

Biodiversity in Traditional Pacific Island Agriculture: Examples from Pohnpei and Samoa

Trees for Improving Sustainability, Resource Conservation, and Profitability on Farms and Ranches

Kona, Hawai'i May 16-19, 2006

Koror, Palau June 26-27, 2006

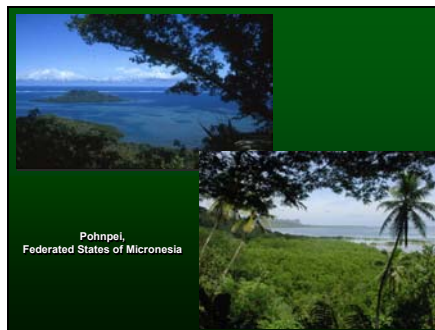
Agana, Guam June 29-30, 2006

Diane Ragone, PhD, National Tropical Botanical Garden, Hawai'i

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Information Resources:

Tuhke en Pohnpei: Plants of Pohnpei. 1992. Mark Merlin, Dageo Jano, William Raynor, Thomas Keene, James Juvick, and Bismark Sebastian. Department of Education, Pohnpei State, Office of Historic Preservation, FSM, and Environment and Policy Institute, East-West Center, Honolulu.

History of plant introductions to Pohnpei, Micronesia and the role of the Pohnpei Agriculture Station. Diane Ragone, David H. Lorence, and Timothy Flynn. 2001. *Economic Botany* 55(3): 290-324.

Raynor, WC and JH Fownes. 1991.

Indigenous agroforestry of Pohnpei: 1. Plant species and cultivars. *Agroforestry Systems* 16:139-157.
Indigenous agroforestry of Pohnpei: 2. Spatial and successional vegetation patterns. *Agroforestry Systems* 16:159-165.

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Information resources:
Botanical and Ethnobotanical Inventories of the National Park of American Samoa: Ofu, Olosega, Ta'u, and {Manu'a Islands} and Tutuila Island. Diane Ragone and David H. Lorence. 2003. Report submitted to Pacific Cooperative Studies Unit: Cooperative Agreement CA 8022-AO-001.

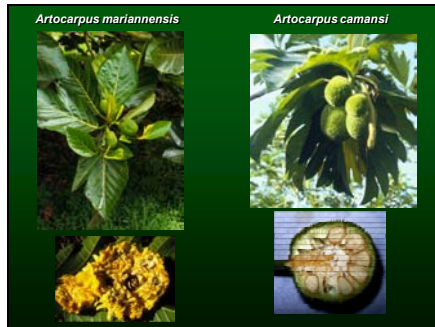
Plants in Samoan Culture: The Ethnobotany of Samoa. W. Arthur Whistler. 2000. *Isle Botanica*

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Breadfruit-based agroforestry systems are complex, species-rich production systems. Raynor and Fownes documented more than 100 species in 54 farms on Pohnpei. A few species were found in all sample areas, breadfruit, coconut, *Cananga odorata*, mango, bananas, *Hibiscus tiliaceus*, *Morinda citrifolia*, *Alocasia macrorrhiza*, *Dioscorea alata*, and *Piper methysticum*.

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Artocarpus mariannensis: This seeded species of breadfruit grows wild in Palau, Guam, and the Mariana Islands and is cultivated throughout Micronesia. The ripe yellow fruit is a nutritious source of provitamin-A carotenoids.

Artocarpus camansi: the seeded, ancestral form of breadfruit, known as breadnut, grows wild in New Guinea and has been introduced to other Pacific Islands in the past 50 years. It has been grown in the Caribbean, Africa, and other tropical areas for the past 200 years. The nutritious seed is high in protein, low in fat, and has the taste and texture of chestnuts.

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Artocarpus altilis is most widely distributed and cultivated species of breadfruit, with seeded as well as seedless forms. There are hundreds of varieties in the Pacific Islands and a few seedless varieties from Polynesia were introduced to the Caribbean 200 years ago. These subsequently spread to other tropical regions and breadfruit is now grown in close to 80 countries.

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Breadfruit is an important staple food for Pohnpei and Samoa. Preserving breadfruit for long-term storage in leaf-lined pits is still practiced in Pohnpei.

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Preserved breadfruit (mahr) is stored in pits lined with banana and *Curcuma australasiatica* (auleng) leaves. The fruit ferments into a soft doughy mass that is kneaded then baked. Fresh grated coconut is often added to the dough. Mahr lasts up to one year or more, and there are reports of edible mahr from decade-old pits.

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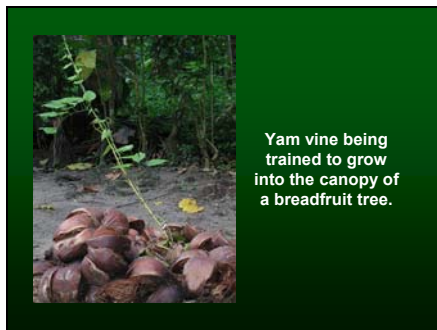
More than 130 names have been recorded for breadfruit varieties in Pohnpei and more than 150 names for yams (*Dioscorea* sp.).

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Yams and breadfruit production systems are intricately linked in Pohnpei. The yam vines are carefully trained up into the canopy of the breadfruit trees. Their harvest system is complementary; yam vines are vigorous when the tree is not bearing fruit.

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Four agricultural species are involved in this production system. Hibiscus tiliaceus provides the fiber/rope used to train and support the yam vines; coconut husks provide mulch and protect the tuber, while the breadfruit tree provides the infrastructural support for the vine as it develops.

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Piper methysticum is an extremely important cultural plant in Pohnpei, Samoa, and elsewhere in the Pacific. It is a significant cash crop in Pohnpei. In an integrated approach to watershed conservation, farmers in Pohnpei are encouraged to grow sakau in lowland areas and not to clear native forest to cultivate this plant,

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A survey of 350 residents throughout Samoa recorded more than 45 names of breadfruit varieties and assessed their conservation status. Ma'afala and Puou are the most commonly grow varieties, and many varieties are becoming rare.

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Agroforest and farm areas are important sources of food for wildlife, including flying foxes (fruit bats). The bats contribute to the health of the agro-ecosystems by serving as pollinators and seed dispersal.

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Raynor and Fownes

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The villagers of Olosega Village, Manu'a Islands, use all the available accessible land for agroforestry. The wetter area in the foreground is devoted to taro cultivation, while bananas, breadfruit, citrus, pineapples, and other crops are grown on the steeper hillsides.

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Myriad plants grown in traditional agroforestry systems, home gardens, and farms are used for medicine. These include native as well as introduced species.

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Paper mulberry (*Broussonetia papyrifera*) is traditionally cultivated to make tapa (kapa) or barkcloth. This is still practiced in Fiji, Tonga, and Samoa. A resurgence in kapa making in Hawaii is underway, but it is difficult to find plants. Botanical gardens, such as Amy Greenwell Garden, and National Tropical Botanical Garden, have small collections.

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Fine mats and mats for everyday purpose are made from various forms of pandanus and coconut.

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The ceiling of a traditional-style Samoan house. The cordage is made from coconut fiber (afa), curved beams are made from breadfruit wood.

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Traditional fishing practices rely on plant materials from cultivated areas, especially pandanus and coconut trees. The health of the marine ecosystem is linked to the health of the land and land-use practices.

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A massive basket woven of coconut leaves is used to catch small mackerel in Manu'a Islands.

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Freycinetia reineckeii ('ie'ie) - the roots of this native species that grows on trees in agroforestry, secondary and primary forest areas is gathered to make fish traps.

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The art of making fish traps (enu) is a vanishing practice, known by a few men in the Manu'a Islands. The enu is constructed of 'ie'ie and the fiber from coconuts, known as afa.