

FOODWAYS IN THE MARIANA ISLANDS: A LOOK AT THE PRE-CONTACT PERIOD

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ABSTRACT

The historic literature contains considerable information about subsistence strategies in the Mariana Islands just after European Contact in 1521. Drawing from these accounts, historic food resources and food-related behaviors are described as they provide a basis for making inferences about past subsistence activities. Unpublished archaeological and palynological reports and published articles provide information about pre-Contact exploitation of marine and terrestrial animal resources and the availability of specific edible starchy plants. I draw on these resources to compile a preliminary food list for the pre-Contact period. Although there are long temporal gaps in the data presented, the pre-Contact and post-Contact food lists are examined. With few exceptions, foods listed just prior to Contact (late Latte Period) continued to be utilized in historic times. Certain animal, marine and plant-based products endured as principal dietary elements even as new foods and different methods of preparation were incorporated into the Chamorro subsistence system.

INTRODUCTION

The fiesta (*gupot* in Chamorro) tables in the Mariana Islands today display a variety of delicious dishes including those introduced after Western Contact in 1521. The introduced foods that guests have come to expect include roasted beef and pork, barbecued chicken and ribs, potato salad, corn tortillas (*titiyas*), tamales, the essential bowl of red rice, as well as pies and cakes for dessert. Chickens, pigs, sweet potatoes, corn and other food products introduced after Contact did not replace traditional dishes such as cooked rice (*hineksa'*), taro (*sunì*), breadfruit (*lemmai*, *rìma*), yams (*dâgu*, *gaddo'* and *nika*), bananas (*chotda*), various fishes (*guihan*), shrimp, crabs, turtle (*haggan*), octopus (*gâmsan*), coconut crabs (*ayuyu*), shellfish and fruitbat (*fanihi*). These foods stayed on the menu and, with the exception of endangered marine turtle and fruitbat, are consumed today.

Pollock (1983 and see 1986, 1992) carefully reviewed reports and various translations of reports written by the early foreigners, beginning with Magellan's

voyage in 1521, to glean information about the range of food items and food related behaviors of the Chamorro people at Contact and thereafter. Among the foods she listed at Contact were birds, flying fish, bananas, breadfruit, coconuts, taro, yam, sugarcane and rice; rice was noted for its ritual connection with mortuary events (Pollock 1983). Here I expand on her study and present information about the pre-Contact diet and other post-Contact food-related behaviors described in the literature.

I reviewed translations of other early historic accounts and more recent information contained in archaeological and palynological reports. The early historic accounts contain descriptions of locally produced foods and food-related behaviors observed by foreigners after Contact. The archaeological and palynological studies contain information about discarded food remains and fossil plant parts associated with radiocarbon dates, making it possible to track exploitation and availability during the more than 3,000-year-long pre-Contact Period (BC 1500-AD 1521). Considerably more information is available for the latter part of this period than for its earliest portion.

The paper begins with a brief section on the environmental and historic background of the Mariana Islands. A discussion of procurement and consumption practices described in the historic literature follows as it provides insight into potential pre-Contact activities. The third and fourth sections list the various marine and terrestrial animal remains identified in cultural deposits and inventories the probable subsistence plants based on the identification of starches, raphides, pollen and phytoliths in charred residue on pottery sherds, in soil samples and in riverine and wetland cores. The paper concludes with a preliminary summary of pre-Contact subsistence data.

BACKGROUND INFORMATION

Geography and Climate

The Mariana Archipelago consists of 15 major islands situated in the western Pacific about 1,500 miles east of the Philippines (Rogers 1995). The nearly 500-mile-long island chain extends from the largest and most southern island, Guam at 13 degrees North Latitude, to

Farallon de Pajaros at 21 degrees North Latitude (Figure 1).

Generally, the islands experience two seasons during the year: a wet season from July to December and a dry season from January to June. Floods and typhoons can occur any time throughout the year, but droughts are more likely during the latter part of the dry season.

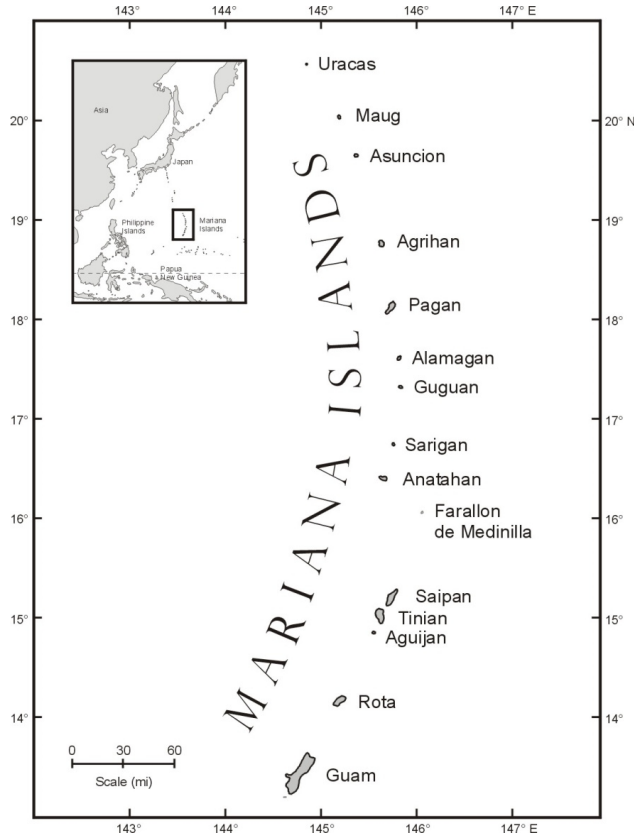


Figure 1: Map of the Mariana Islands (courtesy of Barry Smith).

Historic Background

Arriving around 3500 years BP, the earliest settlers were fishers and gatherers who initially lived along the shorelines of the southern islands, where a variety of marine resources were abundant and accessible (Amesbury 2013; Carson 2011, 2013; Carson and Kurashina 2012; Rainbird 2004; Russell 1998). About 1000 BP inland habitats were incorporated into the southern settlement system (Dixon and Schaefer 2014; Dixon et al. 2011; Kurashina 1991) and by 650 BP some of the potentially less desirable northern islands, such as Pagan and Sarigan, began to be exploited (Athens 2011; Egami and Saito 1973; Yawata 1940). At Contact, the people throughout the archipelago shared the same culture and spoke the same language.

Magellan briefly stopped in the Mariana Islands in AD 1521; in 1565 Legaspi claimed them for Spain; and in 1668 Father Sanvitores named them after Mariana of Austria, the Queen Regent of Spain from 1665 to 1667 (see Rogers 1995). The Manila Galleon trade between Acapulco, Mexico and the Philippines, with provision-

ing stops in the Mariana Islands on the western leg of the voyage, began in 1565 and continued until 1815 (Schurz 1939). The founding of the Catholic mission on Guam in 1668 marked the first official Spanish residency. The Marianas remained a Spanish colony until 1898, when the American government acquired Guam and the German government acquired the remaining islands in 1899 (Rogers 1995).

Archaeological Background

For detailed reviews of archaeological research in the Mariana Islands see Carson (2012). The prehistoric chronology is commonly viewed as consisting of two components: Latte Period (AD 900-1700) and Pre-Latte Period (1500 BC-AD 900) (Spoehr 1957). Located at coastal and inland locales, Latte Period sites are more numerous and better documented than the Pre-Latte sites which are buried, often near inland edges of the present beach strands. The word latte (or *latde*) refers to the stone/coral pillar and cap architecture characteristic of many sites dating to the Latte Period.

According to pre-colonial accounts (Lévesque 1992), at Contact Chamorro villages contained at least two kinds of structures: elevated houses where people slept and stored their belongings, including ancestral skulls and valuables, and low houses for cooking. Most Latte Period sites contain features that represent elevated structures and cooking areas. Investigations at these sites have recovered artifacts, fire-altered rock, charcoal, pottery fragments and food remains including marine shells and other faunal material (Bayman et al. 2012; Carson and Peterson 2010; Dixon et al. 2006).

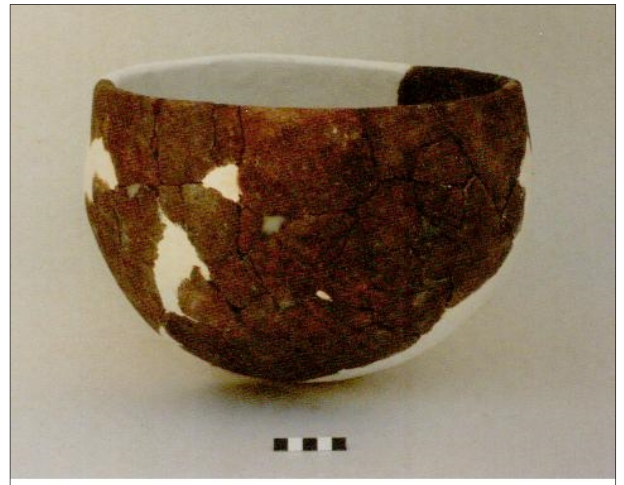


Figure 2: Reconstruction of a typical Latte Period pot. The scale is 5 cm.

The combination of several changes in the material culture and settlement patterns near the beginning of the Latte Period suggest substantial modifications in subsistence practices. Large, durable pots, suitable for boiling and storing appear (Figure 2), the population expands to the island interiors, and latte sets and stone mortars become evident. These changes suggest in-

creases in farming activities, processing plant foods and storing capabilities (Butler 1990; Dixon et al. 2011, 2012; Hunter-Anderson and Butler 1995; Moore 2005).

An even earlier change, during Pre-Latte times, is indicated by cooking areas with shallow, flat-bottomed pans and bowls (Figure 3) that may mark the transition to permanent habitation locales about 500 BC. How these open pots were used remains open to conjecture. Their calcareous inclusions, thick walls and abrupt wall/base junctures made them unsuitable vessels for boiling, though toasting, drying, steaming, salting, and serving are possibilities (Carson and Peterson 2010; Moore and Hunter-Anderson 1999).



Figure 3: Typical flat-bottomed Pre-Latte pot (500 BC-AD 500), photo by H. Kurashina. The scale is 15 cm.

FOOD PROCUREMENT AND CONSUMPTION PRACTICES IN THE EARLY CONTACT PERIOD (1521-1668)

Subsistence Cycles

Lacking details about early subsistence cycles, we refer to fishing, planting and harvesting cycles described in the 1930s. They were seasonal and dependent on weather conditions (Thompson 1945, 1947). These cycles, many of which are followed today, may be a continuation of pre-Contact practices. Fish can be caught year round but some are seasonally abundant. The pelagic fish, mahimahi, is abundant from December to March/April (Kraul 1999). Schools of *mañāhak* (juvenile rabbitfishes) are caught during the last quarter of the first moon in April and October (Thompson 1947). Schools of *atulai* (bigeye scad) are caught in February and October (Barcinas 1938 in Thompson 1947). Before WWII, rice planted in October was harvested in January and February; breadfruit was harvested from May to August; taro, yam, and other tubers, such as arrowroot, in December and January (Sproat 1968; Thompson 1945, 1947).

Procurement and Consumption Activities at Western Contact

An early account by Fray Juan Pobre, who stayed in Rota for seven months in 1602, indicates that the islanders greatly enjoyed eating (Driver 1989). Different

villages held festivities (*gupot*), with the host village providing the food (Driver 1989). At these functions certain leading men and their wives were served first and received the best food (Driver 1989). Among the favorite dishes were salted fish (*asnen tucon*), a mixture of pounded rice and grated coconut, a drink (*alaguan*) of pounded rice and coconut diluted with water, seedless breadfruit (*lemmai*), roasted or boiled, and rice boiled in water (*hineksa'*) (Driver 1989; Mallada 1990).

Large fish, seedless breadfruit and rice were highly regarded (Barratt 2003; Driver 1989; Hunter-Anderson et al. 1995). Certain ritual practices, involving skulls of the ancestors, were associated with some fishing endeavors (Driver 1989). Seedless breadfruit was gifted to high status members of the group. Special dishes involving rice and fish were served to the sick, and at ceremonies such as funerals (Driver 1989). Presentations of uncooked rice, fish and turtle shell were offered to make restitution or amends for some transgression. People living along the coast exchanged fish for agricultural products from people living inland where a variety of roots and tubers was planted (Driver 1989). Little is known about specific gardening practices, but domestic plants, trees and garden plots likely were situated near coastal villages also. At Contact, the islanders offered a variety of food items, including fresh water in gourds or sections of bamboo, to foreign ships in exchange for iron (Lévesque 1992; 1993).

PRE-CONTACT EVIDENCE OF ANIMAL AND ANIMAL PRODUCT CONSUMPTION

The Chamorro term *fatda'* means to eat seafood, and over time its meaning has expanded to include introduced poultry and meats. Although the archaeological data are uneven, in the prehistoric past people obtained dietary protein by fishing for pelagic and reef fish, catching sea and land crabs, shrimp, lobsters, octopi, eels, and turtles, collecting shellfish and echinoderms and capturing birds and fruitbats. Rats are not included in the following discussion, though they may have been consumed.

Fish remains from ten coastal sites on four islands indicate that both pelagic and reef fish were caught throughout the pre-Contact period (Amesbury 2013). The pelagic species include mahimahi, marlin and tunas; parrot fish is the most common reef fish (Amesbury and Hunter-Anderson 2008). While the historic accounts indicate that people living inland traded agricultural products for fish, few fish remains are recovered from interior sites (Amesbury and Hunter-Anderson 2003; Bodner 1997; Carson and Peterson 2010; Dixon 2011; Dixon et al. 2006; Gosser et al. 2002). Some interior sites yield no fish remains, or bones of only small individuals (Amesbury in Moore and Hunter-Anderson 2001; Amesbury in Hunter-Anderson 1994). Present archaeological evidence from Guam lends little support to the idea that people living in the interior during the Latte Period ate whole, large fish. However, consumption of boneless slices of large

fish would leave no tangible remains. Over time, changes in fishing technology, such as the appearance of bone tools used to make fishing nets, compound fishhooks and fish weirs, suggest greater numbers of certain fish were captured during the Latte Period (Craib 1998; Dixon 2011).

Evidence for the preparation of fish is scant. Fish scales identified on a mat-impressed pan dating to the mid-Pre-Latte Period, from a coastal site, suggest that fish was prepared, stored, or served in clay pots (Moore 2012).

Since crustacean remains are fragile and difficult to identify to species, evidence for their human consumption is unavailable. The number of sea urchin spines (modified as tools) decreases from the Pre-Latte to the Latte Period (Amesbury and Hunter-Anderson 2003; Butler 1992; Cleghorn and McIntosh 2000). Whether the decrease is due to over-harvesting, a change in the environment, a change in technology, or a change in diet is unknown.

Mollusk remains are collected from most archaeological deposits and changes through time have been proposed for specific sites (declines of chitons, limpets and Arcidae and increases in *Strombus*) (Amesbury 1999, 2007; Amesbury et al. 1996; Dixon and Schaefer 2014). Archaeological evidence from Aguiguan (Aguiguan) suggests that people collected whatever shellfish species were available along the shore and in the water near their settlements (Butler 1992). Shellfish remains from interior sites provide evidence that people had access to some coastal resources, or traded for mollusks. However, they may have lacked access to the best and most desirable shellfish as most interior sites yield smaller shells, fewer varieties and limited quantities when compared with coastal sites (Craib in Hunter-Anderson 1994; Hunter-Anderson and Moore 2002).

Archaeological evidence of shellfish preparation is provided by shellfish aragonite in residue on a Latte and a Pre-Latte pottery fragment from two coastal sites, suggesting that mollusks were sometimes prepared or served in clay pots (Moore 2012).

Turtle remains are recovered from coastal sites dating to Pre-Latte and Latte Periods (Amesbury 2013). Sites with the greatest abundance of turtle bones show a decrease from the earlier to the later deposits (Amesbury and Hunter-Anderson 2003; Cleghorn and McIntosh 2000; Haun et al. 1999). To the author's knowledge, marine turtle remains have not been recovered from inland sites.

Evidence suggests that the practice of capturing birds changed over time. Excavations on Tinian and Aguiguan recovered bird remains from Pre-Latte deposits. Haun et al. (1999) noted bird bone decreased during the Pre-Latte Period, changing from flightless rails and megapodes to pigeons and doves. Additional support for bird taking during Pre-Latte times is provided by Bodner (1997) on Tinian and Steadman (1999) on Aguiguan where bird bones were associated with radiocarbon dates of AD 170 and AD 430. Few bird bones

are recovered from most Latte Period sites and it appears that birds did not significantly contribute to the diet then (Butler 1988) or at Contact (Barratt 2003; Lévesque 1992). However, a post-Contact account, written in the 1670s, describes islanders sailing to the northern islands to capture birds for meat (Coomans 1997).

Bones and teeth of fruitbat (*Pteropus tokuda* and *Pteropus mariannus*) (*fanihi* in Chamorro) are recovered from archaeological deposits dating to both Pre-Latte and Latte Periods and from coastal and interior sites (Allen et al. 2002; Gosser et al. 2002; Graves and Moore 1985; Haun et al. 1999; Hunter-Anderson et al. 2001, 1998; Liston 1996; Moore and Amesbury 2010; Moore et al. 2002, 1993, 1992; Steadman 1999). The number of fruitbat remains decreased over time at the early Pre-Latte site of Unai Chulu, Tinian (Haun et al. 1999). While fruitbat could have been stewed or roasted, archaeological evidence of its preparation is lacking. In modern times, the entire creature, fur and all, is cooked in a pot which is placed on the table.

Monitor lizard (*Varanus indicus*) (*hilitai* in Chamorro) bones have been recovered from a few archaeological sites on Guam (Allen et al. 2002; Liston 1996) and the Aguiguan rockshelter (Steadman 1999). The number of remains at some sites caused researchers to suggest that they were eaten (Liston 1996). They could have been stewed or roasted. They are seldom consumed today.

PRE-CONTACT EVIDENCE OF PLANT AND PLANT PRODUCT CONSUMPTION

The palynological identification of plant parts in soil samples and soil cores provides information about the kinds of plants growing on the islands. The analyses of charred residue on pottery sherds provide information about the foods prepared or stored in the pots. The following discussion does not include Cycads and Pandanus, plants that were present early and probably consumed in emergencies. Nor does it include ginger, turmeric, fruit trees other than breadfruit, sweet potato and corn. The latter two crops were introduced shortly after Contact. Chamorro dictionaries (Dept. of Chamorro Affairs 2009; Topping et al. 1975) indicate the term *sinetan* means boiled starchy foods and the term *golai* means vegetable. See Table 1 for a list of plants.

The arrowroot (*Tacca leontopetaloides*, *gabgab*) plant is considered native or early naturalized and its poisonous tubers are edible when grated and washed (Stone 1970). That it was utilized prior to Contact is provided by a possible starch grain in residue from a Latte Period mortar (Haslam in Dixon et al. 2004). In historic times, the tubers were processed and reduced to flour, which when mixed with coconut milk and shredded coconut formed a pudding (*āhu*) (Mallada 1990).

Bananas (*choitda*) had been introduced to Guam by the mid-Pre-Latte Period as provided by a phytolith in a soil sample associated with a radiocarbon date of 375-155 BC (Collins and Pearsall in Hunter-Anderson et al.

Table 1: Chronological list of selected plant remains dating to the pre-Contact Period. The table does not include every occurrence reported in the literature. The dates may not mark the plant's earliest introduction or indicate its utilization.

Common/Scientific Name	Type of evidence	Approx. Radiocarbon Calendar Range	Reference
Breadfruit (seeded ?) <i>Artocarpus mariannensis</i>	Pollen in Pago River core	7050-5650 BC	Ward in Hunter-Anderson 1994
	Pollen in Laguas core	1608 BC	Athens & Ward 2004
	Pollen in wetland core	150 BC	Ward in Hunter-Anderson 1994
	Possible starch grain on sherd	250 BC-AD 550	Horrocks in Carson & Peterson 2010
Coconut <i>Cocos nucifera</i>	Pollen in Laguas core	4904-2455 BC	Athens & Ward 2004
	Pollen in Tipalao core	4405 BC	Athens & Ward 2004
	Pollen in Pago River core	2378 BC	Athens & Ward 2004
	Pollen in Lake Hagoi core	1494 BC	Athens & Ward 2004
Ti plant <i>Cordyline fruticosa</i>	Pollen in Laguas core	2455-1006 BC	Dixon et al. 1999
	Pollen in soil sample	AD 655-1380	Ward in Hunter-Anderson et al. 2001
	Pollen in soil sample	AD 1448-1656	Cummings & Puseman in Henry et al. 1998
	Starch grains and raphides on sherds	Late Pre-Latte and Latte	Loy & Crowther in Moore 2002
Taro <i>Alocasia</i> <i>Colocasia Cyrtosperma</i>	Pollen in Kagman core	2172 BC	Athens et al. 2004
	Pollen in soil sample	775-395 BC	Cummings in Allen et al. 2002
	Pollen in Laguas core	AD 850	Athens & Ward 2004:26
	Starch & raphides in soil sample	AD 350-1260	Horrocks in Carson & Peterson 2010
Banana <i>Musa</i> sp.	Starch & raphides on sherds	Latte Period	Moore 2012:134-135
	Phytolith in soil sample	375-155 BC	Collins & Pearsall in Hunter-Anderson et al. 2001
	Leaf phytolith in soil sample	AD 50-240	Horrocks in Carson & Peterson 2010
	Phytoliths in soil sample	AD 980-1200	Collins & Pearsall in Hunter-Anderson 2003
Wax gourd <i>Benincasa hispida</i>	Phytolith in soil sample	Post AD 1460	Collins & Pearsall in Hunter-Anderson & Moore 2002
	Pollen on sherd	AD 130-350	Horrocks in Carson & Peterson 2010
Yam <i>Dioscorea</i> sp.	Phytolith in soil sample	Late Pre-Latte	Cummings et al. in Hunter-Anderson 2006
	Pollen in soil sample	AD 670-880	Cummings in Hunter-Anderson 2005
	Starch on sherd	Latte Period	Moore & Cummings 2005
	Starch in soil sample	Latte Period	Horrocks in Carson and Peterson 2009
Rice <i>Oryza sativa</i>	Impression on sherd	Pre-Latte ?	DeFant et al. 2008
	Impressions on sherds	AD 1300s	Hunter-Anderson et al. 1995
	Leaf phytolith on pounder	Latte Period	Pearsall 1997
	Phytolith on sherd	AD 1390-1490	Loy in Moore & Hunter-Anderson 2001
Sugarcane <i>Saccharum</i>	Cooked residue on sherd	Latte Period	Loy & Crowther in Moore 2002
Arrowroot <i>Tacca leonto-petaloides</i>	Starch in mortar	Latte Period	Haslam et al. in Dixon et al. 2004
Bottle gourd <i>Lagenaria</i>	Phytolith in soil sample	Post AD 1460	Collins & Pearsall in Hunter-Anderson & Moore 2002

2001). A banana leaf phytolith was associated with a radiocarbon date ranging from AD 50-240 (Horrocks in Carson and Peterson 2010). A phytolith in a Latte Period soil sample was associated with a date range of AD 980-1200 (Collins and Pearsall in Hunter-Anderson 2003).

Seeded breadfruit, *Artocarpus mariannensis* (*dok-dok* in Chamorro), is an early introduction while seedless breadfruit, *A. altilis* (*lemmai* or *rima* in Chamorro), arrived much later in the Prehistoric Period (Petersen 2006; Stone 1970; Zerega et al. 2004). Precise timing for these introductions is unknown. The *Artocarpus* trees are closely related, thus researchers are unable to distinguish morphologically their fossil remains.

Artocarpus sp. pollen has been identified in cores with date ranges of 7050-5650 BC, 1608 BC, and 150 BC (Athens and Ward 2004; Dixon et al. 1999; Ward in Hunter-Anderson 1994), suggesting that seeded trees were present early.

Additional evidence of *Artocarpus* is provided by a starch grain on a sherd from a deposit with dates ranging from 250 BC to AD 550 (Horrocks in Carson and Peterson 2010). Whether the starch derived from edible

seeds or seedless fruit remains unresolved. Both the fruit and seeds are eaten today (Figure 4).



Figure 4: Edible breadfruit seeds (*Artocarpus mariannensis*) prepared by Lourdes Babauta, Agat.

Stone (1970) proposed that coconuts (*Cocos nucifera*; *niyog* in Chamorro) were introduced to the islands early in prehistoric times. However, pollen in cores associated with early dates (4904-2455 BC; 4405 BC) suggests that it was among the plants present when people arrived; and based on pollen abundance, the number of plants gradually increased after 1500 BC (Athens and Ward 2004).

The ti plant (*Cordyline fruticosa*) is native in the Pacific Islands (Stone 1970). Evidence that it was present is provided by pollen in a core that dates to c. 2455-1006 BC (Dixon et al. 1999) and in soil samples from two sites associated with dates of AD 655-1380 and AD 1448-1656 (Cummings and Puseman in Henry et al. 1998; Ward in Hunter-Anderson et al. 2001). *Cordyline* starch grains and raphides, similar to those in leaves, identified in residue on sherds suggest that the corms were cooked and the leaves wrapped foods for steaming and/or serving (Loy and Crowther in Moore 2002). Records of its historic use were not located.

Rice (*Oryza sativa*) was introduced to the Marianas by the mid-1300s if not before, and it was grown until WWII (Hunter-Anderson et al. 1995). Although rice starch has yet to be identified, accidental impressions of rice grains have been reported on sherds from Guam, Rota, Saipan, and Tinian (DeFant et al. 2008; Gosser et al. 2002; Hunter-Anderson et al. 1995; Moore et al. 1997). Rice phytoliths have been recognized in residue on a Latte Period sherd and in a wetland core, while rice leaf phytoliths have been found in residue on stone pounders (Hunter-Anderson et al. 1995; Collins and Pearsall in Moore and Hunter-Anderson 2001; Pearsall 1997). Rice is a staple today; sometimes it is prepared by placing a woven container (*katupat*) of uncooked rice in boiling water (Figure 5).



Figure 5: Woven coconut frond containers (*katupat*). These half-filled packets of uncooked rice are placed in a pot of boiling water. When the rice is cooked, the packet is carried away. The scale is 10 cm.

Taro (*Colocasia esculenta*, *sun*i in Chamorro; *Cyrtosperma chamissonis*, *baba* in Chamorro; and *Alocasia indica*, *piga* in Chamorro) is the common English term for the many plants with edible tubers listed here

(Kikusawa 2003). According to Stone (1970) taro is a common domestic plant in tropical Asia and throughout the Pacific. Introduced to the Marianas early in prehistoric times, its precise timing is uncertain. Pollen in a core suggests it was present by 2172 BC (Athens et al. 2004). Pollen in a soil sample was dated to 775-395 BC (Cummings in Allen et al. 2002; for more recent dates see Athens and Ward 2004; Dixon et al. 2004; Horrocks in Carson and Peterson 2010, 2009). Taro starch and raphides have been identified on pottery sherds (Bayman et al. 2012; Moore 2012). In the historic past and today, taro is prepared in earth-ovens or boiled in metal pots (Mallada 1990; Pollock 1986; Sproat 1968).

The yam family (*Dioscorea* sp.) includes several edible species that spread from Asia and Malaysia to Polynesia (Stone 1970). The Chamorro names for yam varieties include *nika*, *dāgu* (cultivated) and *gaddo* (wild spiny yam) (Dept. of Chamorro Affairs 2009). Evidence of its presence is provided by pollen in a soil sample associated with a radiocarbon date of AD 670-880 (Cummings in Hunter-Anderson 2005). Additional evidence is provided by yam thorns in a possible farming site dated to AD 986-1210 (Moore 2005) and thorns and starch in a soil sample from a Latte Period yam field (Horrocks in Carson and Peterson 2009). Yam starch has been identified in charred residue on a Latte Period pottery sherd (Moore and Cummings 2005). Yams are eaten today.

Although the bottle gourd (*Lagenaria siceraria*), known locally as *tagu'a*, is believed to have originated in Africa, its introduction to Guam could have been either from the east or the west as it was widely dispersed quite early (Bellwood 1979). A phytolith in a soil sample was associated with two radiocarbon dates with intercepts that began in AD 1460 and continued into historic times (Collins and Pearsall in Hunter-Anderson and Moore 2002).

Wax gourd (*Benincasa hispida*), known locally as *kondot* or *condor*, is a member of the squash (Cucurbitaceae) family native to tropical Asia (Stone 1970; Topping et al. 1975). The fruits can be cooked as a vegetable, added to soups, or prepared as a sweet pudding (Stone 1970). Evidence of its presence is provided by pollen on a pottery sherd associated with a radiocarbon date of AD 130-350 (Horrocks in Carson and Peterson 2010), and a probable phytolith in a soil sample from an undated late Pre-Latte deposit in Agaña Bay (Cummings et al. in Hunter-Anderson 2006).

Sugarcane (*Saccharum officinarum*), *tupo* or *tupu* in Chamorro, was introduced to the Marianas in prehistoric times (Stone 1970). Evidence of its presence is provided by phytoliths on a Latte Period sherd (Loy and Crowther in Moore 2002).

SUMMARY AND CONCLUSION

It is beyond the scope of this paper to discuss how or when the edible plants arrived in the Marianas. Clearly the data presented here do not necessarily mark first appearance or utilization. Only presence is indicated. It

appears that seeded breadfruit, coconut, taro and *ti* plants were early arrivals. When people arrived, they exploited available plants and captured fruitbat, birds, monitor lizards, pelagic and reef fish, mollusks and turtles. Remnants of earth-ovens and fire features indicate foods were cooked. The early pots, although small by later standards, could have contained coconut milk, coconut oil, and various seafood concoctions, among other unidentified products. Residue analyses have yet to be performed on the oldest pot fragments, thus what foods were associated with them remains unknown.

Some time prior to AD 500 dependence on birds, turtles, certain mollusks and sea urchins had decreased. By 155 BC banana was present. By AD 350 wax gourd was present. By AD 880 yam was present. The flat-bottomed pots and pans of 500 BC-AD 500 would have made appropriate containers for cooking bananas in coconut milk, roasting breadfruit seeds, steaming shellfish, making salt by evaporating seawater, salting fish, preparing and serving soups or puddings, among other dishes. Hot coals, placed outside and inside these open pots, would have generated sufficient heat to cook foods wrapped in leaves. These ideas would not require the thick-walled, friable pots to be subjected to heat intense enough to boil taro and yam. Taro and yam, along with fish, fruitbat, and other foods were probably prepared in earth-ovens or over open fires.

By the beginning of the Latte Period, stone mortars, used for husking and pounding rice, appear along with a possible rice impressed, late Pre-Latte pottery sherd (DeFant et al. 2008). They suggest that rice was known earlier than the mid-1300s. Cultivation of rice may have been attempted several times before it was incorporated into the Latte Period subsistence system.

During the Latte Period, in addition to the previous plant resources, arrowroot, seedless breadfruit, bottle gourd, rice and sugarcane had become available. The protein resources apparently remained about the same, though there were changes in the kinds of mollusks collected and greater numbers of certain fish were captured. The more durable pots of this period made appropriate containers for boiling foods (including seedless breadfruit, rice, taro, and yams), and for storing water, surplus rice, slices of dried breadfruit, and salted fish.

By Contact, rice, seedless breadfruit, large fish, and salted fish were regarded as having special status and certain ritual behaviors (probably Latte Period carryovers) had developed around their procurement (fishing), distribution (presentations and gifts) and consumption (certain events required special dishes). Rice and salted fish may have been valued for their storability and seedless breadfruit for its taste (and perhaps its storability once dried). Evidence that fermented breadfruit was stored in pits, as it was elsewhere in Micronesia, is lacking for the Marianas.

The data presented provide information about the various foods consumed prior to Contact, but details about actual eating events and behaviors are missing.

For that we look to historic documents. From historic times to the present, Chamorro people have enjoyed festivities (Figure 6) and food plays an important role in the culture, particularly with respect to extended family or community events such as weddings, christenings, funerals, and political activities, which involve reciprocal exchanges of food and labor (Del Valle 1979). While the kinds of food served at these functions have changed somewhat, the contributions and obligations of the participants are still recognized and honored.



Figure 6: Roadside mural in Mangilao, Guam depicting a fiesta table and event.

ACKNOWLEDGEMENTS

Michelle Eusebio and Amy Jordan are thanked for organizing the Foodways Session at the 2014 IPPA Conference in Siem Reap, Cambodia and for their efforts in publishing session articles. I'd also like to thank three anonymous reviewers for their constructive comments on an earlier version.

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