

---

**ATOLL RESEARCH BULLETIN**

**NO. 361**

**BATIRI KEI BARAVI: THE ETHNOBOTANY  
OF PACIFIC ISLAND COASTAL PLANTS**

**BY**

**R. R. THAMAN**

**ISSUED BY  
NATIONAL MUSEUM OF NATURAL HISTORY  
SMITHSONIAN INSTITUTION  
WASHINGTON, D.C., U.S.A.  
MAY 1992**

# BATIRI KEI BARAVI: THE ETHNOBOTANY OF PACIFIC ISLAND COASTAL PLANTS<sup>1</sup>

R.R. Thaman<sup>2</sup>

## INTRODUCTION

Jonathan Sauer (1961) remarked, in his Coastal Plant Geography of Mauritius, that the chance to study the coastal vegetation there was like being "admitted to a field worker's paradise" and stressed that "most tropical coasts are beautiful and exciting, particularly to people concerned with natural processes . . ." The same can certainly be said for the tropical coasts of the often Edenized islands of the Pacific Ocean. Their "beauty and excitement" is considerably enhanced, however, when one is also "concerned" with cultural processes and ethnobotany, in particular, the immense cultural utility of coastal plants, a factor which strongly influences the distribution and character of plant communities.

Because the use of plants, in particular, wild plants is so clouded in antiquity and so intimately associated with cultural origins, ethnobotanical research can shed considerable light on the the origin and nature of pre-European contact Pacific island societies. Ubiquitous coastal plant communities, because they are among the most useful, the most familiar to new settlers, and most subject to disturbance because of the attractiveness of coastal areas for human habitation and development, would seem to be a particularly important focus for ethnobotanical studies.

There is, however, a relative paucity of Pacific-wide systematic ethnobotanical studies, with most prehistories, ethnographies and ethnologies of the area having focused on aspects such as settlement sequence and routes, carbon dating, blood groups and physical types (human genetics), material technology, linguistics, social organization, cosmogeny and major agricultural and food systems. Little emphasis has been placed on the use of and impact on indigenous plant resources and the wide array of supplementary crops and plants that sophisticated horticultural and maritime societies must have brought with them or used upon their arrival in the islands.

Although plant lists, floras, and vegetation studies, often including vernacular names and plant uses, exist for most of Polynesia, much of Micronesia and some of Melanesia (see references cited in Appendix), very few systematic ethnobotanical studies of Pacific island plants exist.

The paucity of ethnobotanical information may reflect both the rarity of plant remains, especially wild plant remains, in archeological deposits, as well as the extensive pre- and post-European-contact modification of coastal plant communities. An additional factor is the need for relative fluency in vernacular languages and/or knowledgeable and interested informants, if researchers are to successfully tap the wealth of ethnobotanical knowledge of traditional societies.

Notable exceptions, however, are Powell's (1976) comprehensive ethnobotany of New Guinea and ethnobotanical studies by Setchell (1924), Petard (1986), Whistler (1987), Whistler (1988), Krauss (no date), Luomala (1953), and Lessa (1977) of Samoa, Tahiti, the Cook Islands, Tokelau, Hawaii, Kiribati, and the Caroline Islands, respectively. Comprehensive studies such as

---

<sup>1</sup>. Batiri and Baravi are Fijian words for a mangrove coast and an open coast or beach, and the names of the author's daughter and son, respectively.

<sup>2</sup>. Geography Department, School of Social and Economic Development, The University of the South Pacific, Suva, Fiji.

Koch's material cultures of Tuvalu (1983) and Kiribati (1986); Hedley's (1896, 1897) ethnology and vegetation of Funafuti, Tuvalu; Te Rangi Hiroa (Peter Buck)'s Samoan Material Culture (1930) and ethnologies of Tongareva, Manahiki and Rakahanga atolls in the northern Cook Islands (1932a,b); Metraux's (1940) ethnology of Easter Island; Thompson's (1940) ethnography of Lau, Fiji; Oliver's (1974) study of Ancient Tahitian Society; and Manner and Mallon's (1989) plant list for Puluwat Atoll are also excellent sources. Neal's (1965) In Gardens of Hawaii also contains substantial information on plant use.

Also of particular ethnobotanical importance are Haddon and Hornell's (1975) comprehensive Canoes of Oceania, and studies of Pacific island food plants and subsistence agricultural systems by Massal and Barrau (1956), Barrau (1958, 1961), Handy *et al.* (1972), Jardin (1974), Catala (1957), Small (1972), Soucie (1983), and Thaman (1976, 1982ab), plus Yen's (1971, 1976, 1984) studies of the development of agriculture, with specific focus on arboriculture in Solomon Islands, and Merrill's (1943) study of emergency food plants and poisonous plants. Studies of the medicinal plants of Melanesia (Sterly, 1970), New Guinea/Papua New Guinea (Holdsworth and Mahana, 1983), Solomon Islands (Maenu'u, 1979), New Caledonia (Rageau, 1973), Fiji (Singh and Siwatibau, 1980; Waqavonovono, 1980; Weiner, 1984), Tonga (Weiner, 1971), Samoa (Mc Cuddin, 1974; Uhe, 1974), Hawaii (Kaaiakamanu and Akina (1922), Kiribati (Polunin, 1979), and Palau (Okabe, 1940) are valuable resources, as are Brown's (1931) study of Polynesian leis and McDonald's (1978) comprehensive study of the leis of Hawaii. Together, these constitute a valuable body of knowledge of Pacific island plant resources and their uses, although, only in rare cases, focussing specifically on coastal plant resources and their utility.

This study, based on over twenty years personal observation and research on the use of Pacific plants, attempts to draw together, from such diverse sources, some of this knowledge. It examines the immense cultural utility of Pacific island coastal plants and the role that they have played in the successful habitation of the Pacific islands. It also attempts to provide a better understanding of the cultural sophistication and storehouse of empirical knowledge possessed by pre-European-contact societies. The geographical scope includes all those islands of Melanesia, Polynesia and Micronesia, extending from the islands of New Guinea and Palau in the west, to the Hawaii, French Polynesia, Pitcairn, and Easter Island in the east.

Finally, it is stressed that, because of the ecological and cultural importance of coastal plant communities, their impoverishment and the loss of ethnobotanical knowledge constitute an ecological, economic and cultural disaster. It is suggested that coastal reforestation and protection of coastal vegetation, coupled with a rejuvenation of traditional ethnobotanical knowledge, are among the most direct, cost-effective, self-help-oriented, and culturally-sensitive strategies for addressing both the short- and long-term obstacles to sustainable development in small-island states and coastal areas of the tropical Pacific Ocean.

The specific focus is on the ethnobotany of ubiquitous or locally important coastal strand, mangrove and coastal wetland plant species which are considered to be indigenous to, or long-established human introductions into, the Pacific islands. The Appendix lists some 140 coastal plant species or groups of similar species which are considered to be almost ubiquitous from, tropical Asia (the source region for many) to the smaller oceanic islands of the central Pacific, or which have particular localized ethnobotanical importance. All have the ability to cope successfully in environments characterized by loose shifting sands, soilless limestone and volcanic terraces and rock outcrops, high salinity, strong sunlight, strong winds and seasprays, and associated physiological drought (Fosberg, 1960), and, in some cases, periodic inundation and waterlogging.

These 140 plants include 10 ferns, 17 herbs, 11 grasses or sedges, 14 vines or lianas, 26 shrubs and 62 trees. All are commonly found in one or more of the following coastal vegetation categories: 1) the outpost strand or outer littoral zone closest to the high water zone characterized

by high soil salinity, salt spray and associated physiological drought; 2) the inner littoral zone; 3) mangrove habitats; and 4) coastal wetlands or marshes. Some of these are also found in a wild state or actively cultivated or protected in agricultural and fallow areas, secondary forests, and ruderal habitats or houseyard gardens in non-coastal environments (see Appendix).

Plants not included, but of considerable cultural utility, are those species restricted to only a few islands, and a number of indigenous species occasionally found in coastal forests, but usually restricted to more inland forests. Also beyond the scope of this paper are a wide range of recently introduced weedy exotics commonly found along Pacific coasts, particularly in disturbed or ruderal sites.

## ETHNOBOTANICAL ORIGINS AND THE SETTLEMENT OF THE ISLANDS

According to some scholars, agriculture may have first evolved among sedentary fisherfolk in southeast Asia, the ancestral homeland of today's Pacific islanders in southeast Asia (Sauer, 1952; Anderson, 1967). In these rich coastal environments people, living primarily by fishing, would have been able to supply themselves with food without shifting from place to place. Archeological evidence, both from southeast Asia and the Pacific islands, indicates that these coastal societies had elaborate fishing gear consisting of boats, harpoons, and fish hooks, the latter indicating that there must have been fishing lines and probably nets using plants for cordage (Anderson, 1967). Sauer (1952) further stressed that, associated with this, would have been the development of plant-derived fish poisons, and other ethnobotanical developments such as netmaking, bark cloth manufacture, bark or thatch housing, folk medical technology, and the use and limited domestication of tuberous staples and tree crops, all of which would seem to tie into one ancient southeast Asian cultural complex.

In the Pacific islands, the coastal environment also seems to have been the focus of early settlement. There is evidence that the first settlement of the oceanic islands to the east of New Guinea by the Austronesian (Malayo-Polynesian) speaking Lapita Culture over three thousand years ago, was always coastal or on small offshore islands, and that these migrations and some later influences were all from island southeast Asia. The Lapita Culture (named after incised, applied-relief and paddle-impressed pottery characteristic of the group) constitutes a number of highly mobile groups, which expanded very rapidly through Melanesia in the mid-late second Millennium B.C. and on into Polynesia, the present inhabitants of which are almost certainly their direct descendents. Other aspects of Lapita Culture also indicate that their economy was heavily oriented towards the ocean, marine fishing, long-distance oceanic voyaging, and inter-island transport of scarce materials such oven stones and obsidian (Bellwood, 1978).

## THE UTILITY OF COASTAL PLANTS

Because of the perishability of plant remains, there is limited direct evidence of the widespread use of cultivated plants. However, based on linguistic and ethnobotanical evidence, as well as on the existence of vegetable scrapers, ovens and storage pits, it is probable that the Lapita peoples also had a wide range of domesticated or semi-domesticated plants (Bellwood, 1978). It must also be accepted, that they had in-depth knowledge of, and great use for a very wide range of wild plants, particularly ubiquitous coastal plants, which they encountered upon arrival at new islands. Handy *et al.* (1972) note that in Hawaii the area with which the Polynesian migrants first became familiar was the *ko kaha kai* (place [land] by the sea), which, although not favorable for agriculture, most of its varied plants found use in the "fishers" economy. In the atoll environment

of Kiribati, the diverse utility of almost all species is perhaps nowhere surpassed, with there being no word for weed (an unwanted or troublesome plant).

There are also indigenous or possibly indigenous coastal species, the distribution of which may have been assisted by the early inhabitants, because of their cultural utility. These include Cocos nucifera, Abrus precatorius, Barringtonia asiatica, Calophyllum inophyllum, Casuarina euisetifolia, Hibiscus tiliaceus, Inocarpus fagifer, Morinda citrifolia, Tephrosia purpurea, and Terminalia catappa (Merrill, 1954).

## ETHNOBOTANY AND THE ALTERATION OF COASTAL VEGETATION

Ethnobotanical studies of coastal plants can be problematic due to the extreme alteration of coastal plant communities. As Sauer (1961, 1967) found on Mauritius and the Mexican Gulf Coast, much of the coastal vegetation had been severely altered by centuries of exploitation, including pre-European contact use of fire, clearing for agriculture in near-coastal areas, and the use of scarce timber resources for construction, and the production of a wide range of other objects.

Coastal areas, with their rich plant and fisheries resources, proximity to the sea (the main pre-road transportation route in most areas), and health-giving sea air (especially in areas plagued by malaria), were heavily affected and in some cases deforested by indigenous societies. Nypa groves were cleared to make way for taro gardens in coastal New Guinea (Barrau, 1958), and extensive pre-European contact coastal reclamation took place in the Langlanga Lagoon area of Malaita, Solomon Islands and on coastal islets in Pohnpei. Severe deforestation resulted from shifting cultivation and overpopulation on Lanai in Hawaii (Kirch, 1982) and Flenley and King (1984) go as far as suggesting that the megalithic Polynesian society of Easter Island (Rapa Nui) collapsed as a result of almost total deforestation. Handy *et al.* (1972) also discuss the pre-European contact elimination of wild plants in Hawaii from areas suitable for cultivation and, due to population increase, the use of trees for canoes, cooking tools, and handicrafts, and intensified foraging during times of drought.

Coastal forests have been widely replaced by coconut plantations, because coastal areas were most accessible to European influence and settlement (Barrau, 1958). In the Society Islands, the coastal zone, extending from the littoral to the bottom of the slopes and into the valleys, has been transformed more by human occupation than any other part of the islands (Oliver, 1974).

Species of particular value to Europeans for general construction, ship repair, and fuel for drying copra or beche-de-mer were undoubtedly first exhausted in the more accessible coastal zone. Sandalwood (Santalum neo-caledonicum) in New Caledonia's littoral forests became the object of intensive exploitation from the first arrival of Europeans. Catala (1957) cites the similar disappearance or decline in the numbers of important coastal species such as Barringtonia asiatica, Calophyllum inophyllum, and Cordia subcordata, in Kiribati, due to post-European-contact expansion of coconut plantations and their use for timber and fuelwood. There was also widespread destruction of coastal vegetation during World War II and resulting from open-cast phosphate mining in Nauru (Manner *et al.*, 1984, 1985).

The destruction and reclamation of mangrove areas, often seen as unproductive marginal lands by Europeans, has been widespread. Considerable areas of mangroves have been reclaimed in Fiji, New Caledonia, and Solomon Islands for the expansion of sugarcane monoculture and urban development. Exploitation for firewood and charcoal production has been responsible for mangrove deforestation in Samoa, Tonga and Fiji and, in Truk, mangroves were completely removed by Japanese woodsmen (Fischer and Fischer, 1970).

In short, centuries of exploitation and reclamation of coastal strand and mangrove forests, coupled with monetization and modern in-the-school (away-from-plants) education and an associated loss of ethnobotanical knowledge and appreciation of the critical subsistence and developmental importance of coastal plants, have led to serious coastal deforestation and the endangerment and extinction of indigenous and traditionally important coastal species throughout the Pacific. The impoverishment of these plant communities represents a serious and continuing ecological, economic and cultural problem for coastal communities.

## CULTURAL UTILITY OF PACIFIC COASTAL PLANTS

Table 1 shows the frequency of usage for specified purposes of the 140 plant species commonly found among Pacific island coastal and mangrove vegetation associations (Appendix). The analysis shows that there are some 75 different purpose/use categories for coastal plants, with the total frequency of usage for 140 plants being 1024, an average of 7.3 purpose/use categories per plant, ranging from no reported uses for only two species to as many as 125 for the coconut, if distinct uses within categories (e.g., tools with distinct functions) are counted (see Appendix). Next in order of importance, all with 20 or more reported uses, are Hibiscus tiliaceus, Pandanus tectorius, Calophyllum inophyllum, Cordia subcordata, Guettarda speciosa, Scaevola sericea, Pemphis acidula, Thespesia populnea, Rhizophora spp., Tournefortia argentea, Casuarina equisetifolia, Premna serratifolia, Morinda citrifolia, Pipturus argenteus, Terminalia catappa, Ficus tinctoria and Ficus prolixa. Another 29 species have at least 7 uses each (Table 2). There is some usage overlap between categories, such as supplementary and emergency foods and medicinal plants, magical, ceremonial and body ornamentation plants, or plants used for handicrafts, woodcarving, cordage, and clothing. Conversely, the categories could be further broken down to yield an even greater list of uses (e.g., 125 for coconut). Moreover, the list does not include the more strictly ecological functions of coastal plants, such as shade, protection from wind, sand and salt spray, erosion and flood control, coastal reclamation, animal and plant habitats, and soil improvement, all of importance to Pacific societies.

In terms of specific uses, the most widely reported uses are for medicine, general construction, body ornamentation, fuelwood, ceremony and ritual, cultivated or ornamental plants, toolmaking, food, boat or canoe making, dyes or pigments, magic and sorcery, fishing equipment, cordage and fibre, games or toys, perfumes and scenting coconut oil, fertilizer and mulching, woodcarving, weapons or traps, food parcelization, subjects of legends, mythology, songs, riddles, and proverbs, domesticated and wild animal feed, handicrafts, cooking equipment, clothing, fish poisons, items for export of local sale, adhesives or caulking, and musical instruments, all of which were reported for at least eleven species (Table 1). The analysis, however, is based on traditional uses, many of which have lapsed or are only employed in emergency, because modern technology has pre-empted them.

In terms of plant type, trees have the greatest utility, both in numerical dominance and diversity of uses per tree, with 671 purposes or uses reported for 62 species, an average of 10.8 uses per species (Table 1). Next in importance are shrubs, with 159 uses for 26 species, an average of 6.2 uses per species, followed by vines and lianas, herbs, ferns, and grasses, with averages of 4.4, 3.7, 3.5 and 2.9 uses per species respectively.

### Medicinal Plants

The most frequently reported use of coastal plants is medicinal, with 113 species (81%) reportedly used medicinally, in at least one area of the Pacific. The medicinal importance of these same species in the ancestral homeland of Pacific peoples is supported by the fact that 109 of the

total of 140 species or closely related species are used for medicinal purposes in southeast Asia (Perry and Metzger, 1980).

Of the 113 species reportedly used medicinally, almost a quarter of these (27) are used medicinally for a variety of purposes, wherever they are found throughout the Pacific, as well as in southeast Asia (Perry and Metzger, 1980). Among the species of most widespread medicinal importance are Polypodium scolopendria, Triumfetta procumbens, Cassytha filiformis, Vigna marina, Wollastonia biflora, Cocos nucifera, Glochidion spp., Guettarda speciosa, Hibiscus tiliaceus, Morinda citrifolia, Pandanus tectorius, Premna serratifolia, Terminalia catappa, Vitex spp., and Xylocarpus spp.

The relative importance of coastal plants as a percentage of total medicinal plant resources ranges from around 20% for the larger high islands of western Melanesia to a high of 67 to 82% for the smaller atolls and limestone islands of Kiribati and Nauru (Table 3). Moreover, the proportion of coastal medicinal plants as a percentage of all medicinal plants would have been considerably higher prior to European contact, particularly on the smaller islands, because many of the medicinal plants of today are recent introductions which have been adopted for medicinal use.

Also of medicinal value are species used as insect repellants or fumigants, soap substitutes, shampoos or hair conditioners, and antitoxins. Of the soap substitutes, Colubrina asiatica, is used almost universally for this purpose. Among those used for antitoxins, as insect repellants, or to treat puncture wounds from marine animals or jellyfish stings are Avicennia maritima, Cassytha filiformis, Crinum asiaticum, Excoecaria agallocha, Sophora tomentosa, and Tournefortia argentea, whereas the seeds of Calophyllum inophyllum, the heartwood of Santalum yasi, and the leaves of Vitex spp. are burned as mosquito repellents. Several species are also used to fumigate clothing (Appendix).

### General Construction

The timber of 60 species (6 shrub and 54 tree species), 43% of all coastal species and 87% of all tree species, was reportedly used for general construction purposes such as sawn or hewn timber, house poles, beams, rafters, flooring, walling, pilings, wharves, bridges, etc. Some of the more commonly used species include Bruguiera gymnorhiza, Calophyllum inophyllum, Casuarina equisetifolia, Cocos nucifera, Guettarda speciosa, Heritiera littoralis, Hibiscus tiliaceus, Inocarpus fagifer, Intsia bijuga, Lumnitzera littorea, Pandanus tectorius, Rhizophora spp., Terminalia catappa, and Thespesia populnea. Shrubby species such as Pemphis acidula and Scaevola sericea are important for house frames and planking on atolls. Of particular importance for thatching are Cocos nucifera, Metroxylon spp., Nypa fruticans, and Pandanus spp.

### Fuel

Although most woody species are used for fuel, some are particularly favoured, because of their high heat content, ability to produce slow-burning charcoal or provide a desired taste to foods, or in some cases to cook things particularly slowly. These include the shrubs, Pemphis acidula and Suriana maritima, because of the hot flame they produce. Among the trees, the mangrove species, Bruguiera gymnorhiza and Rhizophora spp., are preferred firewood in many coastal areas and also used to produce charcoal commercially in Fiji. Casuarina equisetifolia and Calophyllum inophyllum are excellent firewoods, and almost all parts of the coconut palm are used for fuel, with the shells of the nuts being a preferred fuel and an excellent source of charcoal. The coconut palm is by far the main source of fuel in atoll countries, as well as on some of the larger low-lying islands such as Tongatapu in Tonga (Thaman, 1984). Premna serratifolia, is considered

the best wood for cooking pandanus in the earthen oven in Nauru, and Hibiscus tiliaceus is a decent firewood, especially for slow smoking, and seems to be particularly suited for firing bakery ovens, such as on Aitutaki, in the Cook Islands, where it is used for that purpose. Certain species are also favored for making fire by friction and for use as tinder (Appendix).

### Canoe and Boat Building

The diversity and sophistication of ocean transport ranging from the multiple-hulled lakatoi of the Papuan Gulf and the elaborate double-hulled chiefly voyaging, and war canoes of Polynesia and Micronesia, to smaller fishing and racing outrigger canoes and freight rafts, with and without sails, made possible the migration to and settlement of vast stretches of the Pacific Ocean (Haddon and Hornell, 1975). Without such sophisticated voyaging technology, the great hiri and Kula Ring trade networks of Papua New Guinea, the trade networks between Fiji, Tonga, and Samoa, as well as the great interisland voyaging and tuna fishing, so important in Micronesia and the smaller islands of Polynesia, would not have been possible. The components of such craft, almost all of which are derived from plants, included hulls, keel and prow pieces, floats or outriggers, booms, ribs and spreaders, garboard strakes and gunwhales, planking, platforms, shelters and elaborate decking, masts, paddles and steering oars, sails and weather screens, all bound together, primarily with coconut husk fiber cordage, and caulked with plant materials.

Some 34 species, including over 48% of all trees, were used in canoe or boatbuilding. Particularly valued for canoe hulls or keel pieces were Calophyllum inophyllum, which was favored for the hulls of the larger Polynesian chiefly and voyaging canoes such as the tipairua of Tahiti and for the keel piece of Kiribati canoes; Cordia subcordata in the northern Cook Islands, Tuamotus, and Kiribati; coconut for some smaller canoe hulls or for planking in the Tuamotus and Kiribati; and Serianthes in Fiji and Palau. In the Tuamotus, where Cordia was favored, after a cyclone had destroyed the remaining Cordia groves, canoe builders had to turn to Pisonia grandis, a canoe hull which will only last two years, whereas a Cordia hull will last 30 to 40 years (Haddon and Hornell, 1975). In Tuvalu, Hernandia sonora was favored for canoe hulls and for the multiple floats of freight rafts used for transporting large loads of coconuts or timber across lagoons from reef islets to main settlements (Koch, 1983).

Species favored for other components, such as keel pieces, cross beams, pegs or connectives, and floats or outriggers include Pemphis acidula, Guettarda speciosa, Hibiscus tiliaceus, and Tournefortia argentea. In Fiji, the upper mast or domodomo of the large travelling outriggers or camakau, of up to 100 feet in length, were always made with Intsia bijuga. Woods such as Calophyllum inophyllum were favored for bailers; sails were plaited from pandanus and coconut leaves; and other species used as adhesives and for caulking (Haddon and Hornell, 1975).

### Other Uses of Timber and Wood

Other common uses of timber and the woody parts of plants include toolmaking, woodcarving, and the production of fishing equipment, weapons and traps, cooking equipment, games or toys, musical instruments, animal pens or roosts, and a wide range of other handicrafts (Table 1).

Species preferred for tools, such as digging sticks, needles and awls, adze and tool handles, tapa beaters and anvils include durable shrubby species such as Pemphis acidula, Suriana maritima, and Ximenia americana, and trees such as Bruguiera gymnorrhiza, Calophyllum inophyllum, Casuarina equisetifolia, Cocos nucifera, Cordia subcordata, Inocarpus fagifer, Rhizophora spp., Terminalia catappa, and Thespesia populnea, with softer-wooded species such



as Erythrina variegata, Guettarda speciosa, Hibiscus tiliaceus, and Tournefortia argentea, being locally important, particularly on atolls.

Essentially the same species are favored for producing weaponry, such as warclubs, spears and spearpoints, with more specialized items such as bows being made from Colubrina asiatica and Bruguiera gymnorhiza; arrows from Nypa fruticans leaf midribs and the stiltroots of Rhizophora spp.; and snares for capturing fruitbats (flying foxes) and birds from the thorny stems of Caesalpinia spp.

A similar range of species is favored for fishing poles, fishtraps, fish hooks, fishnet frames and handles, nets, meshing needles, floats, and other fishing equipment, with Dodonea viscosa, Cordia subcordata, Guettarda speciosa, Hibiscus tiliaceus, Premna serratifolia, Thespesia populnea, and Vitex spp. being used for fishing rods or hoists; the extremely strong wood of Pemphis acidula for fishhooks, with the wood of Premna serratifolia, the roots of Casuarina equisetifolia, and the thorny sections of Caesalpinia bonduc being used for specialized fishhooks; Ficus tinctoria, Dodonea viscosa, and Rhizophora spp. for scoopnet frames; Cocos nucifera (roots), Lumnitzera littorea, Pemphis acidula, and Rhizophora spp. for fishtraps or cages; lighter woods such as Dolichadrone spathacea, Erythrina variegata, Hernandia sonora, and Hibiscus tiliaceus for floats and paddles; and the bast fiber from Ficus spp., Hibiscus tiliaceus, Pandanus tectorius, and Pipturus argenteus being used to make nets, with large seines made of E. prolixa in Tahiti being 30 to 40 fathoms long and twelve fathoms deep (Oliver, 1974). More specialized uses included the use of coconut fronds for weirs and long drags used in communal fish drives, fronds of Nypa fruticans as floating "fish aggregation devices" (FAD), Rhizophora spp. for shark rattles, and Cordia subcordata and Hibiscus tiliaceus to make buoyant watertight "reefboxes" or toluma (Tokelau) used to store valuable fishing gear such as pearlshell fishing lures.

Similar species are favored for cooking equipment such as bowls, calabashes, ladles, stirrers, mortars and pestles, coconut huskers, and breadfruit splitters and specialized containers, with Hernandia sonora and Sonneratia alba and coconut husk being used for corks or stoppers. Coconut shells are used universally for cups, containers, spoons, with other parts being used for a wide range of cooking equipment (Appendix).

For toys and games the seeds or fruit of Entada phaseoloides, Mucuna gigantea, Abrus precatorius, Caesalpinia bonduc, Barringtonia asiatica, Cynometra ramiflora, Erythrina variegata, Hernandia sonora, Thespesia populnea and Xylocarpus spp. are used for marbles, lagging pieces, small balls, tops and for a range of other toys or games, with the fruit of Ficus tinctoria and chewed pieces of coconut endosperm or pandanus prop roots being used for ammunition for toy blowguns made from a hollowed-out Scaevola sericea stem. The wood of Gardenia taitensis is carved into marbles and cricket balls in Tuvalu, and the wood of other species used to make darts, sticks for jackstraws and other stick games, tops and other toys, while the stems of Cyperus laevigatus are used as cordage for string games or "cat's cradle", coconut and pandanus leaves plaited into balls for kicking or throwing games, pandanus leaves are made into kites, and parts of the coconut palm are made into a range of toys (Appendix).

The most favored species for musical instruments, mainly drums or slit-gongs, include Pemphis acidula, Cocos nucifera, Guettarda speciosa, Lumnitzera litorrea, Terminalia catappa, and Thespesia populnea, with the fruit of Bruguiera gymnorhiza and Rhizophora spp. and the leaves of Pandanus tectorius being used for whistles.

In terms of more specialized, high quality woodcarving of spiritual or prestige importance, such as idols of gods, pendants or "tiki", ceremonial kava bowls, carved prow pieces for canoes, or items for the burgeoning tourist market, certain high quality woods were generally preserved. Although some 19 species are reportedly used in woodcarving, the most highly sought after species, because of their attractive and durable wood, include, Calophyllum inophyllum, Cordia

subcordata, Intsia bijuga, Santalum spp., and Thespesia populnea, the latter four being endangered plants in many areas.

### Ceremonial and Spiritual Importance

The ceremonial and spiritual importance of plants, can not be underestimated, with 40 species having ceremony or ritual importance, 29 used in magic and sorcery, and 18 featuring legends, mythology, songs, riddles, or proverbs.

Those of more ceremonial importance, include species used in ceremonies or rituals associated with death, war and peace, human sacrifice and cannibalism, circumcision or coming of age, house or temple building, canoe making and launching, fishing, planting cycles, wavemaking or control of seastate, prayer sessions, as well as species serving as symbols or totems and mediums for communicating with spirits or gods or those planted in sacred groves or burial grounds. Others are associated with times of revelry or are used in the production of baskets, mats, and other articles reserved for ceremonial exchange or dress (Appendix).

Plants of particular ritual importance include Polypodium scolopendria, Dodonea viscosa, Hibiscus tiliaceus, Calophyllum inophyllum, Cocos nucifera, Scaevola sericea, Pandanus tectorius, Sida fallax and Thespesia populnea. Plants cultivated or protected in sacred groves, in graveyards or around temples included Casuarina equisetifolia, Calophyllum inophyllum, Ficus spp., Intsia bijuga, and Thespesia populnea. Large banyans (Ficus spp.) were, and still are in many places considered as the abode of spirits or aitu throughout Polynesia and Melanesia, and in Vanuatu are still found in almost all ceremonial meeting grounds or nakamal. Sacred Pisonia grandis groves are reported from Onotoa in Kiribati and its leaves considered to be gods on Tongareva (Koch, 1986; Hiroa, 1932a), and the cycad (Cycas circinalis) is of particular spiritual importance in Vanuatu where it is a symbol on the national flag and is planted around ceremonial dance grounds.

Gardenia taitensis is the national flower of both Tahiti and the Cook Islands; Sida fallax, is the flower of the island of Abemama in Kiribati and of Oahu in Hawaii, and was traditionally reserved for chiefs in both areas; Heliotropium anomalum is the flower of the Hawaiian island of Kaho'olawe; and Pandanus tectorius has become the symbol of the people of Kiribati. Casuarina equisetifolia and Premna serratifolia, are the symbols or bodily forms of the Polynesian gods Oro and Avaro in Tahiti, whereas the coconut is identified with Ku, the god of fishing, and Thespesia populnea is the shadow of the god of chanting and prayer in Hawaii and Tahiti (Oliver, 1974; Handy *et al.*, 1972).

In Fiji, Entada phasioloides (walai) is a totem in Namosi, Pemphis acidula (gigia) in Kabara, and Inocarpus fagifer (ivi) on Moce. Cordia subcordata (te kanawa) serves as the totem of the Korongoa clan in Kiribati, and other coastal plants undoubtedly serve as totems for other groups, especially in Melanesia, where totemism is still very strong. According to Hawaiian "natural philosophy, all natural phenomena, objects and creatures, were bodily forms assumed by nature gods or nature spirits" (Handy *et al.*, 1972).

Plants associated with revelry or ceremonial dress, are Triumfetta procumbens, Cassytha filiformis, Premna serratifolia, Sida fallax, and Tournefortia argentea, although there are many more, some of which are discussed below as plants used for garlands and ornamentation. Epipremnum pinnatum is made into ceremonial baskets used in funerals in Tonga, Pandanus spp. and Pipturus argenteus are both used in the fine mats for ceremonial exchange, and the oil from Santalum sp. and Terminalia catappa are both used to rub corpses.

Magic and sorcery, which are still very strong in the Pacific, especially in Melanesia and parts of Micronesia, with plants being integral to such practices, which include magic related to love, exorcism of evil spirits, gardening, and death. Plants used in love magic include Portulaca lutea, Triumfetta procumbens, Ipomoea macrantha, Sida fallax, Guettarda speciosa, Pandanus tectorius, and Premna serratifolia, which is used to banish fear in marriage in Kiribati. Stenotaphrum sp. and Vigna marina are used to exorcise or dispel evil spirits; Cocos nucifera and Pipturus argenteus are used in garden magic, and Morinda citrifolia is used in love, garden, and fishing magic, and to dispel evil spirits.

Some 18 plants feature prominently in Pacific mythology, legends, songs, riddles, proverbs, and cosmogeny. As stressed by Setchell (1924), in his Ethnobotany of Samoa, plant names were given to gods or vice versa and songs and legends have developed around them and the "heroes, families, or villages, etc. they represent." One particular Samoan text of the battle of trees and stones" enumerates between 70 and 80 tree names. There are also legends or myths relating to the introduction of various plants, or to the role of plants in the origin of the sun, fire, etc., such as the Samoan maiden Sina who buried an eel's head which grew into the first coconut, or the story of the triumph of the Samoan tatagia tree (Acacia simplex) over the Fijian banyan tree (Ficus sp.) which had previously triumphed over all the trees of Fiji (Setchell, 1924).

#### Body Ornamentation and Perfumery

The importance of body ornamentation and perfumery is attested to by the considerable time and expense devoted by most societies (very extravagant expenditures in the case of more affluent societies) to clothing, jewelry, perfumes, and other items of personal adornment. Pacific island societies, similarly, placed great importance on the importance of plant products for body ornamentation and perfumery, with 44% (62 of 140) of all coastal species being used in body ornamentation and 21 species used to scent coconut oil or for perfumery (Table 1).

Many places, such as Hawaii or Tahiti, are commonly associated with flower leis or sweet smelling flowers, such as the tiare Tahiti. The salusalu, kahoa and sisi, ula, and te bau, the Fijian, Tongan, Samoan, and Kiribati equivalents of the Hawaiian lei, are all of great social, ceremonial, magical or spiritual importance, with other Pacific societies having equivalent terms for such body ornamentation. Of particular importance in eastern Polynesia and Micronesia was a range of fragrant flowers and leaves worn in slits made in the outer edge and lobes of the ear or in pierced nostrils (Koch, 1983, 1986; Oliver, 1974). Powell (1976), Bonnemaïson (1985), Koch (1983), Neal (1965) and McDonald (1978) all stress the ceremonial or magical importance of body ornamentation in Papua New Guinea, Vanuatu, Tuvalu and Hawaii, with Koch (1983) noting that ornaments used for special occasions in Tuvalu are now almost exclusively made of plants because "the longer-lasting ornaments succumbed to the puritanical zeal of the Samoan missionaries." Whereas all plants valued for perfumery have a characteristic fragrance or scent, the flowers, leaves, and plant parts used in body ornamentation, apart from being favored for their fragrance, were also valued for their bright colors, texture and consistency of form.

Species of particular importance for body ornamentation include Polypodium scolopendria, Crinum asiaticum, Dodonea viscosa, Cassytha filiformis, Cordia subcordata, Ficus spp., Gardenia taitensis, Hibiscus tiliaceus, Sida fallax, and Lumnitzera littorea. Of almost ubiquitous importance were the bright orange-red fruits, the male flower, and other parts of the pandanus, which were strung into leis and garlands and the very young leaflets and other parts of the coconut which were also used in body ornamentation (Appendix).

Also of widespread importance for use in necklaces, bracelets, earrings, or dancing anklets are the seeds of a wide range of species including Abrus precatorius, Entada phasioloides, and Mucuna gigantea, with the wood of some species being occasionally carved into earrings.

Of the species used to scent coconut oil, a product which remains of considerable importance for ceremonial exchange, commercial sale, and ritual, cosmetic, medicinal and other domestic purposes, the most widely used are the fragrant leaves of Polypodium scolopendria, the root nodules of Fimbristylis cymosa, the flowers of Guettarda speciosa, and Phaleria disperma, and the male flower of Pandanus tectorius. Of particular importance are G. taitensis, which is used in the commercial production of the traditionally important "mono'i" scented coconut oil in Tahiti and Rarotonga, and the seeds and flowers of C. inophyllum and heartwood of Santalum spp., which are used in making chiefly perfumed oil used in death rituals. Forster (1777 in Oliver, 1974) of Cook's expedition, reports the use of scented coconut oil or mono'i as pomade by both sexes in Tahiti, with sandalwood and some thirteen other plants being used to scent it.

### Cultivated or Ornamental Plants

Some 39 species of coastal plants are deliberately cultivated or protected in gardens due to their usefulness or ornamental value, often as living fencing or hedges (Appendix). The ferns, particularly the bird's-nest fern, Asplenium nidus, and Nephrolepis spp., and Polypodium scolopendria, are popular ornamental or house plants. Other common ornamentals include Crinum asiaticum, Dendrobium spp., Hymenocallis littoralis, Epipremnum pinnatum, and Hoya australis, among the the herbaceous species, with shrubby species Clerodendrum inerme, Gardenia taitensis, Scaevola sericea being common occurrences in houseyard gardens in many areas of the Pacific. In Hawaii, Sida fallax ('ilima) is cultivated, often commercially, for its flowers.

Tree species commonly found in cultivation in houseyard gardens include Cordia subcordata, Cycas circinalis, Erythrina variegata, Guettarda speciosa, Hibiscus tiliaceus, Morinda citrifolia, Pandanus tectorius, Terminalia catappa, and Thespesia populnea. Those also common in houseyard gardens, as well as being planted in rural garden lands as food plants, include Cocos nucifera, Ficus tinctoria, Inocarpus fagifer, Metroxylon spp., and Pandanus tectorius. In the case of the majority of these plants, deliberate selection has obviously taken place, with a number of named cultivars existing for most species, including non-food species such as C. manghas, E. variegata, and H. tiliaceus.

Species commonly planted as living fencing (with and without wiring), and as animal pens, hedging, garden borders, and boundary markers, include Clerodendrum inerme, Cocos nucifera, Erythrina variegata, Ficus tinctoria, Hibiscus tiliaceus, and Premna serratifolia, with Crinum asiaticum commonly used for garden borders. C. nucifera and Inocarpus fagifer are used for boundary markers, Cocos nucifera logs and thatching for non-living pig pens and fencing, and coconut thatch and roots used to make sand screens. On Majuro and Kwajalein in the Marshall Islands, Vitex trifolia is commonly planted as reportedly mosquito repelling hedges and windbreaks.

### Food Resources

Coastal plants are a significant food resource, with some 6 species used as staple foods, 23 as supplementary foods, 35 as emergency or famine foods, 5 as drinks or beverages, 19 as domestic animal foods, and another 8 serving as food for important wild animal species. Also of critical importance are the roles that coastal vegetation, particularly mangroves, play as habitats and links in the food chains of important fisheries resources.

Of the staples, the most important is the coconut palm, the tree of life for most of the coastal Pacific, which provides an almost endless array of food items prepared in many ways

(Appendix). As Massal and Barrau (1956) argue: "Human life on atolls would scarcely be possible without it", with per capita consumptions as high as 5 to 6 nuts per day having been recorded on some atolls. The pith of the trunk of the sago palm (Metroxylon spp.), found in both wild and cultivated states, which is processed into starch, is the main staple in some coastal and riparian areas of western Melanesia and a major item of the "hiri" trade networks of the Papuan Gulf. The starch is also made into puddings and desserts in Melanesia, Rotuma and Samoa, and the heart or meristem sold and eaten in curries by Indians in Fiji. Polynesian arrowroot (Tacca leontopetaloides), formerly a minor staple in most parts of the Pacific, but now more of an emergency food, is grated, washed and cooked in green leaves in Vanuatu and in areas of Polynesia and Micronesia to make starchy puddings, and was formerly the source of starch for export from some islands (Massal and Barrau, 1956).

The mature seeds or drupes of Pandanus tectorius, or the cultivated form of P. tectorius, P. pulposus, of which there are many cultivars, are eaten raw as a vitamin-A-rich snack food throughout most of Micronesia, atoll Polynesia and parts of Vanuatu and Solomon Islands. In Micronesia and atoll Polynesia, the fruit are pounded, cooked in a variety of ways, made into flour, or preserved by smoking or sun-drying as an important staple. The tips of the aerial roots are sometimes eaten raw or cooked on atolls and the hearts or meristem are occasionally cooked as an emergency food on some Polynesian atolls (Massal and Barrau, 1956; Barrau, 1961; Manner and Mallon, 1989). The mature seeds of the Tahitian chestnut (Inocarpus fagifer) are a seasonal staple or snack food throughout most of Melanesia and Polynesia, and the fruit of Dyer's fig (Ficus tinctoria) is a major staple on the drier islands of Kiribati and a supplementary staple in other areas of Kiribati, Tuvalu and Micronesia.

Among the more commonly consumed supplementary foods are the seeds of the beach or Indian almond (Terminalia catappa), as is the flesh of the ripe fruit in some areas of Papua New Guinea and Nauru, and the extremely foetid ripe fruit of the Indian mulberry (Morinda citrifolia), which was widely eaten in the past. Also eaten more commonly in the past were the seeds and possibly the fibrous pulp of the fruit of Neisosperma oppositifolia.

Asplenium nidus, the bird's-nest fern, is eaten on many atolls and considered a delicacy in Niue, and the fruit of the mangrove species Bruguiera gymnorhiza is eaten cooked in Nauru, Palau, and Yap in Micronesia, and throughout most of Melanesia, especially in New Caledonia (Massal and Barrau, 1956; Jardin, 1984). Peculiar to Melanesia, and particularly New Caledonia, is the consumption of the young shoots, bark, and sapwood of Hibiscus tiliaceus and the fruit and leaves of Wollastonia biflora (Massal and Barrau, 1956). The purslanes, Portulaca australis and P. lutea, are widely eaten as vegetables or emergency foods in Kiribati and other atoll areas, with adults formerly eating up to a kilogram per week in the Phoenix Islands of Kiribati (Turbott, 1954).

Species consumed more as emergency foods, include the young fronds of most ferns and the leaves and tender shoots of a wide range of species including Boerhavia spp., Ipomoea pes-caprae, and Peperomia spp. (Massal and Barrau, 1956; Merrill, 1943), with T. argentea leaves being eaten in salads and by sailors on long voyages in Kiribati and P. grandis leaves being cooked and eaten with fish in Vanuatu and taro on Kapingamarangi atoll. A sterile cultivar, P. alba, is the lettuce tree of Indonesia.

The seeds of the cycad (Cycas circinalis), which are edible after thorough washing and processing into flour, were a widely consumed famine or ceremonial food in many areas, and regularly eaten on Guam. On Pentecost in Vanuatu, an edible starch was reportedly extracted from the leaf stalk of Epipremnum pinnatum (Massal and Barrau, 1956). The roots of the sedges Eleocharis spp. and Cyperus javanicus were also reportedly eaten as emergency foods, and the seeds or fruit of Avicennia maritima, Cordia subcordata, Sonneratia alba, Terminalia littoralis, and

a number of other trees, and many of the leguminous vines are occasionally eaten in some areas (Massal and Barrau, 1956; Barrau, 1961; Jardin, 1974).

Foremost among the beverage plants is the coconut palm, which provides both juice from the nut and fresh and fermented toddy from the sap of the flower spathe, the importance and ritual significance of which is greatest on the freshwater-scarce atolls. Other drinks include the sap from the nypa palm flower spathe, which is fermented into alcohol and vinegar; water from the thick vines of Entada phasioloides and Mucuna gigantea; and teas or stimulants made from a number of species (Appendix).

Also of considerable indirect value to human food systems are those species serving as domestic animal feed and food or habitats for important wild food species. Coconut is, again, the most important subsistence feed for pigs, chickens, and dogs, as well as being widely used in commercial livestock and poultry rations both locally and overseas. Other species including Portulaca, Ipomoea and Ficus spp. Scaevola sericea, Tournefortia argentea, and Boerhavia spp., are also fed to domestic livestock, with both Hibiscus tiliaceus and Pisonia grandis being planted as living pig pens, the leaves being fed directly to the animals. Those which are food sources to important wild food species such as coconut crabs, fruit bats, pigeons, and other birds, include Cocos nucifera, Ficus spp., Premna serratifolia, Scaevola sericea, Soulamea amara, Syzygium spp., and Terminalia catappa.

Of particular importance are mangrove ecosystems which contribute through primary and secondary productivity, to the nutritional requirements of a high proportion of marine food species (Watling, 1985). Research in Fiji has shown that over 60% of commercially important species are mangrove associated at some stage in their life cycle (Lal, et al., 1983), whereas more rigorous research gives figures of 67% and 80% for eastern Australia and Florida (Watling, 1985). Baines (1979) argues that mangrove removal can lead to offshore fisheries' yield declines of 50 to 80%.

### Cordage and Fibre

Some 25 species were used to provide cordage or fibre for lashings on housing, boats, and weapons; fishing lines and nets; for tying parcels and stringing fish; and for a wide range of handicrafts (Appendix). Of ubiquitous importance is the husk fibre or coir of the coconut which is made into cordage and sennit throughout the Pacific (sometimes strengthened with human hair), as well as being used for straining coconut oil and liquids, stuffing and caulking, and a wide range of other uses (Appendix). Also of widespread importance are the bast fibre of Hibiscus tiliaceus and Pipturus argenteus and the leaves of Pandanus spp., which are used for lashing, cordage, and in a wide range of handicrafts, with Ficus prolixa and E. tinctoria both providing cordage for fishing nets and other purposes locally. The stems of the sedges Cyperus laevigatus and C. javanicus and the bast fiber of Hibiscus tiliaceus are used to strain kava (Piper methysticum), coconut cream, and other liquids, and dried fibrous pandanus drupes, coconut coir, and Hibiscus tiliaceus bast fibre are used for brushes for painting tapa and other purposes.

Also commonly used for cordage or lashing are the stems of the ferns Thelypteris spp. and Stenoclaena palustris; the vines Cassytha filiformis, Canavalia cathartica, Entada phaseoloides, Hoya australis, and Ipomoea pes-caprae; and the bast fiber of Wollastonia biflora, Triumfetta procumbens, and Wikstroemia spp.

### Handicrafts and Clothing

Seventeen and 14 species, respectively, are used in the production of handicrafts and clothing (Table 1), The most important are the coconut palm, pandanus, and Hibiscus tiliaceus, the

leaves of the former two being used throughout the Pacific for a large range of plaited ware, including hats, skirts, waist mats, and a wide range of ceremonial and ordinary mats, with other parts, particularly the husk and shell of the coconut, also being used in a wide range of handicrafts, with the husk fiber being particularly important. The bast fibre of Hibiscus tiliaceus is used in a wide array of handicrafts, and along with pandanus, is particularly important for the highest quality ceremonial mats and garments (Hiroa, 1930; Koch, 1986).

Other species used for grass skirts, plaited ware, bark cloth and ceremonial apparel and other handicrafts include Asplenium nidus, Cyperus and Eleocharis spp., Epipremnum pinnatum, Tacca leontopetaloides, Cordia subcordata, Ficus spp., and Pipturus argenteus. The seeds of Acacia simplex, Entada phasioloides, Metroxylon spp., and Nypa fruticans being used for buttons, beads, dancing anklets and other purposes, and the leaves of Metroxylon spp. and N. fruticans for hats and other plaited ware (Appendix).

### Dyes, Pigments and Tannins

Some 30 and 7 species respectively are used as dyes and pigments or tannins and preservatives (Table 1). Common uses are for dyeing, painting or strengthening and preserving barkcloth, mats, baskets and other plaited ware, grass skirts, breachcloths, hats and other clothing items, canoe sails, and the hair, face and other parts of the body for ceremonial occasions. Colors range from black and black-brown to red-brown, red, red-orange and yellow. Although bark is the most common source, roots, leaves, sap, flowers, fruit and seeds are also dye sources.

Of most widespread importance are Ficus tinctoria, Bruguiera gymnorhiza, Morinda citrifolia, and Rhizophora spp. Colubrina asiatica, although not technically a dye, is used to wash and whiten textile kilts and garments made from Cyphlophus heterophyllus in Samoa (Hiroa, 1930).

### Fertilizers, Mulching and Soil Improvement

The importance of organic material to the success of agriculture and plant growth in nutritionally poor and highly permeable coastal soils, particularly atoll soils, which are among the least fertile in the world, cannot be overstated, with many Pacific societies having evolved sophisticated systems of fertilization and mulching using the leaves from at least 21 coastal plants. In atoll Micronesia the practice has attained the greatest sophistication. In Kiribati, the leaves of Guettarda speciosa, Tournefortia argentea and Sida fallax are often applied in pandanus baskets, with other leaves and topsoil, as part of an elaborate mulching system for giant swamp taro Cyrtosperma chamissonis, pandanus, and breadfruit (Small, 1972; Lambert, 1982; Soucie, 1983). Other less elaborate systems include the almost universal use of plaited and unplaited coconut fronds to mulch wetland taro gardens and the digging in of grasses, ferns and other leaves to maintain soil fertility and structure, preserve moisture and inhibit weed growth.

Casuarina equisetifolia is widely acclaimed for its nitrogen fixing ability, and Canavalia rosea has been planted as green manure and cover crop in Samoa.

### Food Parcelization

The leaves of some 19 species are used for food parcelization. Most important are the fronds of the ferns, Thelypteris and Nephrolepis spp., and the leaves of Cocos nucifera, Guettarda speciosa and Hibiscus tiliaceus which are used to parcel seafoods and other foods for

transport, sale and cooking or for covering the food in an earthen oven before it is sealed with earth.

### Fish Poisons

An important complement to the sophisticated fishing gear used by subsistence coastal societies were fish poisons or stupificants, with some 11 species being used for this purpose. The most commonly used species are Barringtonia asiatica, Derris trifoliata, Pittosporum spp. and Tephrosia purpurea, which reportedly suffocate without affecting the flesh (Merrill, 1943).

### Adhesives and Caulking

Eleven species are used as adhesives, waterproofing, or caulking for canoes, housing and other products. Of most universal importance were the tubers of Polynesian arrowroot (Tacca leontopetaloides) which were used as an adhesive for tapa cloth throughout Polynesia, and the bast fibre of Hibiscus tiliaceus and coconut coir which were widely used for caulking. Other sources include the leaves of Ipomoea pes-caprae which were roasted and used for canoe caulking, the sap of Ficus spp. and Pipturus argenteus and the sap or latex from the fruit of Calophyllum inophyllum, Cordia subcordata, Inocarpus fagifer, and Rhizophora spp. (Appendix).

### Other Uses

Other uses which were reported five times or less include strainers and filters, toilet paper, land reclamation, illumination, natural clocks, oils and lubricants, brushes, fans, stimulants, aphrodesiacs, contraceptives, masticants, abrasives, combs, tooth brushes, corks, cigarette wrappers, coconut palm climbing bandages or harnesses, measuring tapes, fireworks, windbreaks, sand screens, ladders, tethering posts, fish bait, punishment, communication or language, and computation or counting (Appendix).

Of particular importance are species planted for land reclamation including Bruguiera gymnorhiza, Casuarina equisetifolia, Lumnitzera littorea, Rhizophora spp. and Scaevola sericea. Finally, Mescam (1989) relates how a wide range of leaves are used to pass messages or warnings or for computation or counting in Vanuatu, but that this "botanical language" is being lost because "the written language learnt by the young has taken its place."

## CONCLUSION

The ethnobotany of coastal plants provides an important key to a better understanding of the cultural sophistication and storehouse of empirical knowledge possessed by Pacific island societies. The study shows that there are at least 75 different purpose- or use-categories for the 140 coastal plant species studied, with the total number of uses being 1024, an average of 7.3 distinctive uses per plant. This diverse utility underlines the central role that coastal plants have played in the successful habitation of the Pacific islands and in providing a high degree of "subsistence affluence" (Fisk, 1972). If the more strictly ecological functions of coastal plants, such as shade, protection from wind, sand and salt spray, erosion and flood control, coastal reclamation, animal and plant habitats, and soil improvement, and their ability to live in harsh coastal environments, are also considered, the critical role of coastal vegetation in the maintenance of Pacific societies, particularly in light of the increased susceptibility of atoll and coastal areas to



extreme events, such as tsunamis, storm surge and hurricanes, which could occur due to predicted global warming (Thaman, 1989), becomes more apparent.

However, the economic, cultural and ecological value of coastal plant resources is rarely acknowledged in development plans, project documents, or aid proposals, despite the fact that the products and benefits provided by coastal vegetation would be extremely expensive or impossible to replace with imported substitutes. The elimination of such utilitarian and cultural diversity can only serve to erode "subsistence affluence and to lock Pacific societies more tightly into the vicious circle of economic and cultural dependency.

Unfortunately, centuries of exploitation and reclamation of coastal strand and mangrove forests and, more recently, urban-industrial development have led to serious coastal deforestation and the endangerment and extinction of indigenous and traditionally important coastal tree and plant species throughout the Pacific. Associated with this, and with modern institutionalized education and development planning, has been a loss of ethnobotanical knowledge and an appreciation of the subsistence and developmental importance of coastal plants. Because of the critical ecological and ethnobotanical importance, the impoverishment of these plant communities and the loss of ethnobotanical knowledge represents an ecological, economic and cultural disaster which makes more problematic the sustainable habitation of small-island states of the Pacific Ocean.

It is argued in this chapter that coastal reforestation and protection of coastal vegetation, coupled with a rejuvenation of traditional ethnobotanical knowledge, could be one of the most direct, cost-effective, self-help-oriented, and culturally-sensitive strategies for sustainable development in the small-island states and coastal areas of the tropical Pacific Ocean. The resources and the technologies already exist in the form of some 140 or more coastal strand and mangrove species of widespread ethnobotanical and ecological importance, which could be used, now, to mount village- and community-based programmes of ecological, economic, and cultural recovery and coastal reclamation which would immediately address many of the serious short-term ecological and social problems facing small island and coastal societies as well as possibly making their coastal islands and coastal areas habitable in a post-global-warming world.

Table 1. Frequency of the usage for specified purposes of 140 Pacific island coastal plant species.

Purpose/Use	Ferns x/10	Herbs x/17	Grasses /Sedges x/11	Vines/ Lianas x/14	Shrubs x/26	Trees x/62	Total x/140
Medicinal/Health	6	15	7	11	23	51	113
General Construction	-	-	-	-	6	54	60
Body Ornamentation	6	8	3	7	12	26	62
Firewood/Fuel	-	-	-	-	8	43	51
Ceremony/Ritual	3	4	-	5	6	23	41
Cultivated/Ornamental	4	3	-	2	10	20	39
Tools/Toolmaking	-	-	-	-	4	33	37
Emergency/Famine Foods	4	5	2	2	4	18	35
Boat/Canoe Building	-	-	1	-	3	30	34
Dyes/Pigments	-	-	-	2	4	24	30
Magic/Sorcery	1	6	1	1	6	14	29
Fishing Equipment	-	1	2	-	8	17	28
Cordage/Fibre	2	2	2	6	3	10	25
Games/Toys	-	-	1	4	4	16	25
Supplementary Foods	2	2	-	2	3	14	23
Scenting Oil/Perfumery	1	1	1	1	6	11	21
Fertilizer/Mulching	1	2	2	1	4	11	21
Weapons/Traps	-	-	-	-	6	14	20
Woodcarving	-	-	-	-	1	18	19
Food Parcelization	3	1	-	3	1	11	19
Animal Feed	1	4	-	3	2	9	19
Legends/Mythology	-	-	-	-	3	15	18
Handicrafts	1	1	3	2	1	9	17

Clothing	-	1	3	-	1	9	14
Musical Instruments	-	-	-	-	1	13	14
Cooking Equipment	-	-	-	-	1	12	13
Fish Poisons	-	-	-	3	4	4	11
Export/Local Sale	-	1	-	-	2	8	11
Adhesive/Caulking	-	1	-	1	-	9	11
Fire by Friction	-	-	-	-	1	8	9
Soap/Shampoo	-	1	-	3	3	2	9
Containers	-	-	-	-	1	7	8
Repellents/Fumigants	-	-	-	-	2	6	8
Wild Animal Foods	-	-	-	-	3	5	8
Tannin/Preservatives	-	-	-	-	1	6	7
Antitoxins	-	1	-	1	1	4	7
Living Fences/Hedges	-	1	-	-	1	5	7
Staple Foods	-	1	-	-	-	5	6
Drinks/Beverage	-	1	-	2	1	1	5
Strainers/Filters	-	-	2	-	-	3	5
Toilet Paper	-	-	-	-	1	4	5
Land Reclamation	-	-	-	-	-	5	5
Calendars/Clocks	-	-	-	-	-	5	5
Contraceptives/ Abortifacants	-	-	-	-	3	2	5
Thatching/Roofing	-	-	-	-	1	3	4
Illumination	-	-	-	-	-	4	4
Combs	-	-	-	-	-	4	4
Animal Cages/Roosts	-	-	-	-	-	4	4
Oils/Lubricants	-	-	-	-	-	3	3
Brushes	-	-	-	-	-	3	3

Fans	-	-	-	-	-	3	3
Corks	-	-	-	-	-	3	3
Fishing bait	-	-	-	-	-	3	3
Other Uses*	-	-	2	-	5	27	34
<b>TOTAL</b>	<b>35</b>	<b>63</b>	<b>32</b>	<b>62</b>	<b>161</b>	<b>671</b>	<b>1024</b>
NO USES	-	1	1	-	-	-	2

\* Other uses include stimulants/teas, flavoring/spices, ear cleaners, splints, aphrodesiacs, hair remover, masticants/chewing gum, abrasives, tooth brushes, cigarette wrappers, coconut climbing bandages or harnesses, measuring tapes, fireworks, windbreaks, sand screens, ladders, walking sticks, tethering posts, punishment/torture, communication/language, and computation or counting.

Table 2. Coastal plant species of particular cultural utility based on an analysis of different uses listed in the Appendix (Note: not including a wide range of ecological functions or uses).

Latin Name	Uses
<u>Cocos nucifera</u>	125
<u>Hibiscus tiliaceus</u>	57
<u>Pandanus tectorius</u>	53
<u>Calophyllum inophyllum</u>	43
<u>Cordia subcordata</u>	40
<u>Guettarda speciosa</u>	36
<u>Scaevola sericea</u>	32
<u>Pemphis acidula</u>	30
<u>Thespesia populnea</u>	26
<u>Rhizophora spp.</u>	25
<u>Tournefortia argentea</u>	23
<u>Casuarina equisetifolia</u>	22
<u>Premna serratifolia</u>	22
<u>Morinda citrifolia</u>	22
<u>Pipturus argenteus</u>	21
<u>Terminalia catappa</u>	21
<u>Ficus tinctoria</u>	21
<u>Ficus prolixa</u>	20
<u>Erythrina variegata</u>	19
<u>Inocarpus fagifer</u>	18
<u>Hernandia sonora</u>	18
<u>Lumnitzera littorea</u>	17
<u>Pisonia grandis</u>	17
<u>Bruguiera gymnorrhiza</u>	16

<u>Nypa fruticans</u>	14
<u>Barringtonia asiatica</u>	14
<u>Mammea odorata</u>	14
<u>Intsia bijuga</u>	13
<u>Cycas circinalis</u>	13
<u>Gardenia taitensis</u>	12
<u>Sida fallax</u>	11
<u>Triumfetta procumbens</u>	11
<u>Vitex spp.</u>	11
<u>Dodonea viscosa</u>	11
<u>Santalum spp.</u>	10
<u>Mammea odorata</u>	10
<u>Entada phasioloides</u>	10
<u>Cerbera manghas</u>	10
<u>Clerodendrum inerme</u>	10
<u>Cassytha filiformis</u>	10
<u>Tacca leontopetaloides</u>	9
<u>Crinum asiaticum</u>	9
<u>Ficus obliqua</u>	8
<u>Polypodium scolopendria</u>	8
<u>Neisosperma oppositifolia</u>	8
<u>Metroxylon spp.</u>	7
<u>Ipomoea pes-caprae</u>	7

Table 3. Proportion of the total reported and identifiable medicinal plants constituted by coastal and mangrove plant species for selected areas of the Pacific islands.

Area	Total Medicinal Plants	Coastal Medicinal Plants	%
Melanesia	295	62	21%
Solomon Is.	145	24	17%
Fiji <sup>1</sup>	226	55	24%
Fiji <sup>2</sup>	173	57	33%
Samoa <sup>1</sup>	146	44	30%
Samoa <sup>2</sup>	77	29	38%
Tonga	71	28	39%
Kiribati	42	28	67%
Nauru	34	28	82%

Sources: Melanesia (Sterley, 1970); Solomon Is. (Maenu'u, 1979); Fiji<sup>1</sup> (Singh and Siwatibau, 1980); Fiji<sup>2</sup> (Weiner, 1984); Samoa<sup>1</sup> (Uhe, 1974); Samoa<sup>2</sup>; (Mc Cuddin, 1974); Tonga (Weiner, 1971); Kiribati (Polunin, 1979); Nauru (fieldwork by author 1978-79).

## BIBLIOGRAPHY

- Alkire, W.H. 1974. Numbers of plant, insect and land bird species on nineteen remote islands in the southern hemisphere. Journal of the Linnaean Society: Biology 6:143-152.
- Anderson, E. 1967. Plants and man. Berkeley: University of California Press.
- Baines, G.B.K. 1979. Mangroves for national development. A report on the mangrove resources of Fiji. (Unpublished manuscript).
- Barrau, J. 1958. Subsistence agriculture in Melanesia. Bulletin 219. Honolulu: Bernice P. Bishop Museum.
- \_\_\_\_\_. 1961. Subsistence agriculture in Polynesia and Micronesia. Bulletin 223. Honolulu: Bernice P. Bishop Museum.
- Bellwood, P. 1978. Man's conquest of the Pacific: The prehistory of southeast Asia and Oceania. Auckland: William Collins.
- Bonnemaison, J. 1985. The tree and the canoe: Roots and mobility in Vanuatu societies. In Mobility and identity in the Pacific, ed. M. Chapman. Special issue of Pacific Viewpoint 26(1):30-62.
- Brown, E.D.W. 1931. Polynesian leis. American Anthropologist 33(4):615-619.
- Brownlie, G. 1977. The Pteridophyte flora of Fiji. Beihefte Zur Nova Hedwigia. Heft 55. Vaduz: J. Cramer.
- Bryan, E.H. Jr. 1972. Life in the Marshall Islands. Honolulu: Pacific Science Information Center, Bernice P. Bishop Museum.
- Catala, R. L. A. 1957. Report on the Gilbert Islands: Some aspects of human ecology. Atoll Research Bulletin No. 59:1-187.
- Chambers, A. 1975. Nanumea report: A socio-economic study of Nanumea atoll, Tuvalu. Victoria University of Wellington rural socio-economic survey of the Gilbert and Ellice Islands. Wellington: Department of Geography, Victoria University.
- Christophersen, E. 1927. Vegetation of Pacific equatorial islands. Bulletin 44. Honolulu: Bernice P. Bishop Museum.
- Decker, B.G. 1971. Plants, man and landscape in Marquesan valleys, French Polynesia. (Ph.D thesis. Department of Geography, University of California, Berkeley). Ann Arbor: University Microfilms International.
- Fischer, J.L. and Fischer, A.M. 1970. The Eastern Carolines. New Haven: Human Relations Areas Files Press.
- Fisk, E.K. 1972. Motivation and modernization. Pacific Perspective 1(1):21-23.



- Flenley, J.R. and King, S.M. 1984. Late Quaternary pollen records from Easter Island. Nature 307:47-50.
- Forster, J.R. 1777. A voyage round the world on His Britannic Majesty's sloop Resolution, commanded by Captain James Cook, during the years 1772, 3, 4 and 5. Vol. II. London: B. White, J. Robson, P. Elmsly, and G. Robinson.
- Fosberg, F.R. 1960. The vegetation of Micronesia. Bulletin of the American Museum of Natural History 119(1):1-75.
- Fosberg, F.R., Falanruw, M.V.C. and Sachet, M.-H. 1975. Vascular flora of the Northern Marianas Islands. Smithsonian Contributions to Botany. No. 22. Washington D.C.: Smithsonian Institution.
- Fosberg, F.R., Otobed, D., Sachet, M.H., Oliver, R.L., Powell, D.A. and Canfield, J.E. 1980. Vascular plants of Palau with vernacular names. Washington D.C.: Department of Botany, The Smithsonian Institution.
- Fosberg, F.R. and Sachet, M.-H. 1984. Micronesian Poaceae: Critical and distributional notes. Micronesica 18(2): 45-120.
- \_\_\_\_\_. 1987 Flora of the Gilberts, checklist. Atoll Research Bulletin. No. 29:1-30.
- Fosberg, F.R., Sachet, M.-H., and Oliver, R. 1979. A geographical list of t h e  
Micronesian dicotyledonae. Micronesica 15(1-2):41-295.
- \_\_\_\_\_. 1982. Geographical checklist of the Micronesian Pteridophyta and gymnosperms. Micronesica 18(1):23-82.
- Gowers, S. 1976. Some common trees of the New Hebrides and their vernacular names. Port Vila: Forestry Section, Department of Agriculture.
- Grimble, A. 1933. The migration of the pandanus people. Journal of the Polynesian Society 42 (Memoir supplement):1-84.
- \_\_\_\_\_. 1934. The migration of the pandanus people. Journal of the Polynesian Society 43 (Memoir supplement):85-112.
- Guerin, M. 1982. The flora of the atolls of French Polynesia. In Regional technical meeting on atoll cultivation, Papeete, Tahiti, French Polynesia, 14-19 April 1980: Collected papers, ed. M. Lambert, pp. 77-89. Technical paper no. 180. Noumea: South Pacific Commission.
- Haddon, A.C. and Hornell, J. 1975. Canoes of Oceania. Bernice P. Bishop special publications 27, 28, and 29. Honolulu: Bishop Museum Press.
- Handy, E.S.C., Handy, E.G. with Pukui, M.K. 1972. Native planters of old Hawaii: Their life, lore, and environment. Bulletin 233. Honolulu: Bernice P. Bishop Museum.

- Hedley, C. 1896. The atoll of Funafuti, Ellice Group: Its zoology, botany, ethnology, and general structure. Part 1. General account of the atoll of Funafuti. Memoir III. Sydney: Australian Museum.
- \_\_\_\_\_. 1897. The atoll of Funafuti, Ellice Group: Its zoology, botany, ethnology, and general structure. Part 4. The ethnology of Funafuti. Memoir III. Sydney: Australian Museum.
- Hiroa, Te Rangi (Buck, P.H.). 1930. Samoan material culture. Bulletin 75. Honolulu: Bernice P. Bishop Museum.
- \_\_\_\_\_. 1932a. The ethnology of Tongareva. Bulletin 92. Honolulu: Bernice P. Bishop Museum.
- \_\_\_\_\_. 1932b. The ethnology of Manihiki and Rakahanga. Bulletin 99. Honolulu: Bernice P. Bishop Museum.
- Holdsworth, D. and Mahana, P. 1983. Traditional medicinal plants of the Huon Peninsula, Morobe Province, Papua New Guinea. International Journal of Crude Drug Research 21:123-133.
- Jardin, C. 1974. Kulu, kuru, uru: Lexicon of names of food plants in the south Pacific. Noumea: South Pacific Commission.
- Kaaiakamanu, D.M. and Akina, J.K. (Akana, A., translator). 1922. Hawaiian herbs of medicinal value. Honolulu: Territorial Board of Health.
- Kanehira, R. 1933. Flora Micronesica. Tokyo: Southseas Bureau Under the Japanese Mandate.
- Kirch, P.V. 1982. Ecology and adaptation of Polynesian agricultural systems. Archaeology in Oceania 17(1):1-6.
- Kirkpatrick, J.B. and Hassall, D.C. 1981. Vegetation of the Sigatoka sand dunes, Fiji. New Zealand Journal of Botany 19:285-297.
- Koch, G. (G. Slatter, translator). 1983. The material culture of Tuvalu. Suva: Institute of Pacific Studies, University of the South Pacific (originally published in German in 1961 by Museum fur Volkerkunde, Berlin).
- \_\_\_\_\_. 1986. The material culture of Kiribati. Suva: Institute of Pacific Studies, University of the South Pacific (originally published in German in 1965 by Museum fur Volkerkunde, Berlin).
- Krauss, B. No Date. Ethnobotany of Hawaii. Honolulu: Department of Botany, University of Hawaii.
- Lal, P.N., Swamy, A. and Singh, P. 1983. Mangroves and secondary productivity: Fishes associated with mangroves in Wairiki Creek, Fiji. In Proceedings of an interdependent workshop. 24 February 1983, Suva, Fiji, P.N. Lal, ed. Technical report 5. Suva: Fisheries Division, Ministry of Agriculture and Fisheries.
- Lamberson, J.O. 1982. A Guide to terrestrial plants of Enewetak Atoll. Honolulu: Pacific Science Information Center, Bernice P. Bishop Museum.

- Lambert, M. 1982. The cultivation of 'taro' (*Cyrtosperma chamissonis*) Schott in Kiribati. In Regional technical meeting on atoll cultivation, Papeete, Tahiti, French Polynesia, 14-19 April 1980: Collected papers, ed. M. Lambert, pp. 163-165. Technical paper no. 180. Noumea: South Pacific Commission.
- Lessa, W.A. 1977. Traditional uses of the vascular plants of Ulithi Atoll, with comparative notes. Micronesica 13(2):129-190.
- Luomala, K. 1953. Ethnobotany of the Gilbert Islands. Bulletin 213. Honolulu: Bernice P. Bishop Museum.
- McCuddin, C.R. 1974. Samoan medicinal plants and their usage. Pagopago: Department of Medicinal Services, Government of American Samoa.
- McDonald, M.A. 1978. Ka lei: The leis of Hawaii. Honolulu: Topgallant Publishing.
- Maenu'u, L.P. 1979. An indicative list of Solomon Islands medicinal plants. Unpublished manuscript. Suva: Pacific Collection, University of the South Pacific, Suva.
- Manner, H.I. 1987. Atoll flora and vegetation. Alafua Agricultural Bulletin 12 (3):67-80.
- Manner, H.I. and Mallon, E. 1989. An annotated list of the vascular plants of Puluwat Atoll. Micronesica 22(1):23-63.
- Manner, H.I., Thaman, R.R., and Hassall, D.H. 1984. Phosphate-mining induced vegetation changes on Nauru Island. Ecology 65(5):1454-1465.
- \_\_\_\_\_. 1985. Plant succession after phosphate mining on Nauru. Australian Geographer 16:185-195.
- Marshall, M. and Fosberg, F.R. 1975. The natural history of Namoluk Atoll, Eastern Caroline Islands: With identifications of vascular flora. Atoll Research Bulletin 189:1-65.
- \_\_\_\_\_. 1956. Food plants of the south sea islands. Technical paper no. 94. Noumea: South Pacific Commission.
- Merrill, E.D. 1943. Emergency food plants and poisonous plants of the Pacific. Technical monograph 10-420. Washington D.C.: United States Printing Office.
- \_\_\_\_\_. 1945. Plant life of the Pacific world. New York: The Macmillan Co.
- \_\_\_\_\_. 1954. The botany of Cook's voyages and its unexpected significance in relation to anthropology, biogeography, and history. Chronica Botanica 14(5/6): i-iv., 161-384.
- Mescarm, G. 1989. Pentecost: An island in Vanuatu. Suva: Vanuatu Extension Centre and Institute of Pacific Studies, University of the South Pacific.
- Metraux, A. 1940. Ethnology of Easter Island. Bulletin 160. Honolulu: Bernice P. Bishop Museum.
- Moul, E.T. 1957. Preliminary report on the flora of Onotoa Atoll, Gilbert Islands. Atoll Research Bulletin No. 57.

- Neal M.C. 1965. In gardens of Hawaii. Bernice P. Bishop Museum special publication 50. Honolulu: Bishop Museum Press.
- Niering, W.A. 1956. Bioecology of Kapingamarangi Atoll, Caroline Islands: Terrestrial aspects. Atoll Research Bulletin No. 49:1-32.
- Okabe, M. 1940. Investigation of the medicinal plants found on the Palau islands, their virtues and popular remedies. Bulletin of Tropical Industry, Palau. No. 5. Tokyo (Translated by Hisayoshi Takeda, Dec-1952)
- Oliver, D.L. 1974. Ancient Tahitian society. Vol 1: Ethnography. Canberra: Australian national University Press.
- Overy, R., Polunin, I. and Wimblett, D. W. G. 1982. Some plants of Kiribati: An illustrated list. Tarawa: National Library and Archives.
- Paijmans, K. 1976. Vegetation. In New Guinea vegetation. ed. K. Paijmans, pp. 23-105. Amsterdam: Elsevier Scientific Publishing Co.
- Parham, B.E.V. 1971. The vegetation of the Tokelau Islands with special reference to the plants of Nukunonu Atoll. New Zealand Journal of Botany 9(4):576-609.
- \_\_\_\_\_. 1972. Plants of Samoa. Information series no. 85. Wellington: Department of Scientific and Industrial Research.
- Parham, J.W. 1972. Plants of the Fiji Islands (revised edition). Suva: Government Printer.
- Percival, M. and Wormersley, J.S. 1975. Floristics and Ecology of the Mangrove vegetation of Papua New Guinea. Botany Bulletin no. 8. Lae: Papua New Guinea National Herbarium, Department of Forests.
- Perry, L.M. and Metzger, J. 1980. Medicinal plants of East and Southeast Asia: Attributed properties and uses. Cambridge: The M.I.T. Press.
- Petard, P. 1986. Quelques plants utiles de Polynesie Francaise et raau Tahiti. Papeete: Edition Haere Po no Tahiti.
- Polunin, I. 1979. A study of local medicinal plants, Tarawa, Kiribati. Assignment Report. Suva: Regional Office for the Western Pacific, World Health Organisation.
- Powell, J.M. 1976. Ethnobotany. In New Guinea vegetation, ed. K.Paijmans, pp 106-183. Amsterdam: Elsevier Scientific Publishing Co.
- Rageau, J. 1973. Les plantes medicinales de la Nouvelle-Caledonie. Travaux et Documents de l'O.R.S.T.O.M. No. 23. Paris: Editions de l'office de la Rescherche Scientifique et Technique Outremer.
- Rock, J.F. 1974. The indigenous trees of the Hawaiian Islands. Lawai, Kauai, Hawaii: Pacific Tropical Botanical Garden, and Rutland, Vermont: Charles E. Tuttle.
- Sachet, M.-H. 1983. Botanique de l'ille de Tupai, Illes de la Societe. Atoll Research Bulletin 276:1-35.

- St. John, H. 1948. Report on the flora of Pingelap Atoll, Caroline Islands, Micronesia, and observations on the vocabulary of the native inhabitants. Pacific plant studies 12. Pacific Science 2:97-113.
- \_\_\_\_\_. 1973. List and summary of the flowering plants in the Hawaiian Islands. Memoir number 1. Lawai, Kauai, Hawaii: Pacific Botanical Garden.
- St. John, H. and Philipson, W.R. 1962. An account of the flora of Henderson Island, south Pacific Ocean. Transactions of the Royal Society of New Zealand: Botany 1(14):175-194.
- St. John, H. and Smith, A.C. 1971. The vascular plants of the Horne and Wallis Islands. Pacific Science 25:313-348.
- Sauer, C.O. 1952. Agricultural origins and dispersals. Berkeley: University of California Press.
- Sauer, J.D. 1961. Coastal plant geography of Mauritius. Coastal studies series vol. 5. Baton Rouge: Louisiana State University.
- \_\_\_\_\_. 1967. Geographic reconnaissance of seashore vegetation along the Mexican Gulf Coast. Coastal Studies Series No. 21. Baton Rouge: Louisiana State University Press.
- Seemann, B. 1873. Flora Vitiensis: A description of the plants of the Viti or Fiji Islands with an account of their history, uses, and properties. London: L. Reeve.
- Setchell, W.A. 1924. American Samoa: Part I Vegetation of Tutuila Island, Part II, Ethnobotany of the Samoans, Part III, Vegetation of Rose Atoll. Vol. XX (inclusive). Washington D.C.: Department of Marine Biology, Carnegie Institution of Washington.
- Singh, A. and Siwatibau, S. 1980. Medicinal plants in Fiji and other Pacific islands (Preliminary results) Suva: School of Natural Resources, University of the South Pacific.
- Small, C.A. 1972. Atoll agriculture in the Gilbert and Ellice Islands. Tarawa: Department of Agriculture.
- Smith, A.C. 1979. Flora Vitiensis nova: A new flora of Fiji (spermatophytes only). Vol. 1. Lawai, Kauai, Hawaii: Pacific Tropical Botanical Garden.
- \_\_\_\_\_. 1981. Flora Vitiensis nova: A new flora of Fiji (spermatophytes only). Vol. 2. Lawai, Kauai, Hawaii: Pacific Tropical Botanical Garden.
- \_\_\_\_\_. 1985. Flora Vitiensis nova: A new flora of Fiji (spermatophytes only). Vol. 3. Lawai, Kauai, Hawaii: Pacific Tropical Botanical Garden.
- \_\_\_\_\_. 1988. Flora Vitiensis nova: A new flora of Fiji (spermatophytes only). Vol. 4. Lawai, Kauai, Hawaii: Pacific Tropical Botanical Garden.
- Soucie, E.A. 1983. Atoll agriculture for secondary schools: Soils and major agricultural crops of Micronesia. Ponape: Ponape Agriculture and Trade School.
- Stemmermann, L. 1981. A guide to Pacific wetland plants. Honolulu: U. S. Army Corps of Engineers.

- Sterly, J. 1970. Heilpflanzen de einwohner Melanesien: Beitrage zur ethnobotanik des sudwestlichen pazifik (medicinal plants of Melanesia: Contributions to the ethnobotany of the southwestern Pacific). Hamburg: Arbeitsstelle fur ethnomedizin.
- Stone, B.C. 1970. The flora of Guam. Micronesica 6 (complete):1-659.
- Sykes, W.R. 1970. Contributions to the flora of Niue. Bulletin 200. Wellington: New Zealand Department of Scientific and Industrial Research.
- Sykes, W.R. 1981. The vegetation of Late, Tonga. Allertonia 2(6): 323-353.
- Thaman, R.R. 1976. The Tongan agricultural system: With special emphasis on plant assemblages. Suva: University of the South Pacific (published version of 1975, Ph.D thesis, University of California, Los Angeles).
- \_\_\_\_\_. 1982a. Deterioration of traditional food systems, increasing malnutrition and food dependency in the Pacific islands. Journal of Food and Nutrition 39(3):109-121.
- \_\_\_\_\_. 1982b. The foods that came first. Alafua Agricultural Bulletin 7(3):105-116.
- \_\_\_\_\_. 1984d. The firewood crisis and smallholder fuelwood systems on Tongatapu Island, Tonga: Present systems and development potential. PEDP report: Tonga 85-1. Suva: United Nations Pacific Energy Development Programme (UNPEDP).
- Thompson, L. 1940. Southern Lau, Fiji: An ethnography. Bulletin 162. Honolulu: Bernice P. Bishop Museum.
- Turbot, J. 1954. Portulaca, a speciality in the diet of the Gilbertese in the Phoenix Islands. Journal of the Polynesian Society 63(1):77-85.
- Uhe, G. 1974. Medicinal plants of Samoa. Economic Botany 28(1):1-30.
- Waqavonovono, M. 1980. Traditional medicine and practices: An alternative health care system for women (A case study of traditional types of healing relating to women's ailments and conditions in seven villages in Nadarivatu, Fiji). Suva: Centre for Applied Studies in Development, University of the South Pacific.
- Ward, R.G. 1980. Agricultural options for the Pacific islands. In The island states of the Pacific and Indian oceans: Anatomy of development, ed. R.T. Shand, pp 23-40. Monograph no. 23. Canberra: Development Studies Centre, Australian National University.
- Watling, D. 1985. A Mangrove management plan for Fiji. Phase 1. Zonation requirements and a plan for the mangroves of the Ba, Labasa and Rewa Deltas. Suva: Government Printer.
- Weiner, M.A. 1971. Ethnomedicine in Tonga. Economic Botany 25(4):423-450.
- Weiner, M.A. 1984. Secrets of Fijian Medicine. Berkeley: University of California.
- Wester, L. 1985. Checklist of the vascular plants of the northern Line Islands. Atoll Research Bulletin 287:1-38.

- Whistler, A.W. 1980a. Coastal flowers of the tropical Pacific. Lawai, Kauai, Hawaii: The Pacific Tropical Botanical Garden.
- \_\_\_\_\_. 1980b. The Vegetation of Eastern Samoa. Allertonia 2(2): 45-190.
- \_\_\_\_\_. 1983. The flora and vegetation of Swains Island. Atoll Research Bulletin No. 262:1-25.
- \_\_\_\_\_. 1984. Annotated list of Samoan plant names. Economic Botany 38(4):464-489.
- \_\_\_\_\_. 1987. Ethnobotany of the Cook Islands: The plants, their Maori names and their uses. Lawai, Kauai, Hawaii: The Pacific Tropical Botanical Garden.
- \_\_\_\_\_. 1988. Ethnobotany of Tokelau: The plants, their Tokelauan names and their uses. Economic botany 42(2):155-176.
- Whitmore, T.C. 1966. Guide to the forests of the British Solomon Islands. London: Oxford University Press.
- Wiens, H.J. 1962. Atoll environment and ecology. New Haven: Yale University Press.
- Wilder, G.P. 1931. Flora of Rarotonga. Bulletin 86. Honolulu: Bernice P. Bishop Museum.
- \_\_\_\_\_. 1934. The flora of Makatea. Bulletin 120. Honolulu: Bernice P. Bishop Museum.
- Woodroffe, C.D. 1985. Vegetation and flora of Nui atoll, Tuvalu. Atoll Research Bulletin 283:1-28.
- Yen, D.E. 1971. The development of agriculture in Oceania. In Studies in Oceania culture history Vol.2., eds. R.C. Green and M. Keedy. Pacific Anthropological Records 12:1-12.
- \_\_\_\_\_. 1976. Agricultural systems and prehistory in the Solomon Islands. In Southeast Solomon Islands cultural history: A preliminary survey, eds. R.C. Green and J. Cresswell, pp.61-74. Bulletin 11. Wellington: Royal Society of New Zealand.
- \_\_\_\_\_. 1984. Aboriculture in the subsistence of Santa Cruz, Solomon Islands. Economic Botany 28(3):247-286.
- \_\_\_\_\_. 1980a. Food crops. In South Pacific agriculture choices and constraints: South Pacific agricultural survey 1979, eds. R.G. Ward and A. Proctor, pp. 197-234. Manila: Asian Development Bank in association with Canberra: Australian National University Press.
- \_\_\_\_\_. 1980b. Pacific production systems. In South Pacific agriculture choices and constraints: South Pacific agricultural survey 1979, eds. R.G. Ward and A. Proctor, pp. 73-106. Manila: Asian Development Bank in association with Canberra: Australian National University Press.
- Yuncker, T.G. 1959. Plants of Tonga. Bulletin 220. Honolulu: Bernice P. Bishop Museum.

Appendix I. Nature and ecological and cultural (ethnobotanical) importance of coastal plant species of the tropical Pacific Ocean (Notes: 1) Under Latin Name, the names in parentheses are either synonyms, important closely related species, or misidentifications commonly applied to a given species; 2) Under "Habitat", O = outpost strand zone, I = inner littoral zone, M = mangrove habitats, W = coastal wetland or marshes; N = also found naturalized or wild in non-coastal habitats, and C = cultivated or planted; 3) Under "Origin", I = indigenous, A = aboriginal introduction, R = recent post-European contact introduction, and ? = status unsure; 4) Under "Importance", "Eco" = ecological importance in coastal plant communities and "Cult" = cultural importance in terms of a species' range throughout the Pacific islands or its overwhelming importance in some localities, with +++ = very important in most island groups, with multiple usage in terms of cultural importance, ++ = of considerable importance in some island groups or some important uses locally, + = present in some island groups or of some use in restricted localities, and - = of minor ecological importance or no cultural uses reported from Melanesia, Polynesia, or Micronesia).

Latin Name  (synonyms/similar or important species)	Habitat	Origin	Importance	
			Eco	Cult
<b><u>FERNS</u></b>				
<u>Acrostichum aureum</u>	I,W,M	I	++	+
Young fronds eaten cooked in Fiji and Tahiti and used medicinally in Melanesia, Tonga and Tahiti				
<u>Asplenium nidus</u>	I,N	I	++	++
Occasionally planted as an ornamental; young fronds of some varieties eaten in parts of Polynesia and Micronesia and considered a delicacy in Niue; leaves used as pig feed and to wrap food for cooking in the earthen oven in Tokelau, and to line breadfruit fermentation pits in Puluwat; fronds used medicinally in New Caledonia and Samoa; shiny outer layer of midrib used to decorate small mats and other plaited ware in Hawaii; leaves used to cover tree stump during canoe-making ceremony in Hawaii				
<u>Davillia solida</u>	I,M,N,C	I	+	+
Occasionally planted ornamental; fronds used medicinally in Melanesia				
<u>Nephrolepis</u> spp. ( <u>N. biserrata</u> , <u>N. hirsutula</u> )	I,M,N,C	I	++	++



Occasionally planted as an ornamental; fronds used medicinally, for body ornamentation and food parcelization; fronds used in fishing magic in Micronesia and for mulching in Tokelau

Polypodium scolopendria            I,N            I            +++    +++  
(Phymatosorus scolopendria, Microsorium scolopendria)

Occasionally planted or protected in houseyard gardens; important in death ritual in New Guinea and in religious rituals in Tahiti; fronds used to scent coconut oil and in garlands, ear slits and body ornamentation in Melanesia, Polynesia, and Micronesia; roots, stems and fronds used medicinally in Melanesia and Polynesia; fronds used in food parcelization and to line earthen oven; young fronds eaten in New Guinea

Pteris spp.                            I,N            I            +        +  
(P. tripartita, P. pacifica, P. ensiformis, P. comans)

Occasionally planted or protected as an ornamental; fronds used medicinally in Melanesia and Polynesia; fronds used in head garlands in Samoa and Puluwat

Pyrrosia adnascens                    I,N,M            I            +        +  
(Cyclophorus adnascens, Polypodium adnascens)

Used medicinally in Fiji

Stenochlaena palustris                I,N,M,W            I            +        +

Young fronds eaten in Fiji; long fibrous stems used for binding timber and thatch in Tonga

Tectaria spp.                            I,N            I            +        +  
(T. latifolia)

Young fronds eaten in Fiji; fronds and shiny black frond midribs used for decorations

Thelypteris spp.                        W,I,N            I            ++        +  
(T. invisus, Cyclosorus invisus, Dryopteris invisus)

Young fronds of some species eaten cooked and raw and used for parcelization of jellyfish and seafoods; fronds used medicinally and in garlands and for body ornamentation; stems used for lashings in New Guinea

HERBS

Achyranthes spp.                    I                    A?                    +                    ++  
 (A. aspera, A. canescens, A. velutina)

Commonly protected in gardens and ruderal sites; important medicinal plant in Melanesia, Polynesia and Melanesia; used in magical songs in Puluwat

Boerhavia spp.                    O,I                    I                    +                    ++  
 (B. repens, B. diffusa, B. tetrandra)

Tuberous root a famine food in parts of Polynesia and Kiribati; used as pig feed in Kiribati; roots and leaves used medicinally in New Caledonia, Samoa and Tokelau; stems sometimes used in garlands in Tokelau; used in magic and compost in Kiribati

Crinum asiaticum                    O,C                    I?,A?,R                    +                    ++

Planted in houseyard gardens, as borders, and in cemeteries; leaves used for body ornamentation for dance and worn in ear slits; leaves used to cover hot stones before placing food in earthen oven and to cover earthen oven; leaves and flower stalk used medicinally; used to treat stonefish poisoning in Micronesia; flowers used in garlands and in the hair in Kiribati, Nauru and Tuvalu; leaves used to counteract sorcery and skin of trunk to lure fish in trolling in Micronesia

Dendrobium spp.                    I,M,N,C                    I                    +                    +  
 (D. tokai, D. valpelianum)

Occasionally planted as an ornamental; used medicinally in Fiji and New Guinea; used in personal adornment in New Guinea

Hedyotis spp.                    O,I                    I                    +                    +  
 (H. biflora, Oldenlandia biflora, H. foetida, H. romanzoffiensis)

Used medicinally in Micronesia; fruit sometimes used in garlands in Tokelau

Heliotropium spp.                    O,I                    I                    +                    +  
 (H. anomalum, H. indicum, H. procumbens)

Official flower of the island of Kaho'olawe in Hawaii; used medicinally in Tahiti; used to brew tea in Hawaii; stems and flowers used in garlands in Hawaii

<u>Hymenocallis littoralis</u>	O, I, C	R	+	+
(Pancreatum littorale)				
Occasionally planted ornamental; flowers used in garlands in Kiribati and Nauru; leaves used medicinally and roots to counteract black magic in Pohnpei				
<u>Laportea ruderalis</u>	I, N	I	+	+
(Fleurya ruderalis)				
Leaves and entire plant used medicinally				
<u>Lepidium bidentatum</u>	O	I	+	+
Leaves edible; used medicinally in Tahiti				
<u>Peperomia</u> spp.	O, I, N	I	+	+
Used medicinally in Melanesia, Tahiti and Guam; leaves eaten in New Caledonia				
<u>Portulaca lutea</u>	O	I	+	+
Stems, leaves and roots an emergency and pig food in Micronesia; cooked after washing in sea water or mixing with toddy in Kiribati				
<u>Portulaca australis</u>	O, I	I?	+	++
(P. samoensis)				
Stems and leaves occasionally cooked or eaten raw in Micronesia; stems and leaves pounded and mixed with coconut syrup to make pudding in Nauru; emergency food in Polynesia; common pig feed; leaves and stems used medicinally in Hawaii, Kiribati and Nauru; used in love magic in Kiribati				
<u>Procris pedunculata</u>	O, I, N	I	+	+
(Elatostema pedunculatum)				
Small fruit reportedly edible and eaten in Tokelau; used medicinally in the Marquesas				
<u>Sesuvium portulacastrum</u>	O, W	I	+	+

Used medicinally in New Caledonia; edible boiled or raw; used for pig feed in Kiribati

Tacca leontopetaloides O, I, N, C A + ++

Occasionally cultivated in Polynesia and Micronesia; tubers cooked as a minor seasonal staple; root grated and washed to make starch and pudding and as an adhesive in Nauru and as the traditional adhesive for bark (tapa) cloth throughout Polynesia; starch formerly exported from Polynesia; fibers from flower stalk used in parts of Polynesia and Micronesia for weaving hats and fishing line; root and sometimes stems used medicinally in New Caledonia, Fiji, Tahiti, Hawaii, Nauru and Puluwat; occasionally used for garlands and scenting coconut oil in Kiribati

Taeniophyllum fasciola I, N I + -

Triumfetta procumbens O I + ++

Bast fiber used for making cordage and fiber for plaited ware in Melanesia, eastern Polynesia and Micronesia; leaves, stems, flowers and burrs used medicinally; leaves used to cover or dampen fire when smoking skirts in Tuvalu; used for love and fishing magic in Micronesia and to defog diving goggles/face masks; used in compost and to make an infusion to get rid of bad breath after eating shark in Kiribati; associated with periods of revelry in Kiribati; flowers and stems used for head garlands in Tuvalu, Kiribati and Puluwat; bark used as shampoo and laundry soap in Tokelau

#### GRASSES AND SEDGES

Cyperus javanicus O, I, W, N I, A, R ++ ++  
(Mariscus javanicus)

Fibrous stems used to strain fluids like kava in Hawaii and eastern Polynesia and for grass skirts in Kiribati, and to strain coconut oil in Hawaii; stems used to string fish and garlands in Nauru; bottoms of stems eaten as a famine food during World War II in Nauru; flower used in garlands in Kiribati

Cyperus laevigatus W I, A? + ++

Stems used to make fine mats in Hawaii and skirts in Kiribati; stems used medicinally and to strain kava and other liquids in Hawaii, and for cordage and in string-figure or cat's cradle games in Kiribati

Cyperus polystachyos O,I,W I + -

No reported use

Eleocharis spp. W I,A? + ++  
(E. dulcis, E. geniculata)

Stems used to make ceremonial fine mats in Fiji and Tonga, soft sleeping mats in Samoa, and canoe sails in Fiji; tuber of E. dulcis edible

Fimbristylis cymosa O,I I ++ +  
(F. atollensis)

Root nodules used to scent coconut oil in Tonga and Fiji; leaves and roots used medicinally in Micronesia and Tokelau; used to make fish lures in Micronesia; stems used to clean ears in Tokelau

Ischaemum murinum O I? + +  
(I. foliosum, I. longisetum)

Used medicinally in New Caledonia

Lepturus repens O I ++ +

Stems used medicinally and to clean ears in Tokelau

Paspalum distichum O,W I,A? + +  
(P. vaginatum)

Used medicinally in Fiji and New Guinea; buried as fertilizer in Puluwat

Sporobolus virginicus O,I I,A,R? + +

Buried as fertilizer in Puluwat

Stenotaphrum spp. O I,A? + +  
(S. micranthum, S. secundatum)

Believed by the Hawaiians to exorcise evil spirits; stems and ashes of stems used medicinally in Hawaii

Thuarea involuta                    O                    I                    ++                    +  
 Used medicinally and to make small fish traps in Micronesia

VINES AND LIANAS

Abrus precatorius                    I,M                    A                    +                    +

Leaves, roots and seeds used medicinally in Melanesia; used for fish poison in Samoa; attractive red and black seeds used in necklaces, for children's games, and to decorate oracle boxes in Fiji

Canavalia cathartica                    I,N                    I,R                    +                    +  
 (C. microcarpa)

Stems used for house lashings in Fiji; leaves and stems used medicinally in Micronesia; flowers and seeds made into leis and necklaces in Hawaii and Micronesia

Canavalia rosea                    O,I,N,C                    I,R                    ++                    ++  
 (C. maritima)

Used as a cover crop for cocoa, bananas, coffee and other tree crops in Samoa; used as fertilizer and mulch in Puluwat; leaves and roots used medicinally in Melanesia and Tonga; used in fishing rituals in New Guinea

Canavalia sericea                    O                    I                    +                    +

Used medicinally in New Caledonia

Cassytha filiformis                    O,I,N                    I                    ++                    ++

Used for sorcery in Kiribati and fruit used in fishing magic in Ulithi; stem used for fastening roofing in Papua New Guinea; important medicinal plant in Melanesia, Polynesia and Micronesia; used to treat jellyfish stings in Fiji; fruit eaten by children in Micronesia and used as a pre-masticated infant food in Ulithi; fruit used by children as ammunition for popguns in Puluwat; sap from stems used as a shampoo and hair conditioner in Tokelau; plant used to line earthen oven in Truk; entire plant used as casual head garlands for picnics and other light-hearted occasions; tips occasionally used for scenting coconut oil in Nauru

Derris trifoliata                    O,I,M                    I                    ++                    ++

(D. ulignosa)

Extract of roots used as a fish poison in Melanesia and Polynesia; stem fibers used for cordage in the past in Tonga and vines as ropes for coconut frond leaf sweeps for communal fish drives; stems and leaves used medicinally in Melanesia and Polynesia

Entada phaseoloides I,N I ++ +++

Important totem in some parts of Fiji; drinking water obtained from thick stems; young stems used for cordage or rope; large stems used as ropes to attach coconut fronds for communal fish drives; large flat dark brown seeds used in necklaces, dance anklets, rattles, and other body ornamentation, in handicrafts, and as objects to be tossed or lagged in children's games; roots, stems, and leaves used medicinally in Melanesia and Polynesia; seeds eaten in Vanuatu and roasted and eaten with wild yams as a chiefly food offering in Fiji

Epipremnum pinnatum I,N I + ++  
(E. mirabile, Rhaphidophora pinnata)

Occasionally planted as an ornamental; long slender stems used in the weaving of ceremonially important baskets in Tonga; stem, leaves and sap used medicinally in Melanesia and Polynesia

Hoya australis I,N I,R + +

Occasional as a planted ornamental; leaves and stems used medicinally in Melanesia and Polynesia; flowers used in garlands in Tonga and Samoa; stems used for lashing in New Guinea

Ipomoea littoralis O,I,N I ++ +

Flowers, stems and leaves used medicinally in eastern Polynesia and Micronesia; young leaves and stems cooked as a vegetable in Fiji and eaten raw and cooked in Micronesia, usually as an emergency food; used as a pig feed in Puluwat; flowers used occasionally in garlands in Micronesia; leaves used in love magic in Puluwat

Ipomoea macrantha O,I,N I ++ ++  
(I. tuba, I. grandiflora)

Leaves crushed to produce shampoo in Kiribati; used medicinally in Samoa, Tokelau, Kiribati and Ulithi; used in love magic, for pigfeed, and the leaves for dyeing pandanus in Kiribati; leaves used for food parcelization in Micronesia

Ipomoea pes-caprae O,W I +++ ++  
(I. brasiliensis)

Used ceremonially in childbirth rites, in bewitching and in surf riding ceremonies to "whip up the waves" in Hawaii; roots and stems a famine food in Tahiti, Hawaii and Easter Is.; leaves, stems, roots and seeds used medicinally throughout the Pacific; stems used for lashing in Papua New Guinea; roasted leaves used for caulking canoes in Fiji

Mucuna gigantea I,N I + +

Used medicinally in Melanesia; thick vines occasionally cut to acquire water; seeds used to make necklaces and in children's games; seeds eaten in Fiji

Vigna marina O,I,C I +++ ++

Important medicinal plant in Melanesia, Polynesia and Micronesia; used to exorcise evils spirits (dispel fits); crushed leaves used to bathe young girls hair in Nauru; leaves used to cover the earthen oven in Nauru; leaves an ingredient in black dye on Ifaluk; leaves used for fodder in Fiji

#### SHRUBS

Abutilon spp. I,N,C I + ++  
(A. indicum, A. asiaticum)

Occasionally planted in houseyard gardens; leaves and roots used medicinally in New Caledonia; young leaves and growing tips used to scent coconut oil in Nauru; flowers used in garlands Kiribati and Nauru; leaves used in mulching in Kiribati

Acanthus ilicifolius M I + +  
(A. ebracteatus)

Flowers and leaves used medicinally in Solomon Islands

Allophylus timoriensis I,N I + +  
(A. cobbe)

Wood used to make lean-to shelters, fishtraps and firewood in Micronesia; bark, leaves and buds used medicinally in Melanesia and Micronesia; seeds used for fish poison in New Caledonia

Bikkia tetrandra O I + +



(E. grandiflora)

Fragrant white flowers used in garlands

Caesalpinia spp.                    I,N,M            I                    +            ++  
 (C. bonduc, C. crista, C. major)

Thorny stems used to make snares for fruit bats and birds in Western Polynesia; thorny parts used for fishhooks on Easter Is.; bast fiber used for fastening canoe pieces and house poles; seeds and other parts used medicinally in Melanesia and Polynesia; seeds used in necklaces and for marbles

Canthium spp.                    I,N                I                    +            ++  
 (C. odoratum, C. barbatum, Psydrax odorata)

Durable wood used for light construction and handicrafts; wood used for digging sticks in Vanuatu and Hawaii; used medicinally in Tahiti and the Marquesas; flowers used in garlands in Tonga and Hawaii

Capparis cordifolia                    O,I                I                    +            +  
 (C. sandwichiana)

Occasionally planted as an ornamental; crushed as a fish poison in Nauru; used medicinally and in garlands in Hawaii

Clerodendrum inerme                    O,I,M,C            I                    +++        ++

Planted as a hedge plant; wood used in frames for fishing nets and soil sieves and in shark rattles in Kiribati; branches used for fish traps in Micronesia; occasionally used as firewood; leaves, bark and sap used medicinally throughout the Pacific; leaves used with other plants as an abortifacient in Pohnpei; flowers used in garlands in Polynesia and Micronesia; leaves boiled with pandanus leaves to dye them brown in Kiribati; flowers used in love magic in Puluwat

Colubrina asiatica                    O,I,N                I                    ++        ++

Branches used to make bows in Samoa; leaves woven into garlands in Nauru; very important medicinally throughout the Pacific; bark and leaves used as a soap substitute; used to wash and whiten fine white textile kilts and garments made from Cypholophus heterophyllus in Samoa

Desmodium umbellatum                    I,N                I                    +            +

Small branches used occasionally for outrigger braces; occasionally used as firewood; bark used as a soap substitute; used medicinally in Melanesia



Fronds used for thatching, umbrellas, raincoats, coarse baskets, mats and bags; young leaves used for cigarette wrappers; leafstalks for fuel, arrows, and floor slats; young leaves when placed on sea reportedly attract fish in Papua New Guinea; young shoots used medicinally in PNG; sugary sap from young inflorescence edible and fermented into an alcoholic beverage or vinegar; young seeds edible; mature seeds used as buttons in PNG

Pemphis acidula

O,I,C,M I

+++ +++

Ancestral tree of the people of Kabara and Wagava, Fiji who believe they originated as its fruit; referred to by the title of Yu (forefather) on Kabara, where only one tree remained in the 1930s; extremely hard wood favored for carved objects such as house frames, canoe parts, keels, connecting pegs, and paddles, digging sticks, clam knives, tool handles, thatching needles, pipes, back scratchers, fish hooks, fishnet frames, fishing poles, shuttles and meshing needles, fish, eel, and rat traps, spears, fish clubs, war clubs, darts, food containers, mortars and pestles, pounders, pump drill pieces, coconut huskers, combs, drums, tops, throwing sticks, and other toys, etc.; a preferred fuelwood with a very hot flame; wood used for spear of wave magician and as staff for magic dances in Ifaluk; old wood used to smoke skirts in Tuvalu; rotting wood mixed with coconut oil as a cosmetic; bark, leaves and flowers used medicinally in Tahiti and Micronesia; bark and leaves mixed with toddy as baby food in Ifaluk; fruits sometimes eaten in Kiribati; used as pigfeed in Tokelau; scraped bark yields a red dye in Tokelau

Scaevola sericea

O,I,C I

+++ +++

(S. taccada, S. frutescens)

Protected in garden areas in Kiribati and occasionally planted in houseyard gardens; associated with phases of the moon in Kiribati; features in legends and chants in Hawaii; wood sometimes used for roofing strips, rafters and supports and house decking, rafts, canoe paddles and poles, scoopnet handles, eel traps, reef markers, net gauges, shark rattles, throwing sticks and toy darts; hollow branches used as popguns or blow guns in games in Tuvalu, Tokelau, Kiribati and Nauru; pith of large trees cut into strips and made into paper-like garlands and headbands in Kiribati and Nauru and to caulk canoes in Tuvalu; pith chewed as gum in Kiribati; leaves made into tuna lures in Tokelau; leaves boiled with women's grass skirts in Kiribati to dye them brown and make them durable; bark, white heartwood, roots, leaves, fruit and seeds used medicinally; leaves used as a contraceptive in New Guinea; leaves used for wrapping penis in Vanuatu circumcision ceremony; leaves used to wrap food and to cover the earthen oven; leaves used as pigfeed in Tokelau; fruits used in magic in Kiribati; fruit used in fishing magic in Ulithi; leaves used for cleansing diving goggles in Polynesia, for shelter in fishtraps in Kiribati, to scent coconut oil in Micronesia, in head garlands and worn in ear slits in Tuvalu, and occasionally for compost or fertilizer; flowers used in garlands in Tuvalu, Kiribati and Nauru; fruit eaten by pigeons or fed to them as pets in Tokelau

Sida fallax I,N,C I,A? + ++

Very important in Hawaiian mythology and believed to be one of the forms taken by the goddess of the hula, Laka, and a prostrate form the body of the god Kane 'Apua, the healer and god of taro planters and the brother of Pele, the fire and volcano goddess; flower of the island of Oahu, Hawaii and of Abemama, Kiribati; planted as an ornamental and commercial crop for the sale of its flowers and garlands in Hawaii and Kiribati; possibly the only plant deliberately cultivated for lei making in ancient Hawaii; stems tied in bundles to encircle swamp taro mounds, as connectives in house thatching, for rough baskets, and floor covering under mats in Hawaii; bright orange flowers very important for garlands in Hawaii, Kiribati and Nauru, formerly reserved for persons of high rank in Hawaii and Kiribati; flowers and tender meristem occasionally used to scent coconut oil in Nauru; flowers and leaves used medicinally; flowers used in magic, particularly love magic, in Kiribati; bushes important in the preparation of swamp taro beds in Hawaii and leaves and flowers dried to make the strongest fertilizer or mulch for giant swamp taro and other crops in Kiribati; sometimes used as fresh compost in Kiribati; several varieties recognized in Hawaii

Sophora tomentosa O,I I + +

Used medicinally in Melanesia and Tahiti; used to cure puncture wounds from poisonous marine animals

Suriana maritima O I + +

Hard wood used in general construction and for fishhooks, adz handles, spears, frames for lobster nets, canoe booms and connectives, and fuelwood; bark used medicinally in Ulithi

Tephrosia purpurea I,N I,A + ++  
(T. piscatoria)

Possibly cultivated in the past in Samoa; extract of root used as a fish stupefacient throughout Polynesia and Melanesia; roots, young leaves and buds used medicinally in Fiji, Tahiti and Hawaii

Wollastonia biflora O,I,P I ++ ++  
(W. strigulosa, Wedelia biflora)

Leaves, sap, fruits and roots used medicinally in Melanesia, Polynesia and Micronesia; young fruit eaten in Solomon Is. and leaves eaten in New

Caledonia; flowers used as a contraceptive in Solomon Islands; leaves used in compost or fertilizer in Kiribati and Namoluk; stems used for cordage in Melanesia; entire plant used in magic in Namoluk to protect canoes at sea from breaking up

Wikstroemia foetida I,N,C I,A + ++  
 (W. elliptica)

Occasionally planted in Hawaii; bark used in Melanesia and Polynesia as a source of fiber and cordage for fishing nets, etc; leaves, bark and root used medicinally in Melanesia and Polynesia;; bark root and leaves used as a fish poison in Tahiti and Hawaii; flowers and bright red fruit used in garlands in Hawaii

Ximenia americana O,I I + +

Hard wood used for making headrests in Fiji; fruit edible and a favored food of pigeons; stems and leaves used medicinally in Melanesia

TREES

Acacia simplex O,I,M I ++ ++  
(A. simplicifolia)

Wood occasionally used in general construction, for handicrafts and tools, and for firewood; leaves used medicinally in New Caledonia and Tonga; leaves used as spoons in Fiji; seeds occasionally used for necklaces in Samoa

Aidia cochinchinensis I,N I + +  
(Randia cochinchinensis)

Wood used to make thatch rafters for houses and coconut huskers in Samoa and for canoe booms in Futuna; fruit eaten by children in Nauru

Avicennia marina M I ++ ++  
(A. alba)

Wood used in general construction; bark used medicinally and sap of leaves on poisonous fish punctures in PNG; resin used as a contraceptive in PNG; fruits edible in PNG

Barringtonia asiatica O,I,C I +++ ++

Occasionally planted in houseyard gardens; occasionally planted from drift seeds in Kiribati; tree believed to be inhabited by ghosts in Tokelau; said used to assist priests (kahunas) in praying someone to death in Hawaii; wood used for general construction, handicrafts and occasionally for boatbuilding; used for firewood in Micronesia and for cooking coconut syrup in Nauru; bark, root, flowers, fruit and seeds used medicinally in New Guinea, Polynesia and Micronesia; seeds crushed to yield fish poison and insecticide; dried fruit used as fishnet and turtle net floats and for games in Fiji; leaves used to parcel food and line earthen oven; some parts (possibly the fiber from the fruit) used to make women's skirts in Fiji

Barringtonia racemosa I,W I + +

Used for light construction and house beams in Papua New Guinea; bark and leaves used medicinally in Melanesia

Bruguiera gymnorhiza M I,R +++ +++  
(B. conjugata, B. eriopetala)

Wood used in construction, for tools, coconut huskers, bows, gunwales, masts and other canoe or raft parts, and highly valued for firewood and

charcoal making; bark a good source of tannin, bark and flowers yield dark brown dye used for bark cloth in Tonga and Fiji; red dye from bark used to preserve and color canoe sails in Kiribati; skin of fruit used to make black dye for skirts in Nauru; bright red flowers and white flowers strung in leis in Kiribati, Puluwat, Tonga and Hawaii; fruit (hanging radicle) used as food in Melanesia, an emergency food in parts of Polynesia and processed into a bread-like delicacy in Nauru; hollowed fruit use as a whistle in Samoa; fruits and bark used medicinally

Calophyllum inophyllum                    O,I,N,C            I,A                    +++    +++

Occasionally planted in houseyard gardens; a sacred tree in the past on Tabiteuea in Kiribati; features in Hawaiian chants and considered a sacred tree and planted around the most sacred temples in parts of Polynesia; the name of one of the three islands of Tokelau, Nukufetau, means the village or place of C. inophyllum; associated with rituals of human sacrifice and cannibalism in Tahiti and planted in groves and individually in Hawaii; fruit used in fishing magic and wood for spears used by wave magicians in Ulithi; reportedly semi-domesticated and planted for shoreline protection in Solomon Islands; strong and durable wood used in house construction, for woodcarving, canoe hulls, bowpieces, mastheads, rudders, booms and connectives and other durable canoe parts, and a wide range of wooden objects such as kava bowls, horsecarts, cooking vessels, calabashes, food containers or boxes, bailers, ladles, hat blocks, water-tight fishing boxes, headrests/pillows, canoe paddles, spades, digging sticks and other tools, tool handles, stilts, fishing poles, weapons, drums and slit-gongs, diving goggles, pump drill pieces, coconut tree-climbing clasps/ratchets, etc.; stems used for scoopnet and birdnet frames; used for firewood; sap used for caulking canoe hulls in Vanuatu and Nauru; fruit latex used as glue in New Guinea; leathery leaves used to make small kites and worn in ear slits in Tuvalu; seeds, leaves, gum and bark used medicinally; seeds provide brown dye for tapa cloth in Samoa, Tahiti and Hawaii; skin and outer flesh of fruit eaten in Kiribati and Puluwat; oil from seed kernel burned to provide illumination (as lamps); fruit burned as mosquito repellent; seed kernel pressed to produce highly-valued greenish oil and used to scent coconut oil for royalty in Fiji and Tonga; soot from seed used a tattoo pigment in Ulithi; sap used to pull out facial hair in Ulithi; seed used in necklaces and as marbles by children; green and mature seeds used to make hair tonic in Nauru; fragrant flowers used in garlands and to scent coconut oil in Polynesia and Micronesia

Casuarina equisetifolia                    O,I,N,P                    I,R                    +++    +++  
(C. litorea)

Features in Fijian and Polynesian mythology and legends; the emblem tree of Oro, the god of war and planted around sacred areas (marae) in Tahiti; reportedly semi-domesticated in Solomon Islands; planted to stabilize coastal areas in land reclamation, as windbreaks, hedges, and living fences around homes and to protect coastal plantations and as a nitrogen-fixing tree; common ornamental or street tree; planted near

burial sites in Fiji; durable heavy wood used in construction and woodcarving and for war clubs, dart tips, bark cloth beaters and anvils, fans, digging sticks and other tools and tool handles, house posts, canoe hulls and parts, and other objects; excellent firewood; roots used to make fishhooks in Tahiti; bark and leaves used medicinally in Melanesia and Polynesia; bark provides a brown dye and tannin for tapa cloth in Tahiti

Cerbera manghas I,N,M,C I + ++  
(C. odollam)

Occasionally planted as an ornamental; poisonous fruits and seeds used as a fish poison in Melanesia and Polynesia and reportedly for suicide in the Marquesas; wood used for general construction and handicrafts; trunks used for canoe hulls and hollowed into drums with sharkskin heads; bark and leaves used medicinally in Melanesia and Polynesia; flowers used in garlands and decoration; distinct red and green fruited forms or cultivars recognized in Vanuatu

Ceriops tagal M I + +

Very durable wood used in house construction in PNG; excellent firewood; excellent source of tannin; dye obtained from bark in PNG

Cocos nucifera O,I,N,C A,I? +++ +++

The most useful of all plants in the Pacific; features in mythology, legends, songs, proverbs and riddles throughout the Pacific; of ceremonial importance and its leaves a sign of high rank in Polynesia and Micronesia; the tip of the frond a religious emblem in Tuvalu; planted in extensive monocultural plantations, as well as being the most important intercrop or agroforestry species in smallholder mixed cropping systems; specific trees or two trees planted together serving as boundary markers in Tuvalu; trunk used in house construction for poles, rafters, and beams and for woodcarving, in fencing and for animal pens, for other articles such as food containers, tools, spears and weapons, drums, canoe planking and small-canoe hulls and paddles, walking sticks, fish clubs, and, most recently, for sawn timber using portable timber mills; major source of fuel on most smaller islands, with almost all parts being used; coir and dry leaves important as tinder in making fire by friction and carrying fire; swelling at base of trunk made into food containers and large hula drums in Hawaii; bark used for scenting body oil and for smoking skirts; mature and young leaves used for weaving baskets, food containers and parcels, mats, housing thatch, tables or table mats for feasts, trays, fans, balls, weirs/barricades for communal fish drives, and other plaited ware; young leaves from germinating nut used to make a coconut-tree climbing bandage or foot-harness which is tied between the feet; unfurled immature leaves used to make skirts, body ornamentation, hats/eyeshades, baskets, fans and fishing lures; leaves used in magic, particularly garden magic and tied around trees in plantations as boundary markers or to ward off evil spirits and as a sign of no trespassing or tapu; old dried leaves and



husks used as mulching; midrib of leaflets or pinnules used in brooms, in weaving, toy windmills, for fishing lures and shrimp snares, to spear mudworms, small arrows, musical instruments, headdresses, combs, for stringing fish and oil-rich seed kernels burnt for illumination, fastening thatch segments, for strengthening bonito hooks, cooking skewers, toy canoes, and in a variety of other ways; woody leaf base and midribs of fronds used for house flooring and rafters, for sandals, carrying poles, toy boats, rattles, sledges or clappers, clubs or mallets, and to beat water during fish drives and for pounding and stabilizing banks of taro beds; doubled-over midribs of fronds used as cooking tongs; midribs of young fronds used for fishermen's belts in Tuvalu; burlap-like fibrous sheath at base of fronds used as tinder, toilet paper, gauze, a filter or strainer and to press medicine or coconut oil and to wrap bait for deepwater fishing and the earth ball on the roots of seedlings when transplanting; flower used in connection with religious ritual in Tahiti; kernel or endosperm of mature nut used raw, cooked and fermented in a variety of ways as a staple food, as a major food for chickens and pigs and ingredient in locally produced commercial livestock feeds, for fish and rat bait, and dried to provide the socially important scented and unscented coconut oil for soap, skin oil, cosmetics, perfume, and copra, the only export crop in many rural areas; chewed pieces of mature kernel used as popgun ammunition on Tuvalu; kernel of mature nuts hung in house rafters as emergency food for up to ten years; oil used as a preservative for tapa, carvings and other objects; soft flesh of immature nut an important weaning food and adult food; juice of immature nuts a nutritious local beverage, which is often sold, and considered a sacred offering to visitors in Kiribati and used in divination in Hawaii; oil chewed and spat on the ocean to calm the sea; sap from flower spathe used to make unfermented and fermented toddy and syrup, which are of considerable nutritional importance in Micronesia and on atolls; husk of some cultivars of green nuts eaten in atoll Polynesia and Micronesia; flower spathe sheath and dried fronds used to make torches for night fishing and for major nighttime ceremonial occasions; dried sheaths used as splints to set broken bones; flower spathe sheath and frond midribs used to splint broken bones in Tuvalu; coir of husk of both green and mature nuts used to make strong fibre and cordage (sinnet) for strainers, affixing tool handles, boat and house lashings, fishnets and lines, measuring tapes for garden lands, hammocks, belts, reef-walking sandals, canoe caulking, corks or stoppers, slings, toilet paper, baskets or carry bags, tying corpses for burial, and commercially to make brooms, brushes, fly whisks, doormats and other objects; green husks used to cover earthen oven; pieces of green husk used as temporary spoons to scoop meat out of green nuts; charred husk fibre used for black dye in Tokelau; shell of nut used to make cups, bailers, small bowls, cooking vessels, funnels, utensils, storage containers, fish hooks and lures, floats, knee drums, cymbals, lagging discs, toys and a wide range of handicrafts and high quality charcoal; roots used to make fish traps, floating cages, sand screens, and other objects; very important medicinal plant, with most parts used medicinally; leaning palms with excavated cavities or attached receptacles near the base used for water catchment; numerous named cultivars recognized in all parts of the Pacific, many of which have specialized uses, e.g., for drinking nuts, cup, or coir cordage

Cordia subcordata                    O,I,C                    I,A                    ++    +++

Planted as a ornamental shade tree in or near settlements; formerly many famous large groves in Hawaii; a favored shade tree in ancient Hawaii; features in Polynesian legends and chants, including the origin of fire from the underworld and, in Kiribati, is the totem of the Karongoa clan and features in mythology; soft but durable chocolate brown and blond wood used in general construction and among the most favored carving woods and used for making canoes hulls, thwarts, rudders, weather platforms, outrigger booms and paddles, furniture, headrests, bowls, trays, plates, combs, food stirrers, food containers or boxes, air-tight reef boxes for fishing equipment, fishnet floats, fishing rods, tools, coconut climbing sticks, toys, drums and slit-gongs, tobacco pipes, images of gods (tiki), and other carved objects for sale to tourists; young saplings used for fishing rods and flutes; inner bark used as pregnant women's girdle to provide magical powers in Kiribati and as sail ornamentation on Polynesian voyaging canoes; inner bark soaked in seawater made into dance skirts, hats, fans, baskets, garlands and, in former times, men's clothing; used for firewood and dry bark and wood used in making fire by friction; leaves, bark, growing tips and stems used medicinally; leaves used in arousing love in Kiribati and for love, wave and protective magic in Micronesia; leaves used to make brown dye in Tahiti and for pigfeed in Tokelau; brown dye made from roots in Tokelau; attractive orange flowers used in leis and garlands; seeds eaten, mainly by children, in Fiji, Tokelau, Puluwat and Ifaluk; seeds used to make paste for bark cloth in Samoa

Cycas circinalis                    I,N,C                    I,A?,R                    +    ++  
(C. rumphii)

Commonly planted ornamental; very important ceremonially in Vanuatu where its is planted in ceremonial dance grounds, pigs tethered to it before ceremonial feasts, leaves an important symbol of taboo or restriction, an emblem on the national flag, and its leaves put on belts by men to show rank of maturity or initiation, with burning leaves used to punish (burn) persons guilty of grave crimes; leaves used in Vanuatu to communicate messages, and leaflets of fronds to count people at feasts and to fix dates for marriages, important feasts, and important works by taking off successive leaflets until a given date; seeds edible after thorough washing and processing into flour; pith-like substance from trunk eaten in Guam and reserved as food for chiefs in the past in Fiji; an important famine or emergency food in the past; fruit, sap and pollen used medicinally in PNG; fronds used in decorations

Cynometra ramiflora                    M,C                    I                    +    +  
(C. insularis, Maniltoa spp.)

Timber used in general construction and for houseposts; seed for children's games in Fiji; leaves used medicinally in Fiji

Diospyros spp. I,N I + +  
 (D. elliptica, D. ferrea, D. insularis, D. samoensis, D. vitiensis)

Timber valuable for general construction, handicrafts, and digging sticks and firewood; bark and leaves used medicinally in Melanesia, Tonga and Samoa; fruit of some species eaten

Dolichandrone spathacea M,I I + +

Wood used in general construction and for net floats; leaves used medicinally in Solomon Islands

Erythrina fusca M,W,I I + +

Leaves, bark and roots used medicinally in New Caledonia

Erythrina variegata var. O,I,N,C I,A ++ +++  
orientalis (E. indica)

Planted as one of the most common living fences and boundary markers; planted as shade, windbreaks, or green manure for coffee, cocoa and citrus plantations; common in houseyard gardens; flowering an important part of traditional agricultural calendar and the signal of the beginning of the yam planting season in many areas; the red flower a sign of blood and a declaration of war on Pentecost, Vanuatu; wood used in light construction, for small canoe hulls and outriggers, floats and for digging sticks; occasionally used as firewood; used for smoking bark cloth in Samoa to give it a deep brown color; leaves, flowers and bark used medicinally; seeds occasionally used in necklaces, by children as toys, and by heathen priests in Fiji to cover oracle boxes; flowers used in garlands in Samoa, Nauru and Puluwat; at least three distinct varieties or cultivars recognized in Vanuatu

Excoecaria agallocha M,O,W I ++ +

Timber used for general construction; leaves, bark, root and sap used medicinally; wood burnt to produce smoke as a cure for leprosy and to treat fish puncture wounds in Fiji; latex used to poison fish in PNG; leaves boiled with coconut sennit to make it black in Lau, Fiji

Ficus obliqua I,N I ++ ++

Wood used in general construction and for firewood; tree once regarded as sacred in Fiji and still regarded as sacred in Vanuatu; bast fiber used to make bark cloth in Fiji; roots, aerial roots, bark, and leaves used medicinally; leaves used in garlands and in ceremonial dress; fruit an important food of fruit bats, pigeons and other birds in Vanuatu

Ficus prolixa I,N I ++ +++  
(*F. aoa*, *F. microcarpa*, *F. virens*)

Tree regarded as having spiritual importance in many areas and the focus of creation mythology and cosmogony in Polynesia and Melanesia; important in rituals and ceremonies in Melanesia; is found in and serves as the focus for the ceremonial meeting place (nakamal) in Vanuatu; timber and aerial roots used in construction and tool making in Melanesia; occasionally used for canoe hulls in Papua New Guinea; large aerial roots used for canoe masts and hauling loads on Ulithi; occasionally used for firewood; bast fibre used to make bark cloth in Vanuatu, Fiji, Niue, and Tahiti, and for making very large seine nets in Tahiti; sap used as chewing gum and, in Vanuatu, for putty and caulking and to dye ceremonial sashes and belts; fruit cooked and mixed with coconut syrup in Nauru to make a pudding; sap used for chewing gum; roots, aerial roots, bark, fruit latex, and leaves used medicinally; leaves used in garlands and in ceremonial dress; latex used in waterproofing in Tahiti; fruit important food of birds and fruit bats

Ficus scabra O,I,N I,A? + +

Used for firewood; leaf used as a sandpaper substitute; roots, bark and leaves used medicinally in New Caledonia Tonga and Samoa; horses eat young leaves in Tonga

Ficus storkii I,N I + +

Leaves used as a green vegetable in Fiji

Ficus tinctoria I,N,C I,A? ++ +++

Widely cultivated and propagated vegetatively as a minor staple food plant in Micronesia and Tuvalu; wood sometimes used in light construction and for digging sticks, canoe connectives, fishnet frames, fishtrap parts, earth sieves and for firewood and making fire by friction; fibrous branches used to clean teeth; roots used in scoopnet frames in Kiribati, and ropes for fish drives in Puluwat; bast fiber used as cordage for lashing and fishnets in Samoa and Tokelau; bast fiber of roots used for fish lures on Ifaluk and for cordage and chewed to make fuses or tapers used in medical treatment in Tuvalu; ripe or green fruit processed or cooked in many ways to produce a minor staple and made into puddings and dried preserved food in Tuvalu and Micronesia; fruit formerly used to dye bark cloth, hats, mats, etc. in Fiji, Samoa, Tokelau, Tahiti, and Kiribati; roots used to produce red dye for pandanus in Kiribati; sap used to produce red dye for face in Tahiti; fruit used as ammunition for popguns in Tuvalu; yellow leaves used in body ornamentation in Tuvalu; young leaves and young inner bark used medicinally in Kiribati; leaves fed to pigs in Tokelau and Kiribati

Glochidion spp. I,N,C I + ++  
(G. ramiflorum, G. concolor, G. littorale)

Wood used in general construction and for firewood; leaves and bark used medicinally throughout the Pacific

Grewia crenata I,N I + ++

Wood used for general construction and for firewood; bast fiber used for cordage; bark and leaves used medicinally; leaves used to cover earthen oven in Lau, Fiji; ripening fruit a sign to harvest yams and taro in Vanuatu; seeds eaten in New Caledonia

Guettarda speciosa O,I I ++ +++

Occasional in houseyard gardens in Nauru; important in Kiribati and Tuvaluan legends and mythology; names of the leaf and the plant being associated with phases of the moon and stations of the sun in Kiribati; hard and durable wood used in construction, for pilings, fishtrap stakes, stakes to hold garden mulch in place, coconut huskers, fishing poles, floats, spears, thatching needles, fishing rods, fishnet and birdnet handles, stilts, eel traps, fruit harvesting sticks, bowls, slit-gongs, for canoe hulls, supports, steering paddles, bailers, poles for poling canoes, and floats; the most desired wood for tapa beating anvils in Tonga; wood used in games in Fiji; used for firewood and for making fire by friction; leaves used in fires for drying pandanus leaves and for toilet paper in Tokelau; dead wood used to smoke skirts in Tuvalu; bark, leaves, flowers and fruit used medicinally; leaf litter considered the most important component and source of black topsoil which is mixed with compost for the cultivation of giant swamp taro, pandanus and other crops in Kiribati; leaves, either alone or with other leaves provide one of the most important composts in Kiribati and Tuvalu; all pastes or preserves spread on Guettarda leaves for sun drying in Kiribati; leaves used to cover earthen oven and as disposable plates in Micronesia; leaves provide a jet-black hair dye in Kiribati; leaves used as a baby's washcloth in Ulithi; leaves used for pigfeed in Tokelau; leaves used in head garlands and worn in ear slits in Tuvalu; flowers used in garlands and for scenting coconut oil; flowers and young leaves soaked in water to provide deodorant and a women's love potion (love magic) or aphrodisiac in Kiribati to make their sweat fragrant; parts used as love charms in Ulithi

Gyrocarpus americanus I,N I + ++

Timber used in general construction; bole used for canoe hulls in Vanuatu and occasionally for firewood; leaves and bark used medicinally in Tonga, Fiji and Vanuatu

Heritiera littoralis O,I,M I + +  
(H. ornithocephala)

Durable wood used in general construction, for canoes, wharves, and as firewood; stems, seeds and sap used medicinally in Melanesia; seeds eaten with fish in PNG

Hernandia sonora O,I,C I,A? ++ ++  
(H. nymphaeaefolia, H. ovigera, H. peltata)

Possibly planted from drift seeds in Kiribati; bole used for canoe hulls, outriggers, freight-raft floats, fish floats, corks, paddles, bailers, bird-net handles, wooden pillows, cricket bats, rat traps, and in light construction; used occasionally for firewood; bark, stem, leaves, fruit and seeds used medicinally in Melanesia, Polynesia and Micronesia; leaves used to make black paint in Truk; leaves used as compost and worn in ear slits in Tuvalu and as pigfeed and in dancing skirts in Tokelau; hard dark brown seed used in necklaces and handicrafts and as marbles by children

Hibiscus tiliaceus O,I,M,N,P I,A +++ +++

One of the most useful trees in the Pacific; commonly planted as living fencing and animal pens and in coastal areas, near houses, in gardens, and as an ornamental or shade tree; a creeping variety planted as windbreaks in Hawaii; its presence in forested areas considered a sign of former cultivation in Hawaii; features in eastern Polynesian legends and Hawaiian firemaking legends; commoners not allowed to cut branches without permission of chiefs in Hawaii; branches borne in battle by priests as a good omen and allowed to fall in retreat in Hawaii; born by attendants at presentation of first fruits to kings on Easter Is.; branches used as tapu markers to delimit restricted areas in Hawaii; used to make spears used in typhoon magic in Ulithi; soft wood used in light construction and woodcarving, for house rafters, pig tethering posts, for canoe outriggers, spreaders, bailers, booms and occasionally hulls, fishing rods, hoists and floats, fishnet frames and handles, bows, fruit-picking rods, tools and tattooing comb handles, kite struts, jackstraw sticks, pestles, breadfruit splitters, coconut huskers, net floats, spears, shoreline posts to delineate fishing zones, fishing gear containers, noddy bird net handles and frigate bird nesting platforms (Nauru), and other purposes; a decent firewood, especially for slow smoking; used in making fire by friction; wood dried for six months used for fireworks in Hawaii; bast fibre used as canoe caulking and to make cordage for clothing and dancing skirts, and kilts, coconut climbing bandages or foot-harnesses, mats, sandals, sewing tapa, bark cloth paint brushes, making fishnets, fishing line and lures, slings, kava strainers, sandals or thongs, tying corpses in tapa, and cordage for tying, lashing and binding canoes, housing and other things; bark used

to strain kava in Pohnpei to give it its preferred slimy consistency; leaves, terminal buds, unopened flowers and bark used medicinally, with leaves being used to reduce hemorrhaging and for treating neurological disorders; leaves used to parcel food, especially seafood, as plates, and to line and cover the earthen oven; leaves widely used as toilet paper; flowers used in garlands in Hawaii; bark, shoots, and sapwood eaten in New Caledonia and other parts of Melanesia; leaves occasionally added to compost in Kiribati and Tuvalu; a number of distinct varieties or cultivars recognized in Melanesia and Polynesia

Inocarpus fagifer M,W,N,C I,A? ++ +++  
(I. edulis, I. fagiferus)

Tree features in Polynesian mythology and is the sacred tree of the people of Moce, Fiji, who are referred to as Vuata Ivi (fruit of the ivi); to injure the tree in any way was taboo on Moce and the first fruits were offered to priests; traditional calendar associated with its fruiting in Lau, Fiji; commonly planted or protected as boundary markers; wood used in general construction and woodcarving, for tool handles, kava bowls, tapa beaters, weapons, packing boxes, etc.; used for firewood; bark a source of dye in Tahiti; leaves used for indicating the value of pigs for ceremonial presentation in Vanuatu; leaves, bark and stems used medicinally; ripe seed, which tastes like chestnut, eaten cooked as a seasonal staple and preserved in the past in Polynesia and Melanesia; cooked seeds sold locally; gum from fruit used for caulking canoes in Uvea

Intsia bijuga I,N,M I + ++

Occasionally planted in villages in Fiji; one of most sacred trees in Fiji; durable attractive dark red-brown wood used in house construction and most desired for woodcarving for canoes and canoe masts, kava bowls, headrests, containers, tapa beaters, combs, warclubs and a variety of other articles of interisland trade between Samoa, Tonga and Fiji; used for firewood; roots and bark used medicinally in Melanesia; seeds used for dancing anklets in Samoa

Leucaena insularum O I + +  
(L. forsteri)

Timber used in handicrafts, for general construction, and for firewood

Lumnitzera littorea M,I I ++ ++

Tree planted for coastal reclamation in Tonga; features in Kiribati legends and songs; timber, which is resistant to marine borers and seawater, used for wharves, fishing poles, fishhook shafts, fishtrap stakes, crabtrap and fishnet frames, fishnoose poles, bridges, canoe parts, and fish traps, and in general construction, for house parts, spears, stilts, sticks for stick games, slit-gong drumsticks, thatching needles; used for firewood; deadwood used for smoking skirts and in garlands in Tuvalu; used medicinally in Melanesia; bright red flowers used in garlands in Tonga, Tuvalu and Kiribati

Mammea odorata I,M I + ++

Used in housebuilding magic and ceremonies in Ulithi; wood used in general construction and for making canoe parts and paddles, adz handles, clubs, barbed spears, arrow points, and wooden fans; various parts used medicinally in Micronesia; sap used as an orange-brown hair dye which was a major item of interisland trade in Fiji; fruit eaten in Ulithi; flowers and fruit used in garlands in Micronesia and fruit used to perfume hair on Ifaluk

Manilkara spp. I,N I + +  
(Manilkara dissecta)

Wood used in general construction and for firewood; flowers used in garlands in Tonga

Metroxylon spp. W,N,C I,A,R ++ ++  
(M. amicarum, M. salomonense, M. vitiense)

Commonly cultivated in New Guinea and Solomon Islands and occasionally in Melanesia and Polynesia; leaves considered among the best thatch in Melanesia; pith of trunk processed into starch which is the main staple in some coastal and riparian areas of Melanesia; sago starch a major item of coastal trade networks in New Guinea; starch made into puddings and desserts in Melanesia, Rotuma and Samoa; meristem eaten in curries by Indians in Fiji; seeds of M. amicarum used in necklaces and handicrafts and for buttons in western Micronesia

Morinda citrifolia I,N,P I,A? ++ +++



Tree features in Hawaiian, Tahitian and Tongan mythology; commonly planted in houseyard gardens; planted around houses to dispel evil spirits in Nauru; wood used in light construction, for digging sticks, adz handles, canoe parts, canoe paddles, stilts, and for firewood; poles used as taboo markers on reefs in Namoluk; fruit formerly eaten, especially by older people, but now mostly as an emergency food in Polynesia, but more widely eaten in Micronesia, often with toddy or sugar; fruit cooked and mixed with coconut to make pudding in Nauru; ripe fruit eaten as a stimulant on long sea voyages and used in love and fishing magic in Kiribati; fruit said to be eaten in the Mortlock Is. as a male contraceptive; bark and roots provide red and yellow dyes, respectively; roots mixed with lime to make red hair dye in Tuvalu; roots, bark, leaves, terminal buds and fruit used medicinally; stipules used to treat scorpion fish puncture wounds in Pohnpei; leaves fed to children as a treatment for vitamin-A deficiency in Kiribati; leaves used in head garlands in Tuvalu; leaves used as compost in Tuvalu; leaves used to wrap breadfruit seeds for cooking in earthen oven in Namoluk; juice of fruit mixed with spring water and drunk with kava to counteract unpleasant effects

Neisosperma oppositifolia O,I I ++ ++  
(Ochrosia oppositifolia)

Reportedly semi-domesticated in Solomon Islands; wood used for timber, houseposts, rafters and frames, tools, canoe paddles and rudders and other handicrafts; used as firewood; seeds and perhaps fibrous flesh of fruit eaten occasionally in past and as an emergency or snack food in Melanesia, Polynesia and Micronesia; leaves used to parcel fish and seafood; bark used medicinally in Micronesia; a number of cultivars or varieties recognized in Melanesia

Pandanus tectorius O,I,N,W,P I,A +++ ++  
(P. odoratissimus, P. pyriformis)

One of Pacific's most useful plants; features prominently in Melanesian, Polynesian and Micronesian creation mythology, cosmogony, proverbs, riddles, songs, chants, and sayings and a symbol of love and a nature spirit in Hawaii; many famous pandanus groves recognized in Hawaii, with the Kahala area of Honolulu, formerly known for its groves, named after the tree; people of Kiribati referred to as the "Pandanus People"; commonly planted in houseyard gardens and in monocultural and mixed stands in garden areas; trunk and prop or aerial roots used in house construction, and for ladders, digging sticks, headrests, rat traps, containers, canes, musical bows, and for fuelwood; roots used to make the ukeke musical instrument in Hawaii; chewed pieces of prop root used as popgun ammunition in Tuvalu and dried to make fuses or tapers used in medical treatment in Tuvalu; green wood used in smokeless fires to wilt pandanus for matmaking; dead wood used to smoke skirts in Tuvalu; treated leaves of selected varieties used to make mats, baskets, hats, fans, bracelets, pillows, canoe sails, toy boats, weather screens, balls, toys and other plaited ware and for cordage; leaves used for

compost, bandages, swabs, corks, cigarette wrappers, whistles and ornaments, and for caulking; most parts used medicinally; male flower used to scent coconut oil, to perfume tapa cloth, in garlands, as a love charm and aphrodisiac, and worn in ear slits in Tuvalu and to make fine mats by Hawaiians in the past; the fleshy drupes (keys) of fruit of many varieties or cultivars eaten ripe as a snack food or cooked and/or dried and processed in a variety of ways in to make coarse starch or flour, desiccated cakes and other staple substitutes in Micronesia and atoll areas, but considered an emergency food in most other areas of the Pacific; aerial root tips eaten on some atolls; stalk or receptacle upon which keys are attached fed to pigs in Tokelau; yellow to red immature drupes strung in leis or garlands; fibrous chewed or dried mature drupes (or after being chewed by hermit crabs) used as paint brushes for painting tapa, for fuel, and as fishing line floats or markers; stilt roots used to make fish net floats, red dye, and fibre from stilt roots for ceremonial skirts in Kiribati, jump ropes in Tokelau, and for stringing leis and straining kava in Hawaii; numerous cultivars or distinct species of pandanus exist, many of which are shrublike cultivars, and not P. tectorius, although some authorities believe that most of the tree-like and edible cultivars could be variants of P. tectorius

Phaleria disperma I,N,C I + ++

Planted as an ornamental in houseyard gardens; wood used for digging sticks and firewood; leaves boiled with coconut sennit to dye it black in Lau, Fiji; bark and leaves used medicinally in Fiji, Tonga and Samoa; leaves and flowers used in garlands and for scenting oil

Pipturus argenteus I,N I ++ ++  
(P. incana, P. albidus)

Features in legends of the Polynesia god Maui capturing the sun in Tahiti; important in magic, sorcery and ritual in Melanesia; wood used in house construction, for fishhooks, rollers for hauling, and firewood and for making tapa beaters in Hawaii; strong cordage obtained from bast fibre used for fishing lines and nets throughout the Pacific, and for making ceremonial mats in Samoa and for tying the navel of newborn babies in Tokelau in the past; made into tapa cloth in Tahiti and Hawaii; bark cloth paste made from bark sap; bark, roots and leaves used medicinally; leaves used in ceremonial dress and to parcel food and line earthen ovens in Melanesia and as imitation feathers on fishing lures on Puluwat; flowers used to scent coconut oil in Lau, Fiji; seeds eaten by pregnant women and newborn babies in Hawaii and by children in Tokelau; young leaves eaten after cooking in toddy and coconut milk on Ifaluk; bark fed to pigs on Namoluk; a number of different red and green-leaved varieties or cultivars recognized in Vanuatu

Pisonia grandis O,I,C I ++ ++  
(P. alba)

The favorite nesting or rookery tree for sea birds, including the black noddy, a ceremonial delicacy in Nauru; reportedly a protected sacred grove on Onotoa in Kiribati; leaves considered godlike on Tongareva; occasionally planted as a living bath house to provide shade and privacy and as a living pig pen in Tonga; soft timber occasionally used for light construction, fence posts, outhouse flooring, canoes, canoe outriggers, floats and bailers; occasionally used for firewood and to make fire by friction; leaves edible and used to wrap food for cooking and eaten with fish in Vanuatu and with taro on Kapingamarangi atoll; leaves a common pigfeed in Polynesia and Micronesia; bark and leaves used medicinally in New Caledonia, Polynesia and Micronesia; planted recently in Kiribati in houseyard gardens and at the hospital for edible vitamin-rich leaves; leaves used as mulching and green manure in Micronesia and Tokelau; a sterile cultivar with edible leaves, *P. alba*, is the lettuce tree of Indonesia.

Pittosporum arborescens                    I,N                    I                    +                    +

Used for firewood; fruit used to poison fish; leaves and bark used medicinally in Tonga

Pouteria costata                    I,N                    I                    +                    +  
(Planchonella costata, Pouteria obovata, P. sandwicensis)

Timber used in general construction and for tools, and handicrafts and bark cloth anvils and spearpoints in Samoa; fruit reportedly eaten in Lau, Fiji

Polyscias spp.                    I,N                    I                    +                    +  
(P. multijuga, P. grandifolia, P. samoensis)

Used medicinally in Fiji

Pongamia pinnata                    O,I,M,N                    I                    +                    +

Timber used for general construction; leaves, bark and roots used medicinally in Melanesia; leaves used in sorcery in Vanuatu

Premna serratifolia                    I,N,C                    I                    ++                    +++  
(P. obtusafolia, P. taitensis, P. gaudichaudii, P. integrifolia)

Commonly planted in Fiji as a living fencing; emblem of the god Avaro in Tahiti; a symbol of love, affection, beauty, goodness, pleasure and virtue in Ulithi; wood used in general construction, for canoe connectives in Ulithi, canoe nails in New Guinea and to make specialized large fish hooks in Kiribati; used as firewood and for making fire by friction in Micronesia; best firewood to cook pandanus in earthen oven in Nauru; straight saplings or branches used as fishing rods; leaves and roots used to perfume coconut oil in Tuvalu, Kiribati and Nauru; bark,

leaves and fruit used medicinally for a wide range of maladies throughout Melanesia, Polynesia, and Micronesia; leaves used in ceremonial dress in New Guinea and worn in ear slits in Tuvalu; leaves used to arouse love and a mixture of the bark, coconut milk and Sida fallax flowers used to banish fear in marriage and to promote true love in Kiribati; important in fishing, canoe making and housebuilding magic in Ulithi; flowers used in coconut oil for hair in Samoa; flowers used in garlands in Nauru and Puluwat; seeds eaten by children in Tuvalu; ripe fruit formerly eaten with yams and a food of pigeons and fruit bats in Vanuatu; root provides dye in Tuvalu

Rhizophora spp.                                  M                                  I                                  +++                                  +++  
(R. mucronata, R. stylosa, R. apiculata, R. mangle)

Wood and stilt roots used in general construction, for needles and awls, earrings, combs, rat traps, headrests, coconut huskers, canoe parts, digging sticks, throwing sticks for games, for threading coconut shells for shark rattles, and scoopnet frames, and for fishtrap stakes in Kiribati because of its resistance to salt water and shipworm; an excellent firewood and also used to make charcoal in Fiji; supple stilt roots once used for bows and arrows in Polynesia and Melanesia and house walling on Kosrae; bark an excellent source of tannin and yields black-brown dye for bark cloth in Fiji and Tonga and for fishing line and nets in Samoa; red dye obtained from roots in Kiribati; bark used in red hair dye and to paint or glaze pottery in Fiji and Polynesia; bark scraped to scent coconut oil in Kiribati; bark, leaves, and fruit used medicinally in Melanesia, Polynesia and Micronesia; fruit a supplementary food and used in body ornamentation in Tuvalu; caulking paste made in past from boiled fruits; hollow fruit used as whistles in Samoa

Santalum spp.    I,N                                  I                                  +                                  ++  
(S. neo-calidonicaum, S. yasi, S. insulare)

Hawaii called "Sandalwood Country" by the Chinese; cultivated in houseyard gardens; features in legends and songs in Tonga and Fiji; heartwood a major export during the nineteenth century and still exported to a limited extent from Fiji, Tonga, and Vanuatu and used for woodcarving for the tourist industry; heartwood used to scent coconut oil of the finest of chiefly quality which is used to scent tapa cloth and to anoint corpses in royal funerals in Tonga and used in religious ritual in Tahiti, with powdered heartwood scattered over coffin in chiefly burials in Lau, Fiji; bark burned as incense and a mosquito repellent; used medicinally in New Caledonia, Tonga, and Tahiti

Serianthes spp.    I,N                                  I                                  +                                  +  
(S. melanesica, S. kanehirae, S. nelsonii)

Wood used in general construction, for canoe hulls and boatbuilding, woodcarving and firewood

Sonneratia alba M I + +

Wood used in light construction; root used as corks and floats in PNG; leaves, fruit, and flowers used medicinally in Melanesia; leaves used in garlands in Kiribati; fruit edible

Soulamea amara I? I + +

Timber used in general construction and for canoe platforms and firewood in Micronesia; long sapling used for poling canoes; flowers, fruit and bark used medicinally in Melanesia and Micronesia; bark used in magic to stop rain in Truk; fruit eaten by pigeons and bats

Syzygium richii I,N I + +  
(Eugenia richii)

Wood used in general construction, especially for fence posts, handicrafts, and tool making; used as firewood; leaves, bark and fruit used medicinally in Melanesia and Tonga; fruit used in garlands in Tonga; fruit of some species edible and a food of fruit bats and birds

Terminalia catappa O,I,N,C I,A,R +++ +++

Favorite tree of the ancestral goddess Nei Tituaabane in Kiribati; tree important in sorcery in Nauru; commonly cultivated as an ornamental shade and nut tree; timber used in general construction and for canoe hulls, paddles, kava bowls, tool handles, warclubs, walking sticks, slit-gongs and drums; used for firewood; bark and leaves occasionally used to make black dye for pandanus leaves in Fiji and Niue; bark of young stems used for cordage; leaves used for wrapping food for cooking in the earthen oven in Kiribati; roots, bark, young leaves and fruit used medicinally; mature seed kernel widely eaten; seeds preserved twice yearly in the Solomon Islands for storage; ripe fruit surrounding seeds occasionally eaten in Nauru and Puluwat; fruit eaten by fruit bats; desiccated pith of fruit used to rub corpses in Kiribati; necklaces made of fruit in Nauru; seeds occasionally made into oil in Samoa for mixing with coconut oil

Terminalia littoralis O,I,C I + +  
(T. samoensis)

Wood used in general construction; roots and leaves used medicinally in Fiji, Tonga and Kiribati; seeds eaten in Fiji and Kiribati; red fruit used in garlands in Kiribati

Thespesia populanea O,I I ++ +++

Believed to be the shadow and spirit medium of the god of prayer and chanting in Tahiti and Hawaii; planted in sacred places in Tahiti, surrounding the house of Kamehameha I of Hawaii, and along bunds between taro gardens in Tuvalu; occasionally cultivated as an ornamental shade tree; branches attached to masts of canoes in Tahiti as a token of peace; durable (especially under water) attractive wood highly esteemed for general construction and wood carving of calabashes, containers, pestles, kava bowls, paddles, drums, weapons, fishing poles and fishnet handles, and carved figures, spirit images, ceremonial thrones and handicrafts throughout Polynesia; used for canoe hulls and floats in Papua New Guinea; provides sticks for stick games in Nauru; branches held by priests when praying and leaves offered to gods as a substitute for kava in Tahiti; leaves used in making fire by friction; bark used for tannin and dye; bark, stems, leaves and green fruit used medicinally; young leaves edible; leaves provide black dye for pandanus in Tuvalu; inner bark used for cordage in Hawaii; fruit used for tops in E. Polynesia; flowers used in garlands in Kiribati; leaves occasionally used in compost in Kiribati

Tournefortia argentea O,I,C I +++ ++  
(Messerschmidia argentea)

Tree features in Tuamotuan and Kiribati mythology; timber occasionally used in light construction, occasionally for canoe hulls, connective and other parts, and for tools, cooking equipment, bailers, backrests, ladles, slit-gongs, diving goggles, carved masks, and rat traps, and for woodcarving; a favored firewood and formerly used in making fire by friction in Kiribati; leaves reportedly eaten raw in "salads" by boat crews in Kiribati; important pig food in Tokelau and Micronesia; leaves, leafbuds, growing tips, roots, bark, stems and fruit used medicinally; tender leaves and meristem used to cure fish poisoning in Nauru; leaves used as a female deodorant in Kiribati, in ceremonial dress in New Guinea, and as fish bait and to stuff pigs for cooking in Tokelau; seeds shot through hollow branch tubes in children's games; leaves used in compost and fertilizers in Kiribati; branches at ground surface and immature flower stalk used in voyaging and love magic in Micronesia

Vavaea amicorum I,N I + +

Wood used for light construction and firewood; wood burned in houses for illumination in Lau, Fiji

Vitex spp. O,I,N,P I ++ ++  
(V. negundo, V. trifolia)

Sometimes cultivated in houseyard gardens; V. trifolia widely planted as mosquito-repelling hedges and windbreaks on Majuro and Kwajalein in the Marshall Islands; wood used in light construction and for tools and axe handles in Melanesia; used for firewood; branches used for fishing rods in Nauru; leaves burnt as an insect/mosquito repellent; leaves, bark and

fruit used medicinally; leaves eaten with dried coconut and leaves and wood made into tea in Hawaii; flowers, fragrant leaves and growing tips used in garlands

Xylocarpus spp.                                M,I                                I                                +                                ++  
   (X. granatum, X. moluccensis)

Timber used in general construction and for firewood; bark and seeds used medicinally in Melanesia and Polynesia; dye obtained from the bark in PNG; fruit used as a ball by children

Sources: General (Merrill, 1943, 1945; Barrau, 1958, 1961; Massal and Barrau, 1956; Jardin, 1974; Whistler, 1980a; Sterly, 1970; Stemmermann, 1981; Haddon and Hornell, 1975); Papua New Guinea (Sterly, 1970; Paijmans, 1976; Powell, 1976; Percival and Wormersley, 1975; Holdsworth and Mahana, 1983); Solomon Islands (Maenu'u, 1979; Sterly, 1970; Yen, 1976, 1984; Whitmore, 1966); New Caledonia (Rageau, 1973; Jardin, 1974); Vanuatu (Gowers, 1976; Sterly, 1970); Fiji (Seemann, 1873; J.W. Parham, 1972; Smith, 1979, 1981, 1985, 1988; Thompson, 1940; Singh and Siwatibau, 1980; Weiner, 1984; Brownlie, 1977; Kirkpatrick and Hassall, 1981); Tonga (Yuncker, 1959; Thaman, 1976; Weiner, 1971; Sykes, 1981); Samoa (Setchell, 1924; Hiroa, 1930; McCuddin, 1974; Uhe, 1974; Whistler, 1980b, 1983, 1984; B.E.V. Parham, 1972); Wallis and Futuna (St. John and Smith, 1971); Niue (Sykes, 1970); The Cook Islands (Wilder, 1931; Hiroa, 1932ab; Whistler, 1987a); Tuvalu (Hedley, 1896, 1897; Chambers, 1975; Woodroffe, 1985); Tokelau (Parham, 1971; Whistler, 1988); French Polynesia (Oliver, 1974; Decker, 1971; Guerin, 1982; Petard, 1986; Sachet, 1983; Wilder, 1934); Pitcairn (St. John and Philipson, 1962); Hawaii (Handy *et al.*, 1972; St. John, 1973; Neal, 1965; Krauss, 1978; Rock, 1974); Easter Island (Metraux, 1940); Kiribati (Polunin, 1979; Luomala, 1953; Catala, 1957; Grimble, 1933, 1934; Moul, 1957; Overly *et al.*, 1982; Fosberg and Sachet, 1987); Nauru (Thaman *et al.*, 1985); Micronesia (Kanehira, 1933; Lessa, 1977; Stemmermann, 1981; Fosberg *et al.*, 1979, 1982; Fosberg and Sachet, 1984; Manner, 1987; Manner and Mallon, 1989; Wiens, 1962; Wester, 1985; Christophersen, 1927); Marshall Islands (Bryan, 1972; Fosberg and Sachet, 1975; Lamberson, 1982); Pohnpei (Lessa, 1977; St. John, 1948; Niering, 1956); Truk (Lessa, 1977; Marshall and Fosberg, 1985); Yap (Alkire, 1974); Palau (Fosberg *et al.*, 1980); Guam and Marianas (Stone, 1970; Fosberg *et al.*, 1975); and personal records and observations by the author and personal communication with F.R. Fosberg and W.A. Whistler.