

Ethnobotanical importance of the coastal plant species of Rotuma Island

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ABSTRACT

The coastal plants of Rotuma have high cultural and ecological utility. Unfortunately, like most of the smaller islands in the tropical Pacific Ocean, Rotuma's coastal littoral flora and vegetation has been extensively modified by human activity. This disturbance has led to the loss of much of the native vegetation that once covered the island. Rotuma's coast is now almost entirely devoid of undisturbed native vegetation because of the high fertility of the island and the suitability of the coastal plains for human habitation and agriculture. The few remaining sites with relatively undisturbed native forests are primarily in those areas that are unsuitable for habitation and agriculture. Such areas are increasingly under threat due to the growing number of native pigsties, from which many escapees have been allowed to forage freely within the forests, killing shrubs and seedlings of forest species, particularly herbaceous under-story species. If allowed to continue, the coastal vegetation, the valuable plants found there and associated ethnobotanical knowledge will eventually be lost. Many littoral species of high cultural utility have already disappeared or are threatened because of many years of indiscriminate coastal deforestation without any effective restorative measures. The need for strategic planning and implementation of protective and restorative measures for Rotuma's coastal littoral vegetation is, thus, an immediate priority. It is imperative that measures are formulated and implemented as soon as circumstances allow.

1 INTRODUCTION

Long before European contact with Rotuma, the indigenous Rotuman people used plants and their products for many purposes including food, medicine, clothing, construction, boat building, tools, weaponry, dyes, garlands and perfumes. Like all other Pacific Islanders, their very existence and survival depended largely on plants. Consequently, and by necessity, they lived close to nature and were well acquainted with the properties of most trees and shrubs (Boddam-Whetham, 1876). Among their most useful plants were coastal plants. Their knowledge of the life histories, habitat requirements and other characteristics of coastal plants enabled them to regulate their harvest and use on a relatively sustained yield basis (Thaman, 1992b, 1994a).

Traditional conservation practices such as chiefly decrees, clan taboos and establishment of sanctuaries in Pacific Islands are reputed to have existed for hundreds of years before the advent of the European influence in the region (Elliot, 1973). These practices imposed limits on taking and use of plants and animals and seemed to maintain a balance between the people and the renewable natural resources on which they depended.

Early visitors to the island observed similar conservation practices in Rotuma. Bennett (1831) commented on how *Calophyllum inophyllum* (hefau) seemed to be a favourite tree with Rotumans because of its shade, its hard wood and the fragrance and ornamental appearance of the flowers. He observed that:

"When one tree was cut down by a ship's carpenter, a young tree was brought and planted close to the place where the old one formerly displayed its wide spreading branches, thus showing a desire of securing for posterity a similar shade and fragrance to that afforded by the one which had fallen".

Allardyce (1886) described how the resignation of a chief or sub-chief required him and his officers to plant beds of crops such as kava, yam, taro and banana.

Sadly, today, conservation practices such as these are almost non-existent. This is because commercially produced household goods and food items, which can be purchased from the many retail stores around the island, are used more widely today than those obtained from native plants. Most homes on the island are constructed from concrete and corrugated roofing iron and furniture and clothing are made commercially. Travel to offshore islands and to neighbouring islands and island-groups are no longer done in canoes. Motorised ships or boats and aeroplanes have replaced them. The use of modern medicine has taken preference over traditional medicines (McClatchey, 1996) and finally, the chiefly system and much of the authority that chiefs held over the people no longer exists. People no longer depend so heavily on plants for their very existence and survival.

This paper focuses specifically on the use and ethnobotany of coastal plants that are among the most widely known and most useful of all island plants. Their high utility, both ecological and cultural, is an important contributing factor to their overexploitation (Thaman, 1994a). The continual use of coastal plants over many years without their being replanted and replenished has resulted in accelerated decline in the abundance or the loss of a wide range of endangered and culturally important species. This impoverishment inevitably leads to the loss of the ethnobotanical knowledge that was an integral component of Pacific Island life and could be considered an ecological, economic and cultural disaster (Thaman, 1994a,b). McClatchey (1996) observed the rapid deterioration of Rotuman traditional knowledge of plants, their cultural uses and especially their medicinal values,

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and stated that it will most probably die out together with the current generation of traditional healers if immediate measures for its revival are not taken. The importance of this knowledge is recently receiving greater recognition as more and more people return to the island in search of more effective remedies for diseases such as diabetes, asthma, cancer and AIDS. Moreover, the inadequate medical services on the island and the chronic problem of drug shortage necessitate the increasingly forced reversion to the use of traditional medicine by Rotumans. Revival of ethnobotanical knowledge will, in addition to energising the traditional medical system, also assist in the protection and selection of plants for reforestation and restoration of coastal areas as well as for use in handicrafts, construction, leis and garlands, perfumes and the production of a range of other culturally valuable products. These and many other reasons necessitate the revival of ethnobotanical knowledge and the protection of the coastal plants that have very high cultural utility.

2 MATERIALS AND METHODS

The field research was carried out by the senior author over a period of 84 days during two separate trips to the island in November 1998 and January 1999. Coastal plants were surveyed using reconnaissance and vegetation surveys. The coastal area of the island was divided into 50 transects in which frequency occurrence and cover abundance of all species were recorded. To obtain information on changes to coastal vegetation and the ethnobotanical importance of coastal plants, interviews were conducted with village elders. Traditional healers were also interviewed to obtain more in-depth information on the cultural uses of coastal plants. Interviews were carried out on an individual, informal basis without the use of a set questionnaire.

A complicating factor here was the custom whereby the person interviewed usually provided answers that he or she thought were expected from him or her. This problem was avoided by not asking leading questions and by checking the reliability of the informant with questions to which the answers were already known.

Another problem was the reluctance of many interviewees to reveal their ethnobotanical knowledge and know-how to another Rotuman. Also, many elderly people refused to give comments for fear of being quoted. This problem was somewhat solved by giving reassurances that their identities would be kept confidential.

3 RESULTS AND DISCUSSION

Although highly disturbed, the coastal vegetation and flora of Rotuma still constitute a critical ecological and cultural resource to the people of Rotuma. This is particularly true for the indigenous species, virtually all of which have wide cultural utility within the traditional subsistence economy. Ecologically, coastal plants are important in that they act as shields, providing protection to other plants and animals from the harsh marine environment. Where they grow, either naturally or planted, they provide protection to coastal settlements from wind and waves as well as help to reduce the rate of beach and coastal erosion and the severity of damage from salt spray. Nunn and Mimura (1997) and Mimura and

Nunn (1998) stated that where mangroves and other coastal vegetation have been cleared in Fiji, coastal erosion has been exacerbated, and that natural protection in the form of vegetation, coral reefs and sandy beaches play essential roles in protecting the coast. It is apparent in Rotuma that in areas where large coastal trees such as *C. inophyllum* and *Hernandia nymphaeifolia* grow, the impact of strong winds, high seas and soil erosion are significantly reduced.

Coastal plants also provide a wide range of habitats to many species of animals and other plants. Many birds, crabs, insects and other animals feed on the fruits, seeds, flowers, leaves and bark of coastal plants. Of particular importance is the role of coastal vegetation as a habitat and resting place for sea birds and a range of crabs, including the land crab (*Cardisoma carniflex*), coconut crabs (*Birgus latro*) and hermit crabs (*Coenobita* spp.). The land crabs, coconut crabs and hermit crabs are important as preferred bait for line fishing. Of great importance to the Rotumans is the shade and protection provided by these coastal plants from strong sunlight and high temperatures.

The cultural utility of coastal plants is equally important and constitutes a major reason for protection of coastal plants and the ethnobotanical knowledge about them. Extensive studies of the ethnobotany of common Pacific Island coastal and mangrove plants by Thaman (1990a,b, 1992a,b, 1994b) indicate that there are some 68 different use categories and a total of 1024 uses for 140 common coastal species found in the Pacific Islands. This averages to over seven uses per plant, with *C. nucifera* (the most useful of all coastal species) having 121 reported uses. Plants such as *Hibiscus tiliaceus*, *Pandanus tectorius*, *Calophyllum inophyllum*, *Cordia subcordata*, *Guetarda speciosa*, *Scaevola taccada*, *Thespesia populnea*, *Pemphis acidula*, *Casuarina equisetifolia*, *Terminalia catappa*, *Premna serratifolia*, *Erythrina variegata*, *Inocarpus fagifer*, *Ficus prolixa*, *Tournefortia argentea*, *Morinda citrifolia*, *Pisonia grandis*, and *Bruguiera gymnorrhiza* have more than fifteen different uses each, while *Hernandia nymphaeifolia*, *Barringtonia asiatica*, *Cerbera manghas*, *Tacca leontopetaloides*, *Crinum asiaticum*, *Clerodendrum inerme*, *Triumfetta procumbens*, *Cassytha filiformis*, *Neisosperma oppositifolium* and *Ipomoea pes-caprae* have at least seven uses each. All these plants are found in Rotuma and are used for the same or similar purposes.

The most widely reported uses of coastal plants in Rotuma are for medicine, construction, food, firewood, scenting coconut oil and cultural attire or body ornamentation. In the past, this list would have been much longer, including additional uses such as carving, clothing, cooking equipment, canoe making, weapons, dyes, soap, perfumery, fish poisons, fish traps, toys cordage and many others. Many of these uses have been replaced by modern technology and materials and are therefore no longer practised.

The medicinal uses of Rotuma's coastal plants have been well documented by McClatchey (1996). Of the total 81 different plant species used medicinally by Rotuman traditional healers, 38 (47%) are coastal species. These include 18 tree species, six shrubs, six herbs, two ferns and six vines.

Table 1 shows the cultural importance of coastal plants in Rotuma. As can be observed from the table most plants have high cultural utility.

Of the seven fern species, four are widely used culturally. *Phymatosorus grossus* is the most widely used fern, having significant medicinal value as well as being used for head garlands and many other forms of body ornamentation. *Nephrolepis biserrata*, *Pteris ensiformis* and *Sphaerostephanos unitus* also have significant cultural usage. The herbs *Centella asiatica* and *Boerhavia repens*, are also used in many medicinal concoctions and are among the most useful plants. *Chamaesyce atoto* is also widely used medicinally. *Boerhavia repens* and *Procris pedunculata* were eaten, as well as fed to animals, in the past and *Procris pedunculata* is still fed to pigs today. *Achyranthes aspera* and *Wollastonia biflora* are food for feral goats and horses.

Tacca leontopetaloides was the main source of starch for traditional puddings, and *Crinum asiaticum* leaves are used for wrapping food and the leaves, stems and flowers are used for making traditional garlands or *tefui*. Except for the sedge, *Cyperus stoloniferus*, the grasses and the sedges are the least used culturally. The fragrant tubers of this sedge are pounded and used to scent coconut oil.

Most vines have many ecological as well as cultural uses. *Vigna marina* and *Ipomoea pes-caprae* are the most typical plants in sandy beaches, reducing evaporation and soil erosion. These two vines, as well as *Dioscorea bulbifera*, *Hoya australis*, *Ipomoea littoralis*, *Ipomoea micrantha* and *P. insectifugum*, are used in many medicinal mixtures. *Canavalia cathartica*, *Mucuna gigantea*, *Derris trifoliata* and *Terminalia samoenses* are used as cordage, with the latter three being used also in the construction of fish and marine crab traps. *Dioscorea bulbifera* was a famine food in the past.

The few plants, which do not have any known cultural use, for example, *Sophora tomentosa* and *Suriana maritima*, are reportedly new arrivals on the island and are little known to the people.

4 CONCLUSION

In conclusion, coastal littoral plant species are among the most useful of all of Rotuma's plants. This has been partly responsible for the loss or endangerment of many of the more culturally useful species. Associated with this loss, is the loss of knowledge of the cultural utility of most plant species. This exacerbates the loss of knowledge of the ecological and cultural importance, including the names of many species, by the younger generation, and the resultant unwillingness to protect these plants and the knowledge associated with them. As suggested above, this constitutes a serious ecological and cultural tragedy, which if not addressed augers poorly for the environmental and cultural stability of the rapidly modernising, but very isolated island of Rotuma.

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Table 1. Cultural (Ethnobotanical) importance of the coastal plant species of Rotuma (+++ = Very important with multiple uses, ++ = have considerable (at least 3) important uses locally, + = have some (1 or 2) uses, - = no cultural or medicinal uses reported)

Botanical Name	Rotuman Name	Cultural Importance
FERNS		
<i>Acrosticum aureum</i>	hana meamea	+
<i>Asplenium nidus</i>	kukuluf	+
<i>Phaerostephanos unitus</i>	sakoto	++
<i>Nephrolepis biserrata</i>	julia	++
<i>Ophioglossum pendulum</i>	repene	+
<i>Phymatosorus grossus</i>	seisei	+++
<i>Pteris ensiformis</i>	sir'ia	++
HERBS		
<i>Achyranthes aspera</i>	sere	+
<i>Boerhavia repens</i>	uh on kalae	++
<i>Centella asiatica</i>	titogo	+++
<i>Chamaesyce atoto</i>	majila	++
<i>Crinum asiaticum</i>	maliha	++
<i>Procris pedunculata</i>	hat en sina	++
<i>Portulaca lutea</i>	periro	+
<i>Portulaca oleraceus</i>	periro	+
<i>Sesuvium portulacastrum</i>	periro	+
<i>Tacca leontopetaloides</i>	marfea	++
<i>Truimfetta procumbens</i>	joan ne pija	++
<i>Wollastonia biflora</i>	totoro	-
<i>Zingiber zerumbet</i>	ragapua	+++
GRASSES AND SEDGES		
<i>Cyperus stoloniferus</i>	pup reag lolo	+
<i>Cyperus compressus</i>	pup	-
<i>Lepturus repens</i>	ma'usu	-
<i>Mariscus javanicus</i>	sere	-
<i>Thuarea involuta</i>	ma'usu	-
<i>Stenotaphrum micranthum</i>	ma'usu	-
VINES AND CLIMBERS		
<i>Canavalia cathartica</i>	fuholi	+
<i>Cassytha filiformis</i>	lu 'on ravak	+
<i>Derris trifoliata</i>	fua niukini	++
<i>Dioscorea bulbifera</i>	fui	++
<i>Hoya australis</i>	hoi	+
<i>Ipomea littoralis</i>	johea	++
<i>Ipomoea macrantha</i>	puak fisi	++
<i>Ipomea pes-caprae</i>	puka	++
<i>Mucuna gigantea</i>	faga	++
<i>Piper insectifugum</i>	sas ne niu	++
<i>Tylophora samoenses</i>	fag fea	++
<i>Vigna marina</i>	karere	++
SHRUBS		
<i>Acalypha grandis</i>	karposi	++
<i>Clerodendrum inerme</i>	ortea	++
<i>Colubrina asiatica</i>	tartarmoana	+
<i>Dendrolobium umbellatum</i>	jojo	+++
<i>Ficus scabra</i>	malu	++
<i>Morinda citrifolia</i>	'ura	+++
<i>Premna serratifolia</i>	varvara	+++
<i>Pemphis acidula</i>	'ai ne peje	+

<i>Pipterus argenteus</i>	arnea	++
<i>Psychotria fragrans</i>	soag koro	++
<i>Scaevola taccada</i>	pulu	+
<i>Sophora tomentosa</i>	not known	-
TREES		
<i>Barringtonia asiatica</i>	hufu	++
<i>Bruguiera gymnorrhiza</i>	fogo	++
<i>Calophyllum inophyllum</i>	hefau	+++
<i>Casuarina equisetifolia</i>	toa	+++
<i>Cebera manghas</i>	giagia	+
<i>Cocos nucifera</i>	niu	+++
<i>Cordia subcordata</i>	man'ao	+++
<i>Dendrocnide vitiensis</i>	'u' apea	++
<i>Diospyros eliptica</i>	mamrao	+
<i>Erythrina variegata</i>	ratu'e	+++
<i>Excoecaria agallocha</i>	majila	+
<i>Ficus prolixa</i>	yayao	+
<i>Glochidion concolor</i>	a'm'ama	+++
<i>Guettarda speciosa</i>	hana	+++
<i>Hernandia nymphaeifolia</i>	popofo	++
<i>Hibiscus tiliaceus</i>	hau	+++
<i>Neisosperma oppositifolium</i>	haohao	++
<i>Pandanus tectorius</i>	hata	+++
<i>Pandanus dubius</i>	hosoa	+++
<i>Plancholenna samoensis</i>	mamrava	+
<i>Pipturus argenteus</i>	arnea	++
<i>Pisonia grandis</i>	puak vai	+
<i>Syzygium inophylloides</i>	hahia ramram	+
<i>Syzygium leucanthum</i>	hahia mon	+
<i>Terminalia catappa</i>	salisa/togoi	+++
<i>Terminalia samoensis</i>	salias ririi	+
<i>Thespesia populnea</i>	penau	+++
<i>Tournefortia argentea</i>	sumi	++
<i>Xylocarpus granatum</i>	lekleki	++
