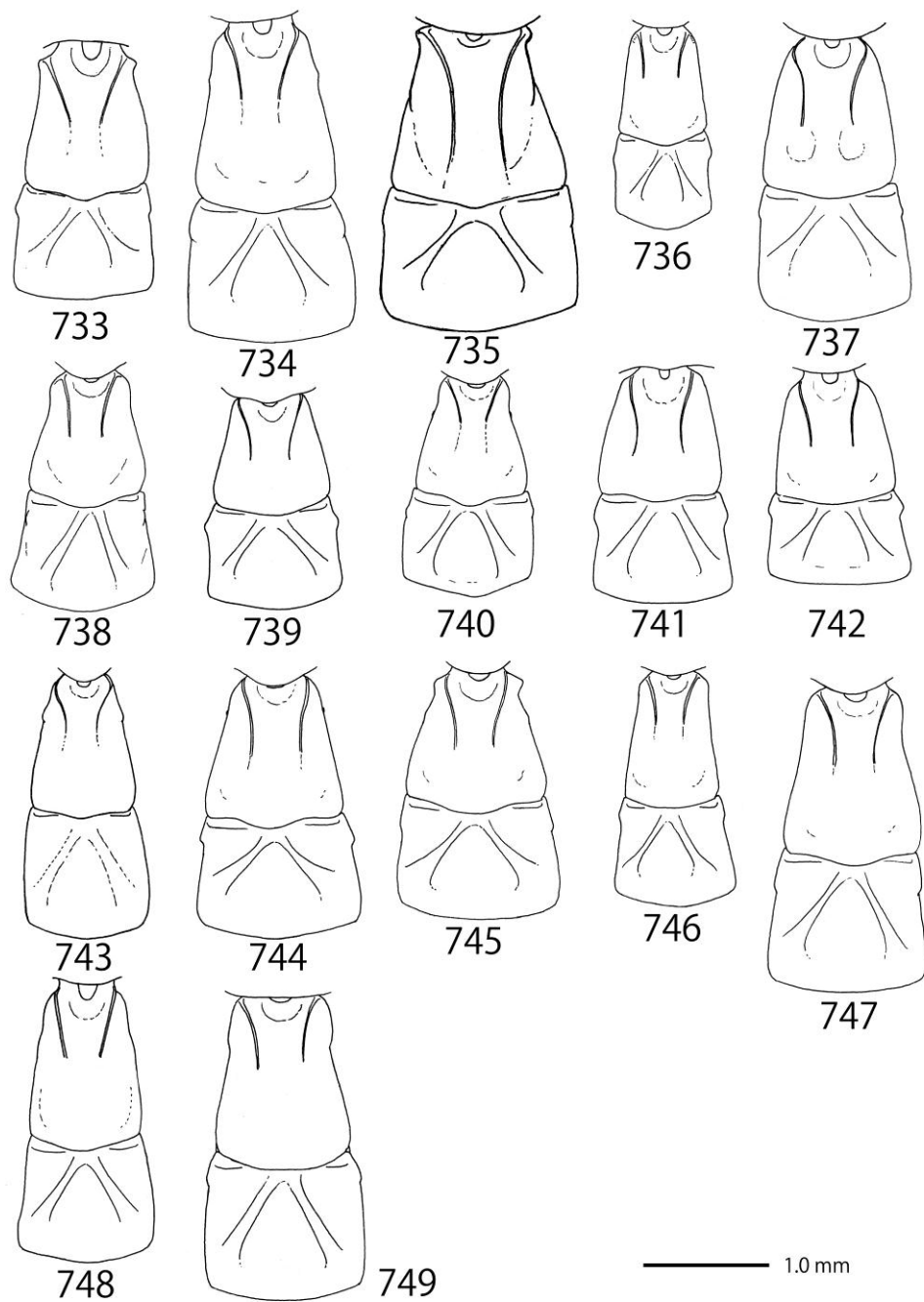




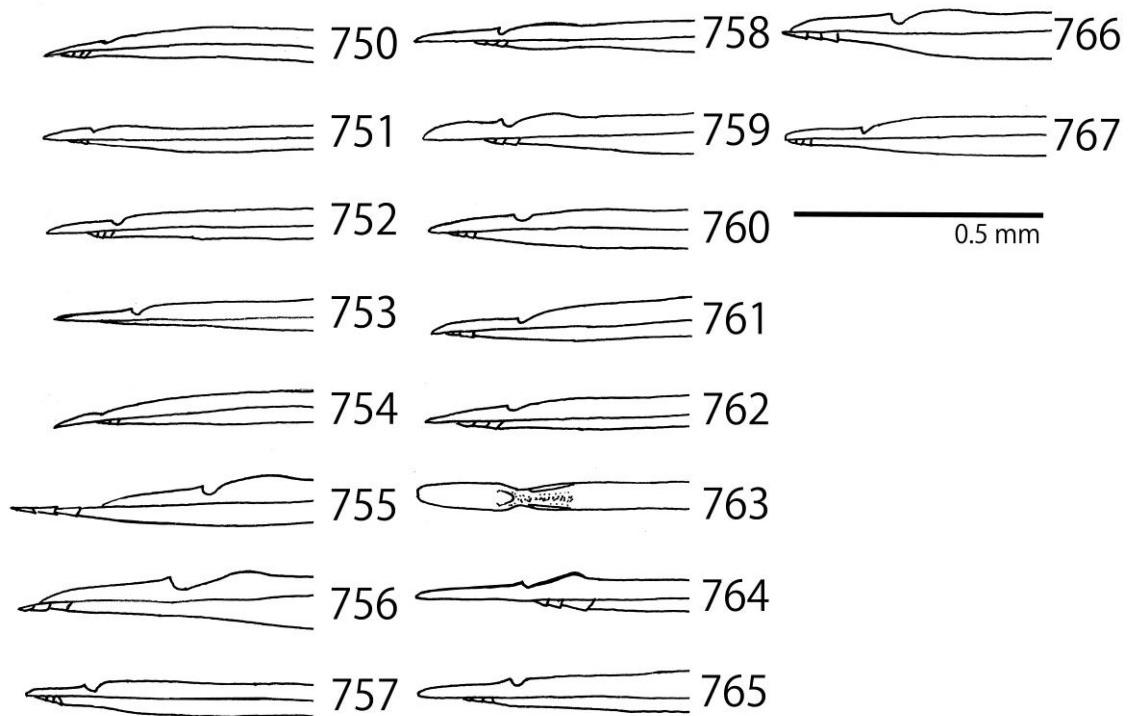
Figures 696–712. T1 and T2 of *Glypta*, dorsal view — 696, *G. elegans* sp. nov. (holotype); 697, *G. kusigematii* sp. nov. (holotype); 698, *G. maruyamensis*; 699, *G. yamamotoi* sp. nov. (holotype); 700, *G. adachii*; 701, *G. akiuensis* sp. nov. (holotype); 702, *G. glypta*; 703, *G. kochai* sp. nov. (holotype); 704, *G. kumaishiensis* sp. nov. (holotype); 705, *G. kuro* sp. nov. (holotype); 706, *G. maetoi* sp. nov. (holotype); 707, *G. minamikawai* sp. nov. (holotype); 708, *G. murotai* sp. nov. (holotype); 709, *G. nagasei* sp. nov. (holotype); 710, *G. nakamurai* sp. nov. (holotype); 711, *G. sudai* sp. nov. (holotype); 712, *G. rufa*.



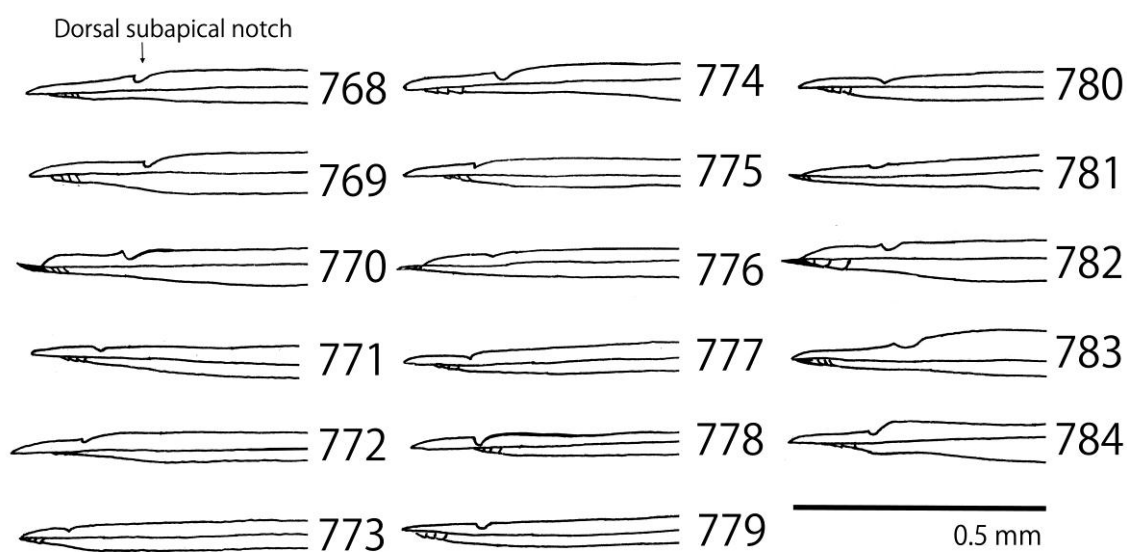
Figures 713–732. T1 and T2 of *Glypta*, dorsal view — 713, *G. aichiensis* sp. nov. (holotype); 714, *G. aino* sp. nov. (holotype); 715, *G. akahige* sp. nov. (holotype); 716, *G. aomoriensis* sp. nov. (holotype); 717, *G. biwakuboensis* sp. nov. (holotype); 718, *G. breviterebra*; 719, *G. breviungulata*; 720, *G. daisensis* sp. nov. (holotype); 721, *G. densa*; 722, *G. erythronota* sp. nov. (holotype); 723, *G. ezoensis* sp. nov. (holotype); 724, *G. fujisana* sp. nov. (holotype); 725, *G. hayachinensis* sp. nov. (holotype); 726, *G. iriei* sp. nov. (holotype); 727, *G. japonica* sp. nov. (holotype); 728, *G. konishii* sp. nov. (holotype); 729, *G. kuslitzkii* sp. nov. (holotype); 730, *G. kyushuensis* sp. nov. (holotype); 731, *G. makiharai* sp. nov. (holotype); 732, *G. mame* sp. nov. (holotype).



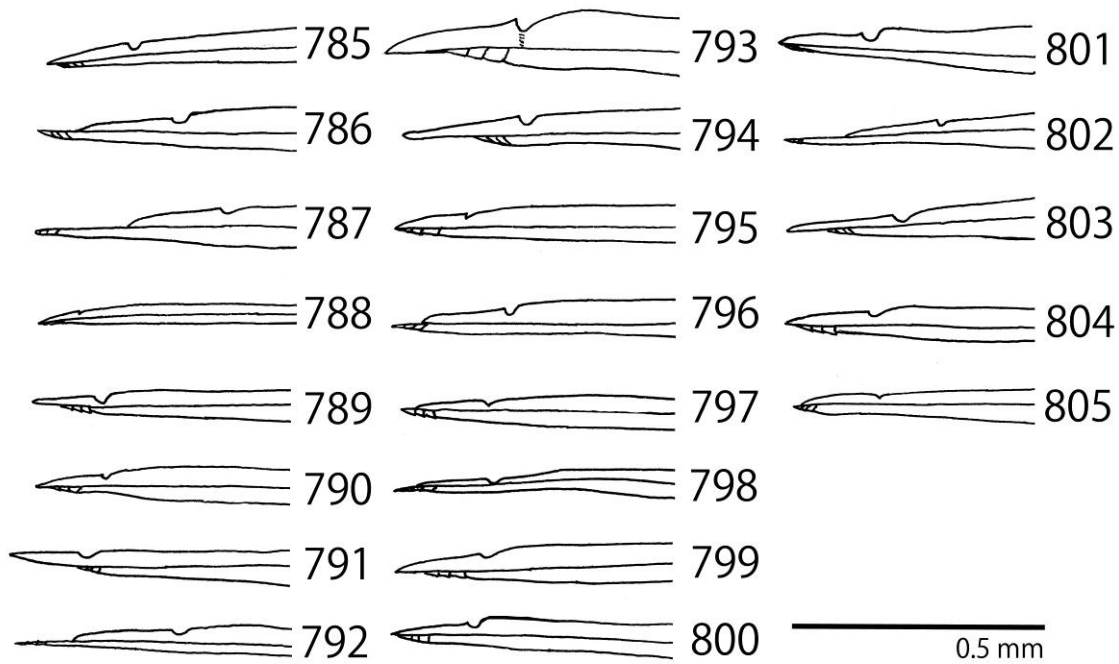
Figures 733–749. T1 and T2 of *Glypta*, dorsal view — 733, *G. matsumotoi* sp. nov. (holotype); 734, *G. media*; 735, *G. momoii*; 736, *G. niigatensis* sp. nov. (holotype); 737, *G. onaga* sp. nov. (holotype); 738, *G. pedata*; 739, *G. rufata*; 740, *G. sankaku*; 741, *G. shibetsuensis* sp. nov. (holotype); 742, *G. shimizui* sp. nov. (holotype); 743, *G. slenda* sp. nov. (holotype); 744, *G. tomuraushiensis* sp. nov. (holotype); 745, *G. uenaensis* sp. nov. (holotype); 746, *G. yamagishii* sp. nov. (holotype); 747, *G. yamato* sp. nov. (holotype); 748, *G. yashajinensis* sp. nov. (holotype); 749, *G. yoshidai* sp. nov. (holotype).



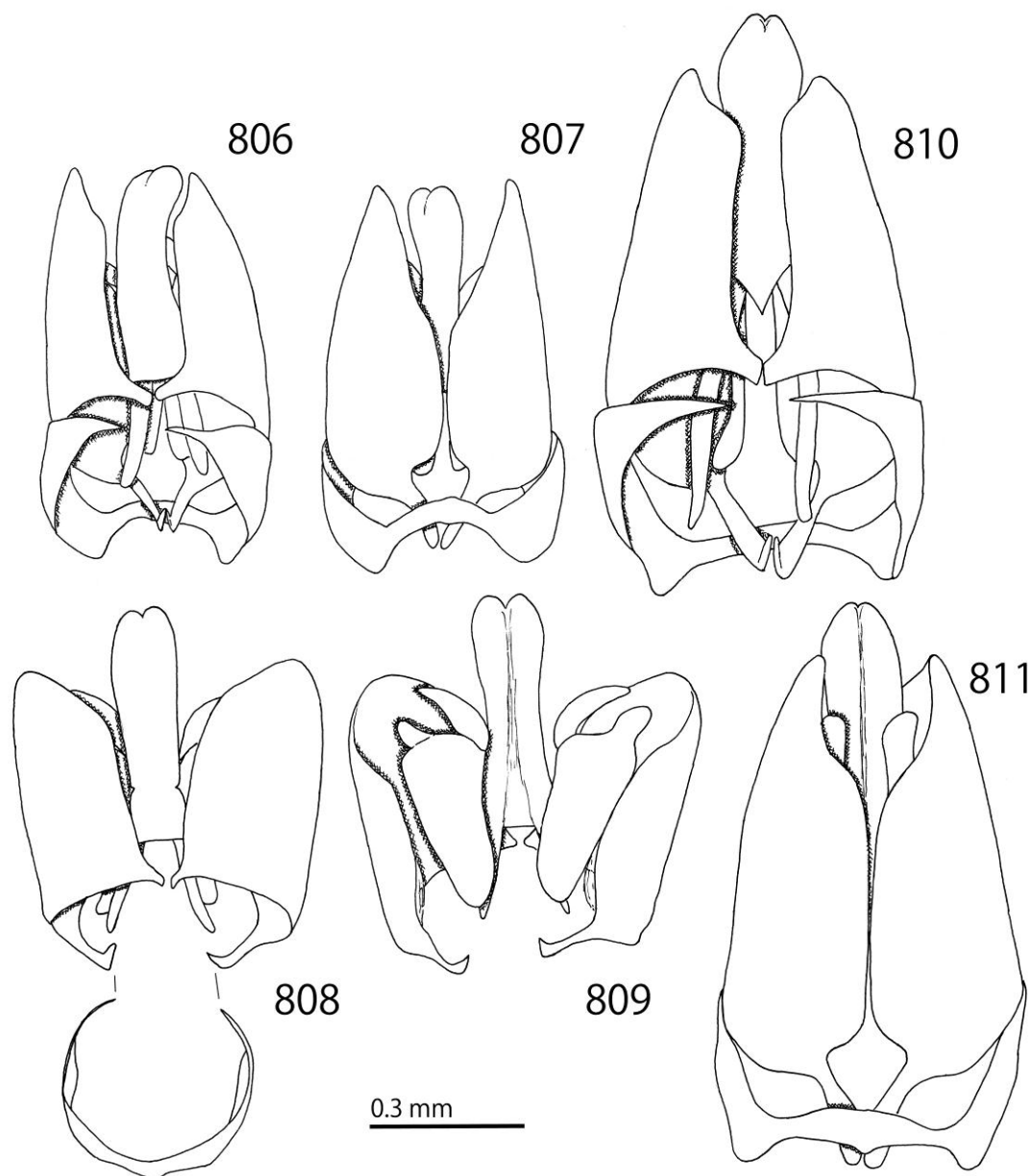
Figures 750–767. Apex of the ovipositor of *Glypta*, lateral (750–762, 764–767) and dorsal (763) view — 750, *G. elegans* sp. nov. (holotype); 751, *G. kusigematii* sp. nov. (holotype); 752, *G. maruyamensis*; 753, *G. yamamotoi* sp. nov. (holotype); 754, *G. adachii*; 755, *G. akiuensis* sp. nov. (holotype); 756, *G. glypta*; 757, *G. kochai* sp. nov. (holotype); 758, *G. kumaishiensis* sp. nov. (holotype); 759, *G. kuro* sp. nov. (holotype); 760, *G. maetoi* sp. nov. (holotype); 761, *G. minamikawai* sp. nov. (holotype); 762, *G. murotai* sp. nov. (holotype); 763, 63, *G. nagasei* sp. nov. (holotype); 765, *G. nakamurai* sp. nov. (holotype); 766, *G. sudai* sp. nov. (holotype); 767, *G. rufa*.



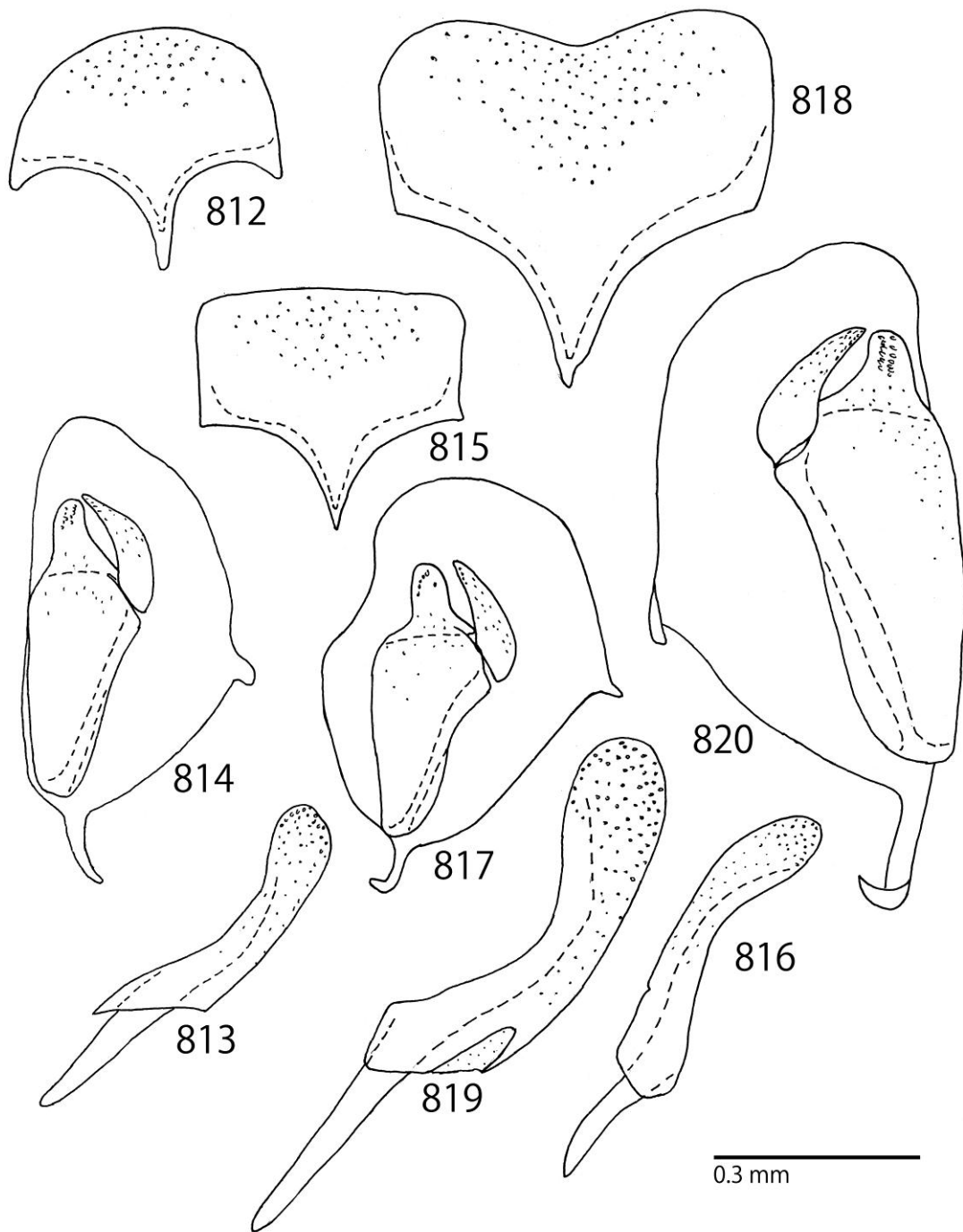
Figures 768–784. Apex of the ovipositor of *Glypta*, lateral view — 768, *G. aichiensis* sp. nov. (holotype); 769, *G. aino* sp. nov. (holotype); 770, *G. akahige* sp. nov. (holotype); 771, *G. aomoriensis* sp. nov. (holotype); 772, *G. biwakuboensis* sp. nov. (holotype); 773, *G. breviterebra*; 774, *G. breviungulata*; 775, *G. daisensis* sp. nov. (holotype); 776, *G. densa*; 777, *G. erythronota* sp. nov. (holotype); 778, *G. ezoensis* sp. nov. (holotype); 779, *G. fujisana* sp. nov. (holotype); 780, *G. hayachinensis* sp. nov. (holotype); 781, *G. iriei* sp. nov. (holotype); 782, *G. japonica* sp. nov. (holotype); 783, *G. konishii* sp. nov. (holotype); 784, *G. kuslitzkii* sp. nov. (holotype).



Figures 785–805. Apex of the ovipositor of *Glypta*, dorsal view —785, 786, *G. kyushuensis* sp. nov. (holotype); 787, *G. makiharai* sp. nov. (holotype); 788, *G. mame* sp. nov. (holotype); 789, *G. matsumotoi* sp. nov. (holotype); 790, *G. media*; 791, *G. momoi*; 792, *G. niigatensis* sp. nov. (holotype); 793, *G. onaga* sp. nov. (holotype); 794, *G. pedata*; 795, *G. rufata*; 796, *G. sankaku*; 797, *G. shibetsuensis* sp. nov. (holotype); 798, *G. shimizui* sp. nov. (holotype); 799, *G. slenda* sp. nov. (holotype); 800, *G. tomuraushiensis* sp. nov. (holotype); 801, *G. uenaensis* sp. nov. (holotype); 802, *G. yamagishii* sp. nov. (holotype); 803, *G. yamato* sp. nov. (holotype); 804, *G. yashajinensis* sp. nov. (holotype); 805, *G. yoshidai* sp. nov. (holotype).

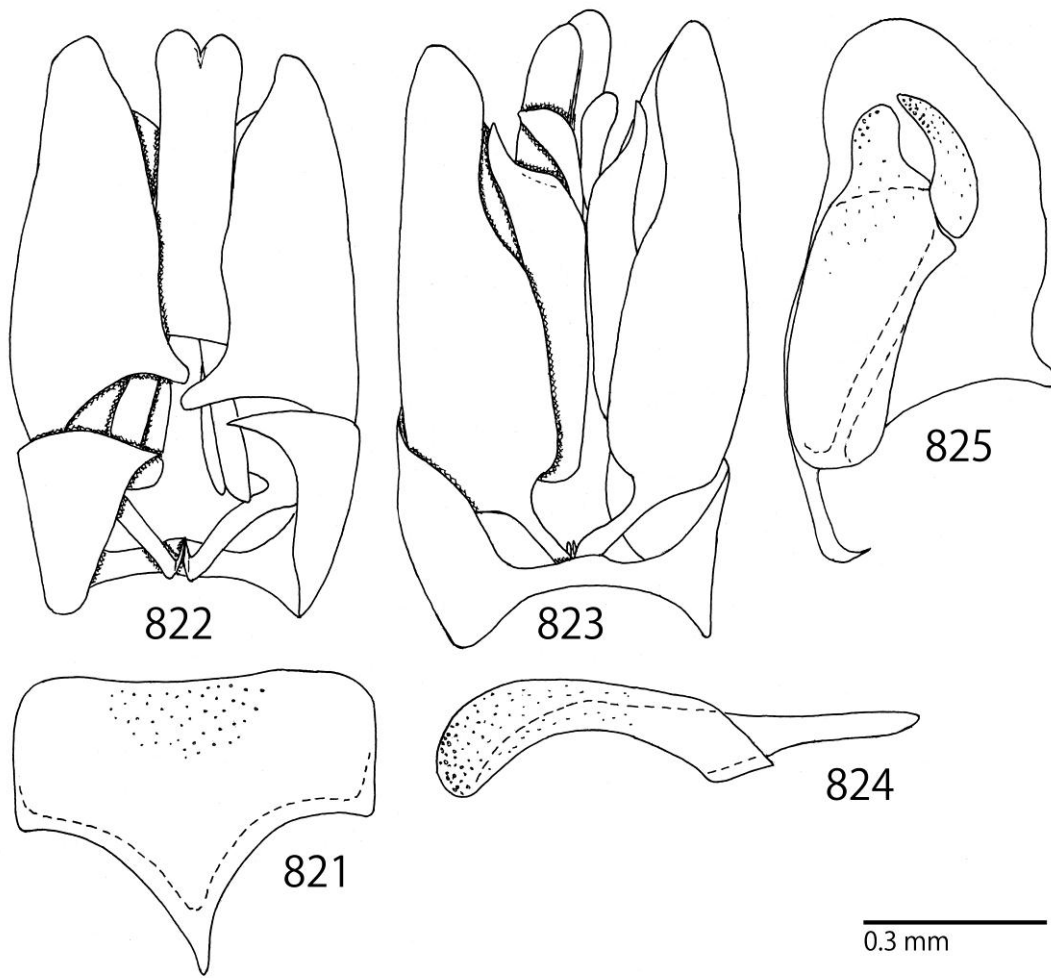


Figures 806–811. Male genitalia of *Glypta*, dorsal (806, 808, 810) and ventral (807, 809, 811) view. — 806, 807, *G. adachii*; 808, 809, *G. glypta*; 810, 811, *G. kochai* sp. nov. (paratype).

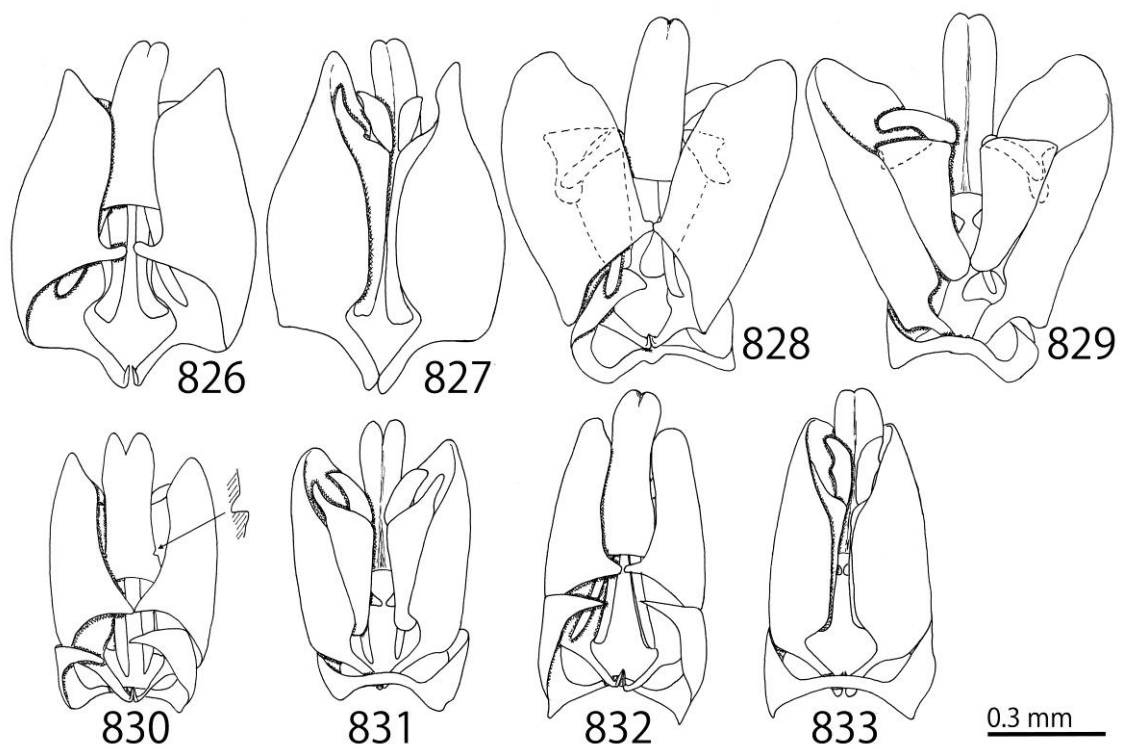


Figures 812–820. Male subgenital plate (ventral view: 812, 815, 818), right parameres (mesal view: 814, 817, 820) and right aedeagi (lateral view: 813, 816, 819) of *Glypta* — 812–814, *G. adachii*; 815–817, *G. glypta*; 818–820, *G. kochai* sp. nov. (paratype).

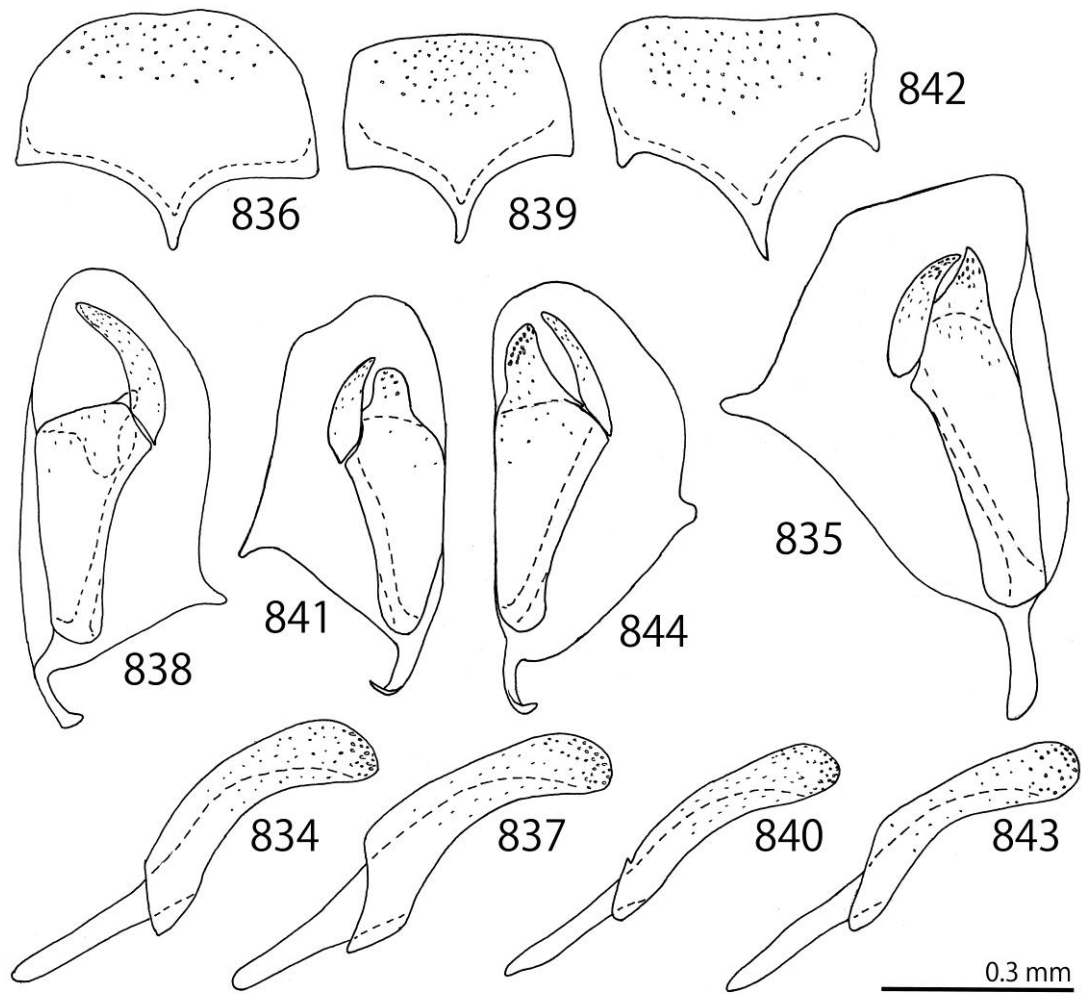




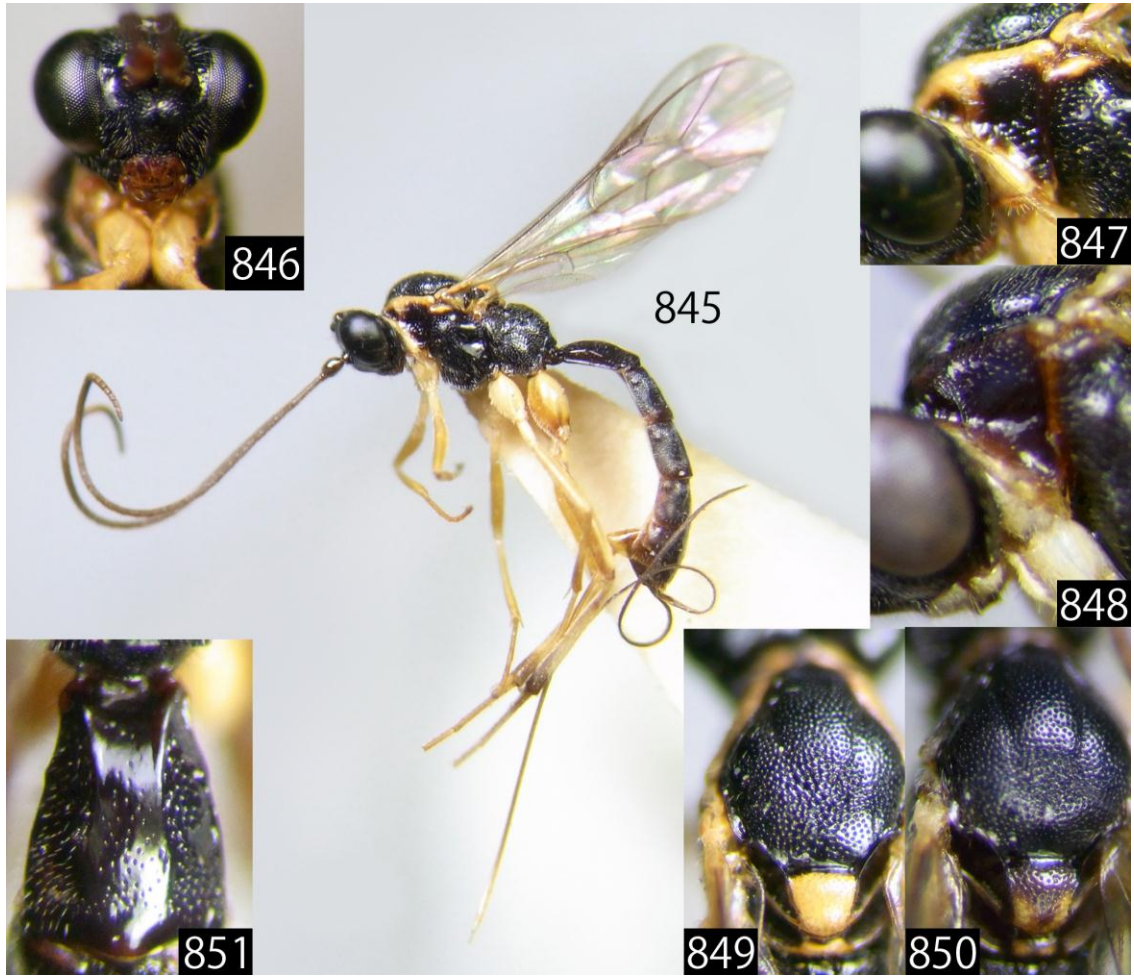
Figures 821–825. Male terminalia of *Glypta rufa* — 821, subgenital plate, ventral view; 822, 823, genitalia, dorsal (822) and ventral (823) view; 824, right aedeagus, lateral view; 825, right paramere, inner view.



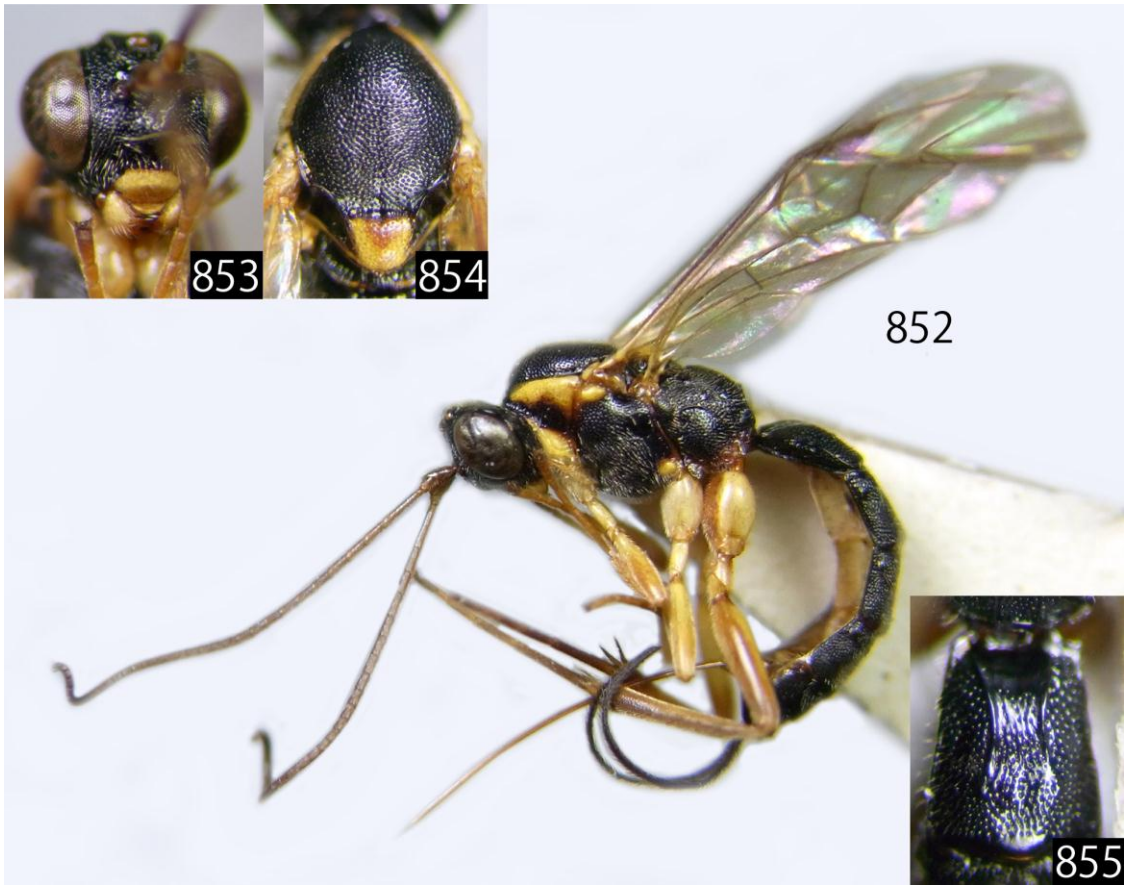
Figures 826–833. Male genitalia of *Glypta*, dorsal (826, 828, 830, 832) and ventral (827, 829, 831, 833) view. — 826, 827, *G. densa*, basal ring damaged; 828, 829, *G. momoii*; 830, 831, *G. slenda* sp. nov. (paratype); 832, 833, *G. yamato* sp. nov. (paratype).



Figures 834–844. Male subgenital plate (ventral view: 836, 839, 842), left aedeagi (lateral view: 834, 837, 840, 843) and right (mesal view: 838, 844) and left (mesal view: 835, 841) parameres (mesal view: 835, 838, 841, 844) of *Glypta* — 834, 835, *G. densa*, subgenital plate damaged; 836–838, *G. momoi*; 839–841, *G. slenda* sp. nov. (paratype); 842–844, *G. yamato* sp. nov. (paratype).



Figures 845–850. Lateral habitus (845), head, frontal view (846), pronota, lateral view (847, 848), mesonota, dorsal view (849, 850) and T1, dorsal view (851) of *Glypta elegans* sp. nov., female (845–847, 849, 851, holotype; 848, 850, paratype).

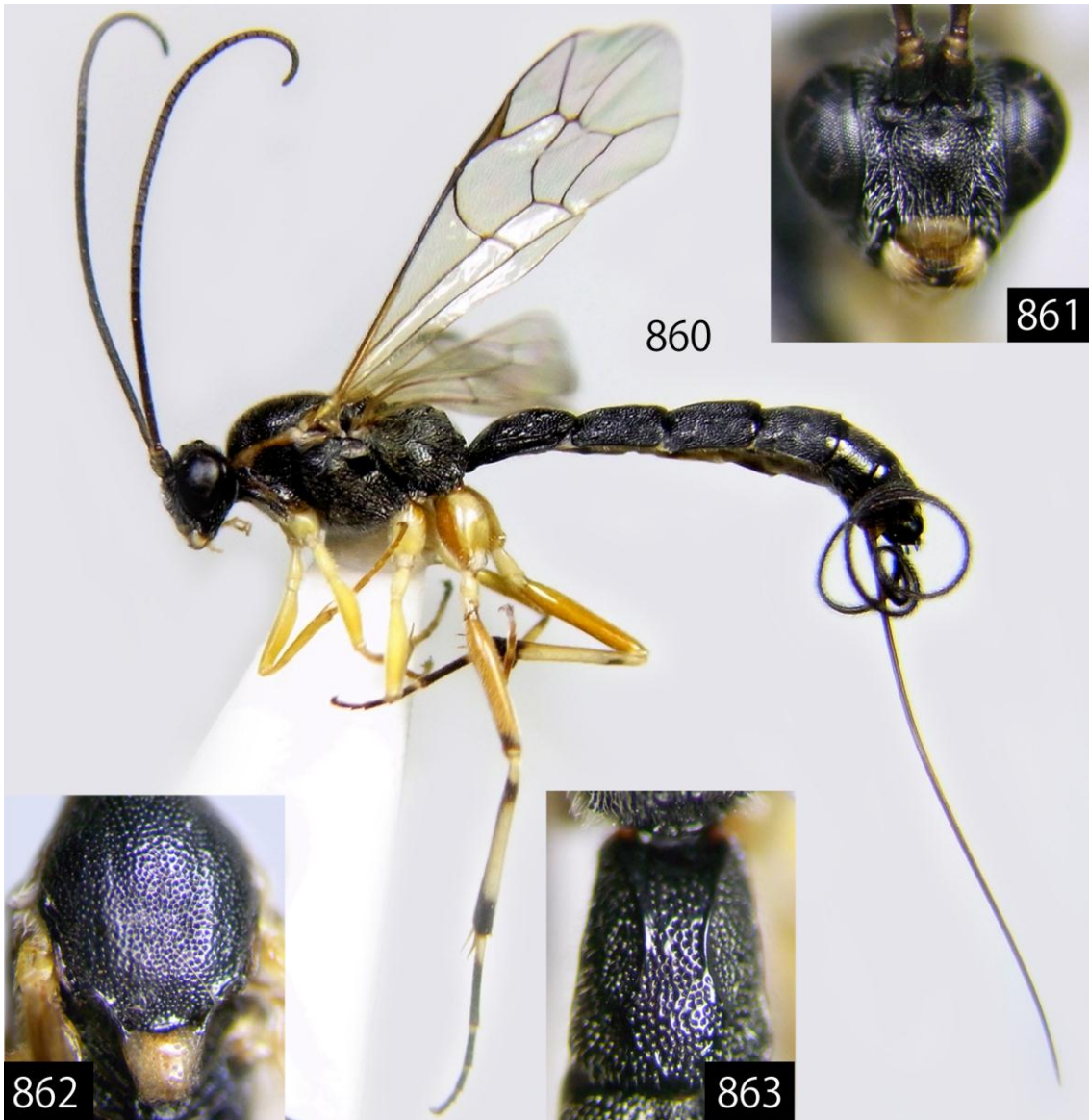


Figures 852–855. Lateral habitus (852), head, frontal view (853), mesonotum, dorsal view (854) and T1, dorsal view (855) of *Glypta kusigematii* sp. nov., female (holotype).

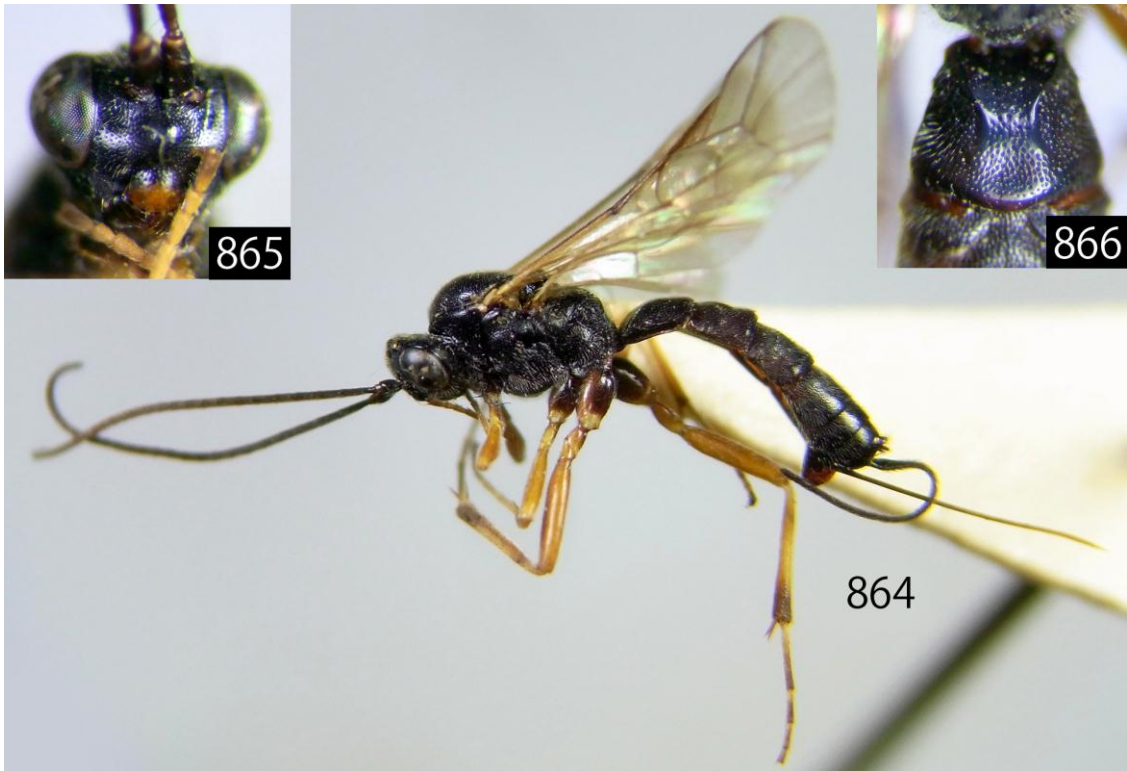


Figures 856–859. Lateral habitus (856), head, frontal view (857), mesonotum, dorsal view (858) and T1, dorsal view (859) of *Glypta maruyamensis*, female.



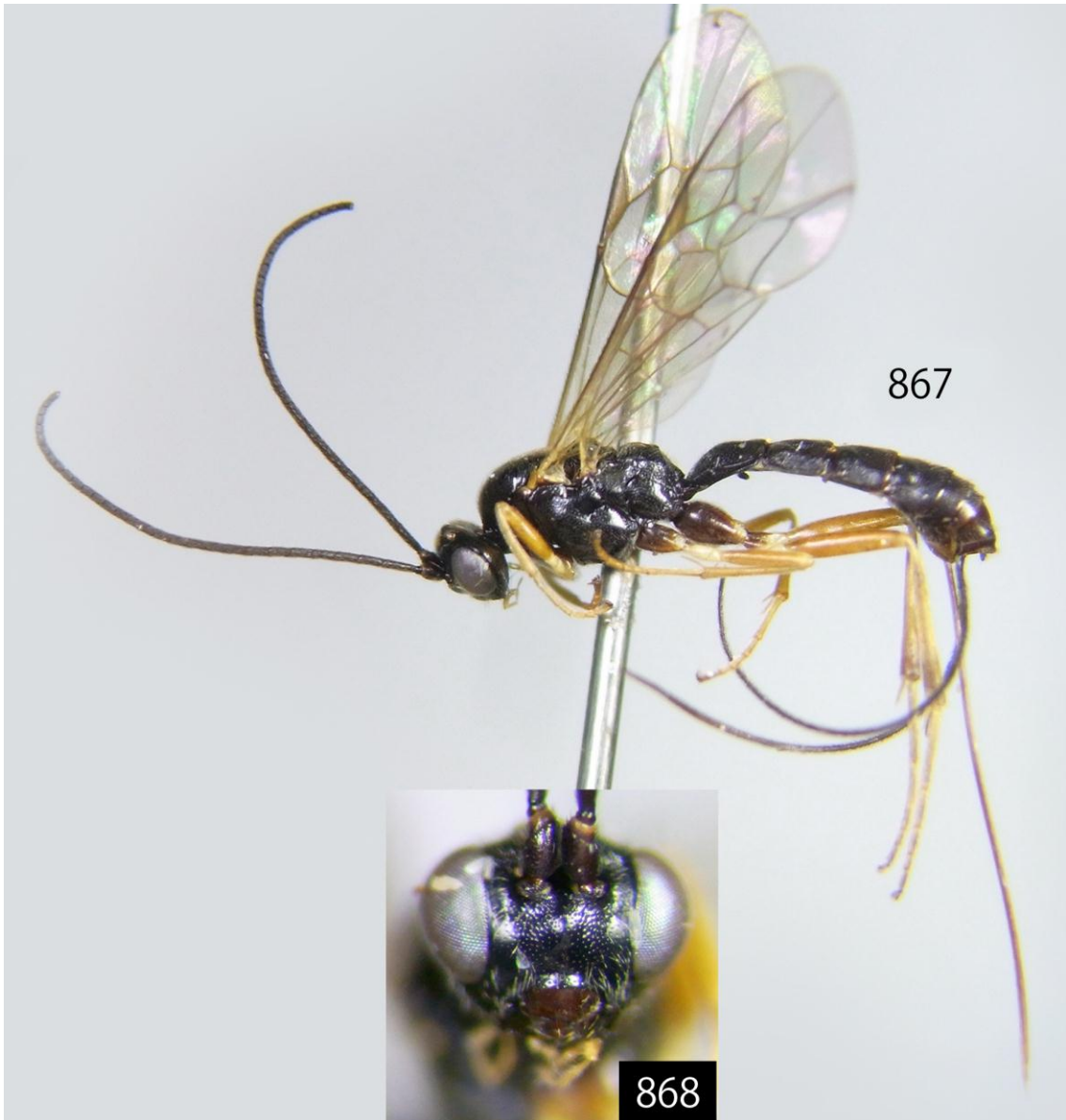


Figures 860–863. Lateral habitus (860), head, frontal view (861), mesonotum, dorsal view (862) and T1, dorsal view (863) of *Glypta yamamotoi* sp. nov., female (holotype).



Figures 864–866. Lateral habitus (864), head, frontal view (865) and T1, dorsal view (866) of *Glypta adachii*, female.





Figures 867 and 868. Lateral habitus (867) and head, frontal view (868) of *Glypta akiuensis* sp. nov., female (holotype).



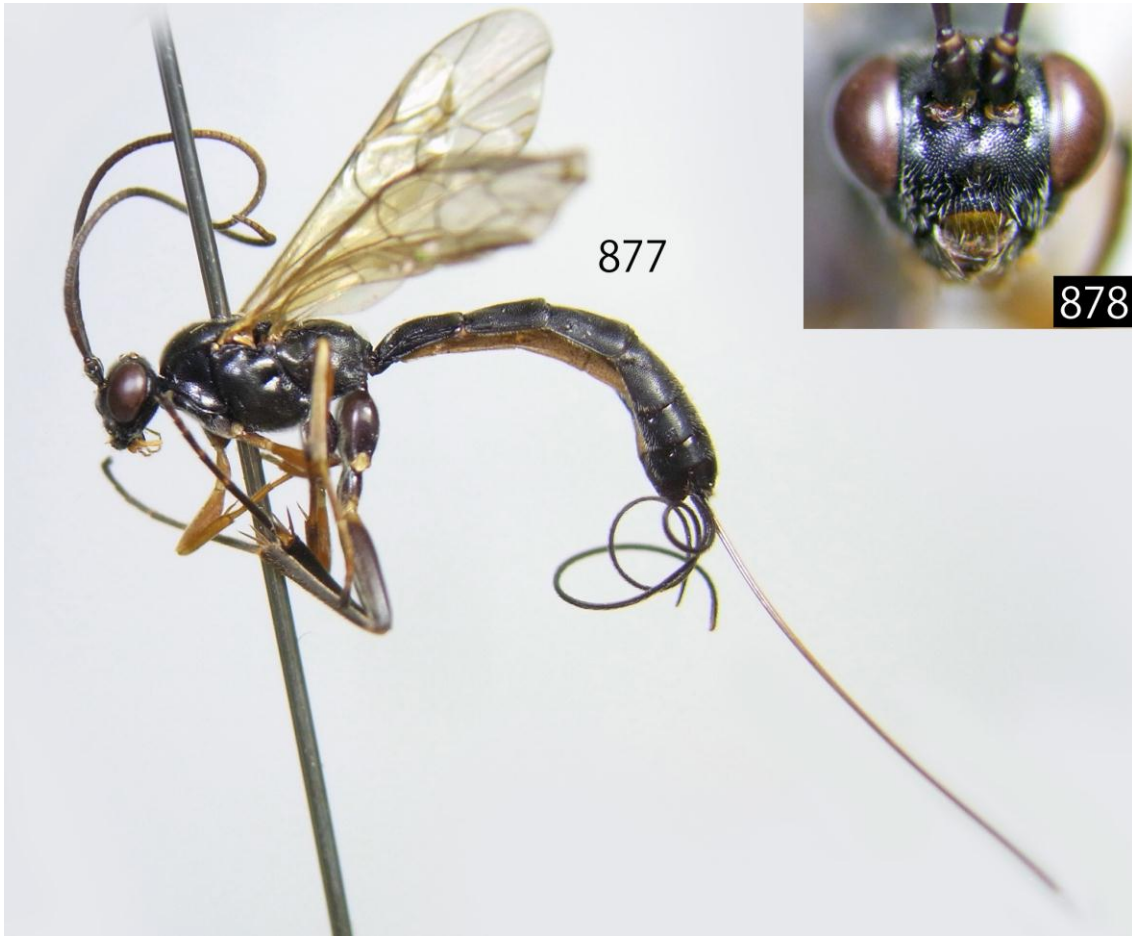
Figures 869–871. Lateral habitus (869), head, frontal view (870) and T1, dorsal view (871) of *Glypta glypta*, female.



Figures 872–874. Lateral habitus (872), head, frontal view (873) and T1, dorsal view (874) of *Glypta kochai* sp. nov., female (holotype).



Figures 875 and 876. Lateral habitus (875) and head, frontal view (876) of *Glypta kumaishiensis* sp. nov., female (holotype).



Figures 877 and 878. Lateral habitus (877) and head, frontal view (878) of *Glypta kuro* sp. nov., female (holotype).

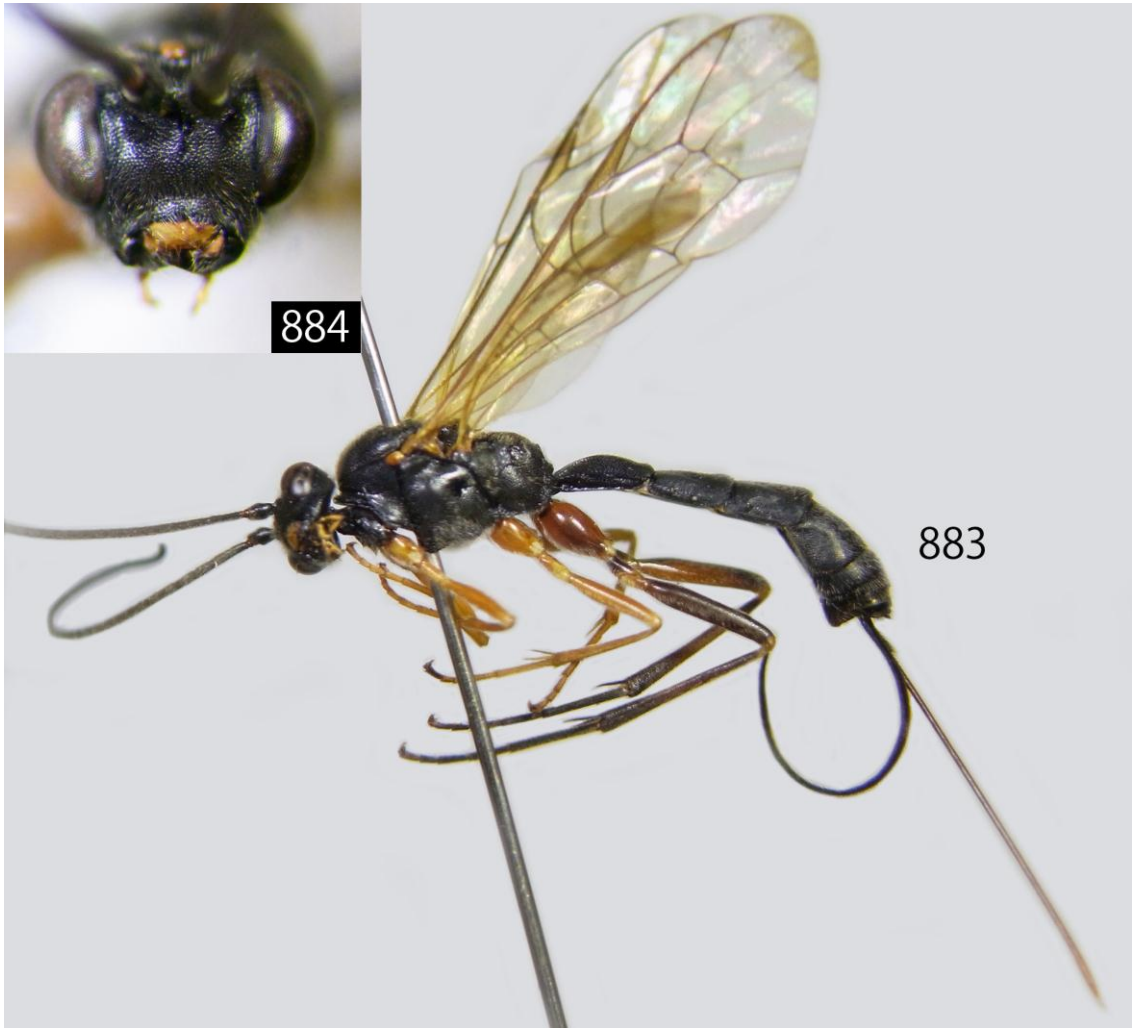




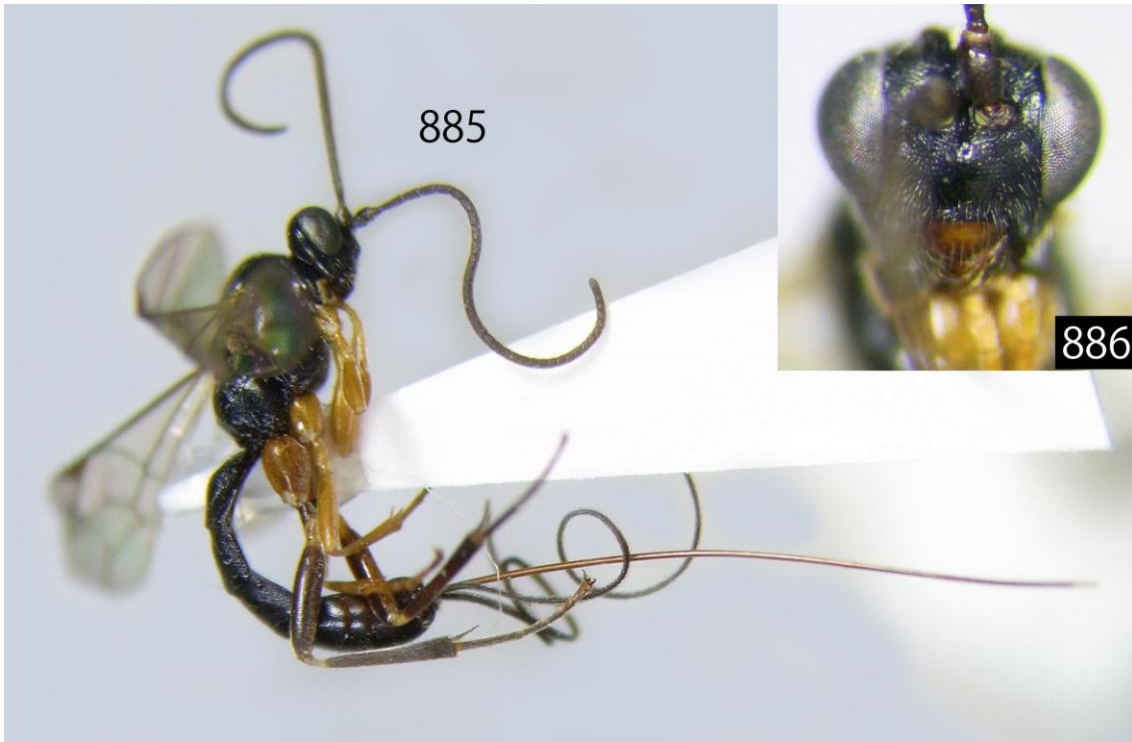
Figures 879 and 880. Lateral habitus (879) and head, frontal view (880) of *Glypta maetoi* sp. nov., female (holotype).



Figures 881 and 882. Lateral habitus (881) and head, frontal view (882) of *Glypta minamikawai* sp. nov., female (holotype).



Figures 883 and 884. Lateral habitus (883) and head, frontal view (884) of *Glypta murotai* sp. nov., female (holotype).

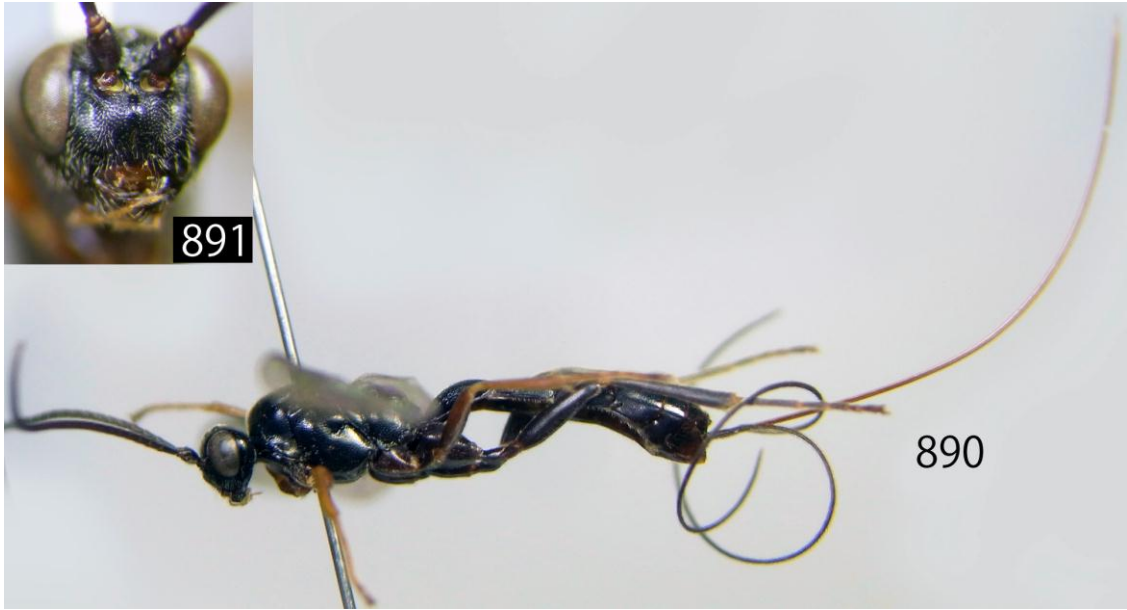


Figures 885 and 886. Lateral habitus (885) and head, frontal view (886) of *Glypta nagasei* sp. nov., female (holotype).





Figures 887–889. Lateral habitus (887), head, frontal view (888) and T1, dorsal view (889) of *Glypta nakamurai* sp. nov., female (holotype).



Figures 890 and 891. Lateral habitus (890) and head, frontal view (891) of *Glypta sudai* sp. nov., female (holotype).



Figures 892–894. Lateral habitus (892), head, frontal view (893) and T1, dorsal view (894) of *Glypta rufa*, female.

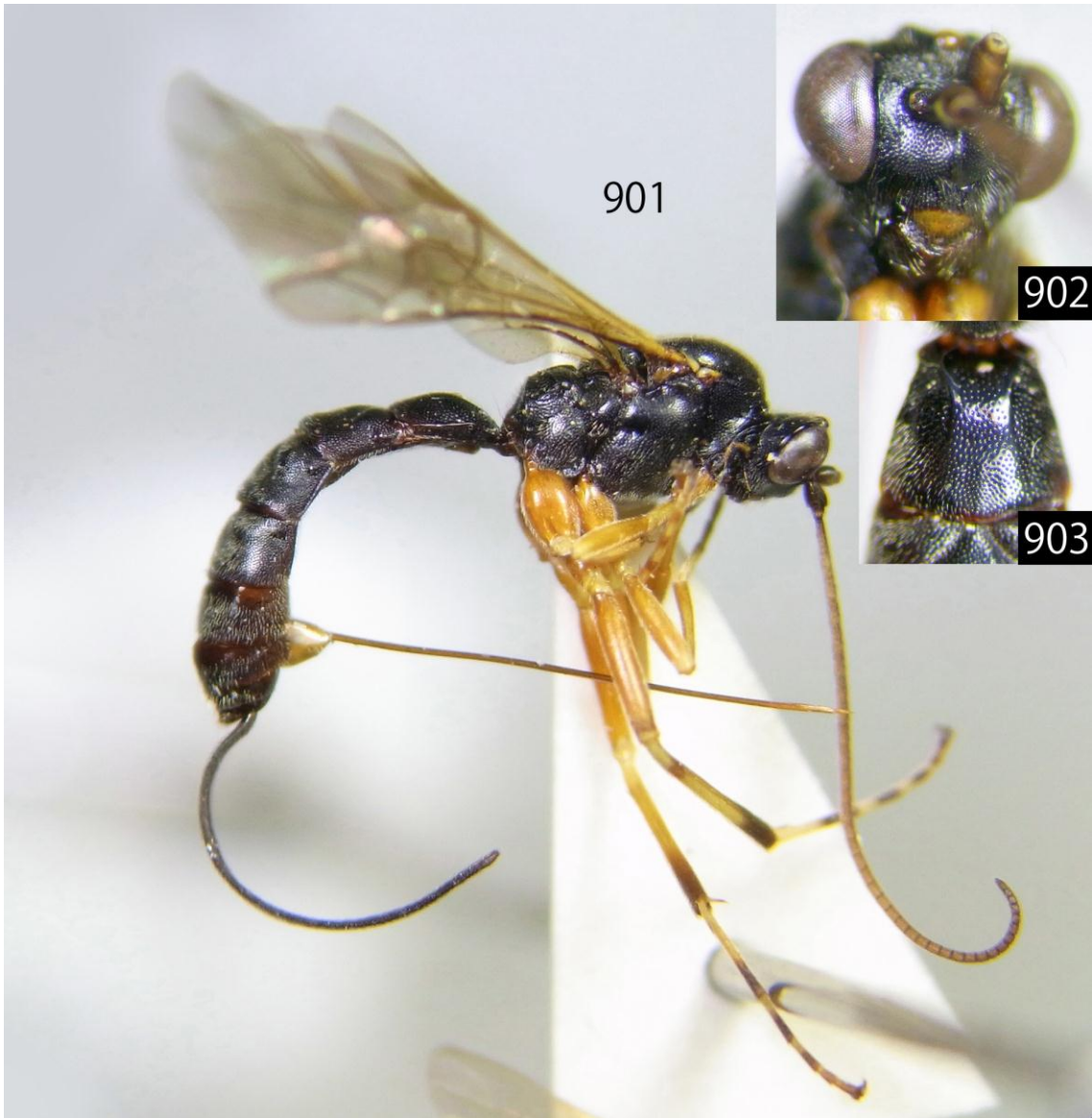


Figures 895–897. Lateral habitus (895), head, frontal view (896) and T1, dorsal view (897) of *Glypta aichiensis* sp. nov., female (holotype).

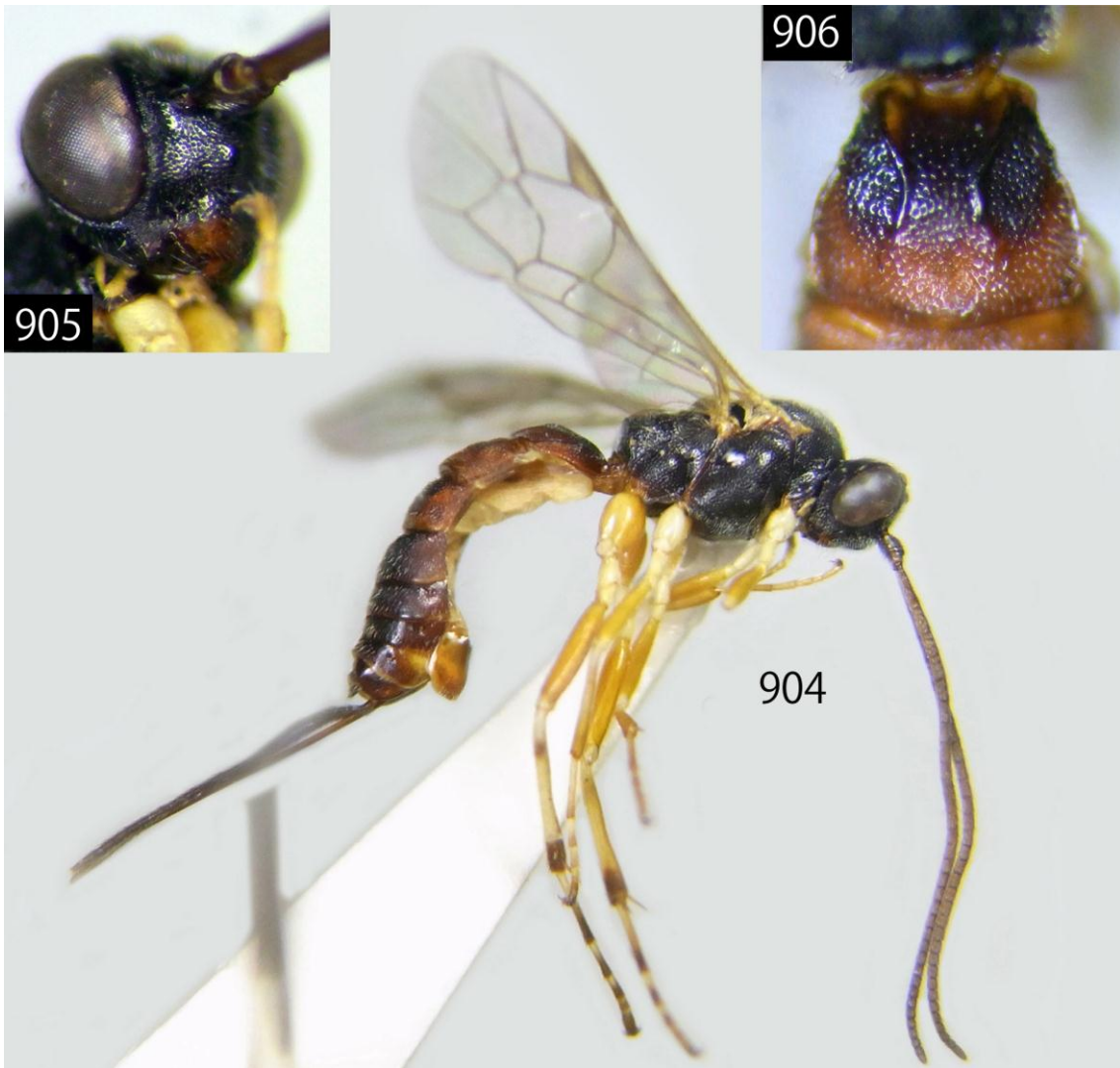




Figures 898–900. Lateral habitus (898), head, frontal view (899) and T1, dorsal view (900) of *Glypta aino* sp. nov., female (holotype).



Figures 901–903. Lateral habitus (901), head, frontal view (902) and T1, dorsal view (903) of *Glypta akahige* sp. nov., female (holotype).



Figures 904–906. Lateral habitus (904), head, frontal view (905) and T1, dorsal view (906) of *Glypta aomoriensis* sp. nov., female (holotype).





Figures 907–909. Lateral habitus (907), head, frontal view (908) and T1, dorsal view (909) of *Glypta biwakuboensis* sp. nov., female (holotype).



Figures 910–912. Lateral habitus (910), head, frontal view (911) and T1, dorsal view (912) of *Glypta breviterebra*, female.

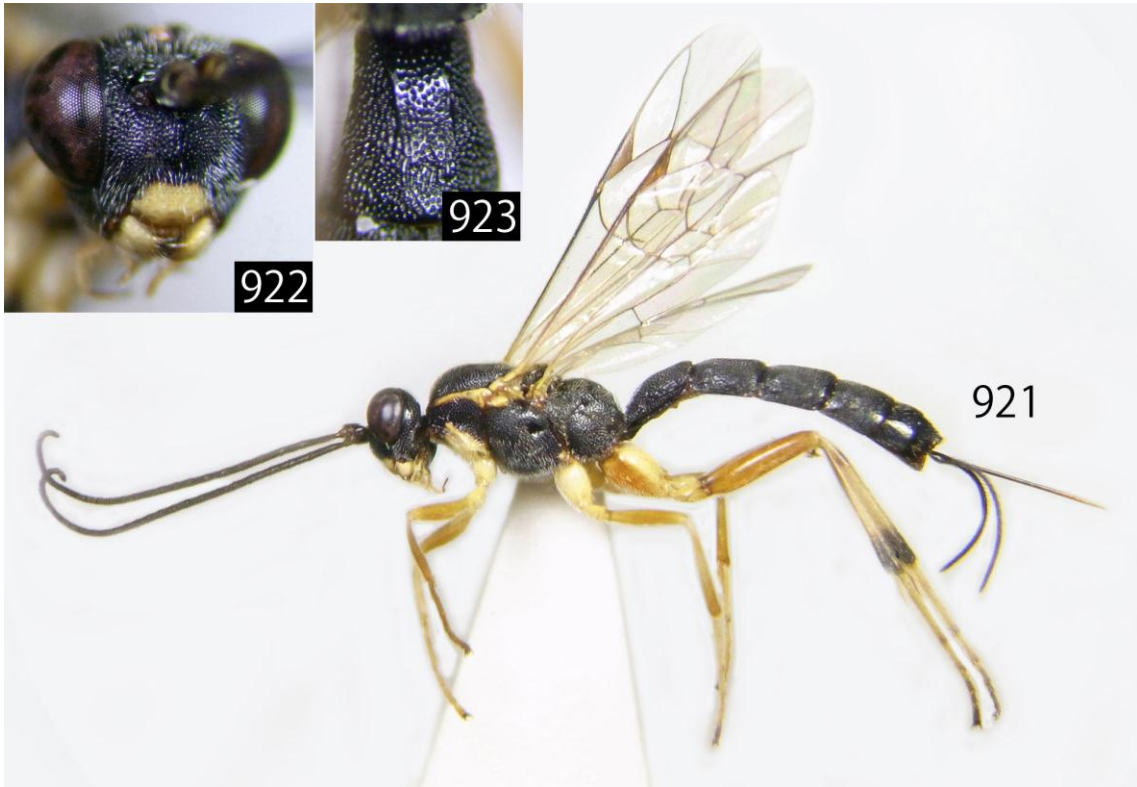




Figures 913–916. Lateral habitus (913), head, frontal view (914), T1, dorsal view (915) and metasomal tergites, dorsal view (916) of *Glypta breviungulata*, female, collected from Japan.



Figures 917–920. Lateral habitus (917), head, frontal view (918), scutellum, dorsal view (919) and T1, dorsal view (920) of *Glypta daisensis* sp. nov., female (holotype).



Figures 921–923. Lateral habitus (921), head, frontal view (922) and T1, dorsal view (923) of *Glypta densa*, female.

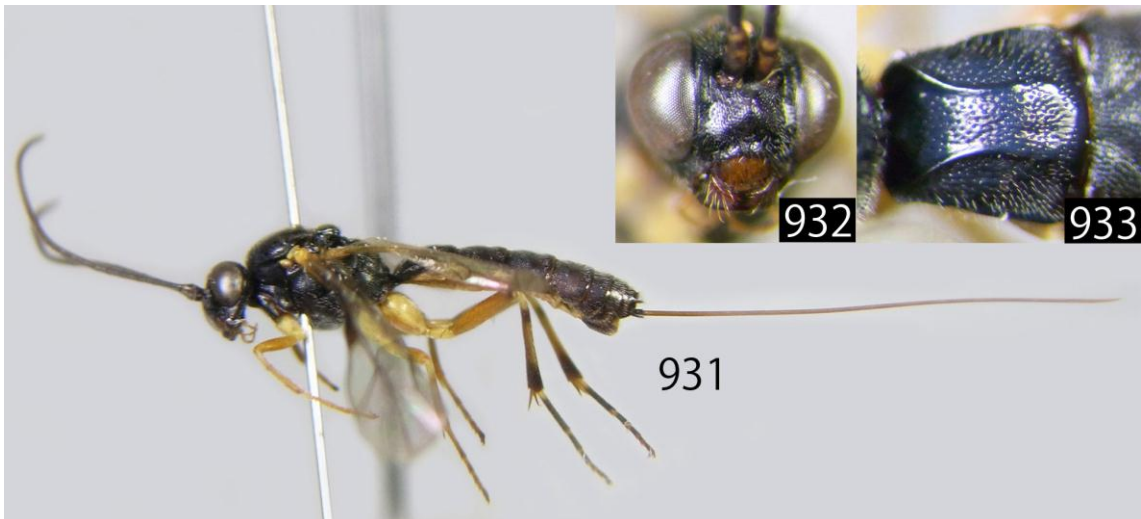


Figures 924–927. Lateral habitus (924), head, frontal view (925) and T1, dorsal view (926, 927) of *Glypta erythronota* sp. nov., female (924–926, holotype; 927, paratype).





Figures 928–930. Lateral habitus (928), head, frontal view (929) and T1, dorsal view (930) of *Glypta ezoensis* sp. nov., female (holotype).



Figures 931–933. Lateral habitus (931), head, frontal view (932) and T1, dorsal view (933) of *Glypta fujisana* sp. nov., female (holotype).



Figures 934–936. Lateral habitus (934), head, frontal view (935) and T1, dorsal view (936) of *Glypta hayachinensis* sp. nov., female (holotype).



Figures 937–939. Lateral habitus (937), head, frontal view (938) and T1, dorsal view (939) of *Glypta iriei* sp. nov., female (holotype).



Figures 940–942. Lateral habitus (940), head, frontal view (941) and T1, dorsal view (942) of *Glypta japonica* sp. nov., female (holotype).

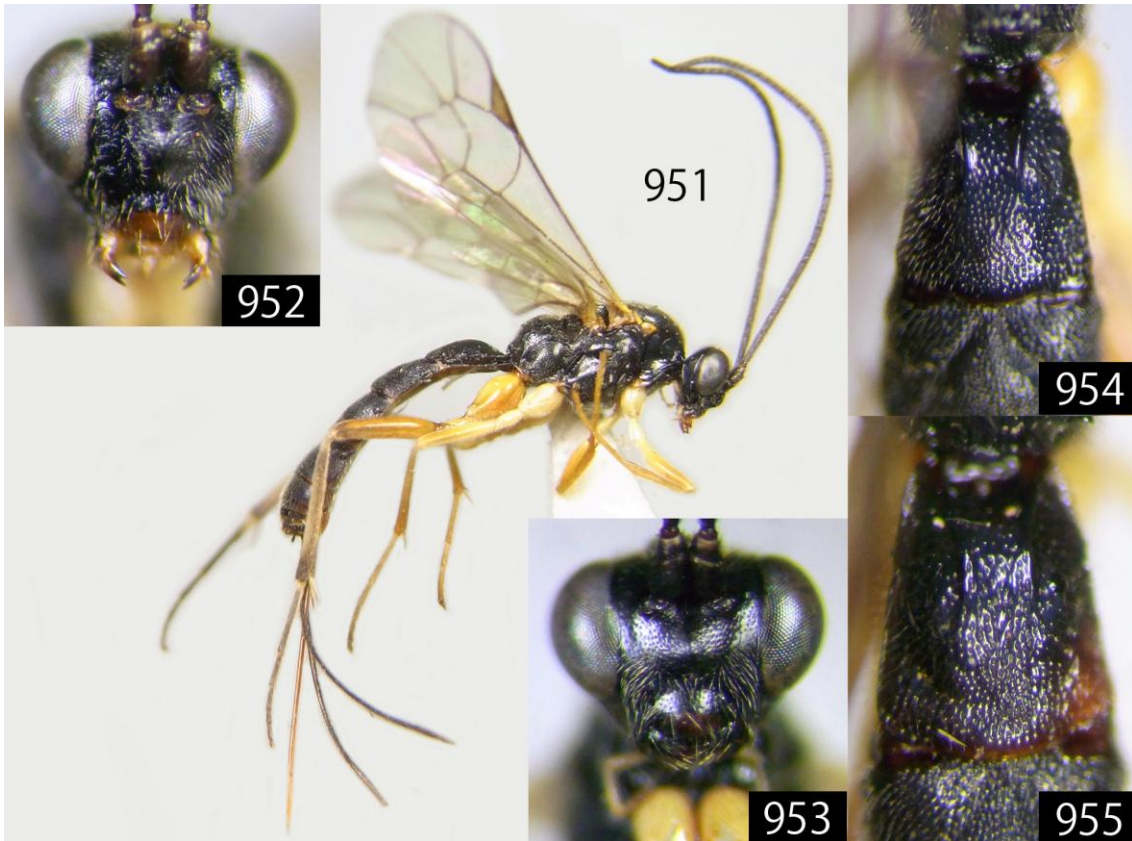




Figures 943–947. Lateral habitus (943), head, frontal view (944), scutella, dorsal view (945, 946) and T1, dorsal view (947) of *Glypta konishii* sp. nov., female (943–945, 947, holotype; 946, paratype).



Figures 948–950. Lateral habitus (948), head, frontal view (949) and T1, dorsal view (950) of *Glypta kuslitzkii* sp. nov., female (holotype).



Figures 951–955. Lateral habitus (951), heads, frontal view (952–953) and T1, dorsal view (954, 955) of *Glypta kyushuensis* sp. nov., female (951, 952, 954, holotype; 953, 955, paratypes).

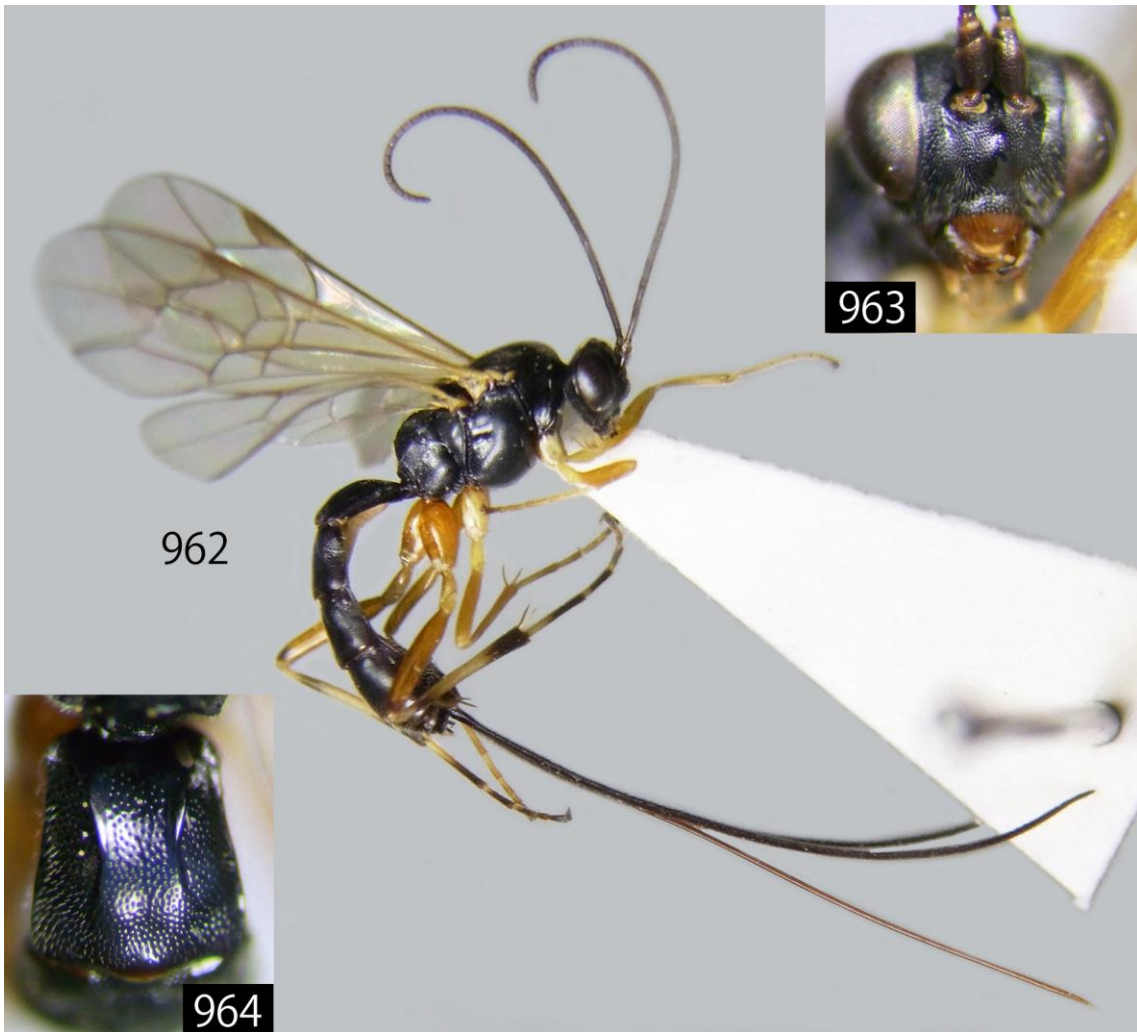


Figures 956–958. Lateral habitus (956), head, frontal view (957) and T1, dorsal view (958) of *Glypta makiharai* sp. nov., female (holotype).





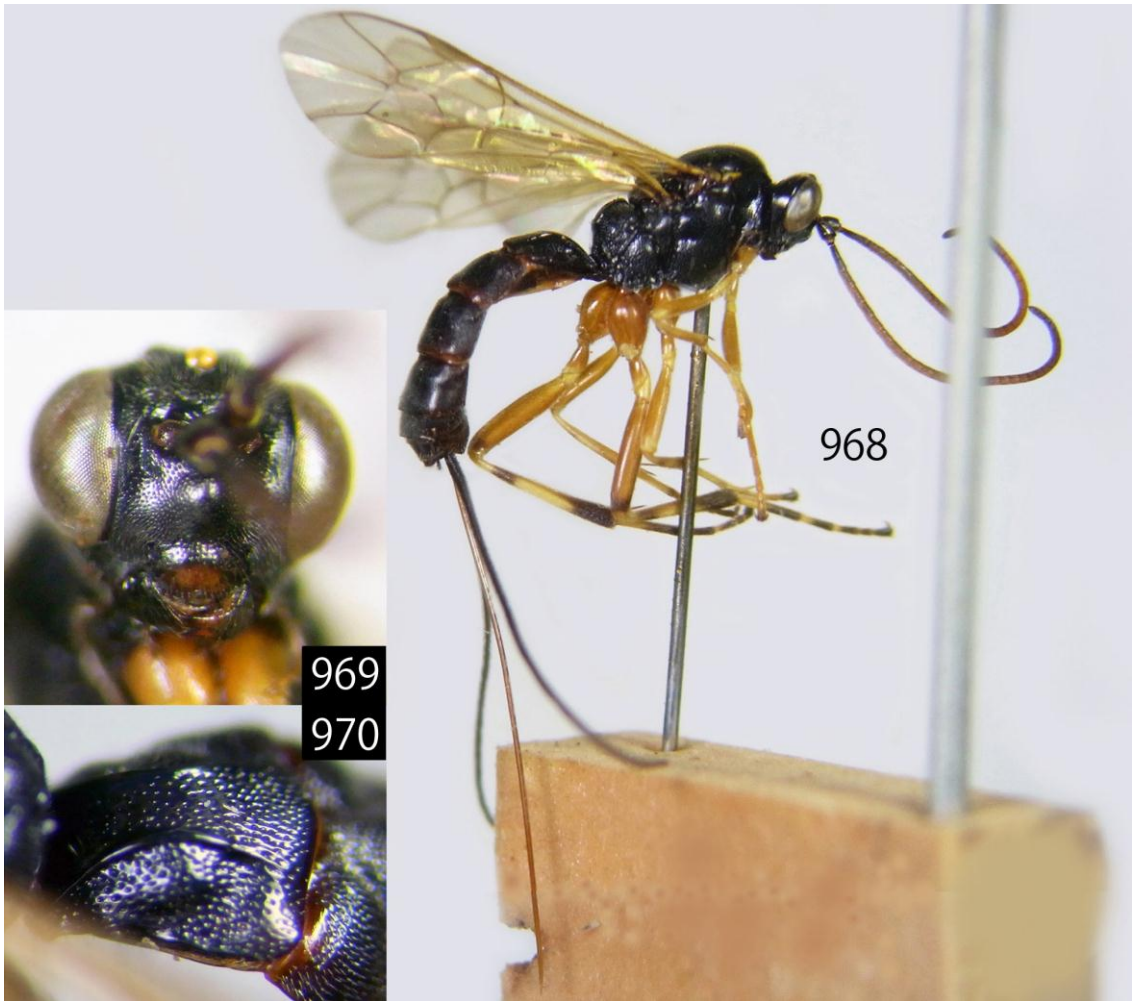
Figures 959–961. Lateral habitus (959), head, frontal view (960) and T1, dorsal view (961) of *Glypta mame* sp. nov., female (holotype).



Figures 962–964. Lateral habitus (962), head, frontal view (963) and T1, dorsal view (964) of *Glypta matsumotoi* sp. nov., female (holotype).



Figures 965–967. Lateral habitus (965), head, frontal view (966) and T1, dorsal view (967) of *Glypta media*, female.



Figures 968–970. Lateral habitus (968), head, frontal view (969) and T1, dorsal view (970) of *Glypta momoii*, female.





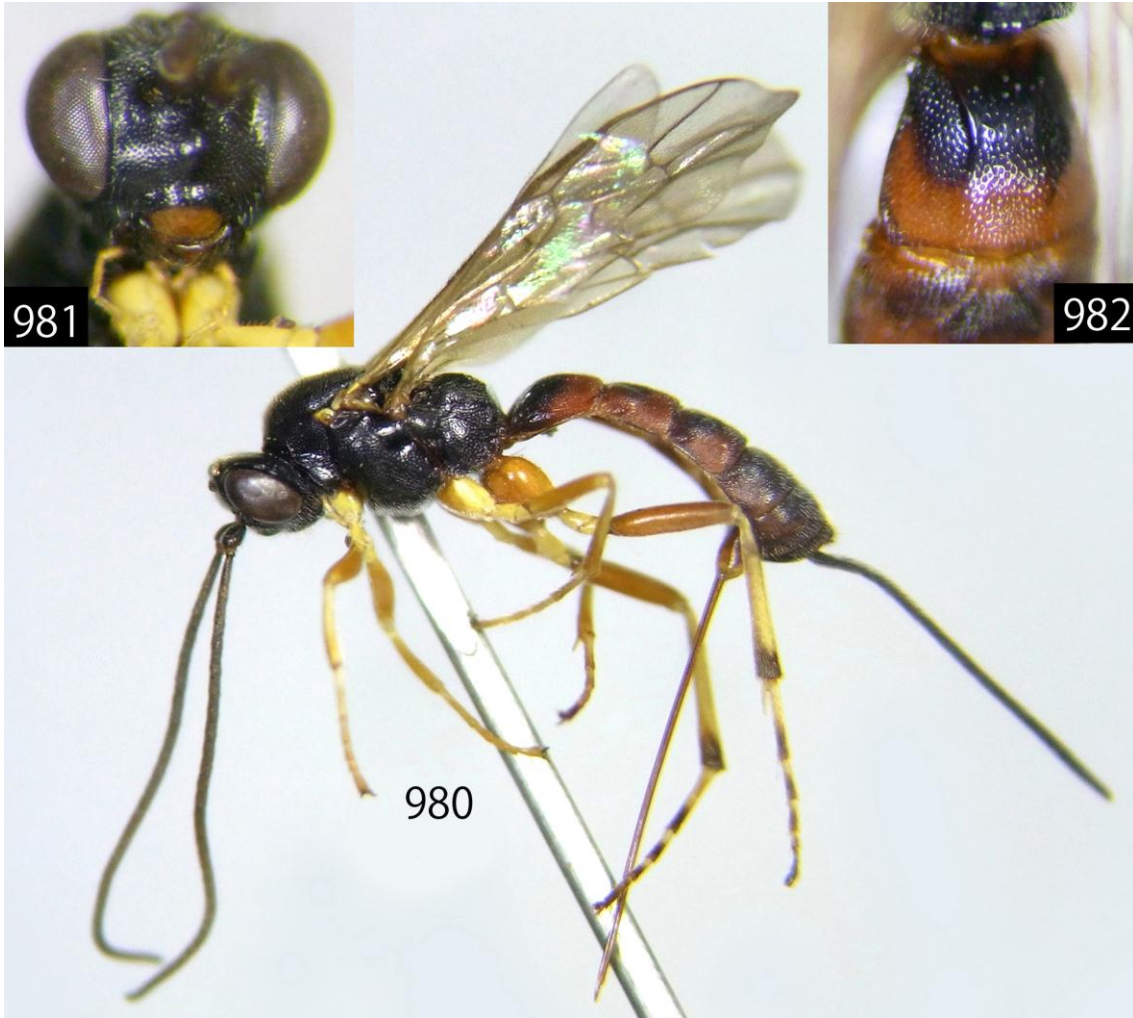
Figures 971–973. Lateral habitus (971), head, frontal view (972) and T1, dorsal view (973) of *Glypta niigatensis* sp. nov., female (holotype).



Figures 974–976. Lateral habitus (974), head, frontal view (975) and T1, dorsal view (976) of *Glypta onaga* sp. nov., female (holotype).



Figures 977–979. Lateral habitus (977), head, frontal view (978) and T1, dorsal view (979) of *Glypta pedata* sp. nov., female (holotype).

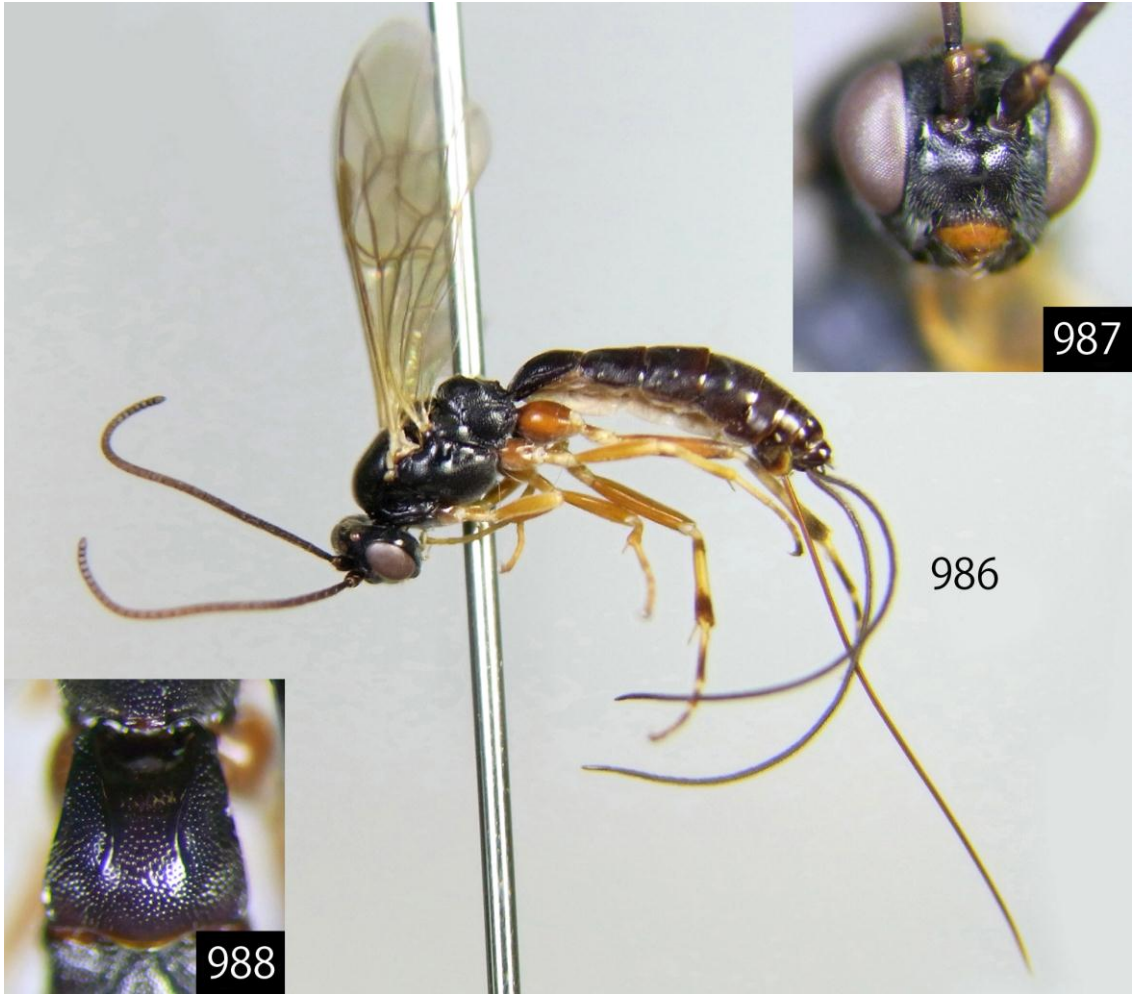


Figures 980–982. Lateral habitus (980), head, frontal view (981) and T1, dorsal view (982) of *Glypta rufata*, female, collected from Japan.

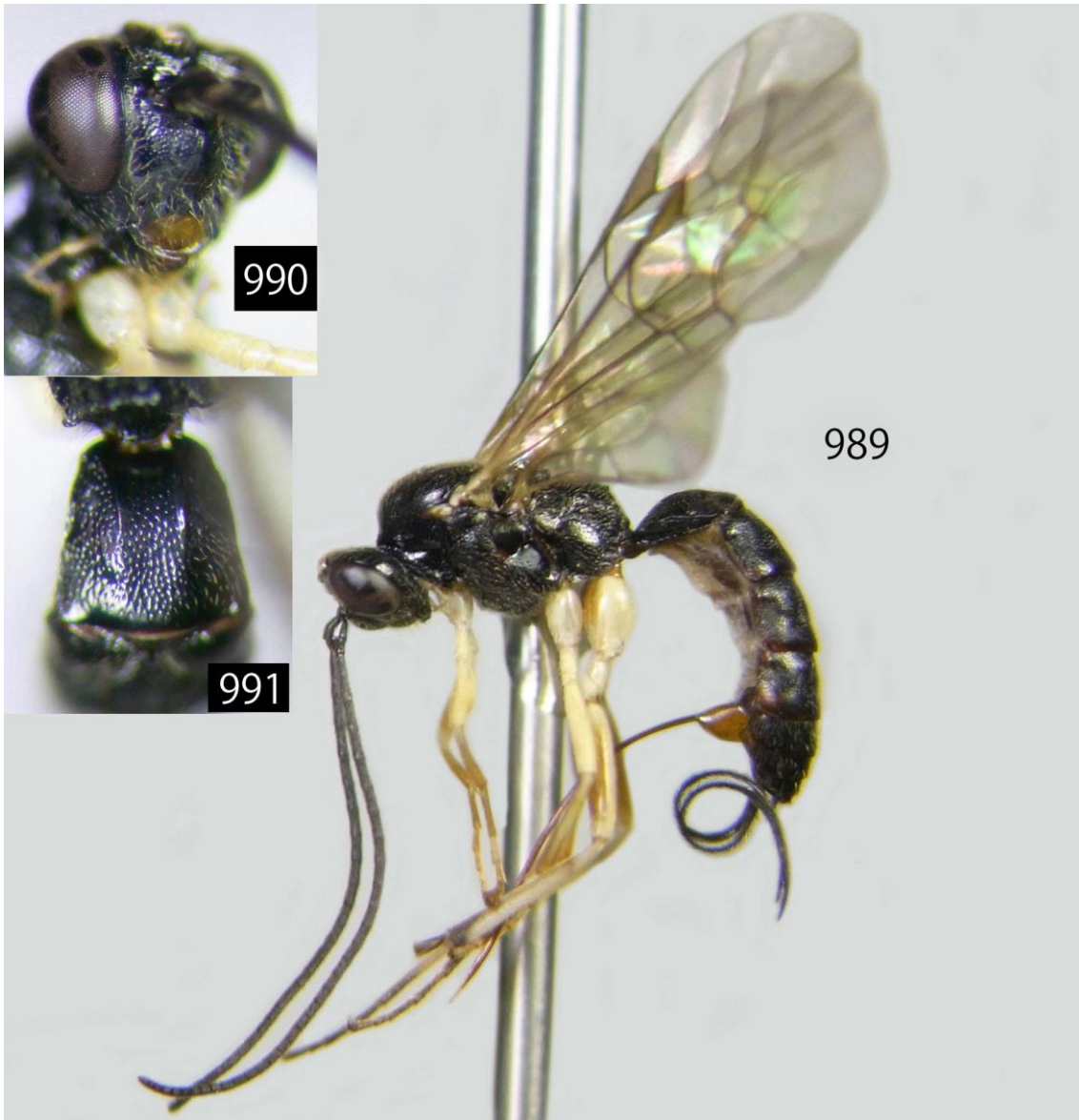


Figures 983–985. Lateral habitus (983), head, frontal view (984) and T1, dorsal view (985) of *Glypta sankaku*, female.





Figures 986–988. Lateral habitus (986), head, frontal view (987) and T1, dorsal view (988) of *Glypta shibetsuensis* sp. nov., female (holotype).



Figures 989–991. Lateral habitus (989), head, frontal view (990) and T1, dorsal view (991) of *Glypta shimizui* sp. nov., female (holotype).

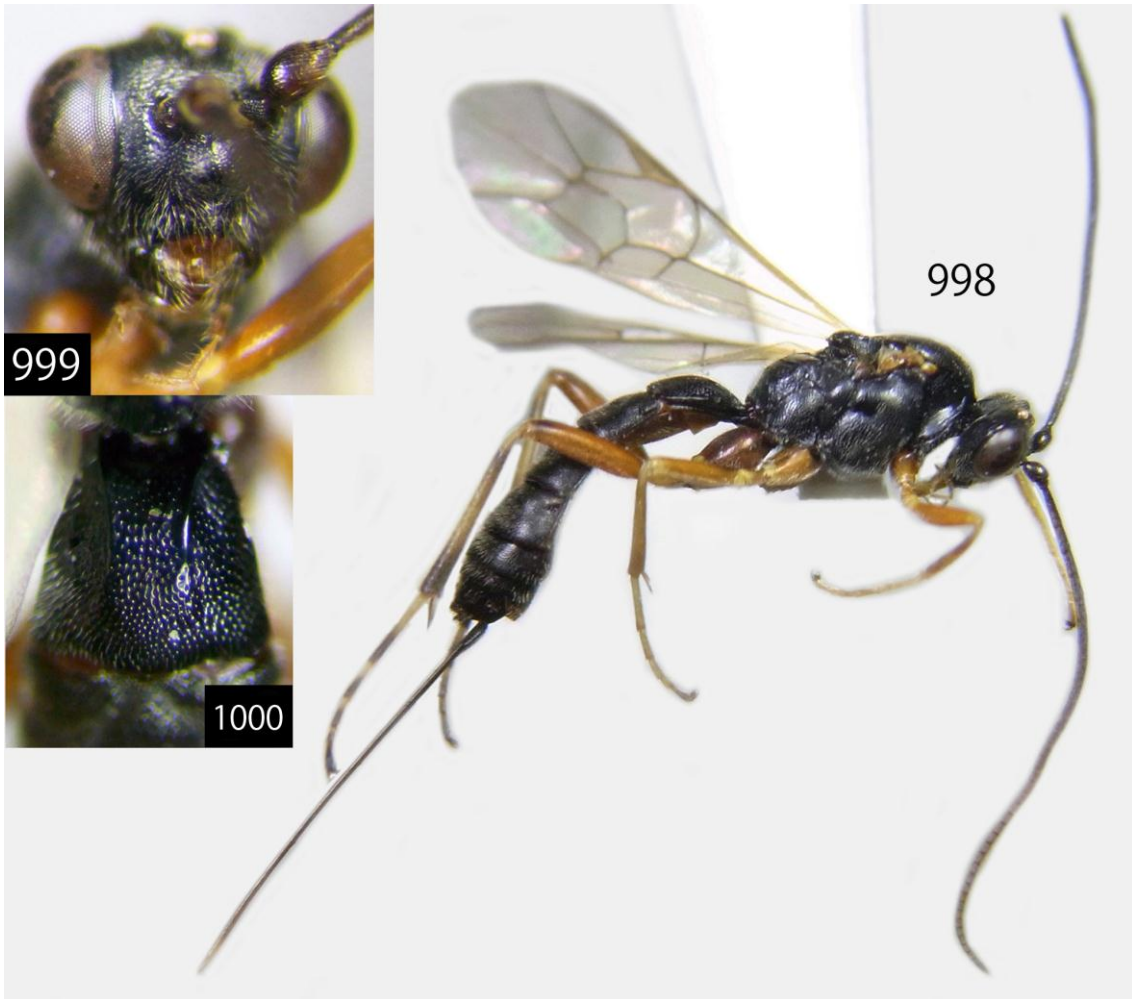


Figures 992–994. Lateral habitus (992), head, frontal view (993) and T1, dorsal view (994) of *Glypta slenda* sp. nov., female (holotype).

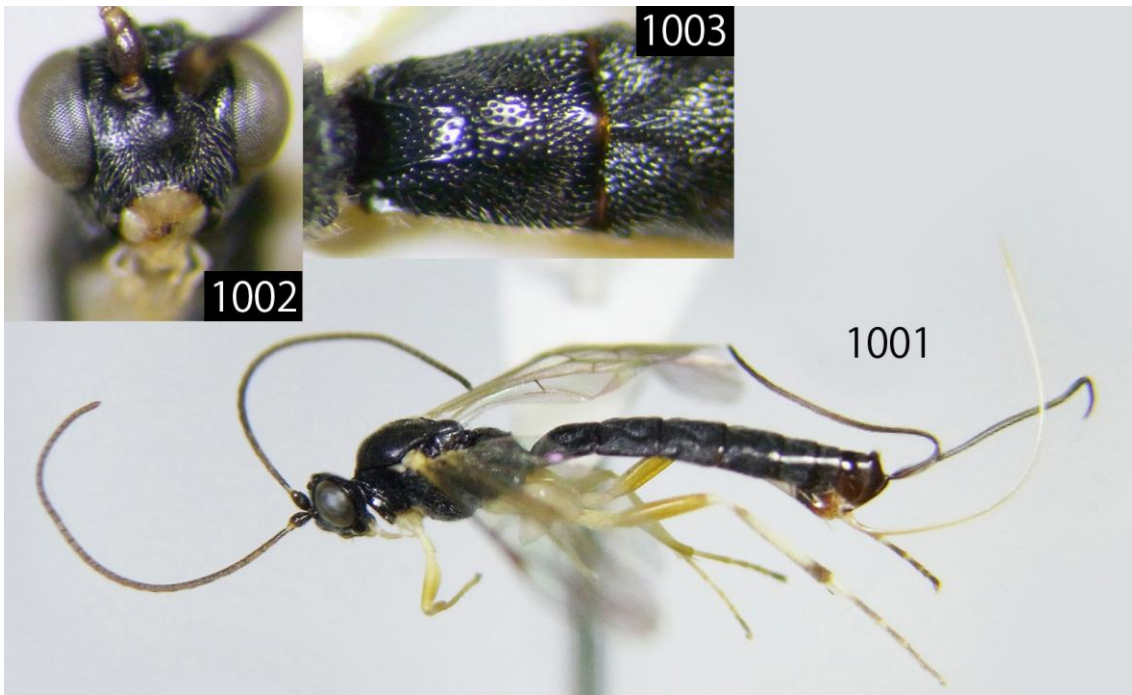


Figures 995–997. Lateral habitus (997), head, frontal view (998) and T1, dorsal view (997) of *Glypta tomuraushiensis* sp. nov., female (holotype).

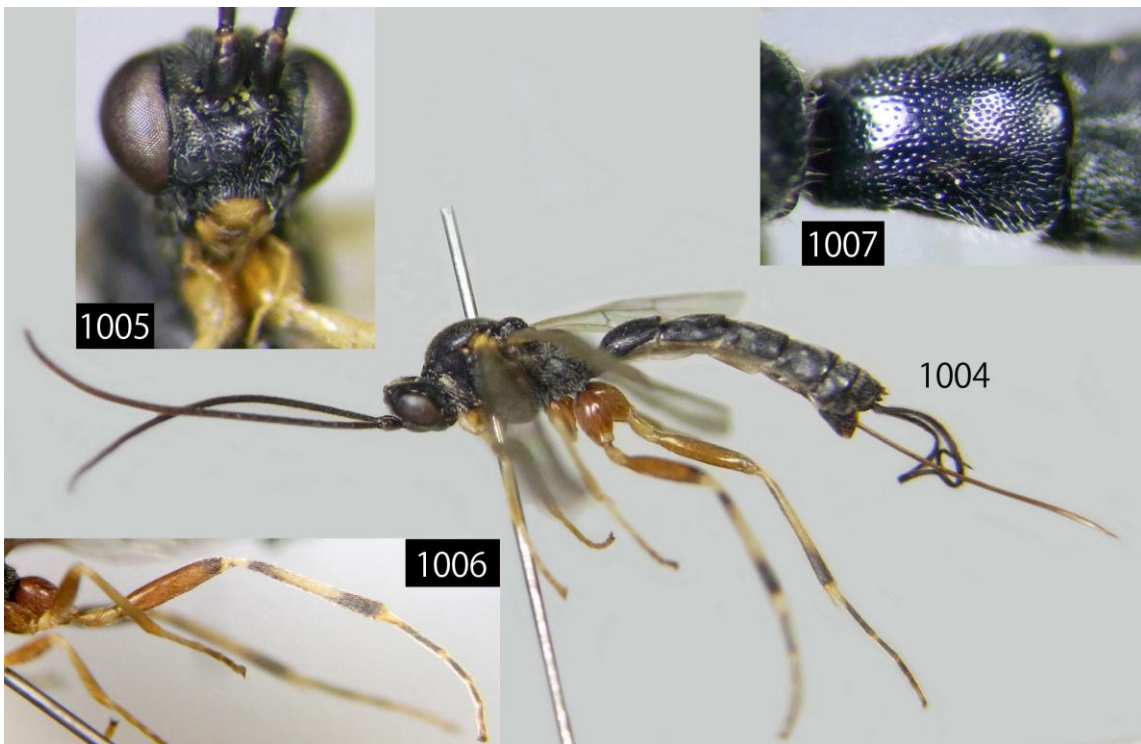




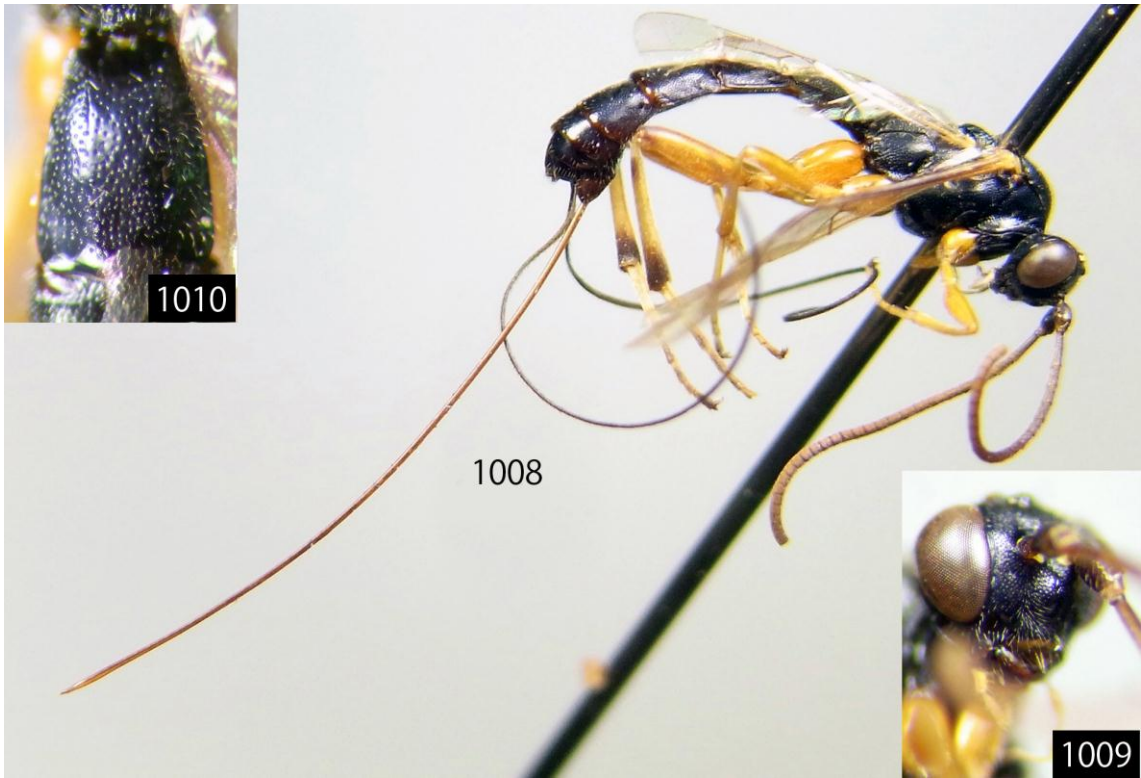
Figures 998–1000. Lateral habitus (998), head, frontal view (999) and T1, dorsal view (1000) of *Glypta uenaensis* sp. nov., female (holotype).



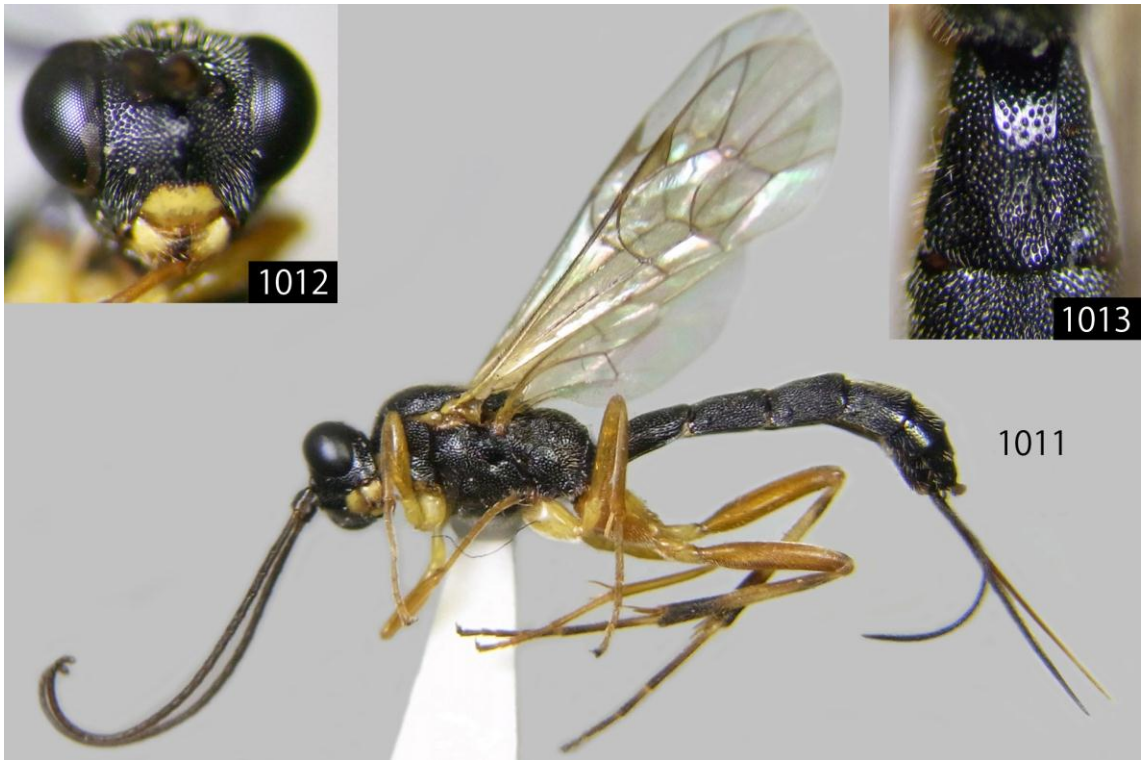
Figures 1001–1003. Lateral habitus (1001), head, frontal view (1002) and T1, dorsal view (1003) of *Glypta yamagishii* sp. nov., female (holotype).



Figures 1004–1007. Lateral habitus (1004), head, frontal view (1005), hind leg, anterior aspect, lateral view (1006) and T1, dorsal view (1007) of *Glypta yamato* sp. nov., female (holotype).



Figures 1008–1010. Lateral habitus (1008), head, frontal view (1009) and T1, dorsal view (1010) of *Glypta yashajinensis* sp. nov., female (holotype).



Figures 1011–1013. Lateral habitus (1011), head, frontal view (1012) and T1, dorsal view (1013) of *Glypta yoshidai* sp. nov., female (holotype).

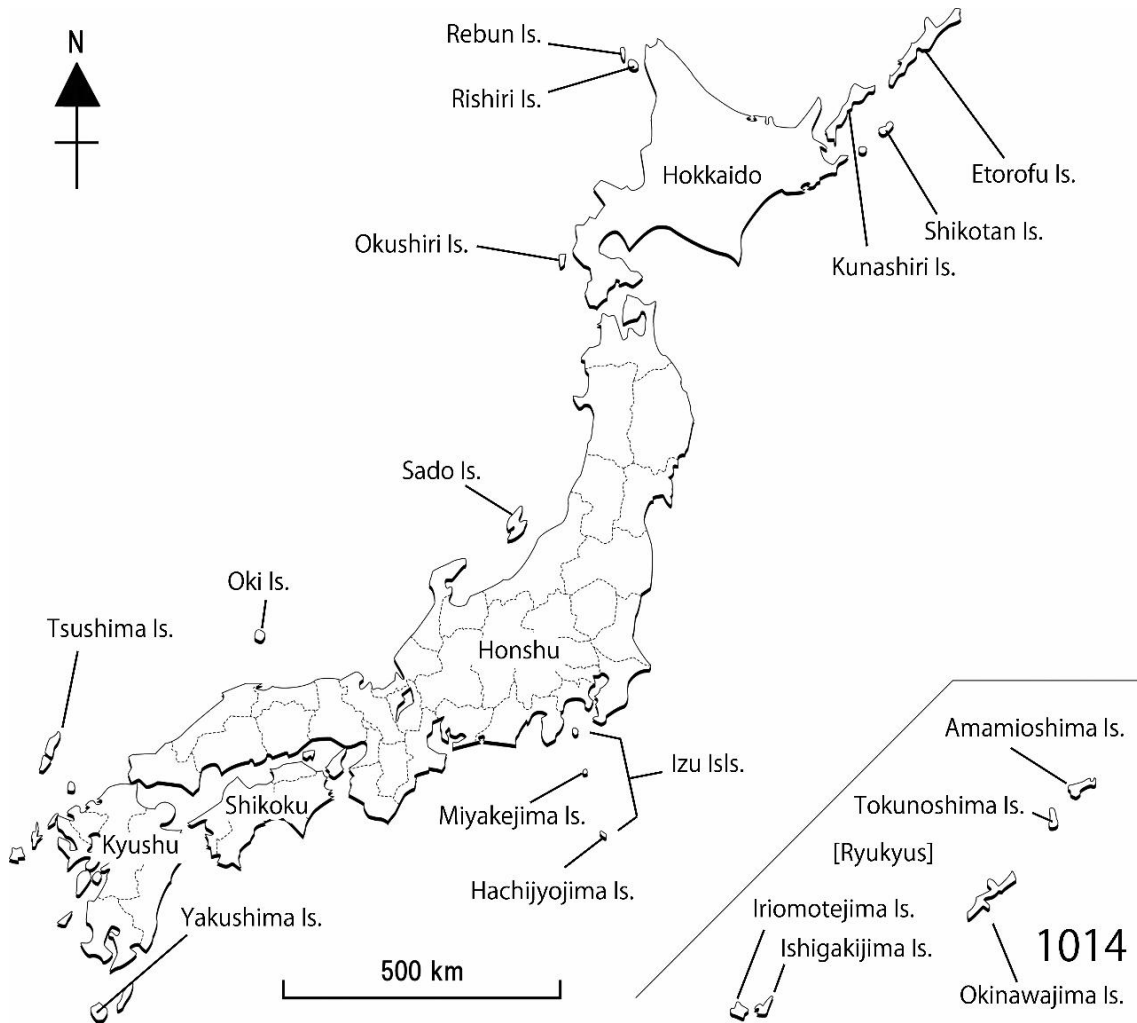


Figure 1014. Island names of Japan.

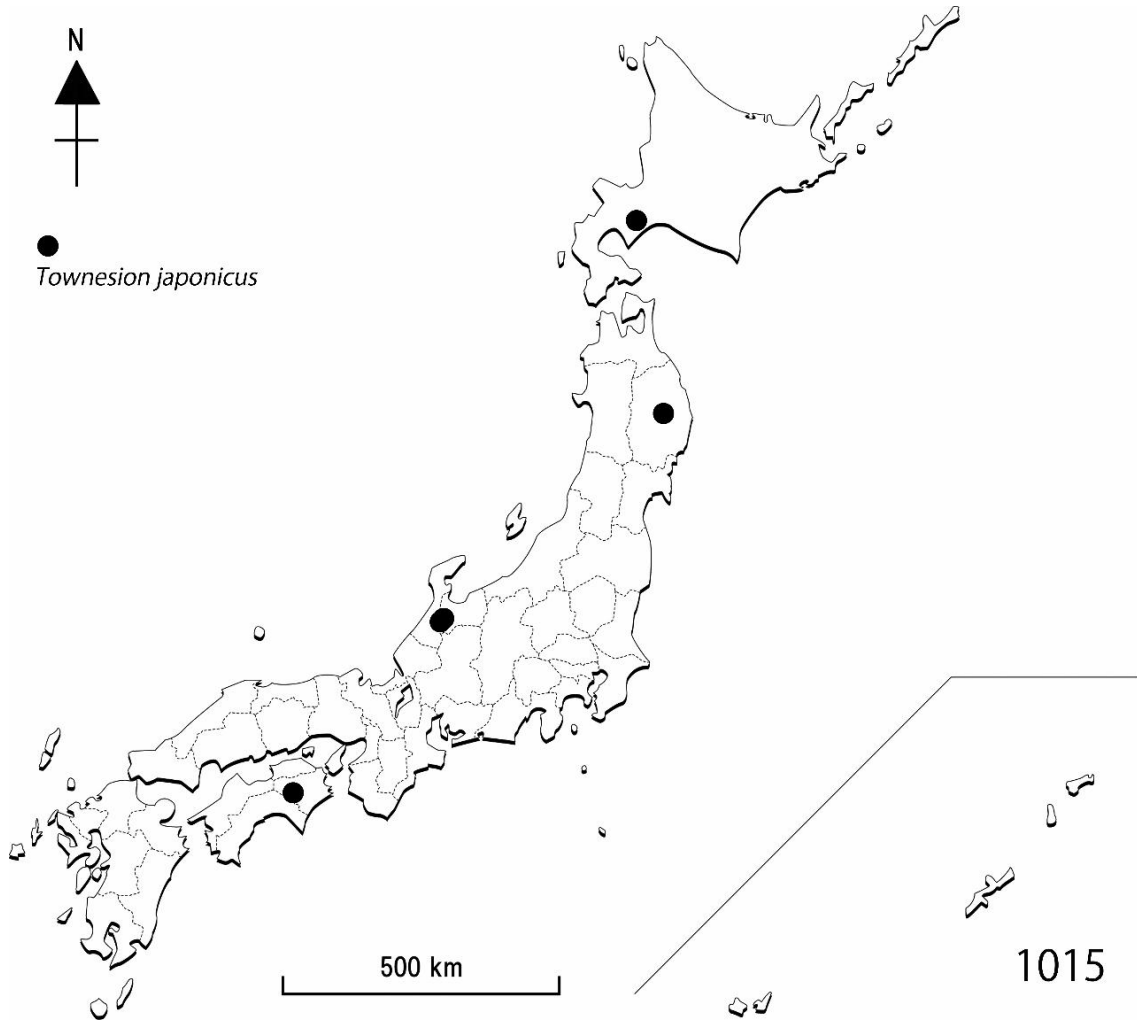


Figure 1015. Distribution of *Townesion japonicus*.



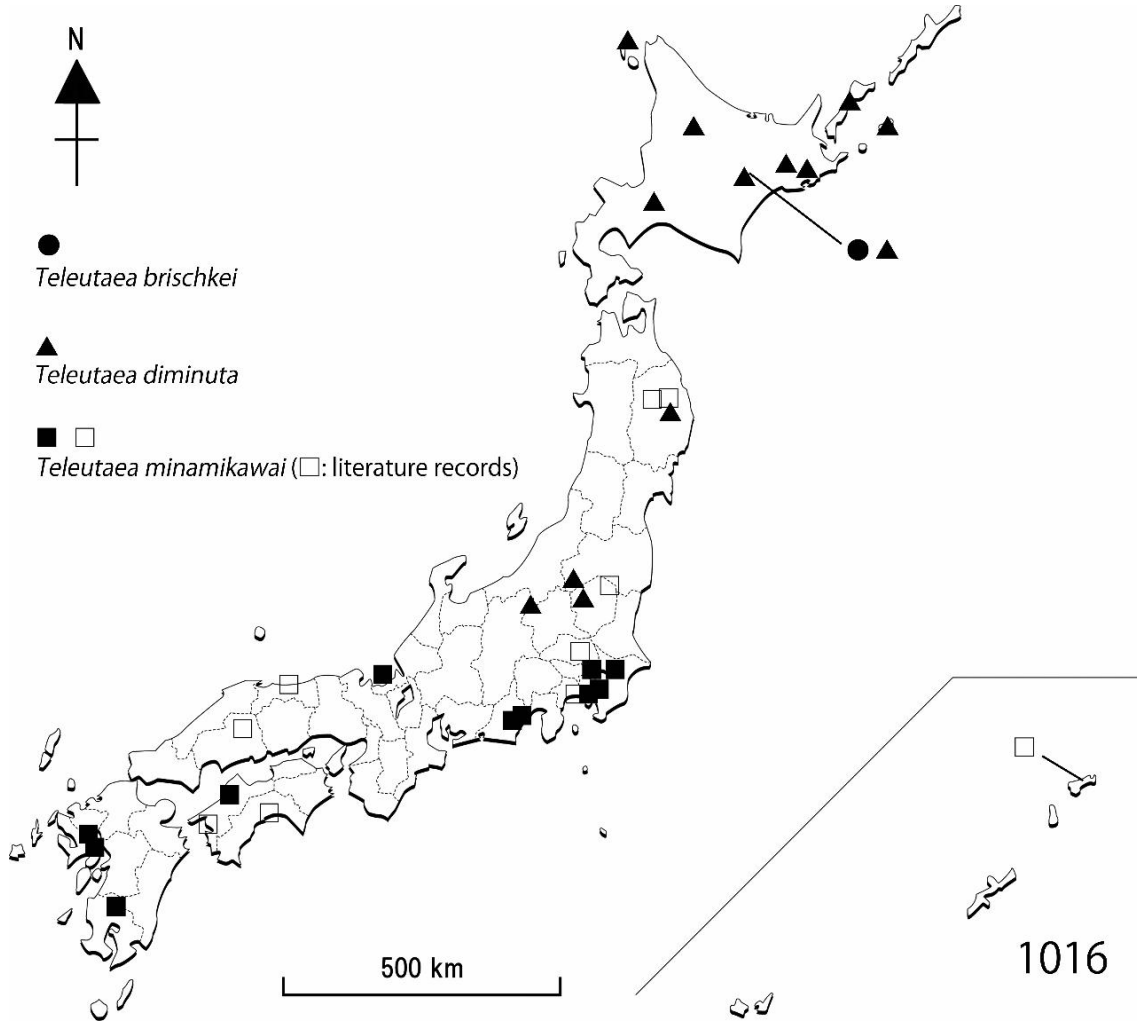


Figure 1016. Distribution of *Teleutaea brischkei*, *T. diminuta* and *T. minamikawai*.

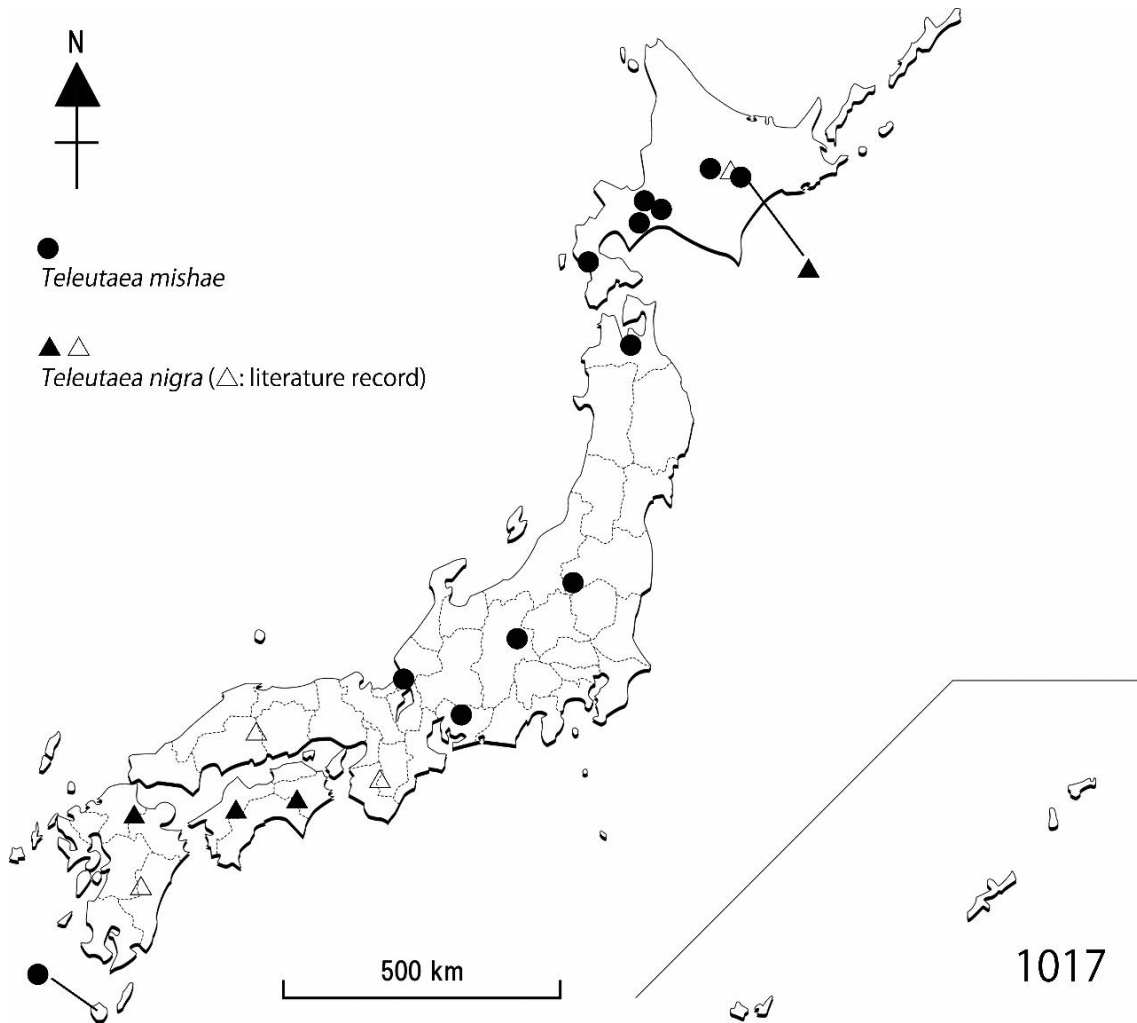


Figure 1017. Distribution of *Teleutaea mishae* and *T. nigra*.



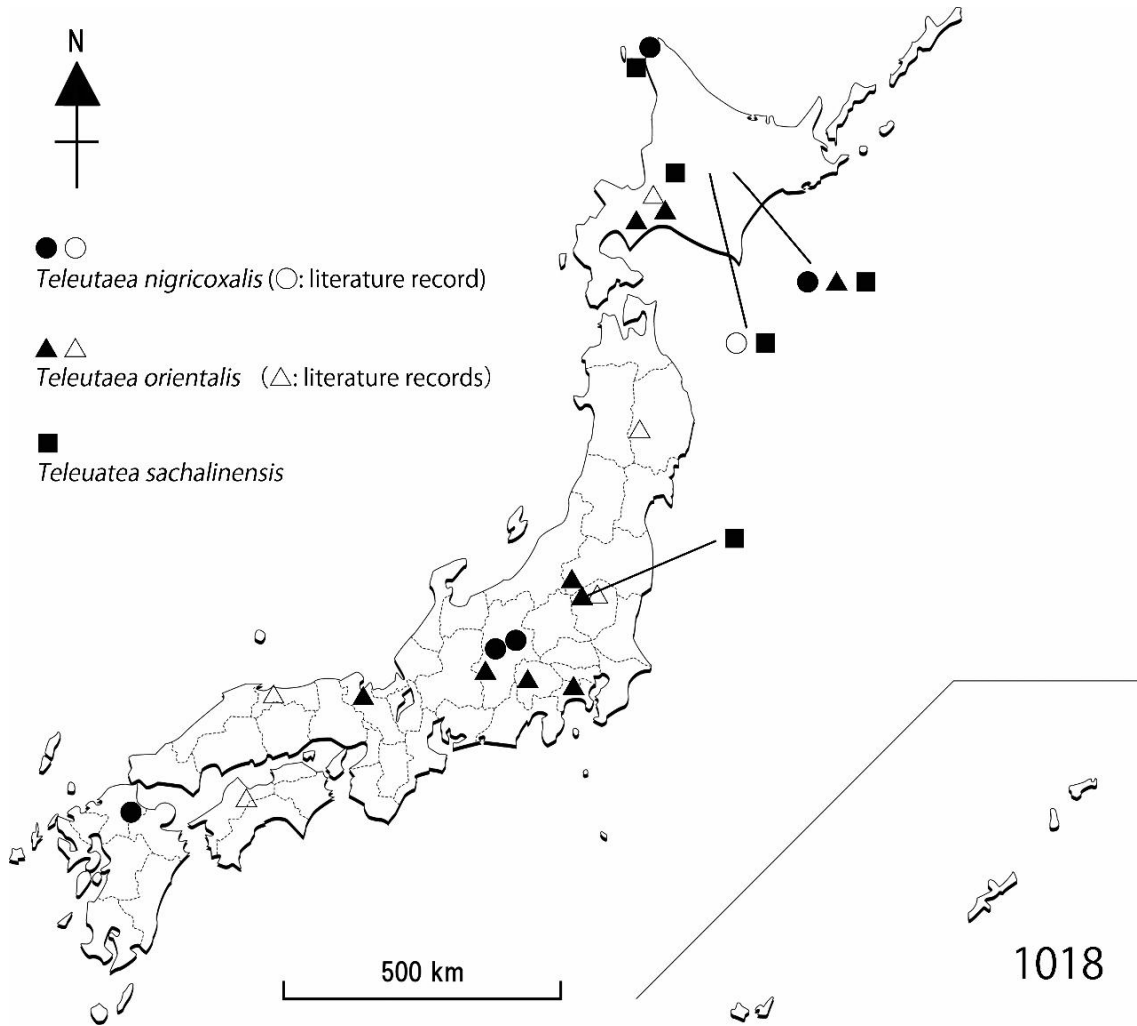


Figure 1018. Distribution of *Teleutaea nigricoxalis*, *T. orientalis* and *T. sachalinensis*.

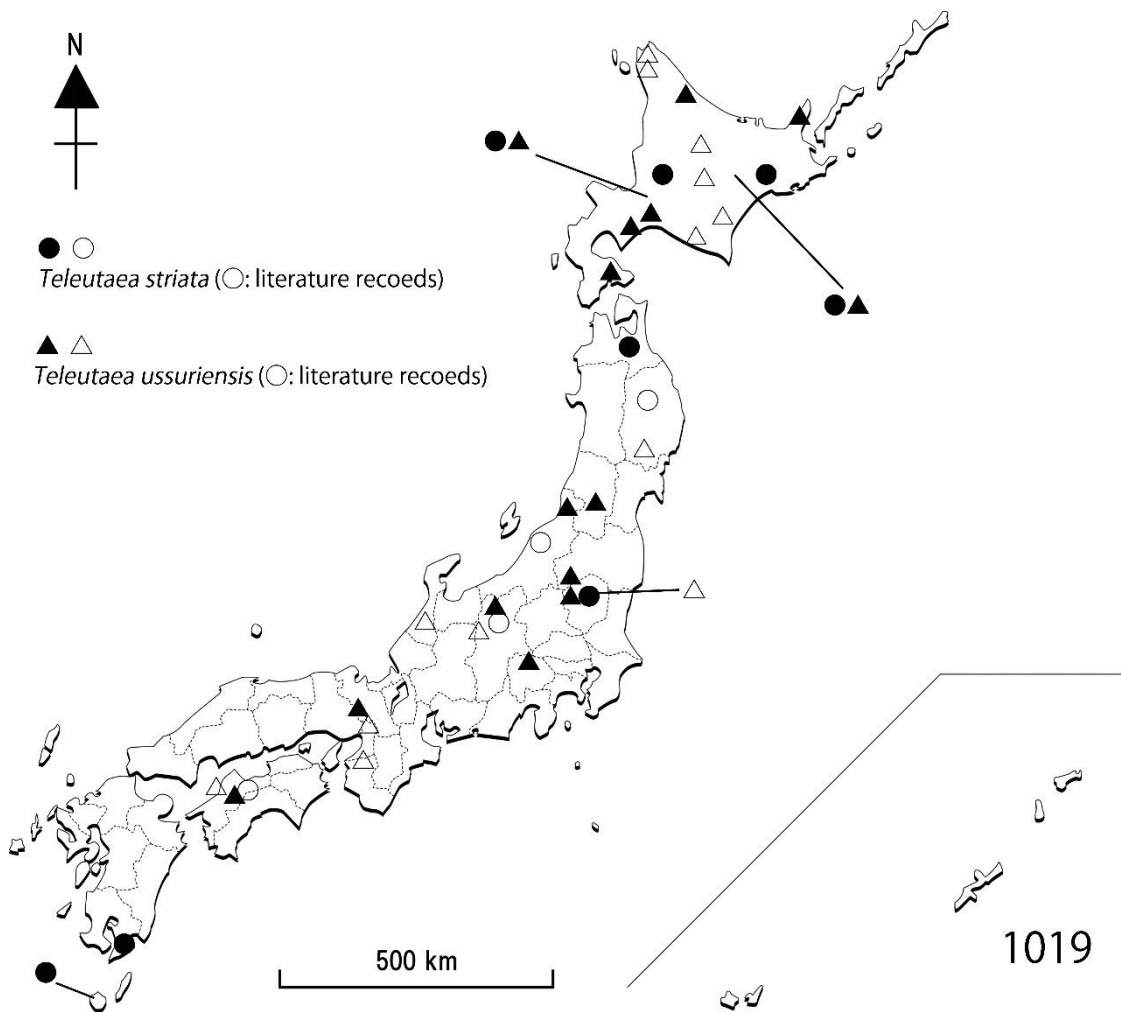


Figure 1019. Distribution of *Teleutaea striata* and *T. ussuriensis*.

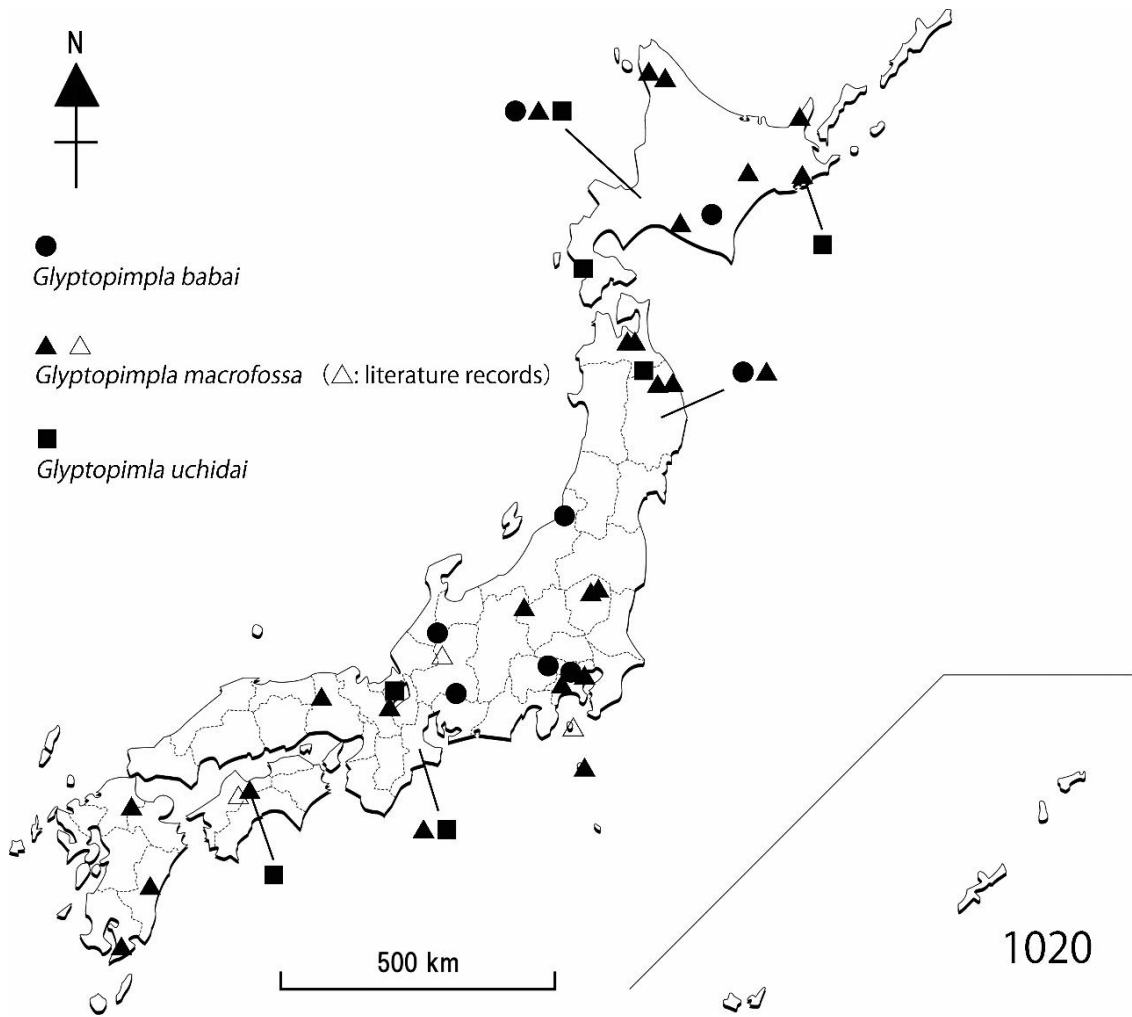


Figure 1020. Distribution of *Glyptopimpla babai*, *G. macrofossa* and *G. uchidai*.

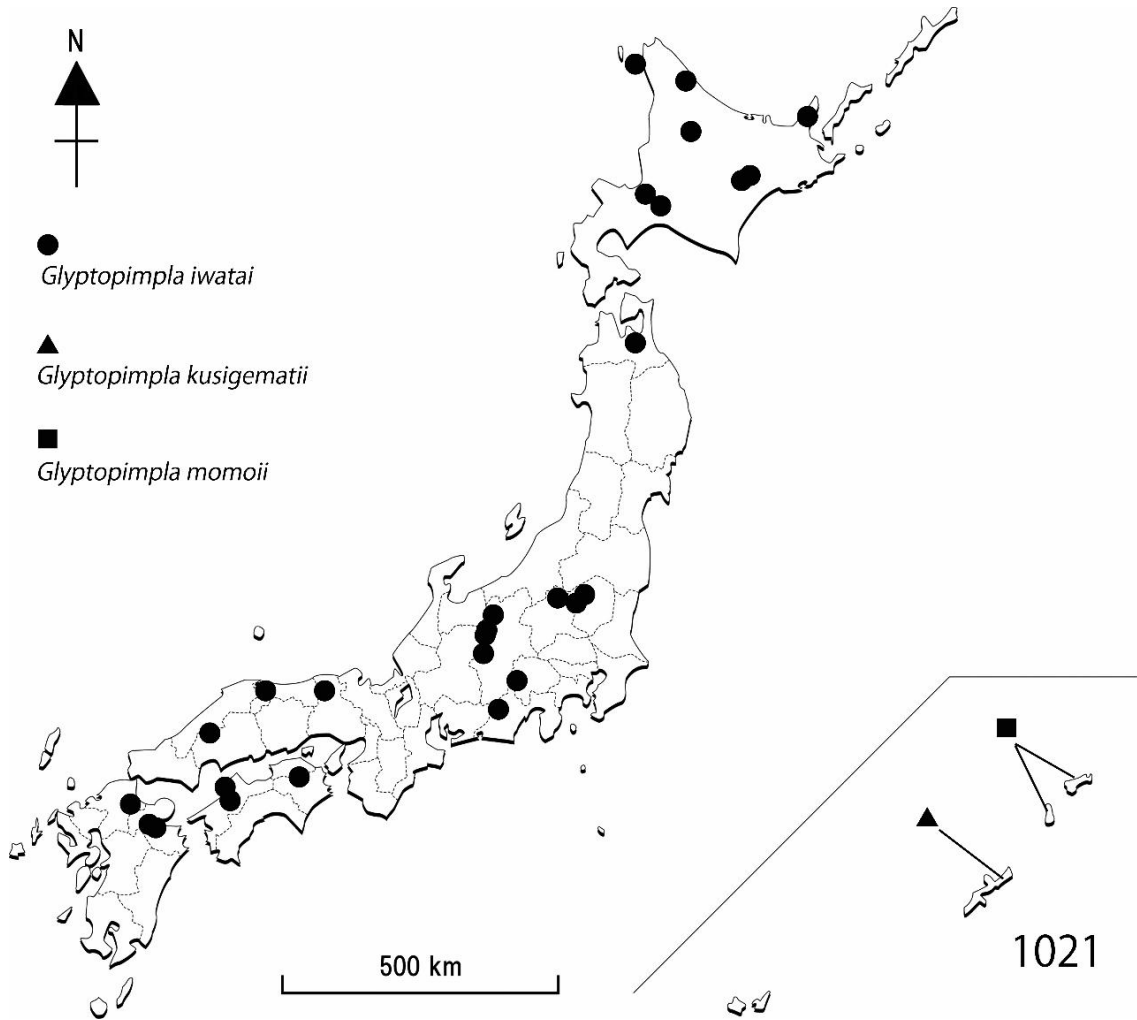


Figure 1021. Distribution of *Glyptopimpla iwatai*, *G. kusigematii* sp. nov. and *G. momoii* sp. nov.

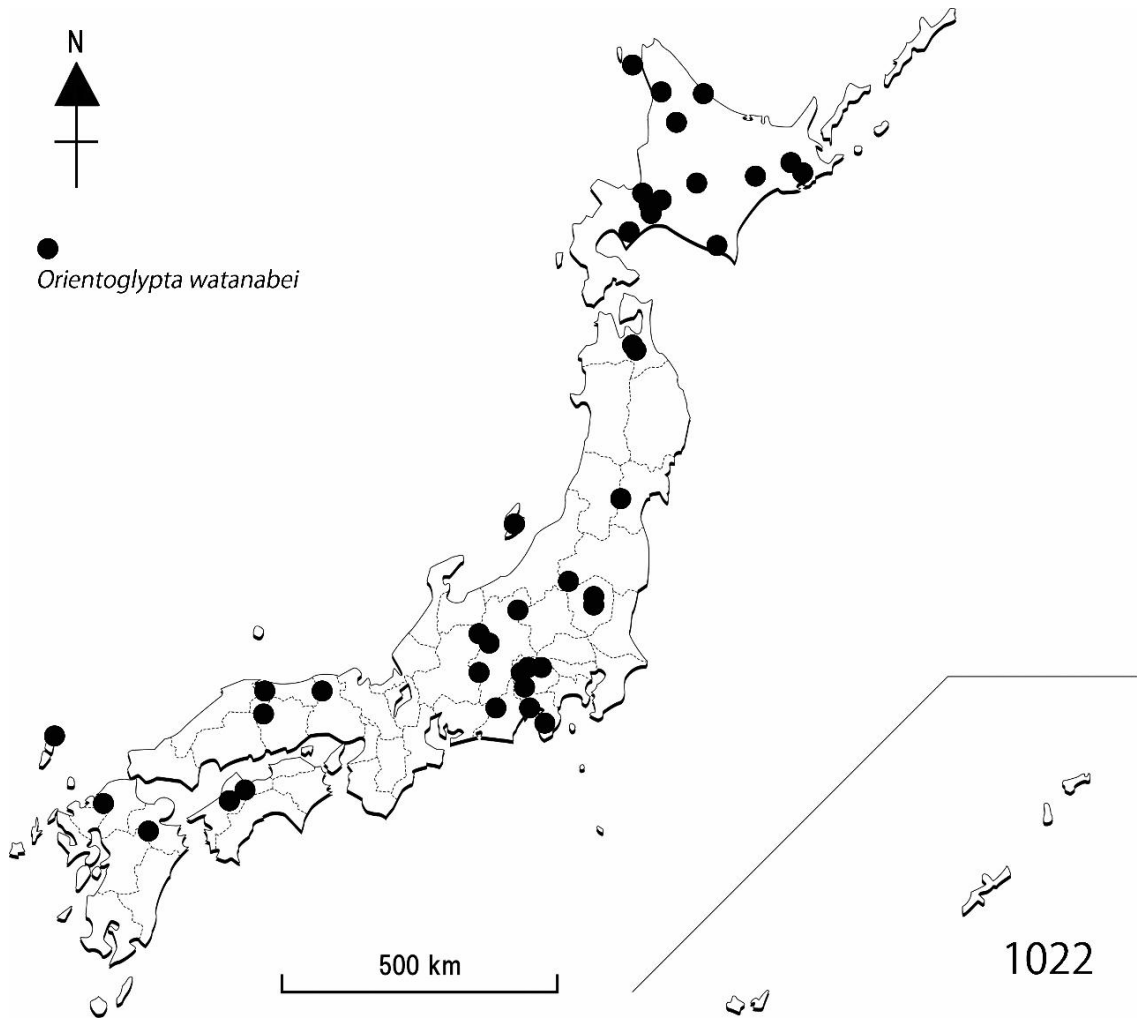


Figure 1022. Distribution of *Orientoglypta watanabei*.

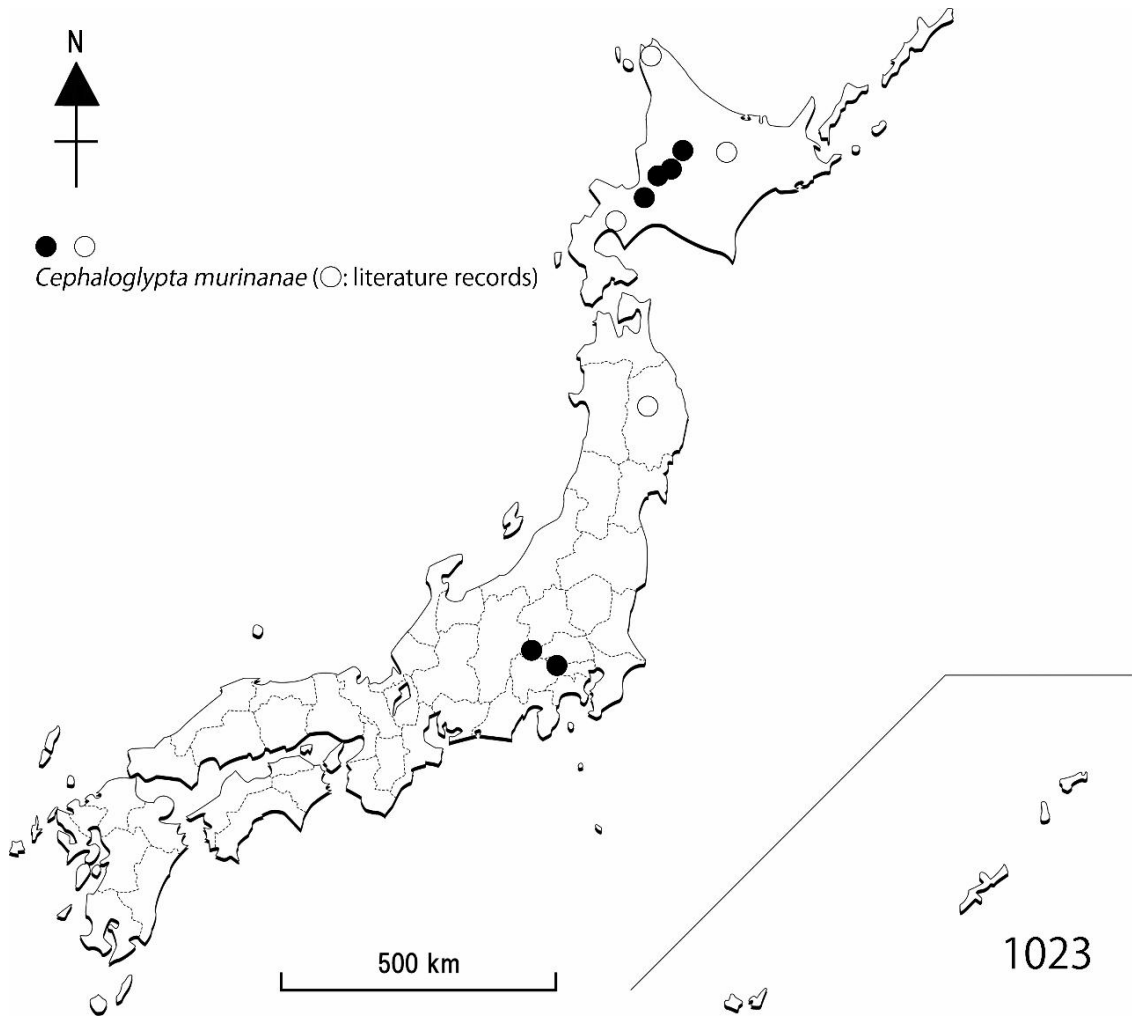


Figure 1023. Distribution of *Cephaloglypta murinanae*.

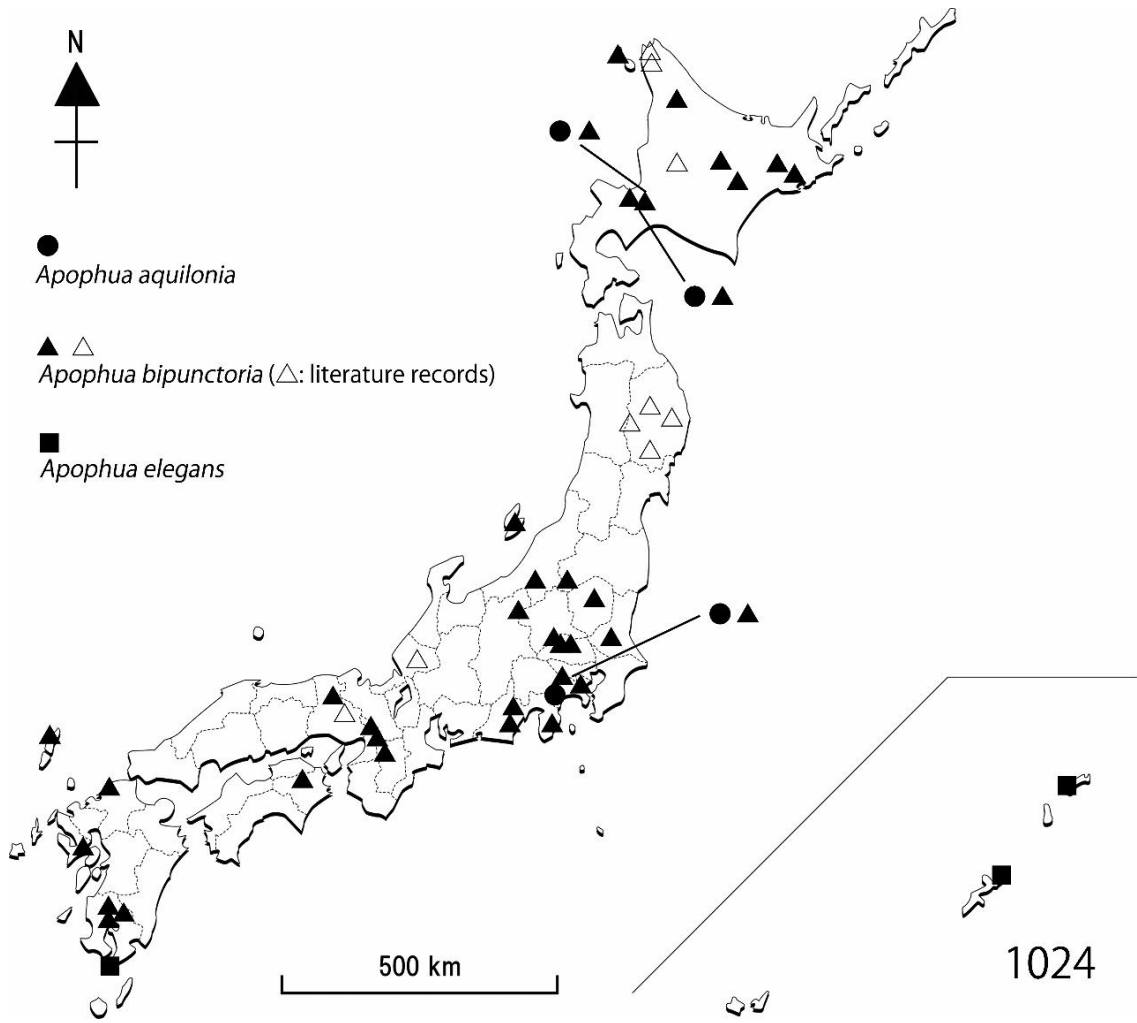


Figure 1024. Distribution of *Apophua aquilonia*, *A. bipunctoria* and *A. elegans* sp. nov.

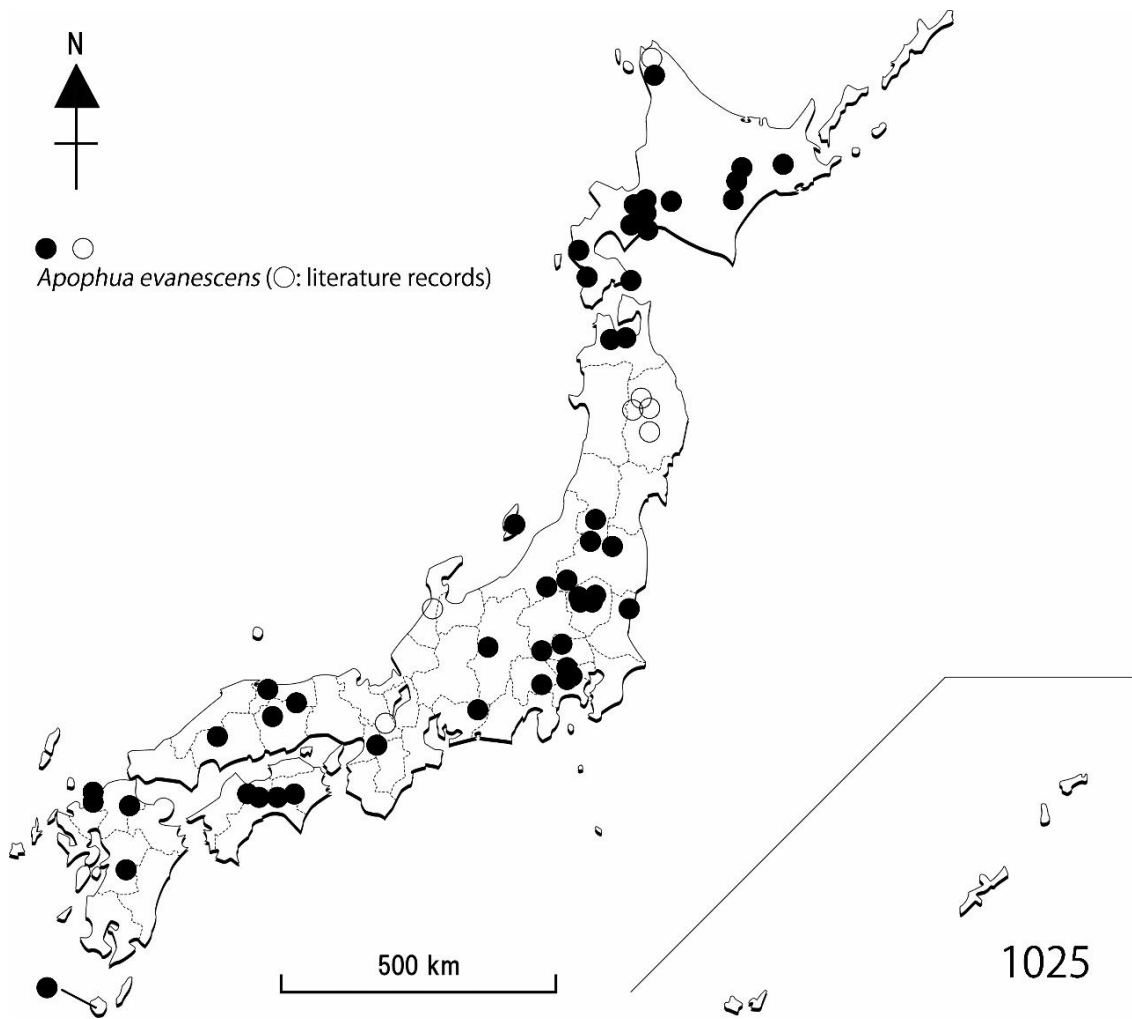


Figure 1025. Distribution of *Apophua evanescens*.



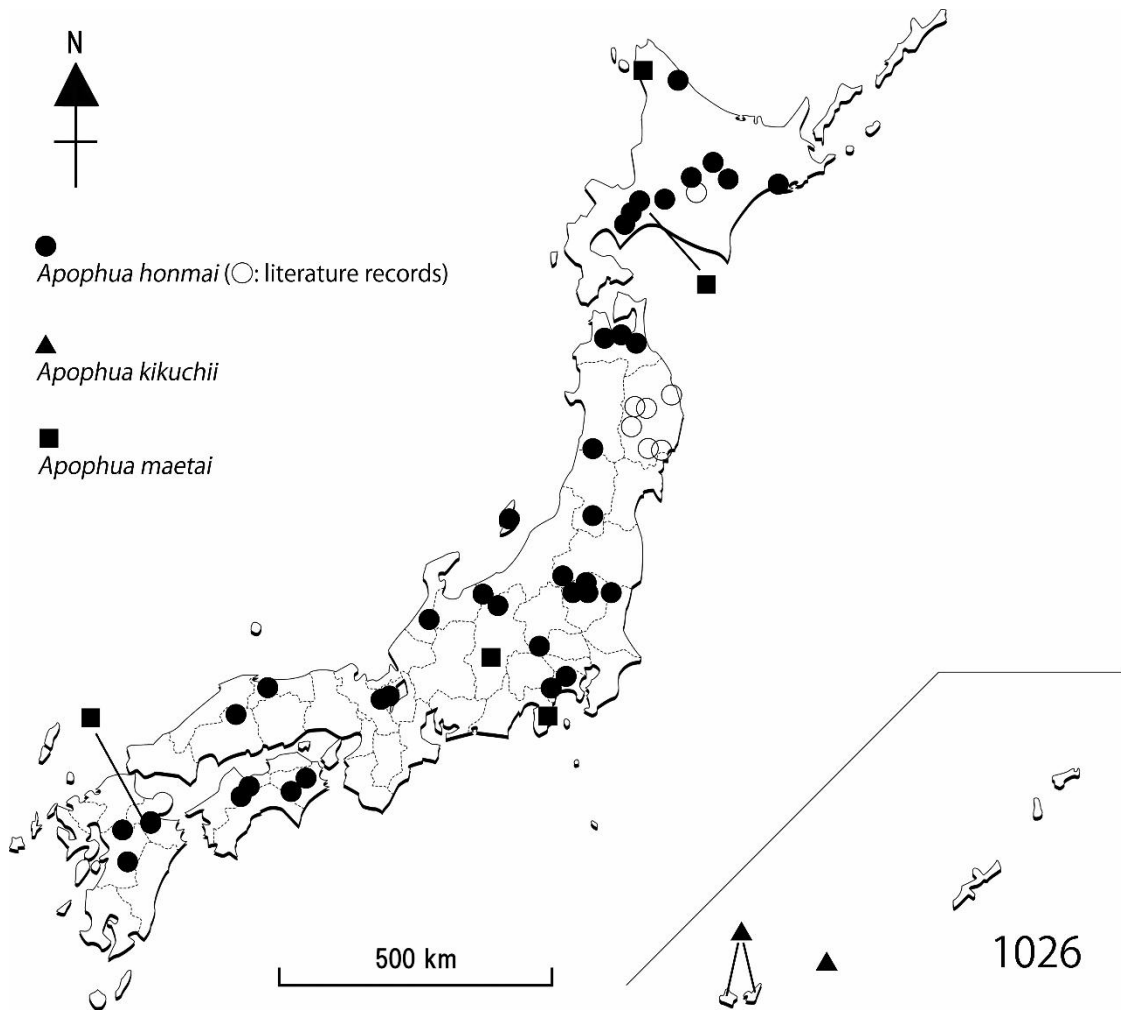


Figure 1026. Distribution of *Apophua honmai*, *A. kikuchii* and *A. maetai* sp. nov.

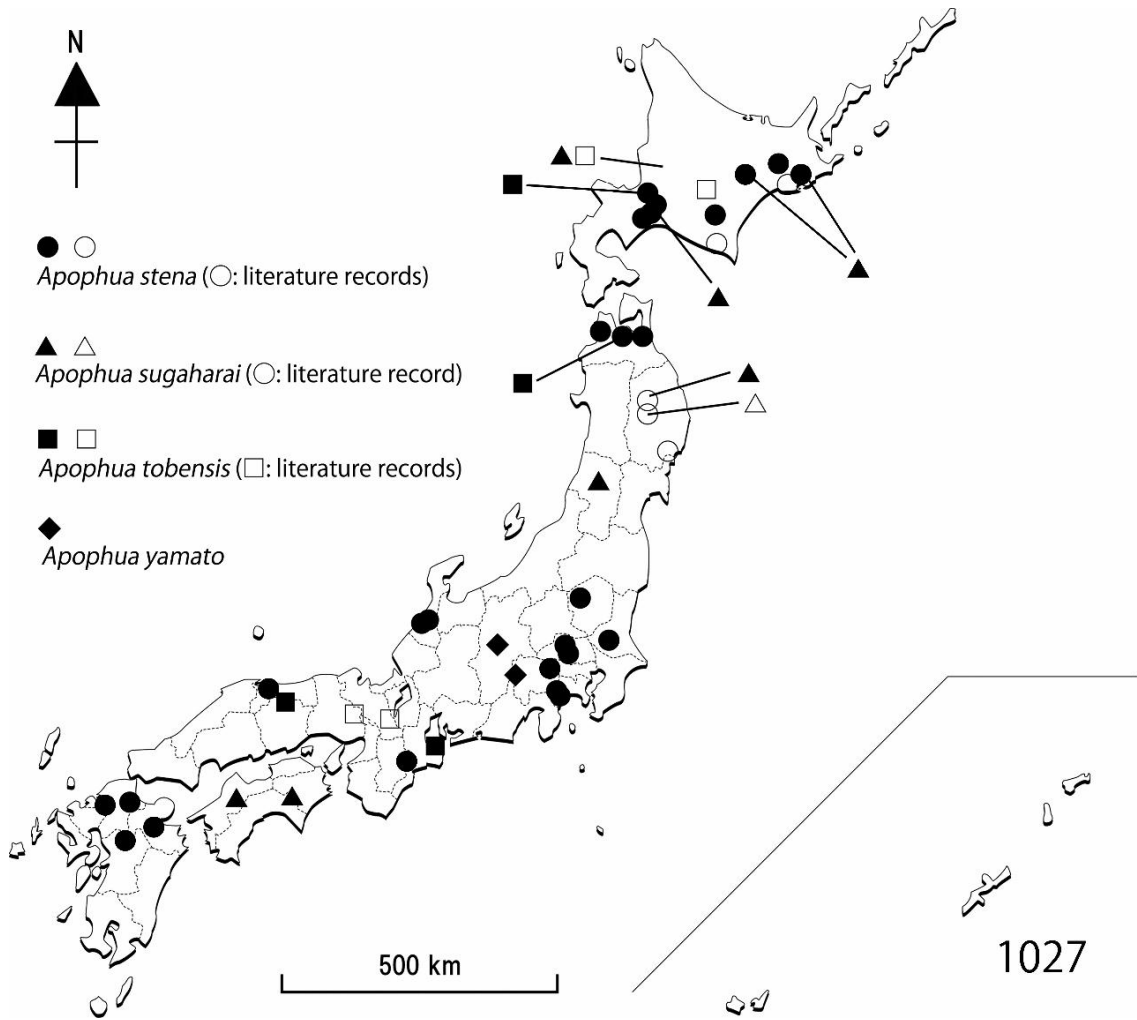


Figure 1027. Distribution of *Apophua stena*, *A. sugaharai*, *A. tobensis* and *A. yamato* sp. nov.

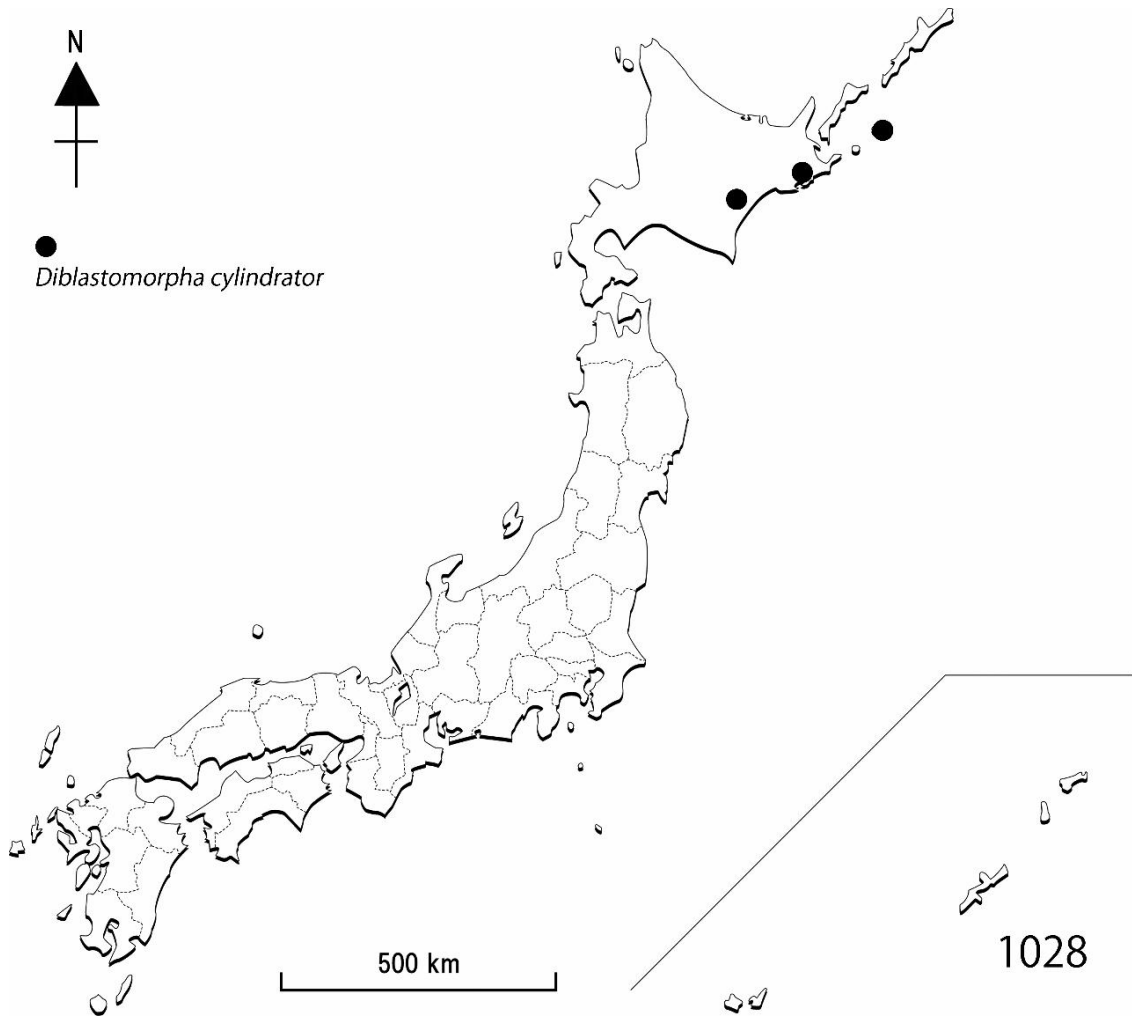


Figure 1028. Distribution of *Diblastomorpha cylindrator*.

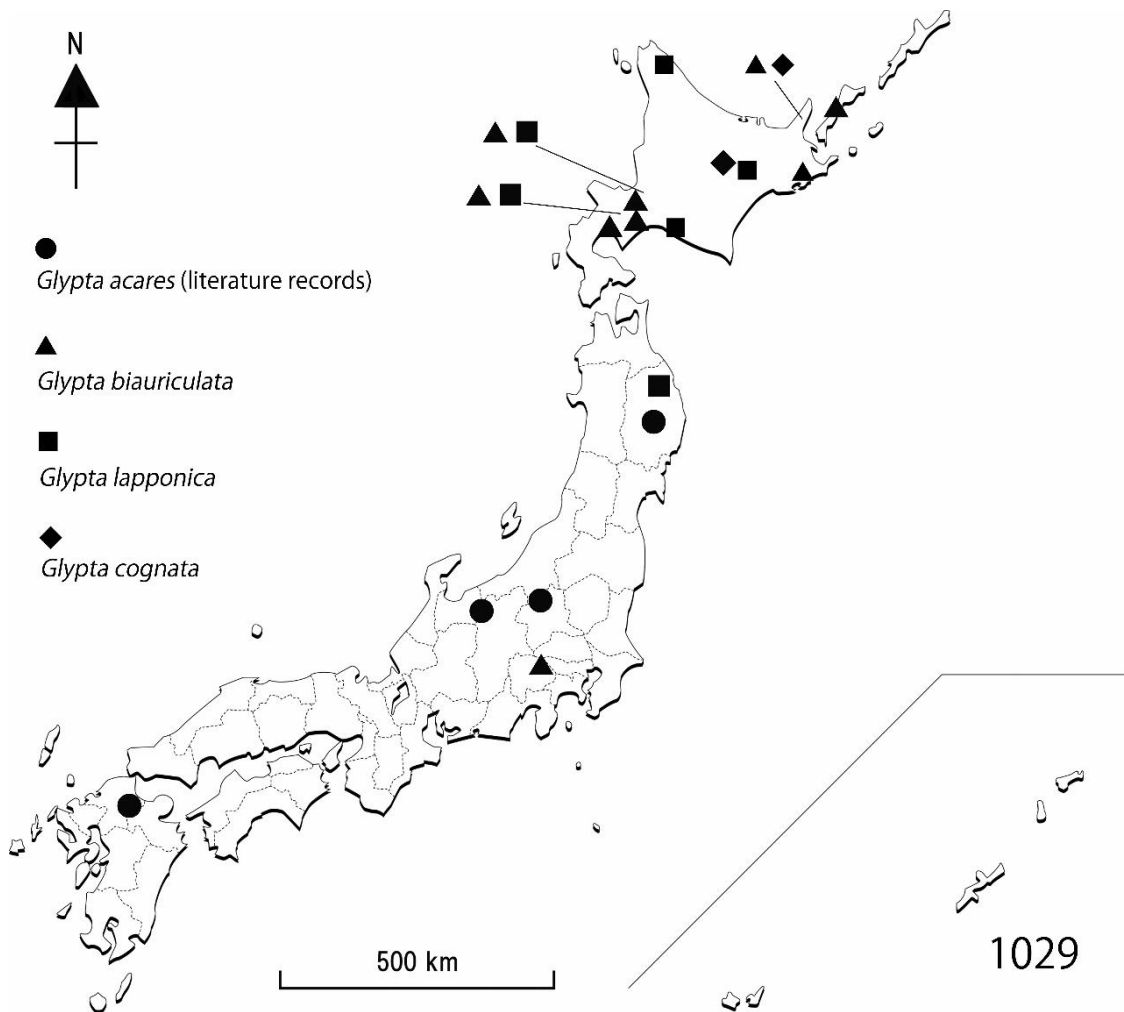


Figure 1029. Distribution of *Glypta acares*, *G. biauriculata*, *G. lapponica* and *G. cognata* sp. nov.

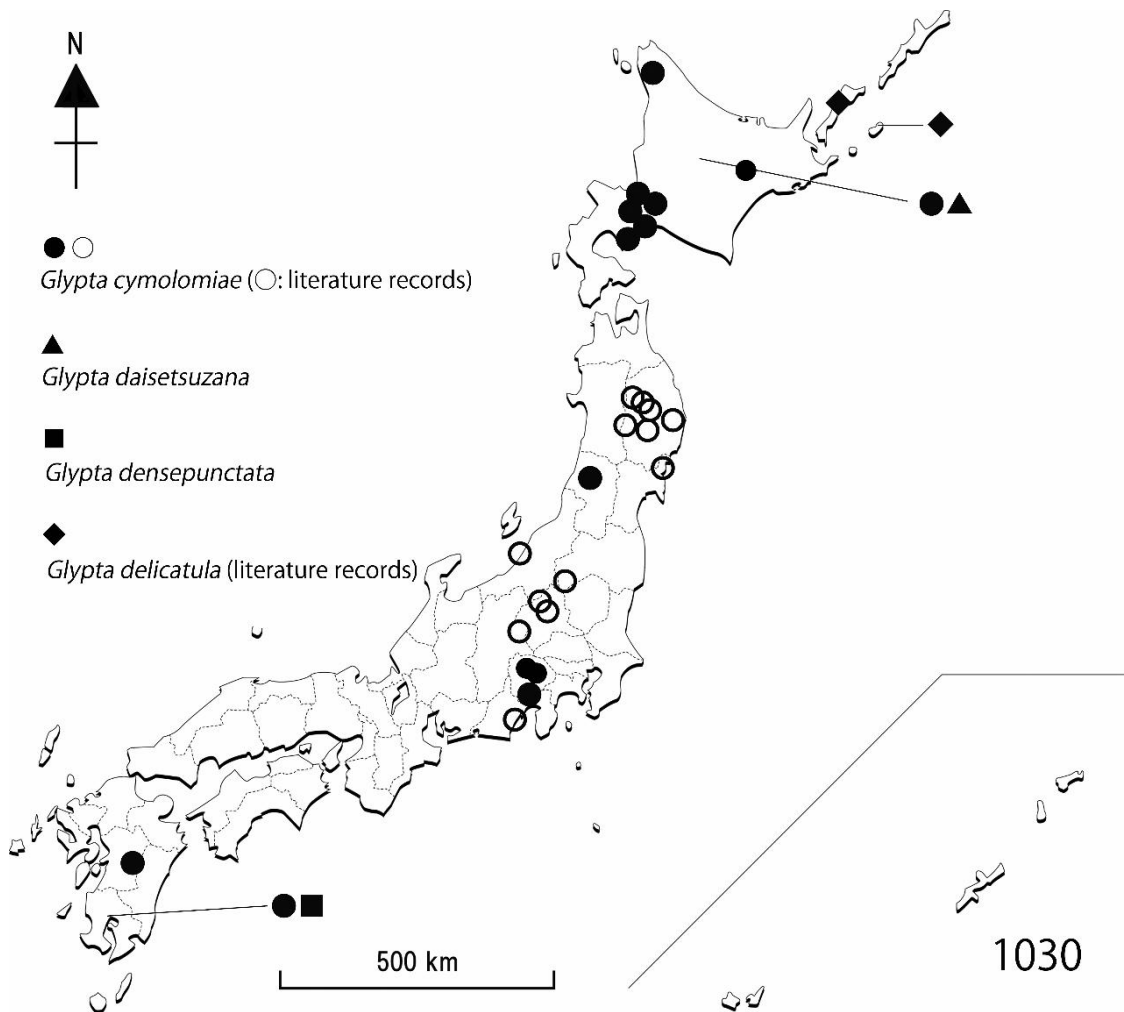


Figure 1030. Distribution of *Glypta cymolomiae*, *G. daisetsuzana* sp. nov., *G. densepunctata* sp. nov. and *G. delicatula*.

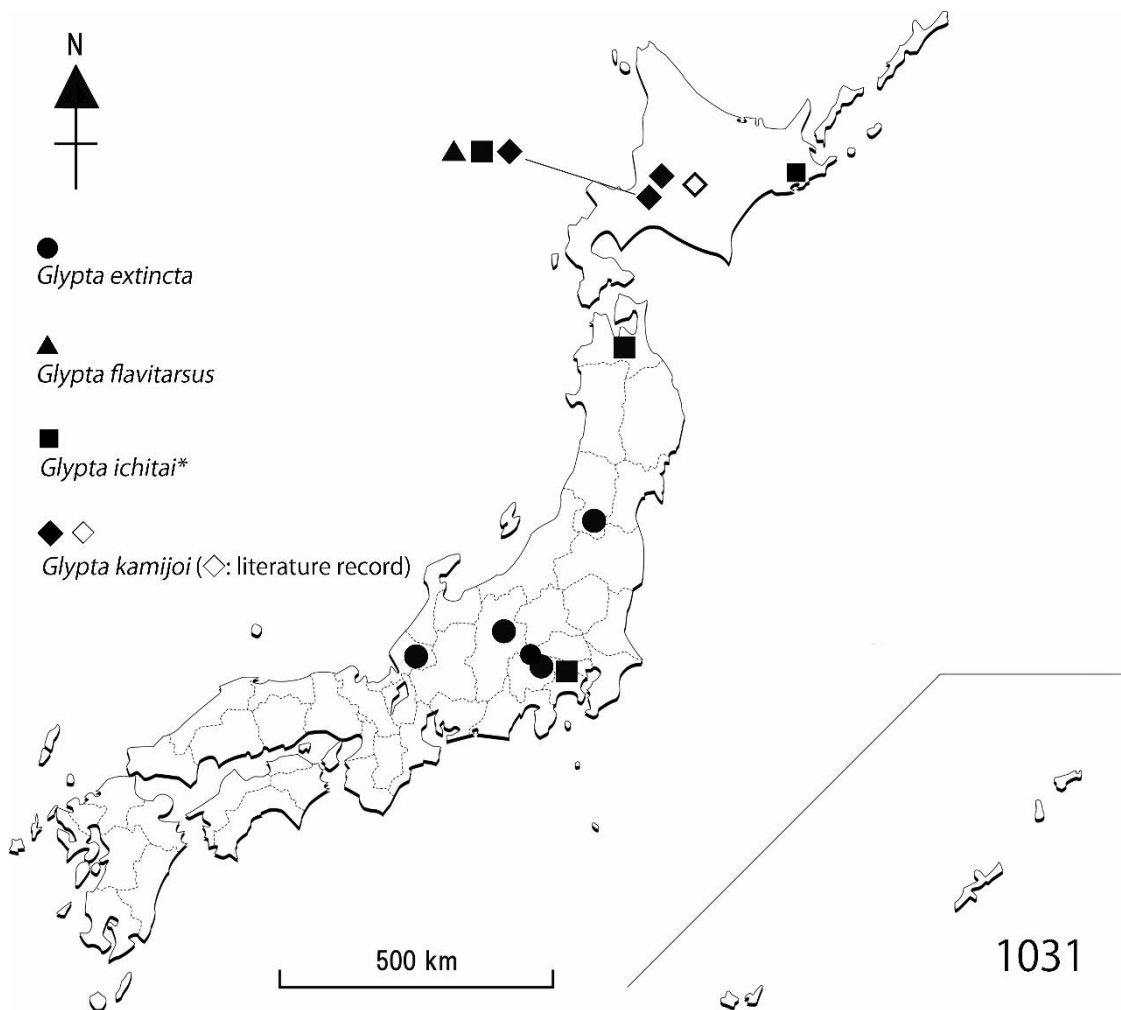


Figure 1031. Distribution of *Glypta extincta*, *G. flavitarsus* sp. nov., *G. ichitai* sp. nov. and *G. kamijoi*.

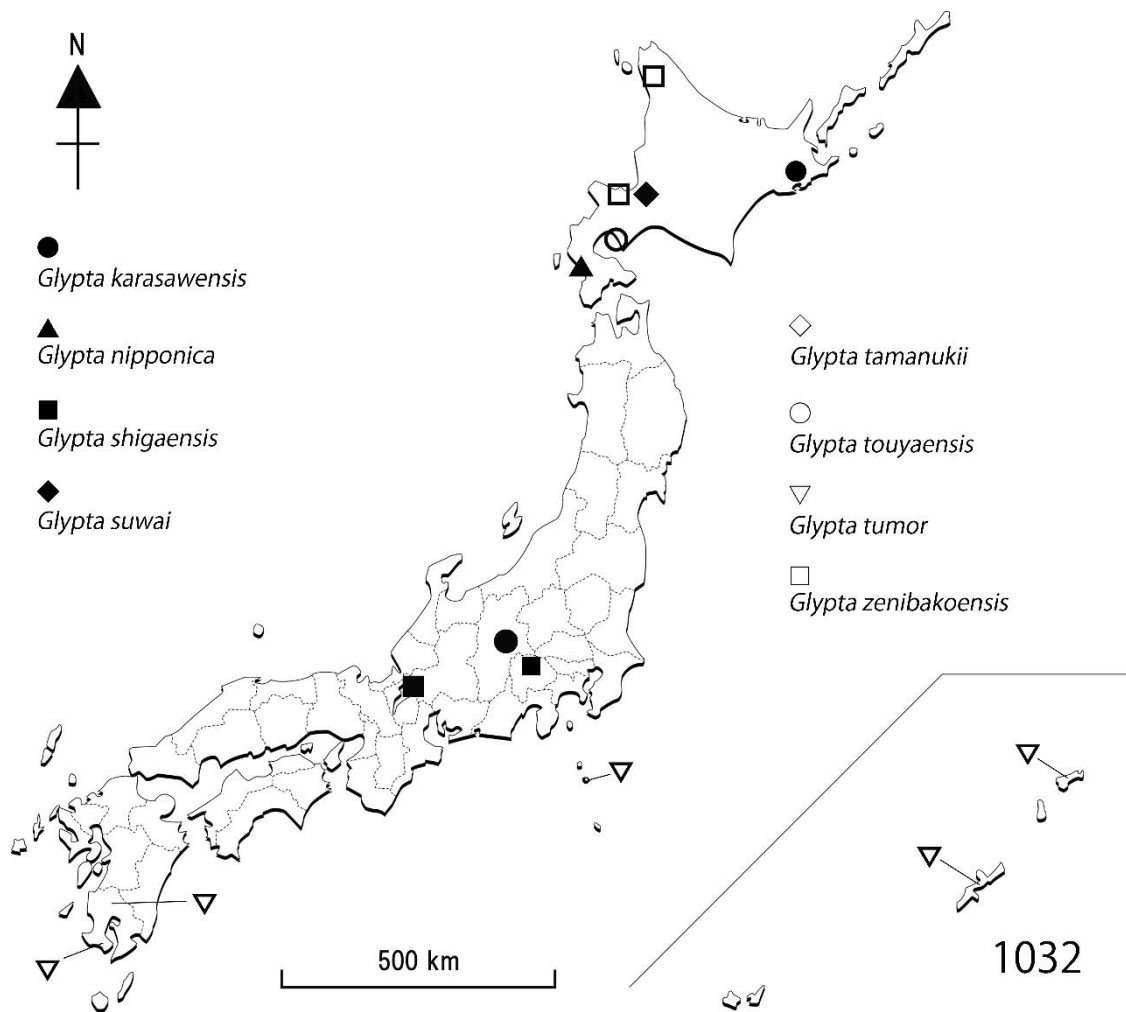


Figure 1032. Distribution of *Glypta karasawensis* sp. nov., *G. nipponica* sp. nov., *G. shigaensis* sp. nov., *G. suwai* sp. nov., *G. tamanukii*, *G. touyaensis* sp. nov., *G. tumor* and *G. zenibakoensis* sp. nov.

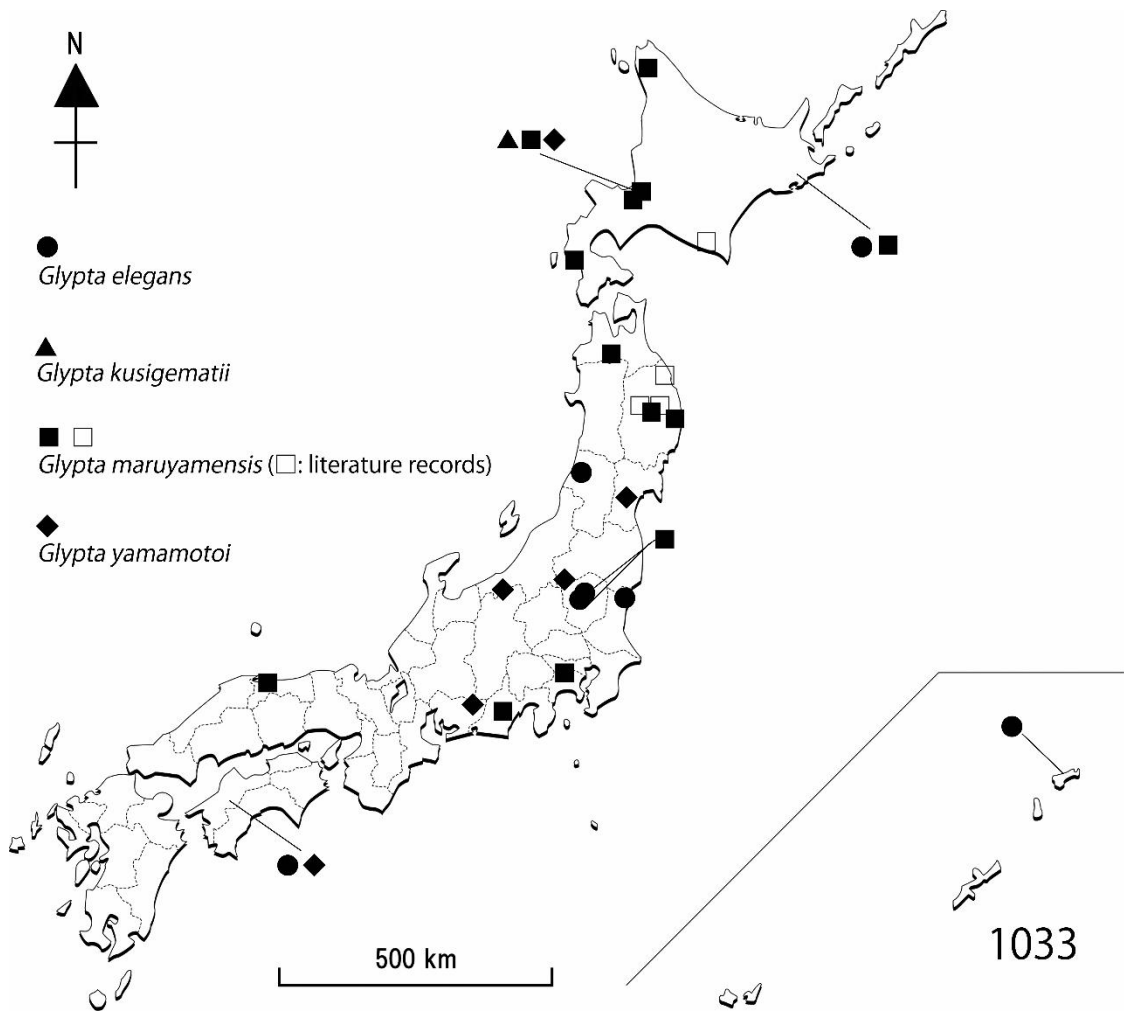


Figure 1033. Distribution of *Glypta elegans* sp. nov., *G. kusigematii* sp. nov., *G. maruyamensis* and *G. yamamotoi* sp. nov.



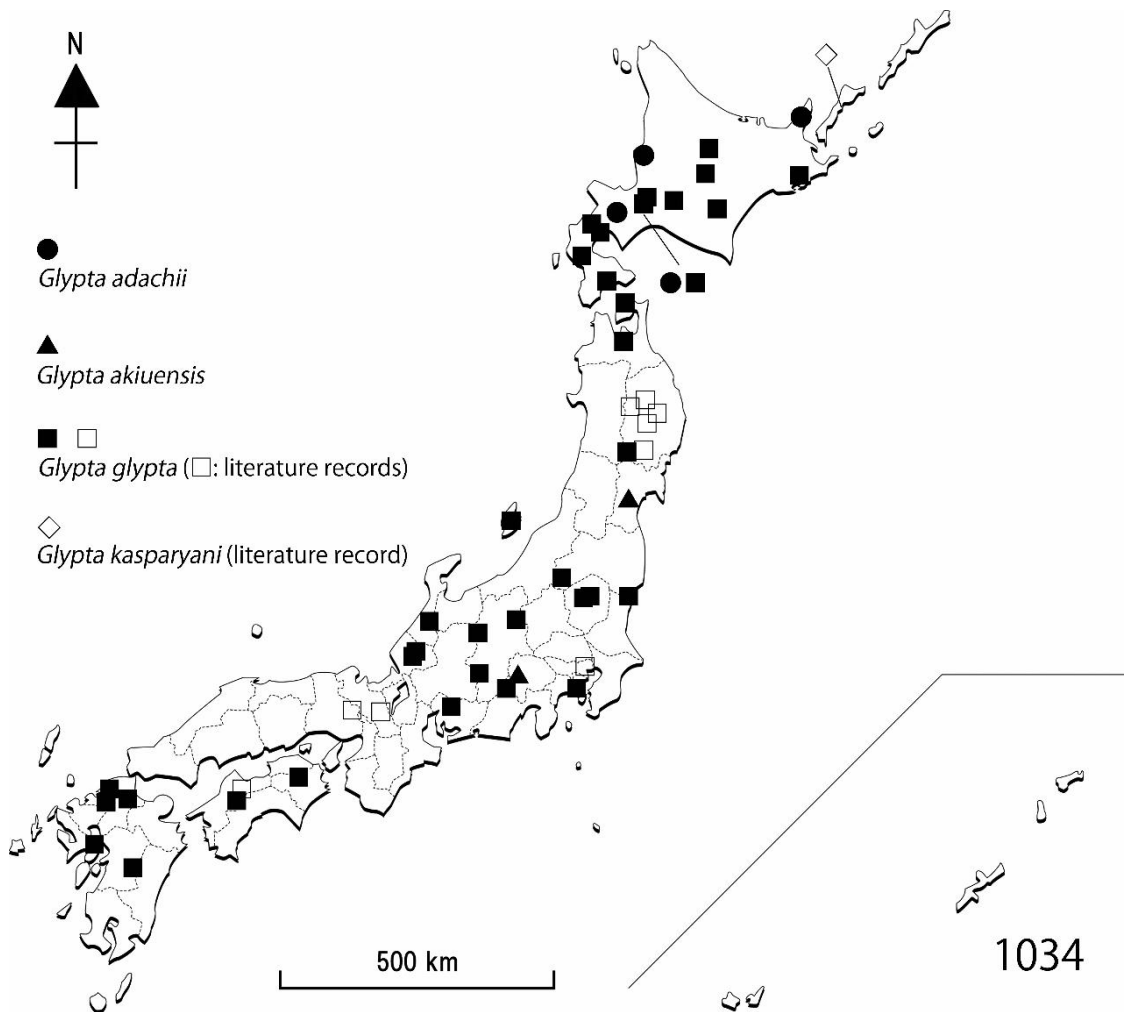


Figure 1034. Distribution of *Glypta adachii*, *G. akiuensis* sp. nov., *G. glypta* and *G. kasparyani*.

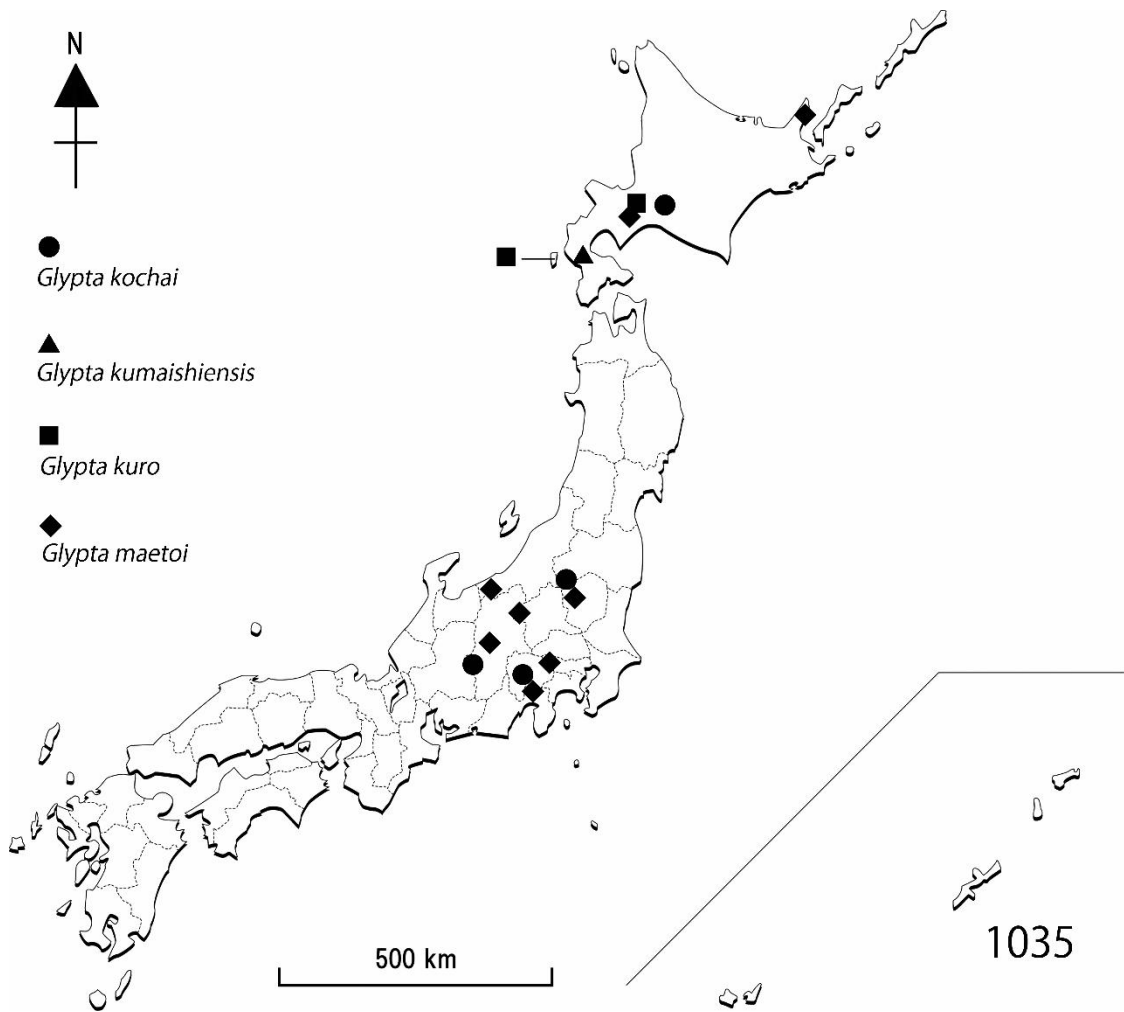


Figure 1035. Distribution of *Glypta kochai* sp. nov., *G. kumaishiensis* sp. nov., *G. kuro* sp. nov. and *G. maetoi* sp. nov.

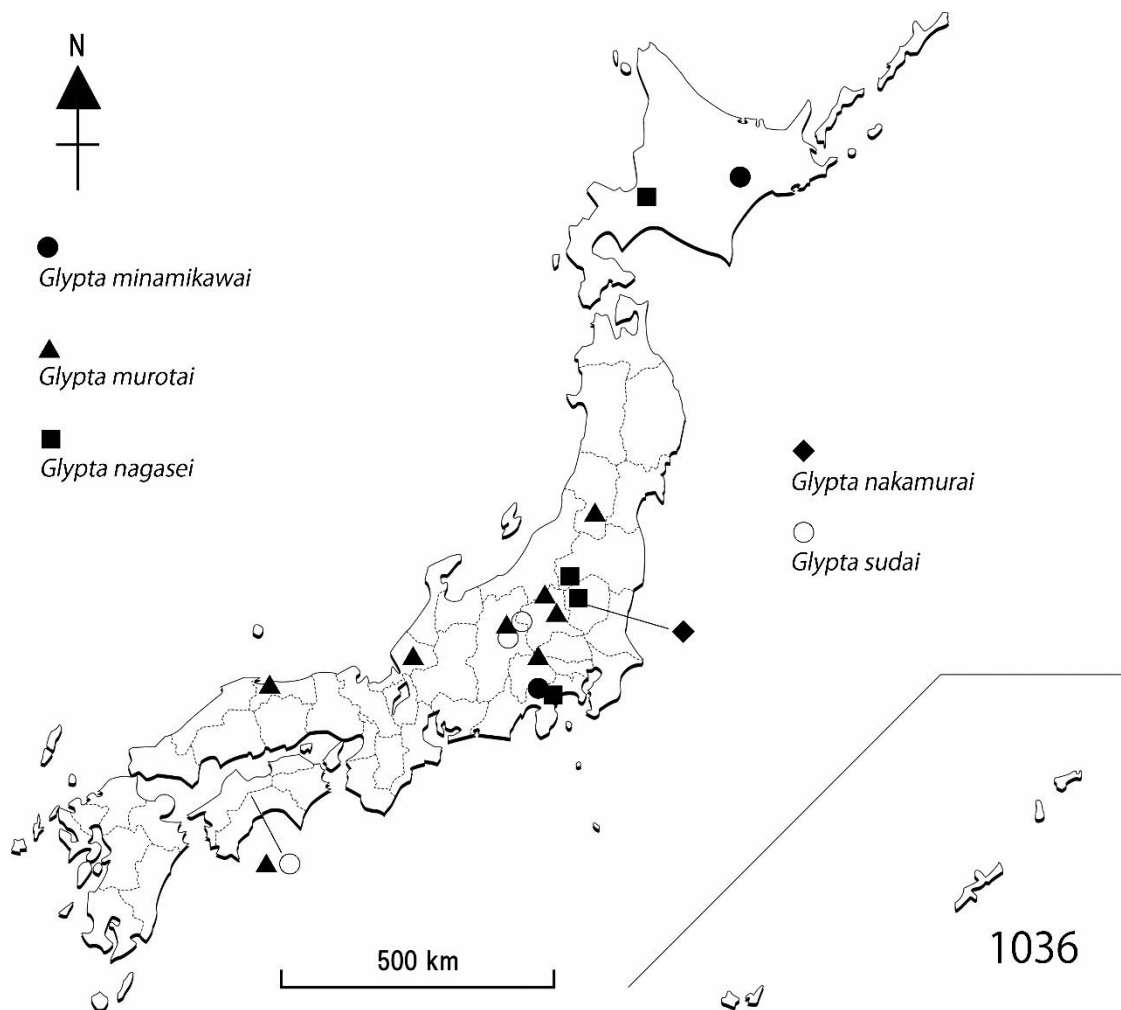


Figure 1036. Distribution of *Glypta minamikawai* sp. nov., *G. murotai* sp. nov., *G. nagasei* sp. nov., *G. nakamurai* sp. nov. and *G. sudai* sp. nov.

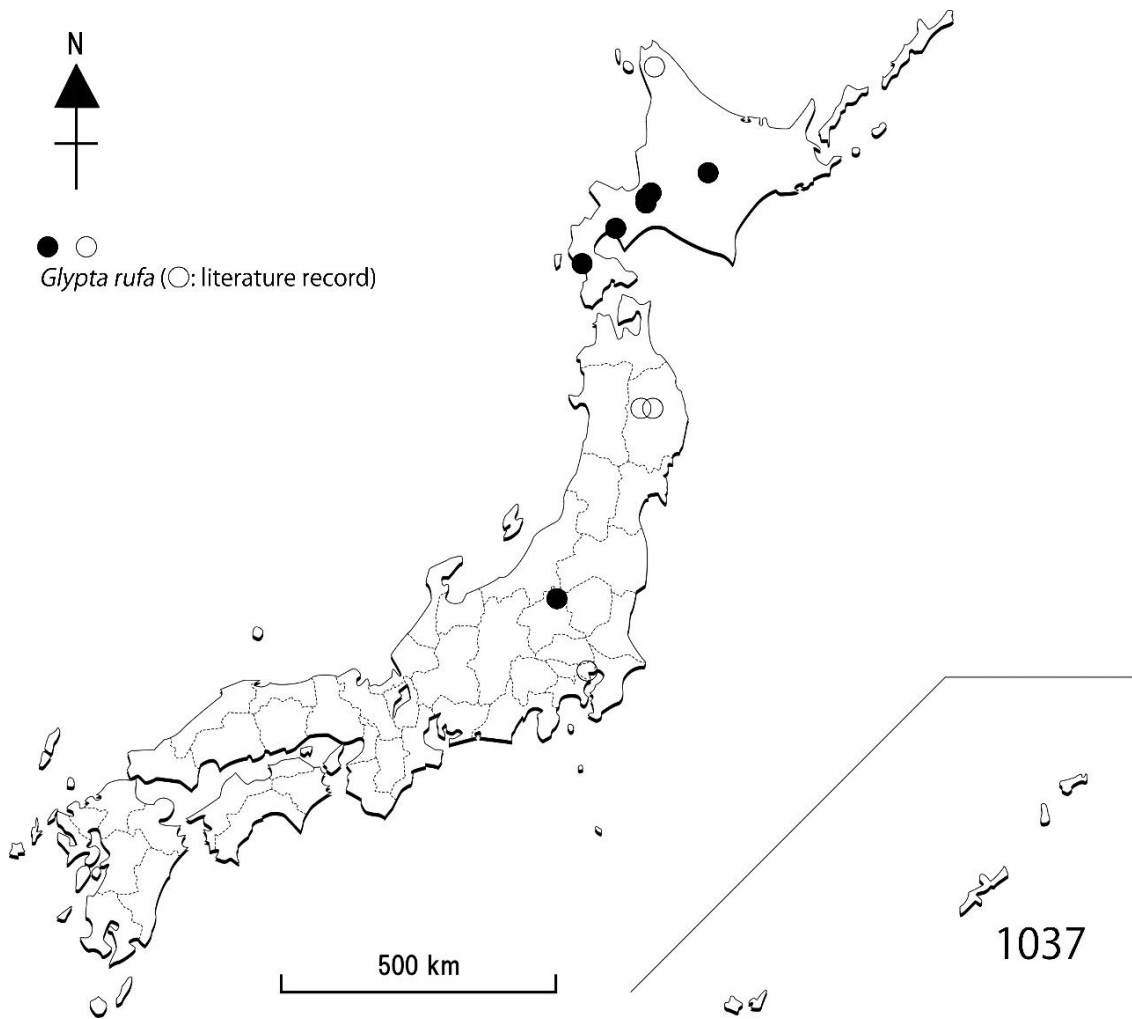


Figure 1037. Distribution of *Glypta rufa*.

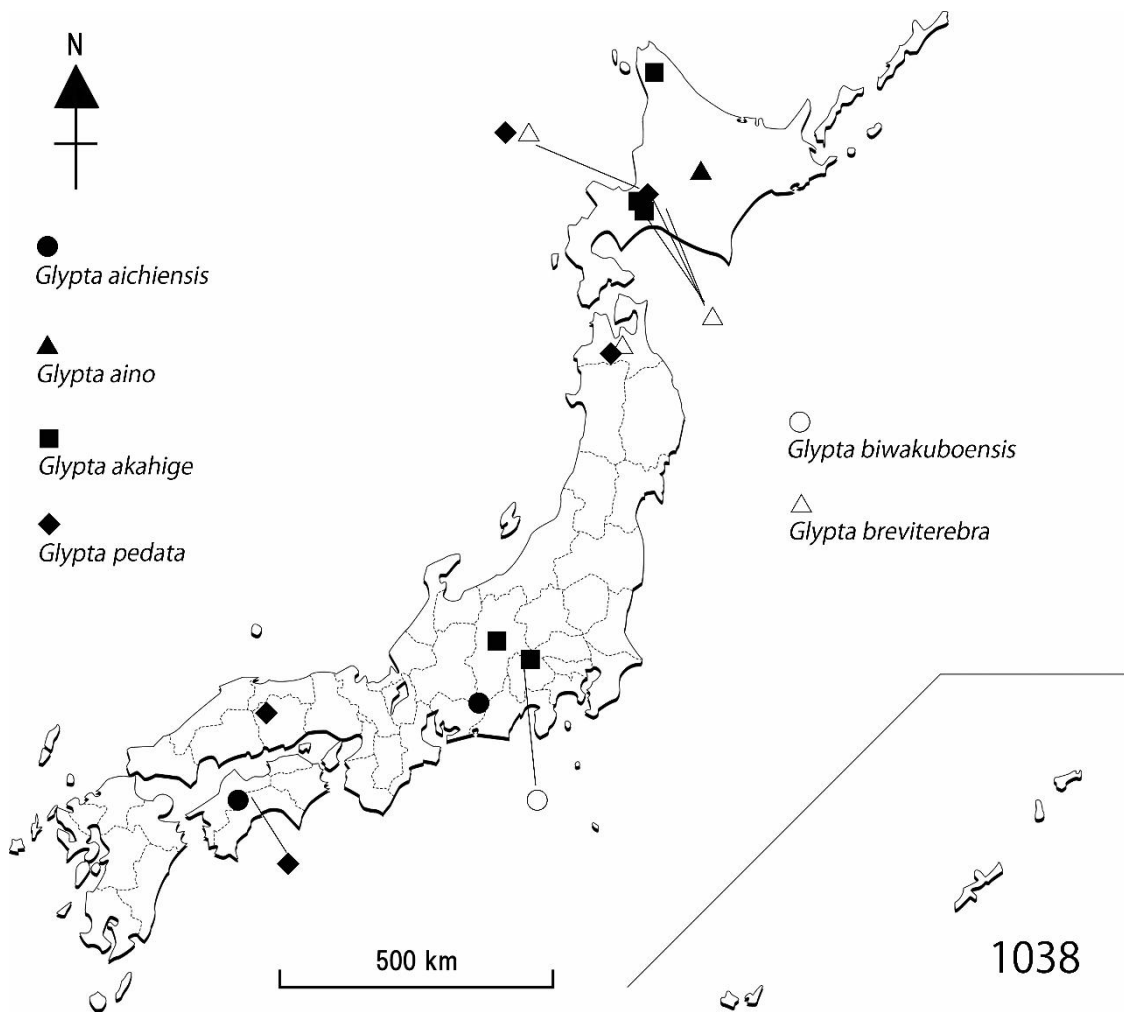


Figure 1038. Distribution of *Glypta aichiensis* sp. nov., *G. aino* sp. nov., *G. akahige* sp. nov., *G. pedata*, *G. biwakuboensis* sp. nov. and *G. breviterebra*.

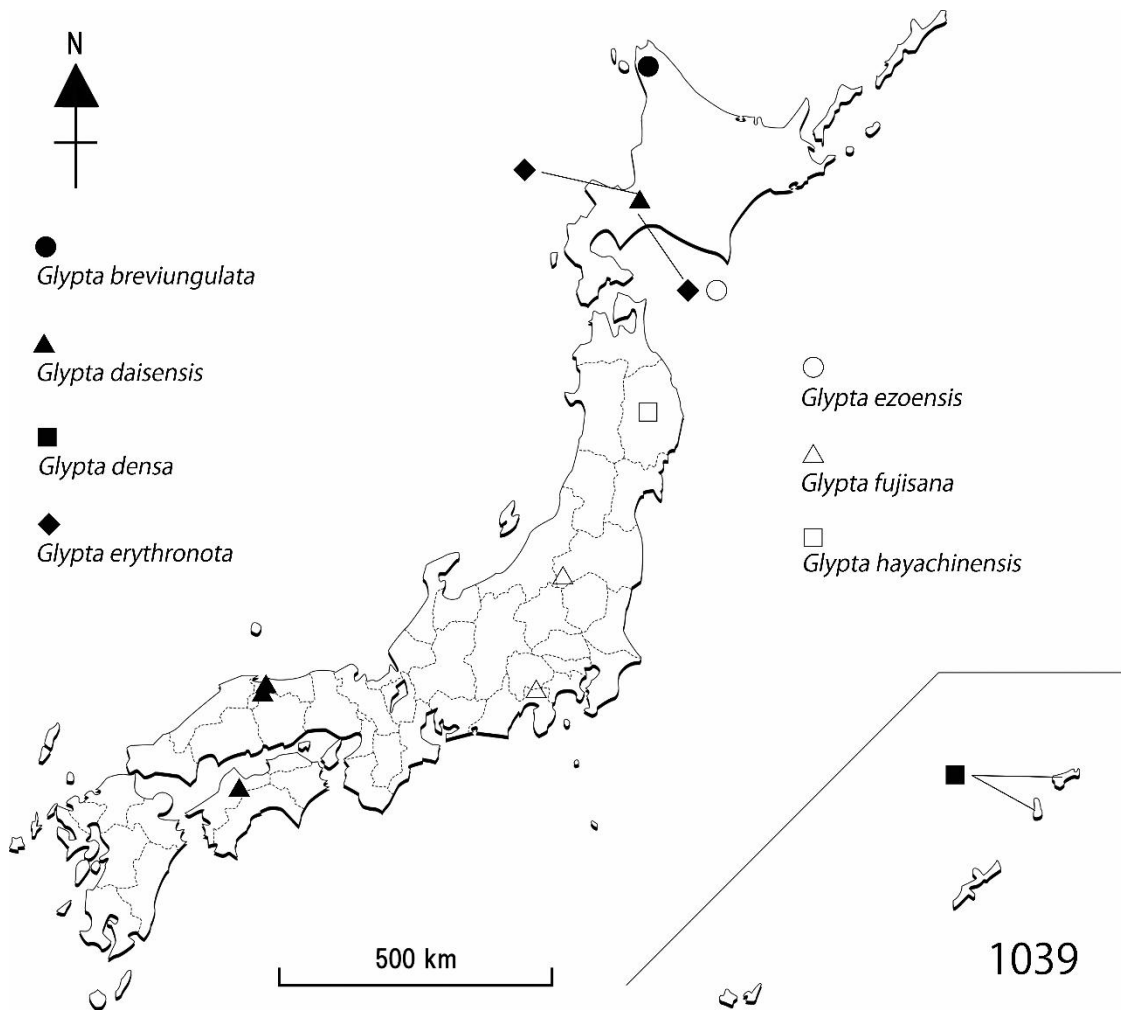


Figure 1039. Distribution of *Glypta breviungulata*, *G. daisensis* sp. nov., *G. densa*, *G. erythronota* sp. nov., *G. ezoensis* sp. nov., *G. fujisana* sp. nov. and *G. hayachinensis* sp. nov.

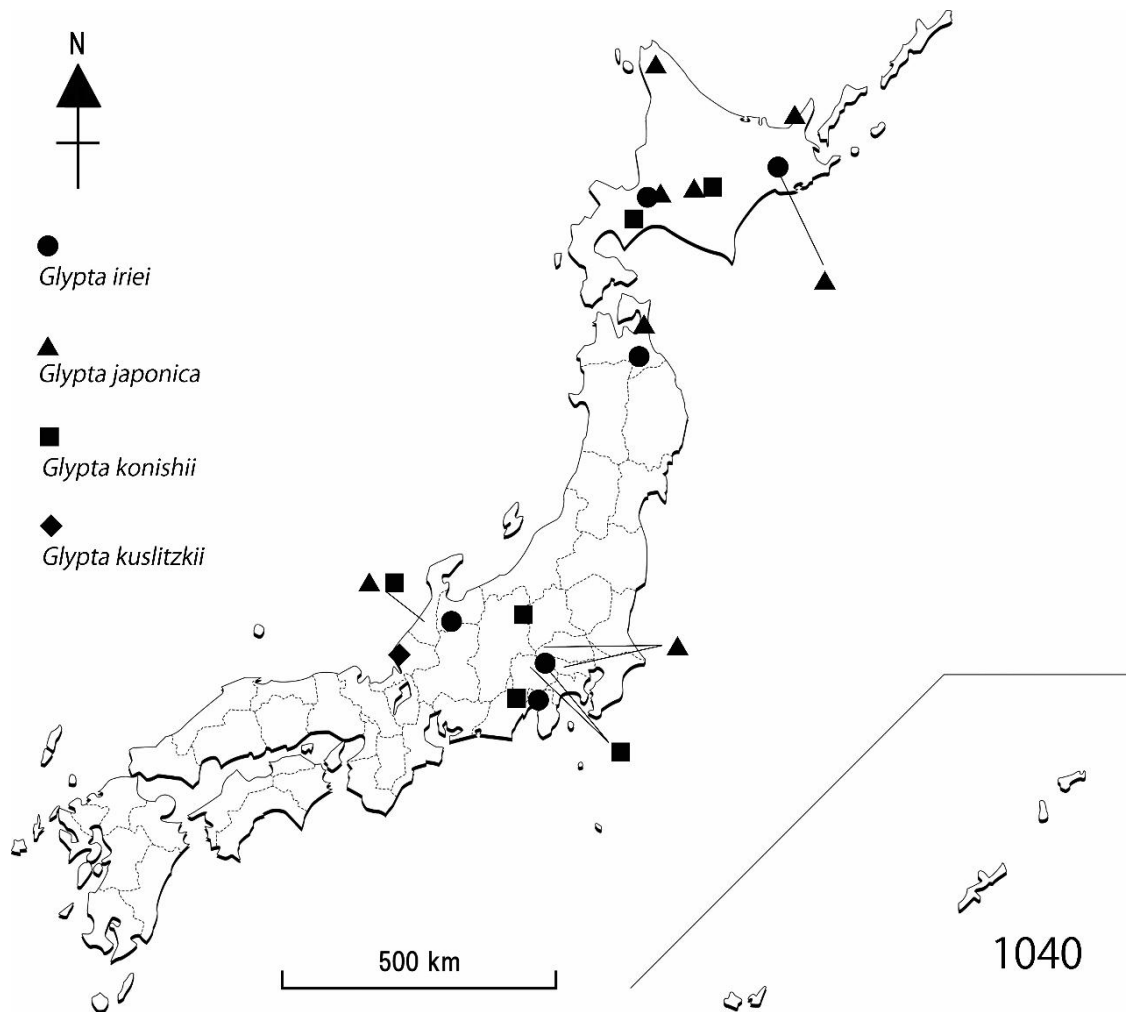


Figure 1040. Distribution of *Glypta iriei* sp. nov., *G. japonica* sp. nov., *G. konishii* sp. nov. and *G. kuslitzkii* sp. nov.

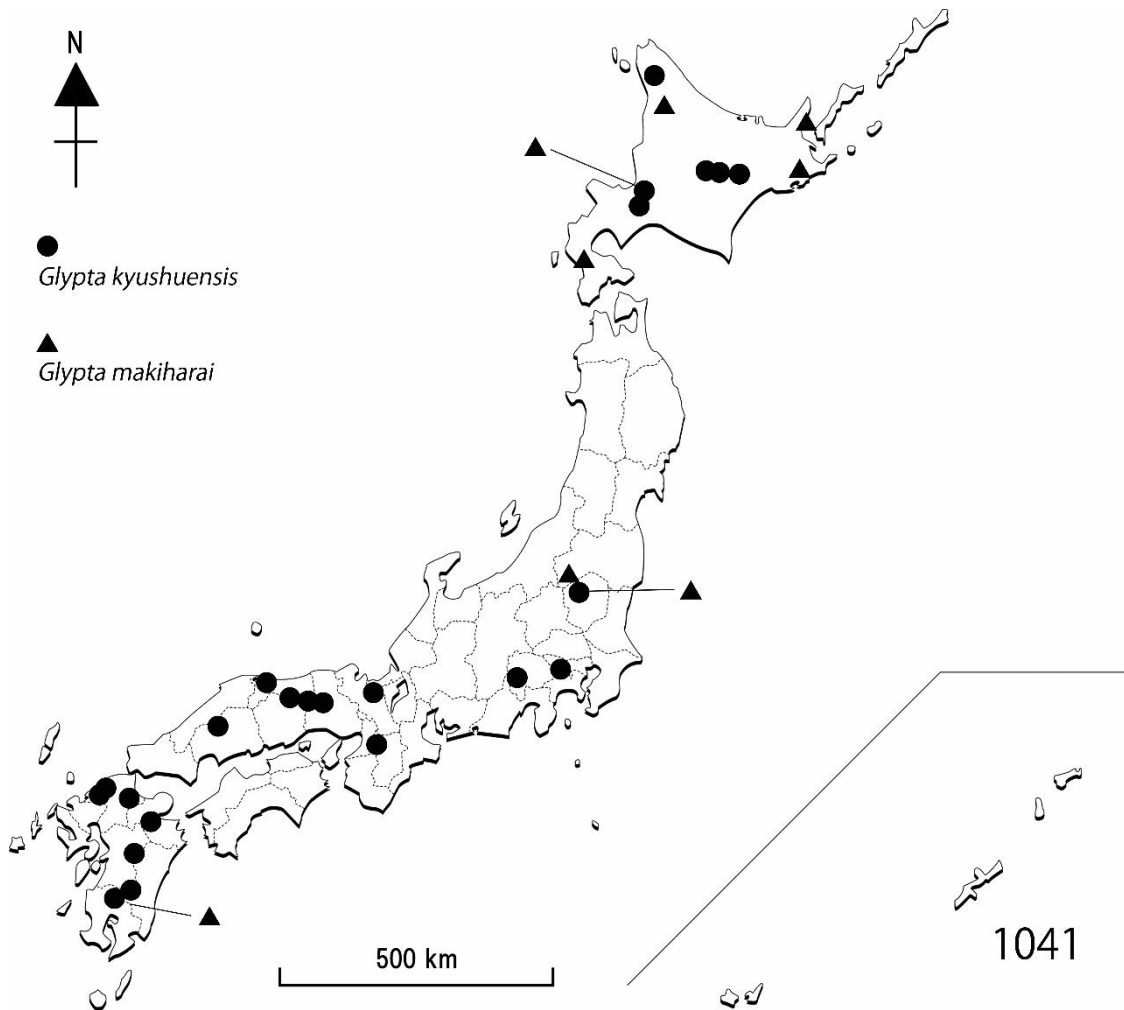


Figure 1041. Distribution of *Glypta kyushuensis* sp. nov. and *G. makiharai* sp. nov.



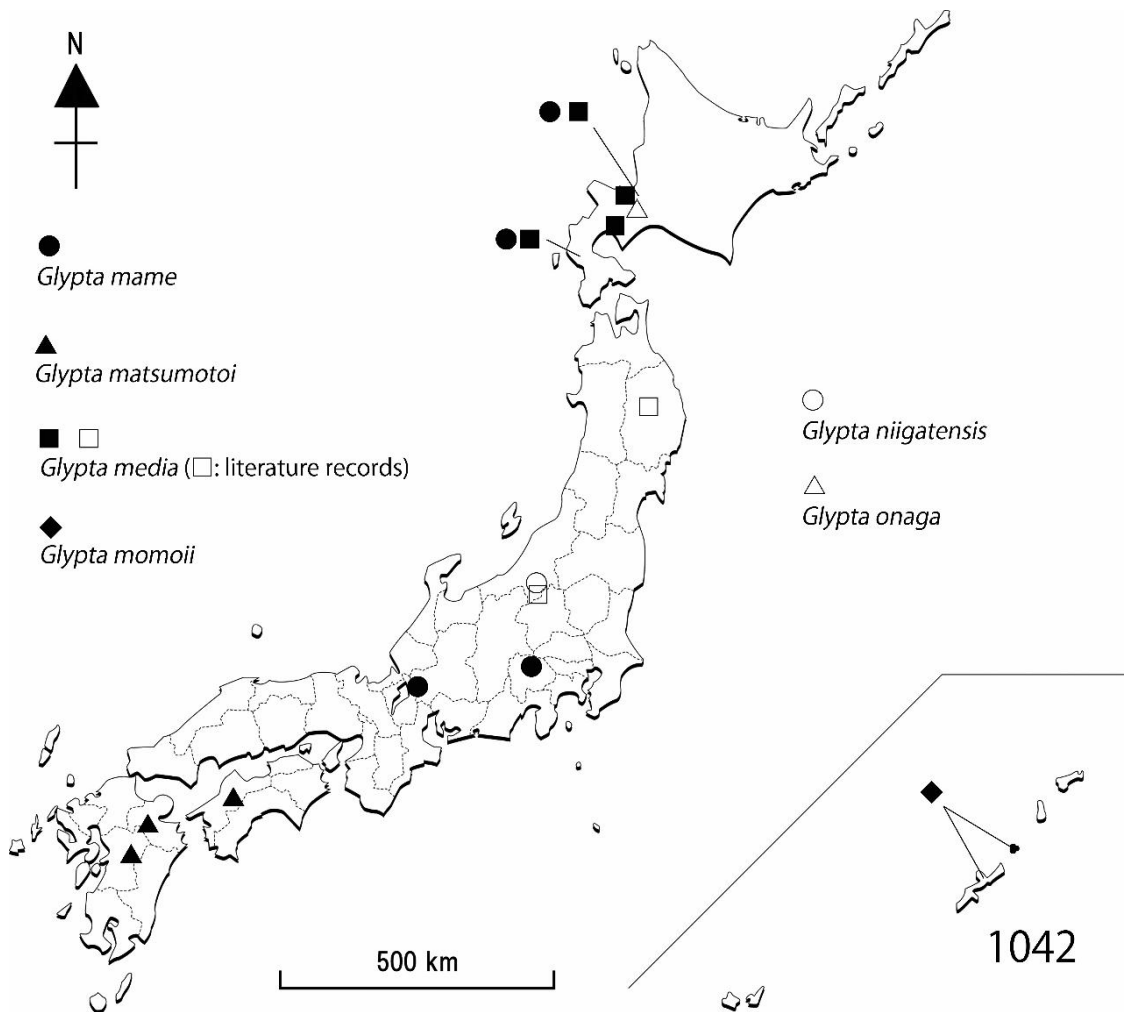


Figure 1042. Distribution of *Glypta mame* sp. nov., *G. matsumotoi* sp. nov., *G. media*, *G. momoii*, *G. niigatensis* sp. nov. and *G. onaga* sp. nov.

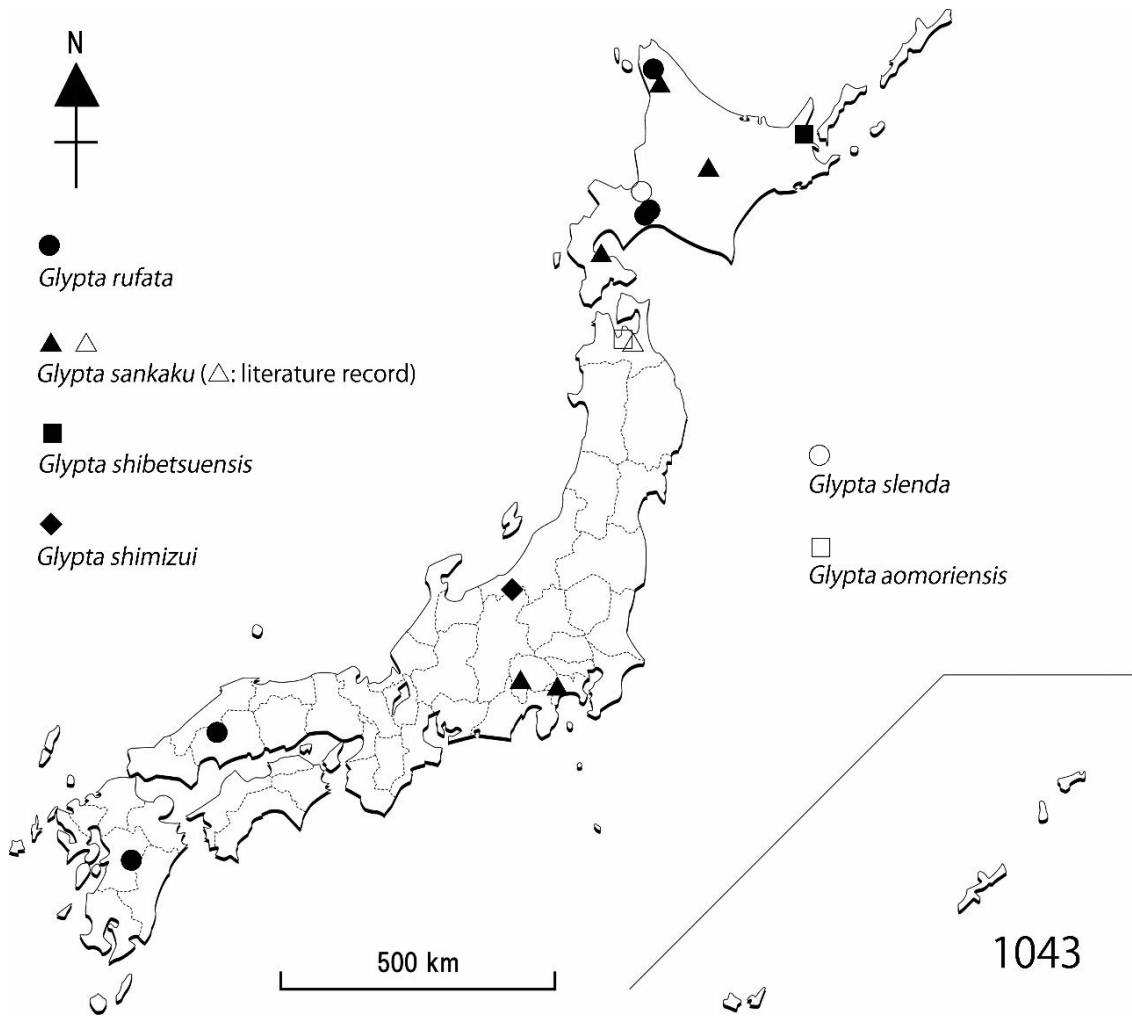


Figure 1043. Distribution of *Glypta rufata*, *G. sankaku*, *G. shibetsuensis* sp. nov., *G. shimizui* sp. nov., *G. slenda* sp. nov. and *G. aomoriensis* sp. nov.

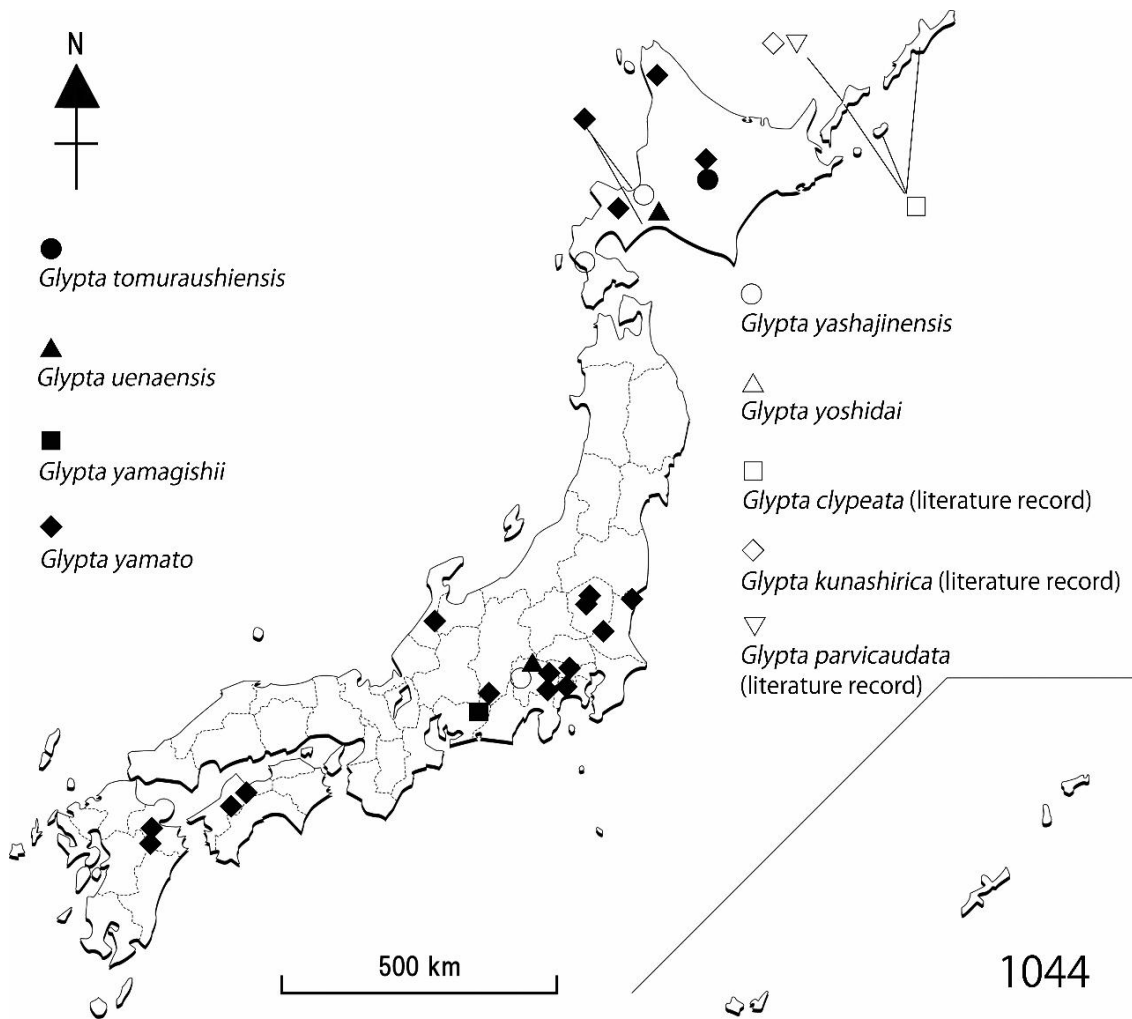


Figure 1044. Distribution of *Glypta tomuraushiensis* sp. nov., *G. uenaensis* sp. nov., *G. yamagishii* sp. nov., *G. yamato* sp. nov., *G. yashajinensis* sp. nov., *G. yoshidai* sp. nov., *G. clypeata*, *G. kunashirica* and *G. parvicaudata*.

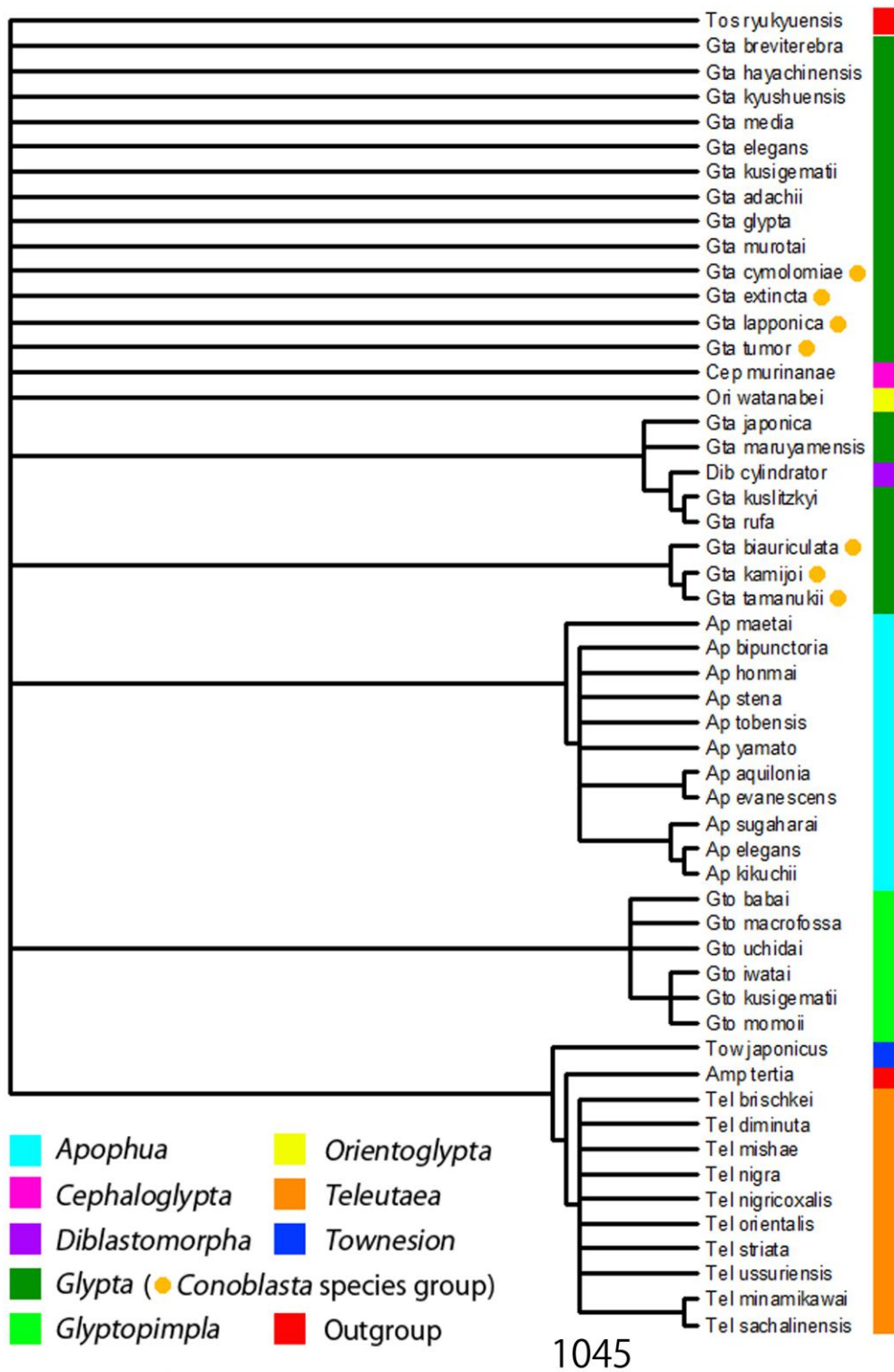


Figure 1045. Strict consensus tree of 752 equally parsimonious trees yielded by the equally weighted parsimony analysis. Gta: *Glypta*, Cep: *Cephaloglypta*, Dib: *Dibrastomorpha*, Ori: *Orientoglypta*, Tow: *Townesion*, Ap: *Apophua*, Gto: *Glyptopimpla*, Tel: *Teleutaea*, Amp: *Amphirhachis* (out group), Tos: *Tossinola* (out group).