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Singular Usage but Multiple Utility: Cycads in Northeastern Arnhem Land, Australia

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1. Introduction

Multiple usefulness of the plant is the focus of this paper, and in fact many plants are useful for human beings in many ways. But when we say that a certain plant is useful, what exactly do we mean by that? When I say 'cycad nut' is useful, what do I mean? When you think of the word 'usefulness', we automatically mean that something is valuable as food or as a tool, in other words, we mean something which has an economical benefit for us. But should usefulness only mean the economic benefit or the value of money? Is this really a self-evident thing? As Ikemoto in this volume pointed out when referring to Amartya Sen's capability approach, utility for human development should not be measured solely in terms of economic value (Ikemoto 2005). If what is valued or regarded as important varies according to the society and situation, then what is a really useful and meaningful plant for the human being?

In this paper I will begin by briefly discussing the various uses of the cycad plant in the world. Then I will look into transforming case and the change of the usage of cycad in Arnhem Land in Australia. In northern Australia where I conducted my research, the usage of the cycad is quite limited. Although cycads are still in use as a food source and seen as quite important for various reasons which I will describe in detail, its usage is quite limited and peculiar. They only use the kernel of seeds and other utilizations are not known. In addition, they are regarded as a delicacy rather than as an emergency provision which is the common usage in the other area. In this paper, I will discuss the use of cycad nuts as a source of carbohydrates in north Australia among hunter-gather people in the coastal semi-tropical area where the traditional food usage using modern equipment is still observed. Although large changes in lifestyle and diet have occurred since the contact with European society which started from the beginning of the 20th century, people still place emphasis on the traditional way of life and its values. In Australia, the cycad nut, because of its unique poisonous characteristic, has been a substantial subject of interest for archaeologists and anthropologists alike. I will explore the peculiarities of its use among Aboriginal people and also the changes and its impact on their society. Then, after this description and comparison, the 'multiple usefulness' of cycads will be examined in particular.

2. Cycad Use in the World

Cycads have been identified as an important food resource for a number of traditional societies in the world in tropical and sub-tropical zones. All cycads are part of a single family, *Cycadaceae*, with nine genera (*Cycad*, *Encephalartos*, *Stangeria*, *Bowenia*, *Macrozamia*, *Ceratozamia*, *Dioon*, *Microcycas* and *Zamia*) and about 100 species (Thieret 1957).

They are used mainly as a source of food starch - a kind of carbohydrate, either from the seeds or stems. They are particularly important as a source of sustenance during famines, or in areas where food sources are limited. In Amami-Oshima in Japan, for example, it was an important source of food especially when other crops failed because of drought, floods or typhoon damage (Thieret 1957).

Starch derived from the stems of cycads often referred as sago or arrow root and is the main diet in places as diverse as New Caledonia, Timor, Indo-China, Malaya, Amami-Oshima, Ryukyu, India, Burma, Fiji, Solomons, Mariana, Guam, Colombia, Mexico, East Africa, Florida and in Madagascar. Seeds are eaten in Andaman Islands, New Caledonia, Fiji, Singhalese in India, Java, Guam, Comoro Islands, among others. And the starch was even brewed into sake in the Ryukyu area, known as 'doku zake (poisonous sake)' locally as sometimes people become ill by drinking them.

Beside the use of cycads as a food source, various uses of the plant have been reported. They are utilized as gum yielder in Australia, are also known to contain oil, which was said to have been used in Okinawa during the food crisis during the WWII. They are cultivated as horticultural plants, fiber (fluff from the base of leaves) are used for stuffing of pillows or woven into various utensils. The export of the leaves for decorative materials to the United States was once an important industry in the Okinawan area (Thieret 1957). In Asian countries, wood is valued for the manufacture of boxes or plates. In the Ryukyu islands, the leaves of cycads were used as fertilizer for rice and sugar cane.

The medical uses of the cycad are also widely known. In Cambodia it is used as dressing for wounds (the mucilaginous terminal bud is used), in India as anodyne (male cone scales). In Whiting's paper at least 33 different external uses as medicine are reported (Whiting 1963). The medical utilization of cycad has also been reported in Dominica, India, Cuba, Mexico, Indonesia, Guam, Manus, the Philippines, Indochina, China, Guatemala, Malaya, Ryukyu, Amami-Oshima, Madagascar, and Venezuela. Followings are some of the common uses of the cycad in folk medicine. Tea and beverage extracts from the nut are prescribed as purges, pin depressants, and emmenagogues. The grated fresh seed is recommended as an external remedy. They are good for the removal of old scars, as styptic, and for insect and snake bites and boils. Their effectiveness has yet to be explained by any pharmacological or chemical research (Whiting 1963).

As the above description shows, multiple usages of cycads are known in the various parts of the world.

3. Cycad Use in Australia

In northern Australia, cycads (*Cycad armstrongi* and *Cycad media*) are known to have been used by Aboriginal people as a food source for a long time. In southern parts of Australia, it is said that *Macrozamia* was in use. Both genera were found in various archaeological sites in Australia, dating back to at least 4300 years ago (Beaton 1977). In the southern part, most of the Aboriginal people ceased to use those food sources long time ago, but in the northern part of the continent some of them still in use. This is due to the difference of historical experiences. In the south, white settlement began in the 1800s, and traditional Aboriginal life has changed rapidly since then. Whereas in the north, contact with the white population started only in the beginning of the 20th century.

In Australia there has been no deliberate activity to increase the productivity of the plant. As cycads grow wild in groves, it is assumed that collection is convenient, but it is not known if any kind of initiative procedure has been taken for its propagation. The only possible measure known is fire. It is a widely known in Australia that Aboriginal people use fire actively and strategically in the bush. They set fire to the bush intentionally at the end of the rainy season. They say that they 'clean' the bush by using fire. Actually it is very difficult to walk around the bush for hunting when the area is not burnt for a long time. Once burnt, many plants are regenerated and it is easy to walk and find the food which you are after. As a result of long burning tradition, many of the plants in Australian bush have adapted to fire, and some of them even need fire to regenerate. Use of the bush fire is still an ordinary act in northern Australia. It used to be seen as an irrational act of savages by white Australians and they often prohibited them from using the technique. But now many archaeologists recognize its strategic use and have named it 'fire-stick farming' (Jones 1968). With the particular reference to cycads, the differences in productivity between 'natural' and fire-managed groves can only be crudely estimated, burnt groves being slightly more productive. Beaton suggested that 'the fire might tend to synchronize seed production' (Beaton 1982).

High toxicity is a unique trait of cycads. Ethno-historical and ethnological studies show that Australian Aboriginal people had been using both fire and water in a complex way to detoxify the cycad nuts. Several different methods of detoxification have been reported by several researchers (Harvey 1945, Beaton 1982, etc). The preservative nature of cycads has also been noted. It is worth emphasizing that it is a very rare food in the Aboriginal diet which can be intentionally preserved for long time (Harvey 1945).

1) *The Treatment and Use of Cycad Nuts*

In the coastal area of northeastern Arnhem Land, Aboriginal people use *Cycads armstorongi* as a food source. The fern-like plants, about 1.5-2 meters high, grow in the bush in groves. Usually 20 to 30 nuts, the size of ping-pong balls, form at the root of the crown. Fruit season lasts from July to December.



Photo 1. The town is surrounded by the bush. The cycad grows in grove in the bush.

As mentioned earlier, cycads have a toxic nature, methylazoxymethanol (MAM) (Whiting 1963). It has to be removed in order to be used as food. Elimination of poison from cycad nuts in the course of food preparation is an essential and complicated procedure. So the process of the food preparation of cycad nuts is lengthy and entails accumulated knowledge. Aboriginal people are very familiar with its toxic nature. The following procedure, according to my own observation and other literature, is common in the area (Meeham & Jones 1977); (1) collect ripe seeds, (2) remove and discard the fleshy husk and inner seed court, (3) dissect seeds (crush seeds), (4) leave seeds in water, (5) grind the seeds into paste, and (6) roast.



Photo 2. The cycad tree (*Cycad armstorongi*)

The following are details of the procedure that I observed in 1987 in northeastern Arnhem Land.

(1) Baniya, a senior woman in her 60s then, who has extensive knowledge about the natural fauna and flora and its use decided to show me the procedure of making *warraga*, a cycad cake upon my request. With Baniya and other three women and children, we drove into the bush by truck. Cycads are found in groves and we stopped at a particular area according to Baniya's direction. Women spread out and started collecting seeds. The collection is a rather easy job, as the nuts grow to human height, and are picked by hand. One record reports that 13 kg of cycad nuts were found in the 10m by 20m grove. On that day, a group of women of four (including me) stayed there for about 2 hours and collected two bags of nuts. The bag is about 50cm by 100cm large.



Photo 3. Collected cycad seeds

In the course of the collection, Baniya sometimes picked up old seeds on the ground, saying that they were over one year old, cracked them open and ate the seeds as is. She said that the toxins have been removed by fire. Beck reported that in their study of the area not far from my site, this was the more common way to eat cycads than processing newly picked nuts. In the same paper, the toxin of the old nuts was examined and reported that they were detoxified (Beck et al. 1988). But in my observations, Baniya was the only person who did so, and told me that you have to be '*maranggi* (knowledgeable)' to do so.

(2) On the next day of the collection, in front of the house in the town, the procedure of the de-husking of seeds began. Using stones, wood, steel or whatever was available around the house, women de-husked the individual nuts. Each nut is placed by the left hand on a flat board or a rock and hit by the utensil to break open. Baniya who is in charge of the whole procedure, occasionally helped by other women, mainly did the work. Two girls in the family aged 8 and 10 respectively, mostly interested because of my presence, also helped sometimes. The fresh husk is about 3 mm thick. After de-husking, the thin brown coat of the kernel is removed to get a white kernel. As they have to de-husk the seed one by one, the procedure is quite time consuming. Baniya did the



Photo 4. Women de-husk the seeds in front of the house in the town.

most of the job, and she had to spend four days almost exclusively for this. During the whole procedure, she was quite concerned with washing her hands after the job. Especially when the children or I were helping, she brought us to the tap after the job, gave us soap, which is a very rare thing to see in their house, and ordered us to wash our hands thoroughly, which all the women did as well. It shows their common knowledge of the toxic nature of the plant.

(3) On the eighth day, a few days after finishing de-husking, a group of women including Baniya and the children drove to the seashore, which is about a 15 minute drive from the town. They brought the big bag of de-husked nuts with them, and they started to crush the de-husked nuts slightly using stones. Baniya told me that the nuts have to be dried a bit before this procedure. It took one whole day by four women to finish crushing. And in the course of it, Baniya ordered the other women to check for nuts which were either too dry or not dry enough, which were then separated from the pile of the nuts and later discarded.

(4) The next day, Baniya told me to drive. We drove into the bush with the bag of nuts for about 20 minutes, found a spring not so far from the sea. The natural spring with drinkable water was about 1 meter in diameter and about 2-3 meter deep. She put the bag into this spring and left it.

(5) After 6 days, we drove back to the spring. The spring was full of white bubbles, and when Baniya took out the bag it smelled strongly of ammonia. She said the nuts had released the poison. She checked the nuts by tasting a bit, and said it was all right. If it had not been all right, she said that she would have put the bag back into the spring and left it for a few more days. She also told me that they wouldn't use the spring until the next year after the big wet (the rainy season) washes out the water.

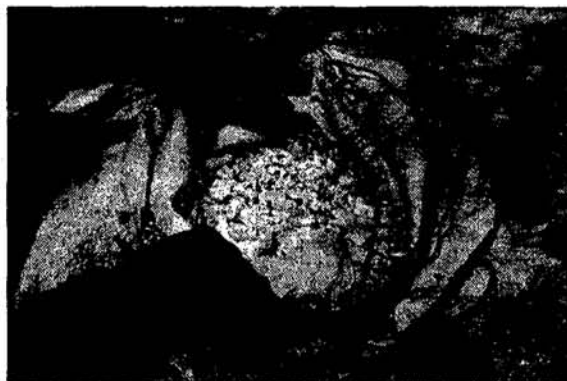


Photo 5. After soaking the crushed nuts, nuts have released the poison.

(6) The next day, we drove to a different seashore about 10 minutes away from the township. Members of the group included Baniya, three women and I, and no children. They put the seeds into a bucket containing water, squeezed out a handful with their hands and placed them onto a flat stone, and then ground them with another stone. Women used special stone tools, which had been left at the site. Obviously, the site was used for the same purpose before, and the tools were left there intentionally. The flat stone is about 40cm in diameter, has a slight depression in the center, and the grinding stone is ellipse-shaped (egg-shaped) and about 30cm wide. They sit in front of the flat stone and move the grinding stone back and fourth on the flat stone by hands, grinding the nuts into paste. They took turns grinding the seeds, as it is quite exhausting job.



Photo 6. Women take turn to grind nuts into paste.

After about an hour of grinding, one of the women started to gather a lot of logs and sticks and started a large fire using old fire place not too far away. Baniya took out a bundle of about 20 cycad nuts which were set separate from other crushed nuts. I did not realize it then but apparently, Baniya put this paper bark bundle in the big bag when they put it in the spring. She put the bundle into the sand under the fire. After 20 minutes or so, she took it out and the people present shared them while working. It tastes like chestnuts.



Photo 7. They make the bundles of cycad paste with paper bark, bake them under the hot ash.

After about 4 hours of the grinding, they put the grinded paste on the sheet

of paper bark. The paper bark tree is the local and common eucalyptus tree grows in the swampy area. Its bark is widely utilized as various utensils. They wrapped it into a bundle and tied it up with string made from pandanus leaves. The bundle is about 30 cm long, 15 cm wide. They put the 4 bundles into the ash of the fire. It took about an hour to bake. They continued the procedure and baked 8 bundles of cycad nut loaves that day. The next day, they continued the same procedure again and finished 12 bundles altogether. In the end, the whole procedure of making cycad loaf took 16 days, and a total of 19 man-days.

2) *Other Important Uses of Cycads*

In Aboriginal society, great significance is placed on spiritual life. Patrilineal clans which is the basic groupings of their social organization, own individual creation stories and it is the body of ownership of the songs, dances, paintings and symbols concerning creation stories and rituals. These creation stories and the ceremonies have crucial importance in their life. In the ceremonies they enact the travels and the occurrences of the creation stories. They place a big emphasis on the ceremonies. These creation stories, rituals and music and paintings are owned by each clan and are regarded as the essential core of their culture. It is said that cycad have several important roles in these important ceremonies as well as the practical value.

Firstly, the cycad is a convenient food for the time of ceremony. As so many people get together for the big ritual for sometimes over a month, it is difficult to feed all the people. But with this bread, which keeps for a long time, it is possible to prepare in advance and keep them for the ceremony.

The preservative nature of cycads is recognized and regarded highly by Aboriginal people. It is not known, however, if it is ever stored for famines or whether groves are reserved for cases of emergency. They do not regard it as a form of subsistence food but prefer to treat it as a delicacy. Instead, the preservative nature of the food is utilized for large gatherings such as rituals, which may lead to food shortages. For the important rituals, many people gather at one place from great distances. Food shortages happen on those occasions are caused by social and cultural activities, not by natural disasters.

I am not sure about to what extent they actually prepare or store the bread for the in-coming people. It seems a very labor-intensive food to support a population with. But it is true that during ceremonies, food shortages often occur. When I was attending a funeral ceremony in 1990, there was tension between the several clans concerning the person's death, which is a quite common occurrence at ceremonies where people from many different clans get together. Because of that, it was very difficult for us visitors, to go hunting in the daytime or even move around the camp freely. As a result, we ran out of food like other visiting clans. We hardly had anything to eat for the last 2 days of the funeral.

Secondly, the cycad is one of the main 'dreamings,' or the totem of creation stories. Cycads are said to have been found and collected by the female creation ancestor in their creation story. In a particular ritual, they sing and dance for this ancestral woman. Because of this connection, the cycad loaf has important mythological symbolism. In *Yolngu* society, each patri-lineal clan owns creation stories about the origin of the clan and their land. The main characters of their creation stories are called 'dreamings'. 'Dreamings' vary according to clans, some are animals such as the crocodile, the kangaroo, the shark, various kinds of fish and birds and insects. Others are trees, plants, and particular rocks, places and even features of the climate. The cycad is the one of them. It is the dreaming of the *Wangurri* clan and *Gumatji* clan. These clans have special rights to dances, music and paintings of the cycad tree, cycad nuts, and cycad loaf. Their ceremony uses the cycad loaf most often.

Thirdly, cycad is a symbolically important food for the secret-sacred ceremonies, such as *Kunapipi*. Not only is the cycad is one of the main 'dreamings' mentioned in the stories, it is used as the symbolic food of the ceremony. For example in the *Kunapipi* ceremony, young boys who underwent circumcisions in the previous year, are treated as novices and undergo a special procedure. Women make the loaf of cycad nuts for the last day of this ceremony. Men take the loaf to the men's segregated ceremonial ground and 'sing' for it with 'big (sacred-secret) name'. By doing so, the cycad bread is turned into a very sacred and powerful food. Then men eat the bread communally. Although the senior men in the ceremony eat the bread, it is understood that it is the ancestral woman who eats it. After eating the bread, men return to the women's public ground and announce, 'The ancestral woman ate the bread, she ate too much, felt full and vomited the novices (boys) that she swallowed.' Novices painted up in red ochre are then taken back to the public camp (Warner 1958). They give important and symbolic meaning to cycads by emphasizing its mythological nature and making it into sacred food to symbolize the end of the ceremony. It is reported that in the central Arnhem area, women and uncircumcised children are prohibited from eating them as they are regarded as mythologically sacred (Issacs 1987).

Lastly, the importance of cycad for their society can also be seen from the detailed variety of their names. The most common word for the cycad tree, nuts and bread is *warraga*. There are other names; *ngathu*, *dingu*, *dhumal maapikani*. The trunk is called *baang*, the male cone is called *gutkut*, and leaves are *madakani*. The nuts are called *ngalkarang*, the internal kernel is *dhorrang*, soaked nuts are called *lami*. Also, the cooked bread is named differently according to size. The largest one is *bukulumbak*, the long loaf is *ngurrumirr*, and the small loaf is *balayin*.

4. Changes in the Use of Cycads

In a case I observed and described in section 3, loaves of cycad cakes were made upon my request, and they were not connected to any ritual. In fact, cycad is not a

daily food anymore in the area. Although people enjoy eating it and although it is very popular, many women say that they do not know how to prepare cycad loaves. Baniya told me that she would send one loaf over to her relatives living in the next community about 50 km away. This shows that cycad loaf is now a novelty.

Christian missionaries established settlements in this area in the 1920s. The central settlement of my research area was established in 1942. Since then, Aboriginal people started to be commodified gradually. Especially since the 1970s, when Aboriginal people started to get cash directly from the government, the cash economy has had a big influence on them. A big supermarket was built in the township and basic food is readily available in the shop.



Photo 8. The town established by the mission has developed and equipped with modern facilities.

As I already mentioned briefly, the traditional use of plants in Arnhem is declining rapidly. Wild flora, such as tubers, nuts, and fruits which are abundant in the bush, are no longer part of everyday diet. Although they gather them and eat them from time to time, normally they eat bread or damper made from flour purchased in the shop. Even in ceremonial situations where they need communal eating of cycad, they say that they seldom eat real cycad. Instead, they eat damper made from store-bought flour. It is important to note that they still call this bread as *warraga*, (cycad loaf bread).

With the introduction of market food and modern equipment, traditional food gathering has changed (Altman 1984). Altman examined this and pointed that whereas the hunting of the wild animals has increased because of modern equipment, the use of wild plants has declined and been replaced by flour purchased at the store. But according to my observation, women's gathering did not decline altogether. The gathering of shellfish, eggs, reptiles, and fish by women is still very much practiced, and may have increased as much as men's hunting activities. Only the utilization of plants has declined specifically. The main reason for this decline, from my perspective, is due to the time- and labor-consuming nature of the processing of wild plants. According to my rough calculations, whereas making cycad loaves needed a total number of 19 man-days, the damper needed only half of man-day, that is 2 to 3 hours.

5. Conclusion

From the above examination, two important features of the cycad usage in Australia can be pointed out. First, Aboriginal use of cycads is rather limited compared to other parts of the world. Although they are highly appreciated as food, its use is limited

to nuts only, and they do not utilize any other part as food at all. Other uses besides food are not known. They do not use the trunk or leaves. Medical uses widely seen throughout the world are not known. They do not produce any materials from cycads. Although its preservative nature is known, it is only used for special social occasions. It is not prepared for the times of crisis and it is not recognized as an emergency plant. In other words, they only use cycad nuts on a daily basis.

Second, there is a special symbolic importance place upon the cycad nut in Aboriginal society. Although the utilization of the plants as practical purpose is limited, its symbolic importance related to the creation story is quite rich. They make the bread especially for the ceremony, and give it mythological importance and by communal consumption at the end of the ceremony as sacrament. Cycad is also one of the 'dreamings,' the main characters of the creation stories which are owned by the clans. Cycad the natural plant, food and medical resource, is turned into the culturally significant symbol which can be called a cultural resource in Australia.

After social changes, especially due to the introduction of a cash economy, Aboriginal usage of wild plants including cycads have changed drastically. The single practical usage of the plant, cycad bread, is now almost lost. Though, the spiritual and symbolical feature is continuing strongly. Cycad loaf is no longer used as sacrament in ceremonies, but flour bread has replaced *warraga* (cycad bread) so the symbolic importance of cycad is being kept. As we have seen with the terminology, the detailed knowledge about cycad is also kept. The practices concerning cycad as one of the 'dreamings' are continued very strongly in ceremonies and at various special occasions. Its social and cultural importance remains and functions as the cultural core very strongly. Although cycads are not economically significant in their daily life anymore, they have been placed quite rich spiritual importance and especially so in the ceremonial settings. In other words, the second feature of the cycad usage is continuing strongly.

The practical multiple use of cycads as a natural resource which was common in the world was not found in Australia, they are not used for multiple economical purposes. And the single practical and economical usage have been lost after the social changes. But this does not mean that the cycad is not useful. On the contrary, it is a crucially important plant especially in mythology and as a central aspect of their culture. In Aboriginal society, cycad has possessed multiple layers of symbolic meaning for a long time. Most importantly, even after great economic changes, even when the practical usage was lost, these symbolic multiple layers of spiritual importance continued. And it is also important that it may, in the future, function as the core of their cultural identity. In this sense, the cycad maintains a real utility for the richness of their culture even if it does not have economical value.

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