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VEGETATION AND FLORA
OF NUI ATOLL, TUVALU

BY

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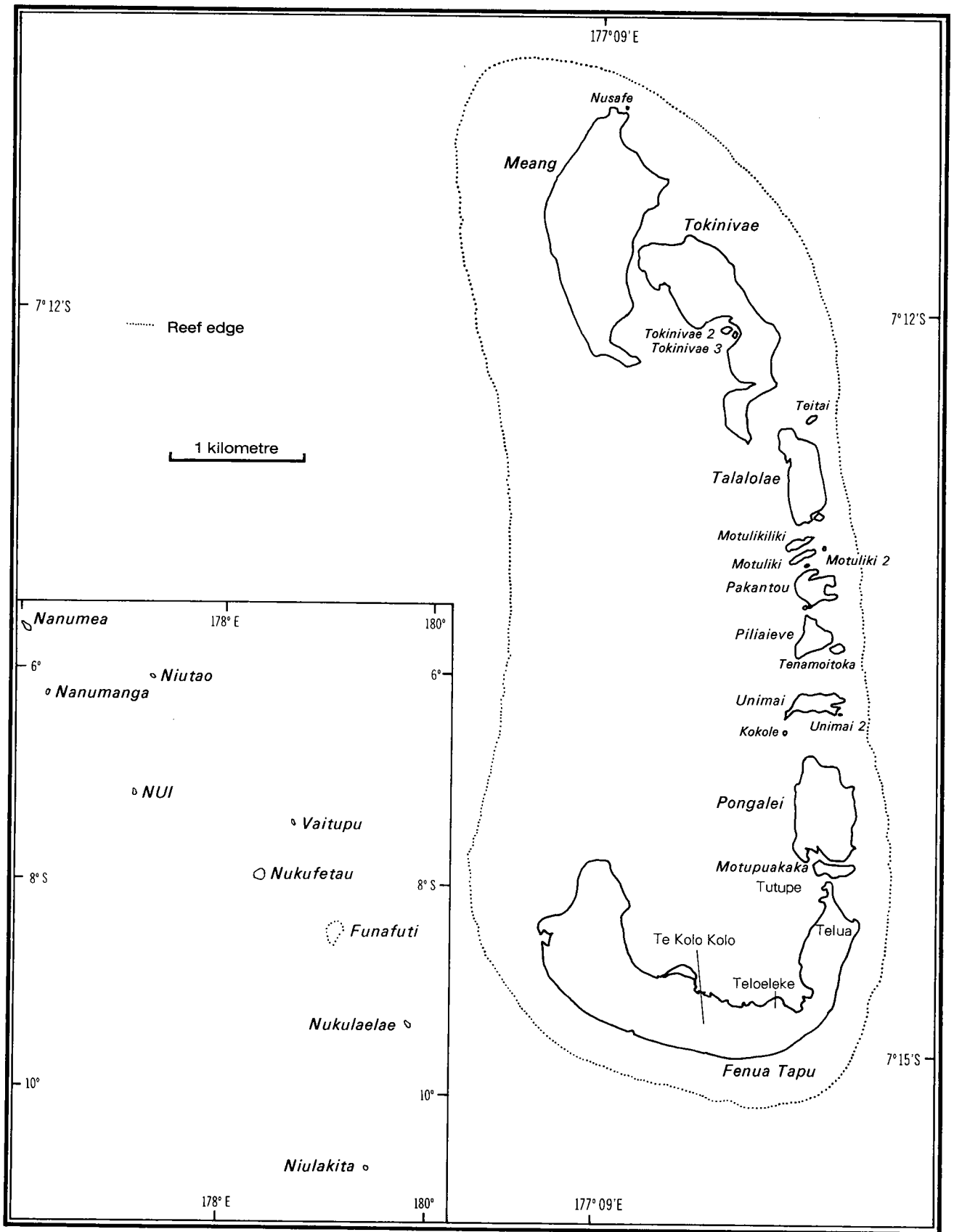


Fig. 1. Nui Atoll showing reef islands

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Introduction

Tuvalu, formerly the Ellice Islands of the Gilbert and Ellice Islands until separation on 1 October 1975, is a particularly remote group of islands in the Central Pacific. There are nine islands, five of which are atolls and four reef-top islands on a reefal platform. The vegetation and flora of these islands have received little attention.

Most of the botanical collections from Tuvalu have been concentrated from the main island, Funafuti. The plants and their uses were first described by Hedley (1896). A collection of plants was made by Mrs Edgeworth David (1899) during her residence on the island in July and August 1897 as part of the Royal Society of London expedition to core the atoll. Plants were also collected by Halligan and Finckh in 1898 and their specimens and those of Mrs David were described by Maiden (1904). Since that time, the plants of Niutao have been described by Koch (1961) who has deposited a collection at the Smithsonian Institution, and those of Nanumea have been described by Chambers (1975) who has deposited a collection at the BP Bishop Museum.

Nui Atoll, to the north of the Tuvalu group, has received very little attention since it was sighted by Alvaro de Mendaña in 1568. In this paper the vegetation and flora of the atoll are described. Mapping of the vegetation of the atoll was done stereoscopically from black and white vertical aerial photographs taken in 1971 at a scale of approximately 1:10,000. Vegetation units, and where possible individual trees, were verified on the ground and the map updated during a visit to the atoll of two weeks in February 1982 and a collection of the plants was made. The specimens are deposited at the herbarium of the Department of Scientific and Industrial Research, Botany Division, Christchurch, New Zealand, and I am grateful to Dr W Sykes of the D.S.I.R. for identifications, and to Professor F R Fosberg and Dr M-H Sachet of the Smithsonian Institution for further identifications. The work was undertaken as part of a Land Resources Survey of Tuvalu, funded by F.A.O./ U.N.D.P. contracted to the Department of Geography, University of Auckland. I wish to thank Dr Roger McLean, project co-ordinator, for his guidance and encouragement, Paul Holthus and Salwa Woodroffe for help in the field and the Island Executive Officer, Lafaele, and the people of Nui for their hospitality.

Nui Atoll

Nui Atoll (lat.7°12'S long.177°10'E) lies to the north of the Tuvalu group, being approximately 130 km south of Niutao and 167 km north of Nukufetau. It consists of a reef platform approximately 7 km from north to south and 3 km from west to east (Fig. 1). There is a shallow central lagoon, and the reef islands are concentrated along the eastern rim of the atoll; the western rim being a bare reef flat, extending nearly 4 km in length. Twenty reef islands were identified and visited; these have a total surface area of 337 ha and vary from the largest, Fenua Tapu, the island on which the principal settlement is located, with an area of 138 ha, to Unimai 2 with an area of less than 0.02 ha.

The atoll is inhabited, the population in 1977 being estimated at about 650. The principal settlements are on Fenua Tapu, with a smaller temporary settlement on Meang. Other islands are visited by canoe, or by walking around the eastern reef flat at low tide.

Nui experiences a warm, humid climate throughout the year. The prevailing winds are easterlies. It receives about 3000 mm of rainfall annually with more than 200 rainy days per year.

The reef islands of Nui are generally sandy with varying amounts of humus incorporated into the sand. A cemented rubble conglomerate platform underlies many of the islands and is prominent on the eastern rim of the atoll and along much of the lagoonward shore. The only extensive coral shingle or rubble ridges occur to the northwest of Meang.

Nui is interesting in that the people of Nui show a much closer relationship to the islands of Micronesia than do other Tuvaluans, despite there being three islands closer to Kiribati (Gilbert Is.). Tradition has it that early Samoan settlers on Nui were largely replaced by people from Tabiteuea and Beru in Kiribati. The language on Nui is much more closely related to the language of Kiribati than on other islands in Tuvalu and names for things, including plants, are often different from the names used in the rest of Tuvalu. For instance, the root crop Cyrtosperma is called 'babai' on Nui whereas it is 'pulaka' on the other islands of Tuvalu. Where it has been possible to establish local Nui names for plants these are reported below.

Vegetation Units

The flora of Nui consists of at least 86 species. The largest number of species occurs on Fenua Tapu; 83 species were observed, many of which were crops or ornamentals found around the village. The following distinct vegetation units could be recognised:

Pemphis scrub

Pemphis acidula forms dense thickets at several sites, particularly on the lagoonward shore, on Nui Atoll. Pemphis occurs either on the dissected conglomerate platforms of the reef islands, or on a substrate of

medium angular coral rubble or coarse sand, where inundation is infrequent and there is a sporadic cover of desiccated algal nodules or an algal mat.

Pemphis scrub is found on the dissected conglomerate platform along the lagoonward shore of Fenua Tapu where it is 4-5m tall and forms either a continuous fringe less than 30m wide along the coast, or a discontinuous fringe scarcely more than an individual shrub wide. Similar Pemphis scrub occurs on a rubble or sand substrate near Telaeleke on Fenua Tapu, and at the northeastern end of that island, on Tokinivae, Pongalei and Talalolae. Within the Pemphis scrub, individual shrubs are spaced 4-5m apart, becoming increasingly sparse in the island interiors. On Tokinivae Pemphis may reach 10m tall; on Pongalei 8-10m tall, and on Talalolae and Fenua Tapu it rarely exceeds 6m tall.

Pemphis scrub on the lagoonward shores grows so densely that there are generally no other plants associated with it, except occasionally the fern Polypodium. However on Tokinivae, Pongalei and Talalolae sparser Pemphis scrub extends inland, over a substrate of fine coral rubble and pinkish sand with an algal mat veneer, or more usually a cover of small black algal nodules, and in these areas Pemphis is generally less than 2m tall and Tournefortia and Scaevola also occur with a ground vegetation of Fimbristylis, Lepturus and Cassytha.

A scrub composed of Pemphis is a common element of the vegetation of islands in the Pacific. It forms a distinct coastal zone on the atolls of the Cook Islands (Linton, 1933; Stoddart, 1975), the Tokelau Islands (Parham, 1971), and continues north through Kiribati (Luomala, 1953; Moul, 1957), and the Marshalls and Marianas (Fosberg, 1960). On Nui Atoll Pemphis scrub occurs on the lagoonward side of many of the reef islands where these are narrowest, and extends into the islands reaching towards the oceanward shore. Pemphis tends to be growing at a lower elevation than surrounding vegetation, where it is prone to occasional flooding, and the areas of Pemphis scrub probably represent old infilled inter-island channels. The area at Telaeleke on Fenua Tapu has Pemphis scrub reaching to within 30m of the oceanward shore separated from the sea by a sand ridge.

Scaevola scrub

A dense scrub of Scaevola sericea occurs as a fringe around most of the perimeter of the majority of the reef islands of Nui, and often extends inland, generally in association with Acalypha, beneath Coconut woodland. The fringe may develop on sandy or on coral rubble substrates. It is particularly well developed along the oceanward shore of the reef islands, where it characteristically forms a fringe 15-20cm wide, rarely exceeding 4m tall, landward of which Coconut woodland is found with the outermost coconuts overhanging the Scaevola.

At the northeast of Fenua Tapu Scaevola scrub forms a belt approximately 20m wide on a beach ridge of fine coral rubble and sand. This is a recently formed ridge which links what was previously the island of Tutupe to Telua, Fenua Tapu.

Over much of the atoll Scaevola scrub is monospecific and the dense fleshy branches of Scaevola make the scrub penetrable only with difficulty. The creepers Canavalia and Cassytha where they occur on the scrub also impede passage. In some places Tournefortia, Cordia, Pandanus or Guettarda may be emergent while Triumfetta occurs on the ground.

In addition to the coastal Scaevola scrub, Scaevola is also an important element of the inland scrub vegetation. A sparse Scaevola scrub, consisting of shrubs of Scaevola rarely exceeding 3m tall and emergent Pandanus, occurs on a series of north-south ridges of fine angular coral rubble to the northwest of Meang. A patchy ground cover of Boerhavia, Fimbristylis, Nephrolepis and Polypodium is found, and much of the vegetation is shrouded in Cassytha. Towards the interior of Meang, Tournefortia, Acalypha, Guettarda and Pisonia become more important and the sparse Scaevola scrub gives way to Scaevola/Acalypha scrub.

Much of the interior of reef islands on Nui has a scrub vegetation composed principally of Scaevola sericea and Acalypha amentacea var. On Fenua Tapu Scaevola is the main element of the scrub, 3-4m tall, with Pipturus, Ficus, Guettarda, Morinda, Nephrolepis, Polypodium and Fimbristylis present and Acalypha only locally important. Elsewhere, as on Pongalei, Acalypha is the most conspicuous element of the scrub and Tournefortia, Asplenium and Boerhavia are also common.

Pandanus is an important component throughout this vegetation unit. It is infrequent in most of the scrubland of Fenua Tapu, though becoming more common in the Scaevola/Acalypha scrub to the eastern end of the island. On Pongalei Pandanus is abundant within the Scaevola/Acalypha scrub and on Meang it is extremely common. These scrub areas are important for the collection of Pandanus leaves, and the general increase in occurrence of Pandanus with distance from the village may reflect decreasing collection intensity.

The Scaevola/Acalypha scrub is also found beneath Coconut woodland and beneath Pisonia woodland. Scaevola, and to a lesser extent Acalypha, grows best where there is plenty of light and is not well developed under dense woodland. Scrub is particularly important in areas of young Pisonia under trees up to 16m tall.

Scaevola scrub forms a seaward belt on other islands in Tuvalu and has been described from Funafuti (Hedley, 1896) and over much of Nanumea (Chambers, 1975). It forms a prominent beach crest facies in the Tokelau Islands (Parham, 1971) on Swains Island (Whistler, 1983), and on Onotoa, Kiribati (Moul, 1957) and is one of the most consistent vegetation units throughout Pacific atolls (Fosberg, 1953).

Tournefortia scrub

Tournefortia argentea is generally taller than, and forms a more penetrable scrub than Scaevola. Small stands of Tournefortia occur within Scaevola scrub, and larger stands form a distinct scrub unit at the northern and southern ends of Pongalei, at the western end and to the southwest of Tokinivae and at the head of inlets on the ocean side of Pakantou and Unimai.

The most extensive fringe of Tournefortia scrub however occurs along the sandy beach crest of the western shore of Meang. Here the scrub is 15-25m wide, and reaches 6-8m tall. Scaevola is found within the unit, and stands of Scaevola and Tournefortia alternate along the coast of central Meang, with replacement of Tournefortia by Scaevola scrub on the coarser substrate to the north of Meang. The Tournefortia scrub is much more open than Scaevola scrub and individual trees are spaced 6-8m apart. Canavalia, Triumfetta and Boerhavia occur within the scrub, while coconut, Guettarda and Pandanus are occasionally emergent.

Small pockets of Tournefortia scrub also occur inland. These are rarely extensive and consist of only one or a few individuals up to 17m tall. The vegetation within these pockets is usually typical Scaevola/Acalypha scrub or Pipturus/Acalypha/Scaevola scrub, sometimes with Pisonia. Similar Tournefortia scrub is an important littoral vegetation of many atolls in the Pacific, including the Tokelau Islands, Marshall Islands, Caroline Islands and northern Cook Islands (Linton, 1933; Fosberg, 1960; Niering, 1961; Parham, 1971).

Pipturus/Acalypha/Scaevola scrub

Pipturus/Acalypha/Scaevola scrub is an inland scrub similar to the Scaevola/Acalypha scrub, but may be distinguished by the dominance of Pipturus argenteus in the upper storey. Pipturus grows to 10m or more tall, and often has several trees of Tournefortia in association, and occasionally Pisonia also. The lighter colour of the canopy of these emergent species allows recognition of this unit on aerial photographs. The lower storey vegetation is usually species-rich, with Scaevola, Acalypha, Ficus, Guettarda, Pandanus and the ferns Polypodium, Asplenium, Nephrolepis and Pteris. Pipturus/Acalypha/Scaevola scrub is found on Motupuakaka, Talalolae and Tokinivae, and to a lesser extent on Fenua Tapu.

Rhizophora scrub

Rhizophora stylosa is not extensive on Nui and is found only on the lagoonward shore of Fenua Tapu at Telaeleke. Here it rarely exceeds 4m in height, and forms a fringe around the edge of the conglomerate platform. This fringe is often only one tree wide, exceptionally reaching a belt 40m wide. Rhizophora scrub is monospecific and is backed by Pemphis scrub. Rhizophora and Pemphis may be interspersed where the two units are juxtaposed. Rhizophora scrub on Nui is more open than that described from a basin on Vaitupu (Woodroffe and Moss, 1984). Cracks and fissures in the surface of the reef flat in this mangrove area were observed to flood and drain the area with the tides.

Lumnitzera scrub

The red-flowered mangrove Lumnitzera littorea occurs in two isolated pockets, each less than 20m x 30m wide, in the Pemphis scrub area of Telaeleke, Fenua Tapu. Lumnitzera reaches 3.5-4.5m tall, and each pocket is surrounded by Pemphis which is the only species recorded in association with Lumnitzera.

Morinda thicket

A thicket, dominated by Morinda citrifolia, occurs at one location surrounding a muddy depression to the east of Pongalei. The stand is only about 10m x 25m wide and is composed of Morinda 8m tall, spaced approximately 5m between individuals. The only associated plants are Ficus and the fern Asplenium.

Pandanus grove

Small groves of Pandanus tectorius occur around the coast of the reef islands of Nui, but do not form Pandanus woodland like that recorded on atolls, such as Aitutaki and Palmerston, in the Cook Islands (Stoddart, 1975; Sykes, 1976), or Kayangel in the Palau Islands (Gressitt, 1952). The groves are generally composed of 5-10 individuals which are 8-10m tall, though Pandanus on Fenua Tapu can reach as much as 18m tall.

Coconut woodland

The most important woodland type on Nui is dominated by the coconut Cocos nucifera. The coconut palms exhibit a great variation in height and density, reaching 26m in some places. In those areas, as around the principal settlement, where there is regular collection of drinking nuts, the woodland is kept relatively clear of undergrowth while elsewhere it may be unattended and entirely overgrown with scrub. Such scrub tends to be dominated by either Scaevola or Acalypha, with Pandanus, Nephrolepis, Morinda, Guettarda, Ficus and Polypodium. Elsewhere Pisonia and Asplenium occur within the coconut woodland, or Asplenium alone may form a dense carpet between the palms.

Pisonia woodland

Woodland of Pisonia grandis is the most extensive natural woodland on Nui and occurs over much of the interior of the various reef islands, occasionally being exposed on the coast. It is well developed even on some of the smaller islands such as Teitai and Tenamoitoka.

The most impressive stands of Pisonia woodland occur on Unimai, southern Meang and on Fenua Tapu at Te Kolokolo and near Telaeleke, in the latter two instances in association with deposits of phosphate. The massive Pisonia of Unimai reach heights of 22-24m and the woodland is dominated by immense individuals which exceed 1m in diameter of the trunk. Acalypha is prominent in the understory, with Ficus and rare Guettarda and Pandanus. The fern Asplenium, of which the young fronds are eaten as a spinach, is also an important associate in Pisonia woodland occurring both epiphytically on the Pisonia trees and on the coral rubble and sand substrate. On Meang similar massive Pisonia trees occur more sparsely, giving the woodland a more open appearance. In addition other large trees, including Hernandia, Calophyllum and occasional breadfruit Artocarpus are found in the woodland; the understory vegetation is dominated by Asplenium but also contains Acalypha, Ficus and Polypodium.

The Pisonia woodland at Te Kolokolo and Telaeleke on Fenua Tapu is also composed of large individual trees, many up to 20m tall; again Ficus, Morinda and Acalypha are important. The ferns Nephrolepis and Polypodium are found on the ground, however Asplenium is less abundant perhaps because the site is closer to the village. The Te Kolokolo area in particular has been altered as a result of felling of Pisonia trees, though the ability of Pisonia to shoot up from fallen limbs means that there has also been some regrowth.

Elsewhere stands of Pisonia woodland are composed of less massive individuals often exceeding 18m in height but rarely more than 50cm diameter, and coconuts are more frequent. Such a Pisonia woodland is a typical woodland of many atolls in the Pacific including Kiribati, the Tokelau Islands, Cook Islands and Caroline Islands (Moul, 1957; Parham, 1971; Stoddart, 1975; Marshall, 1975), and is frequently associated with phosphatic substrates (Fosberg, 1953).

Hernandia woodland

Woodland dominated by Hernandia sonora occurs at several sites just east of the pig wall on Fenua Tapu. Here large individual trees of Hernandia reaching 18m tall dominate small stands of woodland. Occasionally Pisonia may be present, and towards the north coast of Fenua Tapu Cordia is also associated with the Hernandia woodland. In view of the use of timber of Hernandia and its speed of growth, these groves of Hernandia located close to the village, and the individual trees in and around the village, have probably been planted. In a stand of Hernandia woodland on the central road of Fenua Tapu Acalypha is abundant, and Ficus, Guettarda and Asplenium are all frequent. Present but less common are Pipturus, Nephrolepis and Polypodium.

Hernandia woodland also occurs extensively on Meang, though over much of southeastern Meang Hernandia and Pisonia grow in association forming a mixed open woodland more than 20m tall. Hernandia and Pisonia are closely associated in forests on Nanumea (Chambers, 1975) and have also been described together on Swains Island (Whistler, 1983) and on Aitutaki and Palmerston in the Cook Islands (Stoddart, 1975; Sykes, 1976).

Pulaka pits

Small pits of pulaka Cyrtosperma chamissonis (locally called Babai) occur on a number of islands (Small, 1972). One is found on Piliaieva, and several, less than 10m in diameter, occur on Tokinivae. The most pits, and those most important for production of pulaka, presently occur around the village on northwestern Fenua Tapu. Here pit construction is still underway and pits are regularly cultivated. In addition to pulaka, there is talo Colocasia, and banana Musa; there are also several common weeds, most notably Ludwigia, Cyperus and Alternanthera.

A further pulaka pit occurs on Meang. This is presently largely abandoned and pulaka grows only around the edge and in smaller secondary pits. Most of the pulaka pit is covered with Paspalum distichum with patches of Cyperus. Scaevola is found around the pit and grows with Ficus, Guettarda and Polypodium on small islands in the pit.

Village and Gardens

Natural vegetation has been almost totally replaced in the areas in which population is concentrated. The village is dominated by useful trees, particularly by the breadfruit Artocarpus, drinking coconuts, as well as scattered Hernandia trees. Additional areas, such as the hospital, guest house, and cemeteries have largely been planted with ornamental species, and these areas also support several weedy species. Ornamental garden plants include Pseuderanthemum atropurpureum, Clerodendrum inerme, Polyscias guilfoylei, Lantana camara, Plumeria rubra, Gardenia taitensis, Acalypha wilkesiana and Mirabilis jalapa.

The flora

The vascular plants collected or sighted on Nui Atoll are listed below. Numbers refer to voucher specimens deposited at the DSIR, Christchurch.

ASPLENIACEAE

Asplenium nidus L. [local name - laukatapa]

Fenua Tapu: Woodroffe 189; Motupuakaka: sight; Pongalei: sight; Kokole: sight; Unimai: sight; Tenamoitoka: sight; Piliaieve: sight; Motuliki: sight; Motuliki 2: sight; Motulikiliki: sight; Talalolae: sight; Teitai: sight; Tokinivae: sight; Meang: sight; Nusafe: sight.

DAVALLIACEAE

Nephrolepis acutifolia (Desv.) Christ. [local name - lautamatama]

Fenua Tapu: Woodroffe 140, 188; Motupuakaka: sight; Pongalei: sight; Kokole: sight; Unimai: sight; Tenamoitoka: sight; Piliaieve: sight; Pakantou: sight; Sikaiana: sight; Motuliki: sight; Motulikiliki: sight; Talalolae: sight; Teitai: sight; Tokinivae: sight; Meang: sight; Tokinivae 2: sight.

Nephrolepis saligna Cass. [local name - lautamatama]

Fenua Tapu: Woodroffe 187

POLYPODIACEAE

Polypodium scolopendria Burm.f. [local name - maile]

Fenua Tapu: Woodroffe 120; Motupuakaka: sight; Pongalei: sight; Unimai: sight; Unimai 2: sight; Tenamoitoka: sight; Piliaieve: sight; Pakantou: sight; Sikaiana: sight; Motuliki: sight; Motuliki 2: sight; Motulikiliki: sight; Talalolae: sight; Teitai: sight; Tokinivae: sight; Meang: sight; Tokinivae 2: sight.

PSILOTACEAE

Psilotum nudum (L.) Beauv.

Fenua Tapu: Woodroffe 112

PTERIDACEAE

Pteris tripartita Sw. [local name - te laukimoa]

Fenua Tapu: Woodroffe 119; Unimai: sight; Meang: sight.

PANDANACEAE

Pandanus tectorius Park. (s.l.) [local names - teou, teto]

Fenua Tapu: sight; Motupuakaka: sight; Pongalei: sight; Kokole: sight; Unimai: sight; Unimai 2: sight; Tenamoitoka: sight; Piliaieve: sight; Pakantou: sight; Sikaiana: sight; Motuliki: sight; Motuliki 2: sight; Motulikiliki: sight; Talalolae: sight; Teitai: sight; Tokinivae: sight; Meang: sight; Nusafe: sight; Tokinivae 2: sight; Tokinivae 3: sight.

CYCADACEAE

Cycas circinalis L.

Fenua Tapu: Woodroffe 185

GRAMINEAE

Bambusa sp.

Fenua Tapu: Woodroffe 168

Cenchrus echinatus L.

Fenua Tapu: Woodroffe 113, 196

Digitaria pacifica Stapf

Fenua Tapu: Woodroffe 127

Eleusine indica (L.) Gaertn.

Fenua Tapu: Woodroffe 103, 124

Eragrostis tenella (L.) P.Beauv.ex Roem. & Schult.

Fenua Tapu: Woodroffe 110; Piliaieve: sight.

Lepturus repens (Forst.f.) R.Br.

Fenua Tapu: sight; Motupuakaka: sight; Pongalei: sight; Kokole: sight; Unimai: sight; Unimai 2: sight; Tenamoitoka: sight; Piliaieve: sight; Pakantou: sight; Sikaiana: Woodroffe 131; Motuliki: sight; Motulikiliki: sight; Talalolae: Woodroffe 180, 181, 182; Tokinivae: sight; Meang: sight; Nusafe: sight; Tokinivae 2: sight; Tokinivae 3: sight.

Paspalum distichum L.

Fenua Tapu: Woodroffe 147; Meang: sight

Saccharum officinarum L.

Fenua Tapu: sight.

Stenotaphrum micranthum (Desv.) C.E.Hubb.

Fenua Tapu: sight; Motupuakaka: sight; Pongalei: sight;
Tenamoitoka: sight; Pakantou: sight; Motulikiliki: sight;
Talalolae: Woodroffe 179; Tokinivae: sight; Meang: sight.

Thuarea involuta (Forst.f.) R.Br.

Fenua Tapu: Woodroffe 109

CYPERACEAE

Cyperus alternifolius L.

Fenua Tapu: sight; Meang: sight

Fimbristylis cymosa R.Br.

Fenua Tapu: Woodroffe 111, 194; Motupuakaka: sight; Pongalei: sight;
Unimai: sight; Piliaieve: sight; Pakantou: sight; Tokinivae: sight;
Meang: sight; Tokinivae 2: sight

PALMAE

Cocos nucifera L.

[local name - Niu]

Fenua Tapu: sight; Motupuakaka: sight; Pongalei: sight; Kokole:
sight; Unimai: sight; Unimai 2: sight; Tenamoitoka: sight; Piliaieve:
sight; Pakantou: sight; Sikaiana: sight; Motuliki: sight; Motuliki 2:
sight; Motulikiliki: sight; Talalolae: sight; Teitai: sight;
Tokinivae: sight; Meang: sight; Nusafe: sight; Tokinivae 2: sight;
Tokinivae 3: sight.

ARACEAE

Colocasia esculenta (L.) Schott

[local name - talo]

Fenua Tapu: sight; Tokinivae: sight; Meang: sight

Cyrtosperma chamissonis (Schott) Merr.

[local name - babai]

Fenua Tapu: sight; Piliaieve: sight; Tokinivae: sight; Meang:
sight.

AMARYLLIDACEAE

Crinum asiaticum L.

[local name - te luhe]

Fenua Tapu: Woodroffe 135

TACCACEAE

Tacca leontopetaloides (L.) O.Ktze.

[local name - masua]

Fenua Tapu: Woodroffe 115

MUSACEAE

Musa sp.

[local name - ulu]

Fenua Tapu: sight; Meang: sight.

CASUARINACEAE

Casuarina equisetifolia L.

Fenua Tapu: Woodroffe 171

MORACEAE

Artocarpus altilis (Park.) Fosb. [local name - mei]

Fenua Tapu: Woodroffe 193; Pongalei: sight; Tokinivae: sight;
Meang: sight.

Ficus prolixa Forst. f.

Fenua Tapu: Woodroffe 122

Ficus tinctoria Forst.f. [local name - pelo]

Fenua Tapu: Woodroffe 139; Motupuakaka: sight; Pongalei: sight;
Unimai: sight; Tenamoitoka: sight; Piliaieve: sight; Pakantou: sight;
Motuliki: sight; Motuliki 2: sight; Motulikiliki: sight; Talalolae:
sight; Teitai: sight; Tokinivae: sight; Meang: sight; Nusafe:
sight; Tokinivae 2: sight; Tokinivae 3: sight.

URTICACEAE

Laportea interrupta (L.) Chew

Fenua Tapu: Woodroffe 195; Pongalei: Woodroffe 133; Tokinivae:
sight; Meang: sight

Pilea microphylla (L.) Lieb.

Fenua Tapu: Woodroffe 186

Pipturus argenteus (Forst.f.) Wedd. [local name - te pau]

Fenua Tapu: Woodroffe 136; Motupuakaka: sight; Pongalei: sight;
Unimai: sight; Tenamoitoka: sight; Piliaieve: sight; Pakantou:
sight; Motuliki: sight; Motulikiliki: sight; Talalolae: sight;
Teitai: sight; Tokinivae: sight; Meang: sight; Nusafe: sight;
Tokinivae 2: sight; Tokinivae 3: sight.

OLACACEAE

Ximenia americana L. [local name - kanana]

Fenua Tapu: Woodroffe 129; Motupuakaka: sight; Pongalei: sight;
Unimai: sight; Tenamoitoka: sight; Piliaieve: sight; Pakantou: sight;
Talalolae: sight; Tokinivae: Woodroffe 161; Meang: Woodroffe 157

AMARANTHACEAE

Achyranthes aspera L. approaching velutina H&A, [local name - sisi vao]

Fenua Tapu: Woodroffe 126; Motupuakaka: sight; Tokinivae: sight;
Meang: sight.

Alternanthera sessilis (L.) R.Br.

Fenua Tapu: Woodroffe 150

NYCTAGINACEAE

Boerhavia tetrandra Forst.

Fenua Tapu: Woodroffe 104, 130; Motupuakaka: sight; Pongalei: sight; Piliaieve: sight; Pakantou: sight; Sikaiana: sight; Motuliki: sight; Motulikiliki: sight; Talalolae: sight; Tokinivae: sight; Meang: sight; Tokinivae 2: sight; Tokinivae 3: sight.

Mirabilis jalapa L.

[local name - petel]

Fenua Tapu: Woodroffe 172

Pisonia grandis R.Br.

[local name - puka vai]

Fenua Tapu: sight; Motupuakaka: sight; Pongalei: sight; Unimai: sight; Tenamoitoka: sight; Piliaieve: sight; Pakantou: sight; Motuliki: sight; Motuliki 2: sight; Motulikiliki: sight; Talalolae: sight; Teitai: sight; Tokinivae: Woodroffe 163; Meang: sight; Nusafe: sight.

PORTULACACEAE

Portulaca australis Endl..

Fenua Tapu: Woodroffe 197

Portulaca lutea Sol. or P.oleracea L.

Piliaieve: Woodroffe 101; Pakantou: sight; Tokinivae: sight; Meang: sight

LAURACEAE

Cassytha filiformis L.

[local name - te louku]

Fenua Tapu: sight; Motupuakaka: sight; Pongalei: sight; Unimai: sight; Piliaieve: sight; Pakantou: sight; Sikaiana: sight; Motuliki: sight; Motulikiliki: sight; Talalolae: Woodroffe 178; Tokinivae: sight; Meang: sight; Tokinivae 2: sight.

HERNANDIACEAE

Hernandia sonora L.

[local name - puka]

Fenua Tapu: Woodroffe 118; Pongalei: sight; Talalolae: sight; Tokinivae: sight; Meang: sight

CRASSULACEAE

Bryophyllum pinnatum (Lam.) Kurz (= Kalanchoe pinnata (Lam.) Pers.)

Fenua Tapu: Woodroffe 138

LEGUMINOSAE

Canavalia cathartica Thou.

[local name - lokou]

Fenua Tapu: sight; Motupuakaka: sight; Pongalei: sight; Kokole: sight; Unimai: sight; Unimai 2: sight; Tenamoitoka: sight; Piliaieve: sight; Pakantou: sight; Motuliki: sight; Talalolae: sight; Tokinivae: Woodroffe 162; Meang: sight; Nusafe: sight; Tokinivae 2: sight.

Vigna marina (Burm.) Merr. [local name - te louku]
Fenua Tapu: Woodroffe 107; Pongalei: sight; Unimai: sight.

SURIANACEAE

Suriana maritima L. [local name - ngie]
Motupuakaka: Woodroffe 128; Pongalei: sight; Tokinivae: sight.

EUPHORBIACEAE

Acalypha amentacea Roxb. var. [local name - kakarapus]
Fenua Tapu: Woodroffe 137; Motupuakaka: sight; Pongalei: sight;
Unimai: sight; Tenamoitoka: sight; Piliaieve: sight; Pakantou: sight;
Motuliki: sight; Talalolae: sight; Tokinivae: sight; Meang: sight;
Tokinivae 2: sight; Tokinivae 3: sight.

Acalypha amentacea ssp. wilkesiana (Muell.-Arg.) Fosb.
Fenua Tapu: Woodroffe 169

Euphorbia chamissonis (Kl. & Gke) Boiss.
Fenua Tapu: Woodroffe 134; Motupuakaka: sight; Pongalei: sight.

Jatropha curcas L.
Fenua Tapu: Woodroffe 184

Phyllanthus amarus Schum. [local name - te uteute]
Fenua Tapu: Woodroffe 105

TILIACEAE

Triumfetta procumbens Forst. f. [local name - kiaou]
Fenua Tapu: Woodroffe 154; Motupuakaka: sight; Pongalei: sight;
Kokole: sight; Tenamoitoka: sight; Piliaieve: sight; Pakantou: sight;
Talalolae: sight; Meang: sight.

MALVACEAE

Sida fallax Walp.
Fenua Tapu: Woodroffe 164; Tokinivae: sight

GUTTIFERAE

Calophyllum inophyllum L. [local name - itai]
Fenua Tapu: Woodroffe 176; Motupuakaka: sight; Pongalei: sight;
Unimai: sight; Tenamoitoka: sight; Piliaieve: sight; Pakantou: sight;
Talalolae: sight; Teitai: sight; Tokinivae: sight; Meang: sight.

CARICACEAE

Carica papaya L. [local name - esi]
Fenua Tapu: Woodroffe 191

CUCURBITACEAE

Cucurbita pepo L.

Fenua Tapu: Woodroffe 190

LYTHRACEAE

Pemphis acidula Forst.

[local name - ngie]

Fenua Tapu: sight; Pongalei: sight; Unimai: sight; Piliaieve: sight; Pakantou: sight; Motuliki: sight; Talalolae: sight; Tokinivae: Woodroffe 160; Meang: sight; Tokinivae 2: sight.

LECYTHIDACEAE

Barringtonia asiatica L.

[local name - ulu]

Fenua Tapu: Woodroffe 175; Pongalei: sight; Pakantou: sight; Talalolae: sight; Tokinivae: sight; Meang: sight.

RHIZOPHORACEAE

Rhizophora stylosa Griff.

[local name - te tongo]

Fenua Tapu: Woodroffe 146

COMBRETACEAE

Lumnitzera littorea (Jack) Voigt

[local name - tangali]

Fenua Tapu: Woodroffe 116

Terminalia samoensis Rech.

[local name - te ipe]

Fenua Tapu: sight; Motupuakaka: sight; Pongalei: sight; Unimai: sight; Unimai 2: sight; Piliaieve: sight; Pakantou: sight; Motuliki: sight; Motuliki 2: sight; Motulikiliki: sight; Teitai: sight; Tokinivae: sight; Meang: Woodroffe 155

ONAGRACEAE

Ludwigia octovalvis (Jacq.) Raven

Fenua Tapu: Woodroffe 148

CONVOLVULACEAE

Ipomoea batatas (L.) Lam.

Fenua Tapu: Woodroffe 192

Ipomoea macrantha R. & S.

Talalolae: Woodroffe 177; Meang: sight

BORAGINACEAE

Cordia subcordata Lam.

[local name - kanava]

Fenua Tapu: Woodroffe 152; Pongalei: sight; Unimai: sight; Piliaieve: sight; Pakantou: sight; Motuliki: sight; Motulikiliki: sight; Talalolae: sight; Teitai: sight; Tokinivae: sight; Meang: sight; Tokinivae 2: sight

Tournefortia argentea L.f (= Messerschmidia argentea (L.f.) Johnst.
= Argusia argentea (L.f.) Heine)

[local name - tausunu]

Fenua Tapu: Woodroffe 165; Motupuakaka: sight; Pongalei: sight;
Unimai: sight; Piliaieve: sight; Pakantou: sight; Motuliki: sight;
Motulikiliki: sight; Talalolae: sight; Teitai: sight; Tokinivae: sight;
Meang: sight; Nusafe: sight; Tokinivae 2: sight; Tokinivae 3: sight.

VERBENACEAE

Clerodendrum inerme (L.) Gaertn, [local name - inato]

Fenua Tapu: Woodroffe 167

Lantana camara L. [local name - kai puaka]

Fenua Tapu: Woodroffe 166

Premna obtusifolia R.Br. [local name - te angol]

Fenua Tapu: Woodroffe 153; Pongalei: sight.

SOLANACEAE

Physalis angulata L. [local name - te peen]

Fenua Tapu: Woodroffe 145

Solanum lycopersicum L. (= Lycopersicon esculentum Mill.)

Fenua Tapu: Woodroffe 183

ACANTHACEAE

Pseuderanthemum carruthersii var. atropurpureum (Bull) Fosb.

Fenua Tapu: Woodroffe 159

RUBIACEAE

Gardenia taitensis DC. [local name - siale]

Fenua Tapu: Woodroffe 174

Guettarda speciosa L. [local name - uli]

Fenua Tapu: Woodroffe 121; Motupuakaka: sight; Pongalei: sight;
Kokole: sight; Unimai: sight; Unimai 2: sight; Tenamoitoka: sight;
Pakantou: sight; Sikaiana: sight; Motuliki: sight; Motuliki 2: sight;
Motulikiliki: sight; Talalolae: sight; Teitai: sight; Tokinivae: sight;
Meang: sight; Nusafe: sight; Tokinivae 2: sight; Tokinivae 3: sight.

Hedyotis romanzoffiensis (Cham. & Schlecht Fosb.

Pakantou: Woodroffe 132; Talalolae: sight; Tokinivae: sight;
Meang: Woodroffe 156 (Western extension for species)

Morinda citrifolia L.

[local name - te non]

Fenua Tapu: Woodroffe 143; Motupuakaka: sight; Pongalei: sight; Kokole: sight; Unimai: sight; Tenamoitoka: sight; Piliaieve: sight; Pakantou: sight; Sikaiana: sight; Motuliki: sight; Motulikiliki: sight; Talalolae: sight; Teitai: sight; Tokinivae: sight; Meang: sight; Tokinivae 2: sight,

APOCYNACEAE

Neisosperma oppositifolia (Lam.) Fosb. & Sacht [local name - pau pau]

Fenua Tapu: Woodroffe 125; Pongalei: sight; Unimai: sight; Tenamoitoka: sight; Meang: sight.

Plumeria rubra L.

[local name - pua fiti]

Fenua Tapu: Woodroffe 170

ARALIACEAE

Polyscias guilfoylei (Bull) Bailey

Fenua Tapu: Woodroffe 142, 173

GOODENIACEAE

Scaevola sericea Vahl (= S. taccada (Gaertn.) Roxb.) [local name - ngahu]

Fenua Tapu: Woodroffe 158; Motupuakaka: sight; Pongalei: sight; Kokole: sight; Unimai: sight; Unimai 2: sight; Tenamoitoka: sight; Piliaieve: sight; Pakantou: sight; Sikaiana: sight; Motuliki: sight; Motuliki 2: sight; Motulikiliki: sight; Talalolae: sight; Teitai: sight; Tokinivae: sight; Meang: sight; Nusafe: sight; Tokinivae 2: sight; Tokinivae 3: sight.

COMPOSITAE

Adenostemma lanceolatum Miq.

Fenua Tapu: Woodroffe 117

Eclipta prostrata (L.) L.

Fenua Tapu: Woodroffe 114

Synedrella nodiflora (L.) Gaertn.

Fenua Tapu: Woodroffe 123

Vernonia cinerea (L.) Less.

Fenua Tapu: Woodroffe 106

Wollastonia biflora (L.) DC.

[local name - louku]

Fenua Tapu: Woodroffe 108

Discussion

The vegetation cover is more or less continuous over the reef islands of Nui Atoll, being composed principally of scrub or woodland of Pisonia or coconuts. There are no extensive areas bare of vegetation as on drier atolls, such as in Kiribati to the north. The sparse scrub communities occur largely on unfavourable substrates; the Scaevola scrub is sparse on the rubble ridges of north west Meang, and Pemphis scrub is sparse in low lying areas central to several reef islands which seem to represent old inter-island channels and which are probably liable to infrequent inundation. Suriana does not occur as a distinct scrub unit, as in the Cook Islands, but as isolated shrubs.

The vegetation has been modified by human disturbance. Clearing of scrub from beneath coconut woodland is common practise around the village and was observed to have occurred on many other plots. Collection of domestically important plants almost certainly accounts for the present distribution of these plants; for instance the edible fern Asplenium is rare close to the settlement on Fenua Tapu, even in Pisonia woodland where it might be expected, and where it does occur is more commonly epiphytic than growing on the ground. It is much more common on islands further from the main village where it grows both epiphytically and on the ground. Pandanus leaves are also likely to have been collected intensively close to the settlements, and Pandanus is a much less obvious component of scrubland on Fenua Tapu than elsewhere. The main area for collection of Pandanus leaves was on Meang in 1982.

The flora is composed of plants that have a widespread distribution throughout the Pacific and is similar to that recorded in Kiribati, the Tokelau Islands or on other islands in Tuvalu. Neither Thespesia populnea nor Hibiscus tiliaceus were recorded on Nui, though both occur on neighbouring Vaitupu and were collected on Nanumea to the north. Ximena americana appears to be found only on the northern islands of Tuvalu, and has not been observed on the southern atolls.

It is interesting that Acalypha amentacea var. is such a prominent element of the flora of the scrublands, growing with Scaevola. Acalypha is not recorded as such a common element of scrublands outside Tuvalu; it is frequent on Vaitupu, but is restricted to one occurrence on Nukulaelae where it was introduced for compost for the pulaka pits.

There are a lot of introduced plants on Fenua Tapu, where garden crops, ornamentals and weeds have been introduced, but there are many less exotics than on Vaitupu or Funafuti.

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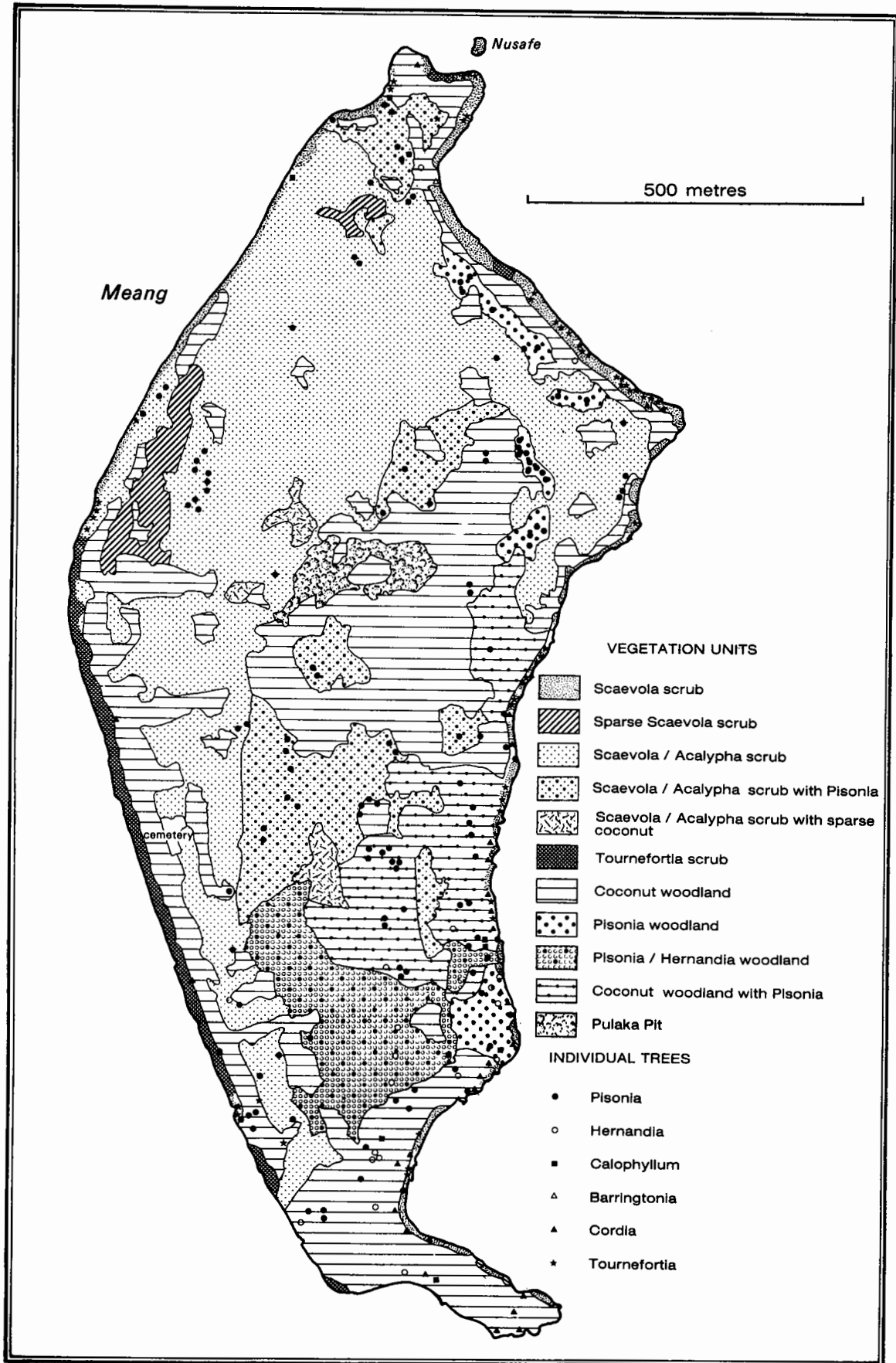


Fig. 2. Vegetation of Meang and Nusafe

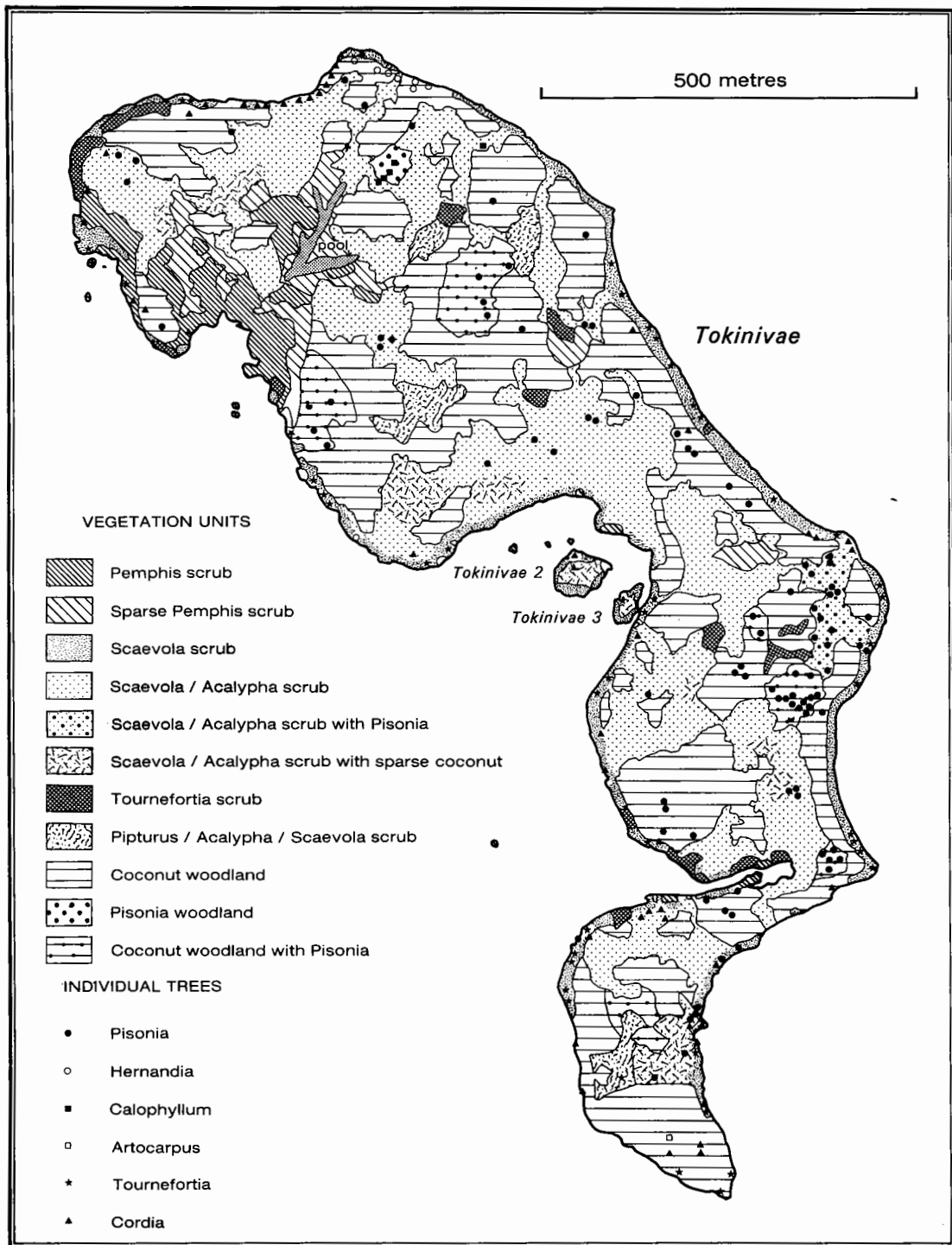


Fig. 3. Vegetation of Tokinivae, Tokinivae 2 and Tokinivae 3

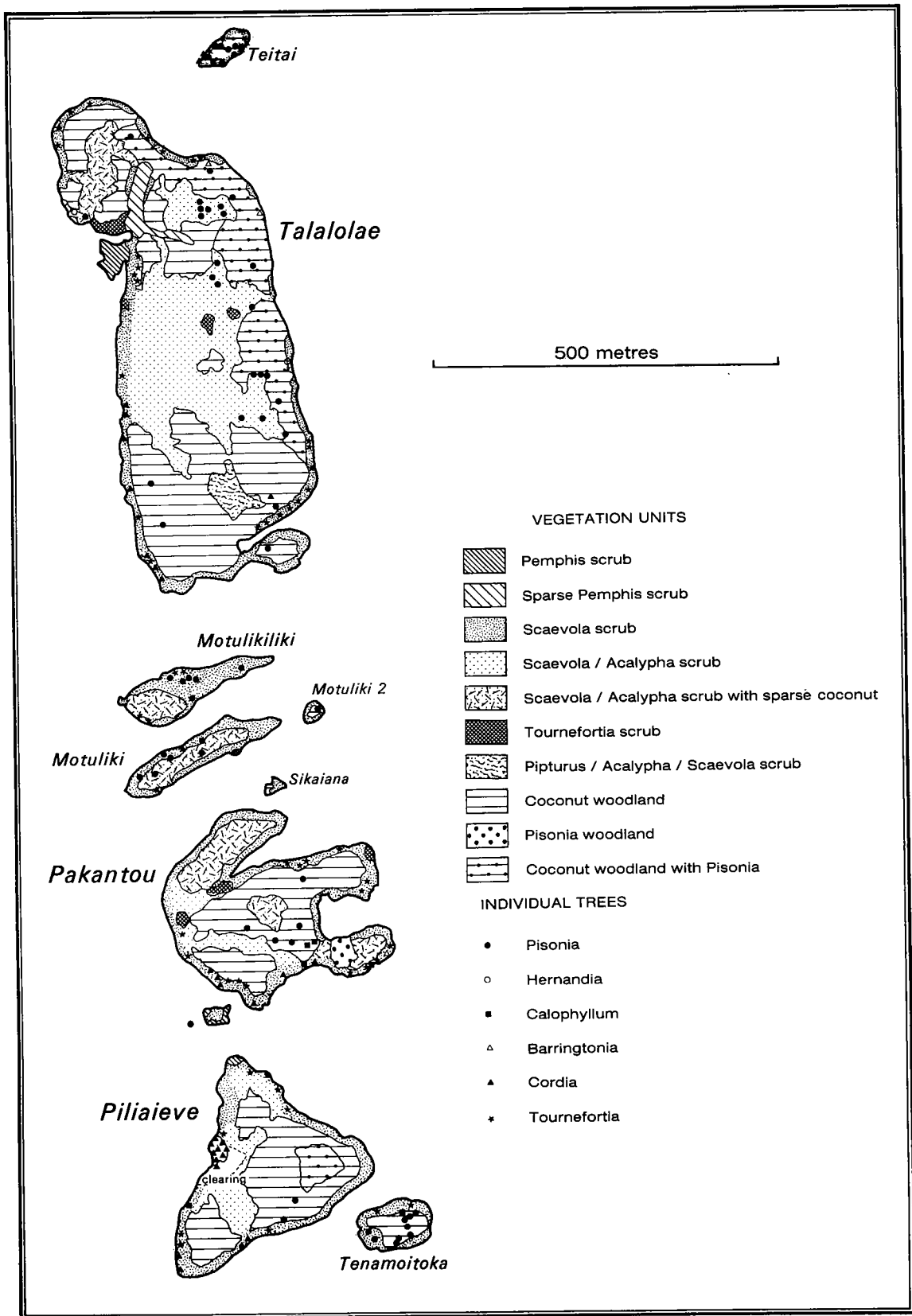


Fig. 4. Vegetation of Teitai, Talalolae, Motulikiliki, Motuliki, Motuliki 2, Sikaiana, Pakantou, Piliaieve and Tenamoitoka

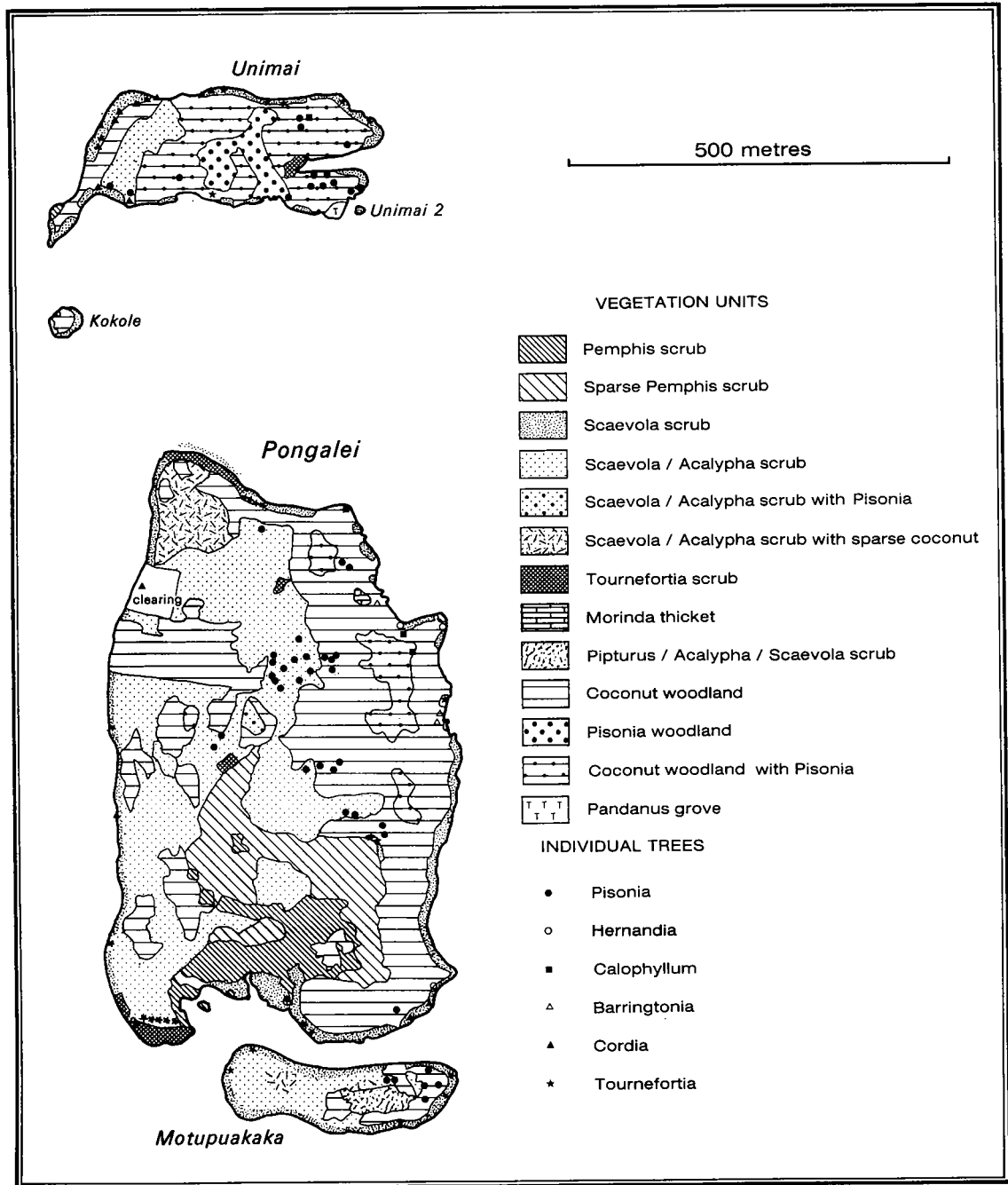


Fig. 5. Vegetation of Unimai, Unimai 2, Kokole, Pongalei and Motupuakaka

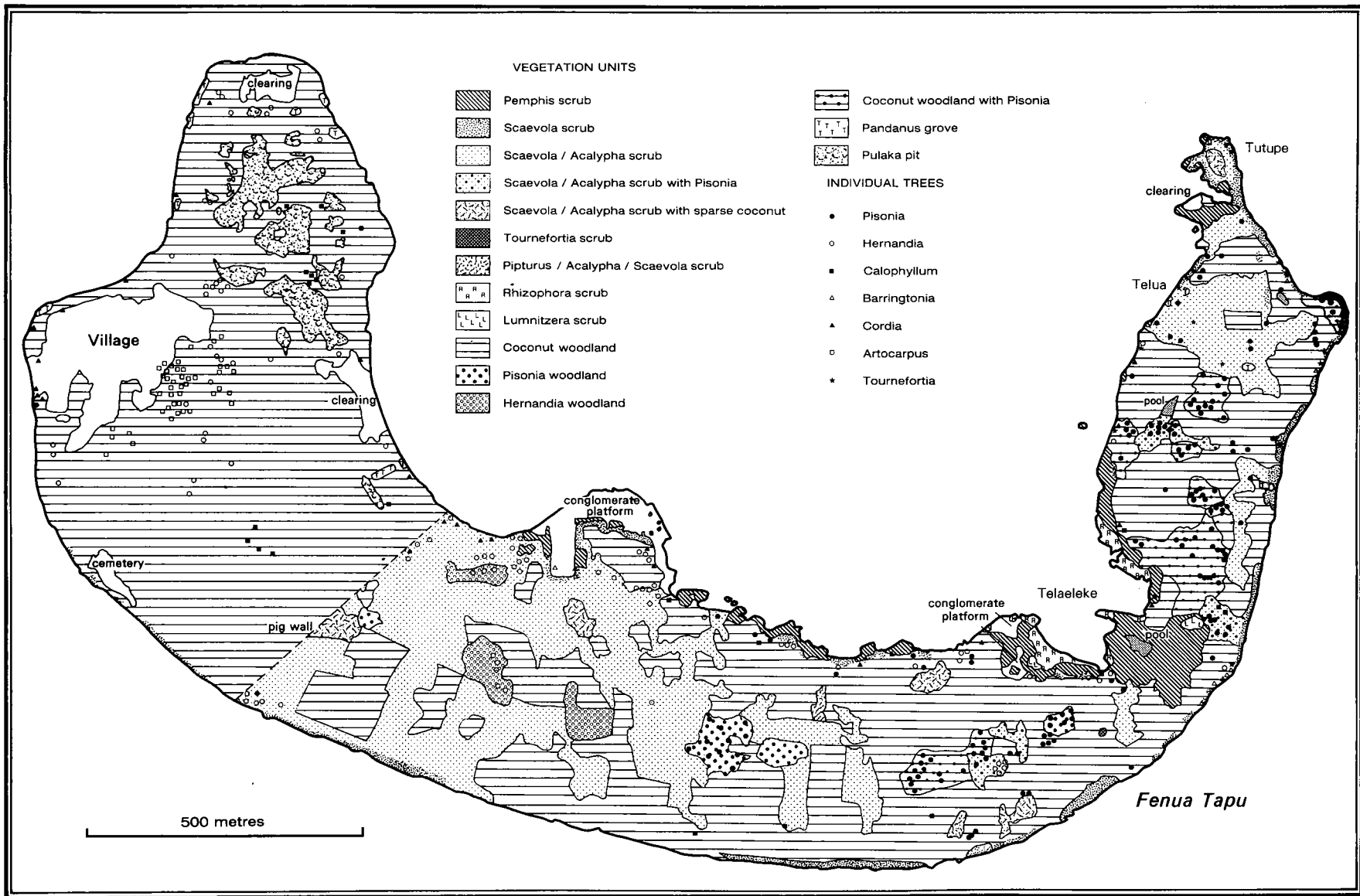


Fig. 6. Vegetation of Fenua Tapu



Plate 1. Pemphis scrub, western Tokinivae



Plate 2. Scaevola scrub on recently formed beach ridge, northeastern Fenua Tapu

Plate 3. Sparse Scaevola scrub, on fine rubble substrate, western Meang





Plate 4. Coastal Tournefortia scrub, western shore of Meang



Plate 5. Pipturus/Acalypha/Scaevola scrub, with young Guettarda in foreground, eastern Fenua Tapu



Plate 6. Coconut woodland with Asplenium, western Tokinivae



Plate 7. Pisonia woodland, Unimai



Plate 8. Scaevola/Acalypha scrub with coconuts, Unimai