



VASCULAR PLANTS, VEGETATION AND ETHNOBOTANY
OF BANABA (OCEAN ISLAND), REPUBLIC OF KIRIBATI

R. R. Thaman and Malosi Samuelu



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CONTENTS

ABSTRACT	1
DEDICATION	1
INTRODUCTION	2
BANABA AND THE REPUBLIC OF KIRIBATI	3
The People and Culture of Banaba	9
Post–European Contact Development History	10
Previous Studies	15
Current Studies	15
THE FLORA OF BANABA	16
Ferns and Fern Allies	16
Gymnosperms	16
Monocotyledons	17
Dicotyledons	18
VEGETATION OF BANABA	20
Coastal Strand or Littoral Vegetation	20
Coastal Limestone Terrace and Cliff Vegetation	21
Inner Coastal Pinnacle and Karstifield Limestone Vegetation	23
Lowland and Escarpment Forest and Woodland	24
Inland Forest and Woodland	24
Disclimax Successional Vegetation in Mined Areas	25
Secondary Vegetation in Abandoned Settlements and Industrial Areas	26
Houseyard and Settlement Gardens	29
Staple Food Gardens	31
Ruderal Vegetation	32
BANABAN VERNACULAR NAMES	33
USES	33
SYSTEMATIC LISTING OF THE VASCULAR PLANTS OF BANABA (OCEAN ISLAND), REPUBLIC OF KIRIBATI, CENTRAL PACIFIC	34
Family Names	34
Latin and Scientific Names	34
Common Names	34
Banaban and Kiribati Names	34
Antiquity Status	35
Abundance or Frequency Occurrence (Conservation Status)	35
Remarks	36
Digital Images	36
PTERIDOPHYTA (FERNS AND FERN ALLIES)	37
Nephrolepidaceae (Sword Fern Family)	37
<i>Nephrolepis biserrata</i> (Sw.) Schott	37
<i>Nephrolepis hirsutula</i> (G. Forst.) C. Presl.	37
<i>Nephrolepis biserrata</i> (Sw.) Schott var. <i>furcans</i> Hort. ex L. H. Bailey	37
Polypodiaceae (Common Fern Family or Polypody Fern Family)	37
<i>Microsorium grossum</i> (Langsd. and Fisch.) S. B. Andrews	37
Psilotaceae (Psilotum Family)	38
<i>Psilotum nudum</i> (L.) Beauv.	38
Pteridaceae (Bracken or Brake Fern Family)	38
<i>Pteris tripartita</i> Sw.	38
Thelypteridaceae (Fern Family)	38
<i>Pteris vittata</i> L.	38

GYMNOSPERMAE (GYMNOSPERMS)	39
Cycadaceae (Cycad Family)	39
<i>Cycas rumphii</i> Miq.	39
ANGIOSPERMAE (ANGIOSPERMS)	39
MONOCOTYLEDONAE (MONOCOTYLEDONS)	39
Agavaceae (Agave Family)	39
<i>Agave sisalana</i> Perrine	39
<i>Cordyline fruticosa</i> (L.) A. Chev.	39
<i>Sansevieria trifasciata</i> Prain	39
Amaryllidaceae (Amaryllis Family)	40
<i>Crinum asiaticum</i> L.	40
<i>Hymenocallis littoralis</i> (Jacq.) Salisb.	40
<i>Zephyranthes rosea</i> Lindl.	40
Araceae (Arum Family)	40
<i>Alocasia macrorrhizos</i> (L.) G. Don	40
<i>Caladium bicolor</i> (Aiton) Vent.	41
<i>Colocasia esculenta</i> (L.) Schott	41
<i>Epipremnum aureum</i> (Lind. and Andre) Bunt.	41
<i>Xanthosoma sagittifolium</i> (L.) Schott	41
Arecaceae or Palmae (Palm Family)	42
<i>Cocos nucifera</i> L.	42
<i>Phoenix dactylifera</i> L.	42
<i>Pritchardia pacifica</i> Seem. and Wendl.	42
Cannaceae (Canna Family)	43
<i>Canna indica</i> L.	43
Commelinaceae (Dayflower or Spiderwort Family)	43
<i>Commelina diffusa</i> Burm. f.	43
<i>Tradescantia pallida</i> (Rose) D. Hunt	43
<i>Tradescantia spathacea</i> Swartz	43
Cyperaceae (Sedge Family)	44
<i>Cyperus compressus</i> L.	44
<i>Cyperus javanicus</i> Houtt.	44
<i>Cyperus rotundus</i> L.	44
<i>Fimbristylis cymosa</i> R. Br.	44
Dioscoreaceae (Yam Family)	44
<i>Dioscorea alata</i> L.	44
Liliaceae (Lily Family)	45
<i>Gloriosa superba</i> L.	45
Musaceae (Banana Family)	45
<i>Musa</i> (AAA Group) Simmonds	45
<i>Musa</i> (AAB Group) Simmonds	45
<i>Musa</i> (AAB Group) "Ney Poovan," "Lady's finger" Simmonds	46
<i>Musa</i> (ABB Group) Simmonds	46
Pandanaeae (Pandanus Family)	46
<i>Pandanus tectorius</i> Park.	46
Poaceae or Graminae (Grass Family)	47
<i>Bambusa</i> sp.	47
<i>Bothriochloa bladhii</i> (Retz.) S. T. Blake	47
<i>Brachiaria subquadripata</i> (Trin.) Hitchc.	47
<i>Cenchrus echinatus</i> L.	48
<i>Chloris inflata</i> Link	48

<i>Chrysopogon aciculatus</i> (Retz.) Trin.	48
<i>Cynodon dactylon</i> (L.) Pers.	48
<i>Dactyloctenium aegyptium</i> (L.) P. Beauv.	48
<i>Digitaria radicata</i> (J. Presl) Miq.	49
<i>Eleusine indica</i> (L.) Gaertn.	49
<i>Eragrostis tenella</i> (L.) P. Beauv. ex Roem. and Schult.	49
<i>Lepturus repens</i> (G. Forst.) R. Br.	49
<i>Melinis repens</i> (Willd.) Zizka	49
<i>Saccharum officinarum</i> L.	50
<i>Sorghum sudanense</i> (Piper) Stapf	50
<i>Stenotaphrum micranthum</i> (Desv.) C. E. Hubb.	50
Taccaceae (Polynesian Arrowroot Family)	50
<i>Tacca leontopetaloides</i> (L.) Kuntze	50
DICOTYLEDONAE (DICOTYLEDONS)	51
Acanthaceae (Acanthus Family)	51
<i>Asystasia gangetica</i> (L.) T. Anderson	51
<i>Barleria prionitis</i> L.	51
<i>Graptophyllum pictum</i> (L.) Griff.	51
<i>Pseuderanthemum carruthersii</i> (Seem.) Guill. var. <i>carruthersii</i>	51
<i>Pseuderanthemum carruthersii</i> (Seem.) Guill. var. <i>atropurpureum</i> (Bull) Fosb.	51
<i>Pseuderanthemum reticulatum</i> (Bull) Radlk.	52
<i>Thunbergia erecta</i> (Benth) T. Anderson	52
Amaranthaceae (Amaranth Family)	52
<i>Amaranthus dubius</i> Mart. ex Thell.	52
<i>Amaranthus viridis</i> L.	52
Anacardiaceae (Cashew or Rhus Family)	52
<i>Mangifera indica</i> L.	52
Annonaceae (Custard Apple Family)	53
<i>Annona muricata</i> L.	53
<i>Annona squamosa</i> L.	53
Apocynaceae (Dog-Bane Family)	53
<i>Allamanda blanchetti</i> A. DC.	53
<i>Catharanthus roseus</i> (L.) G. Don	53
<i>Cerbera manghas</i> L.	54
<i>Ochrosia elliptica</i> Labill.	54
<i>Plumeria obtusa</i> L.	54
<i>Plumeria rubra</i> L.	54
Araliaceae (Panax Family)	55
<i>Polyscias guilfoylei</i> (W. Bull) L. H. Bailey	55
Asteraceae or Compositae (Aster, Sunflower or Composite Family)	55
<i>Bidens pilosa</i> L.	55
<i>Cyanthillium cinereum</i> (L.) H. Rob	55
<i>Lactuca sativa</i> L.	55
<i>Pluchea indica</i> (L.) Less.	55
<i>Synedrella nodiflora</i> (L.) Gaertn.	56
<i>Tagetes erecta</i> L.	56
<i>Tridax procumbens</i> L.	56
<i>Zinnia elegans</i> Jacq.	56
Bignoniaceae (Bignonia Family)	56
<i>Spathodea campanulata</i> P. Beauv.	56
<i>Tecoma stans</i> (L.) Juss. ex Kunth.	56

Bombaceae (Bombax Family)	57
<i>Ceiba pentandra</i> (L.) Gaertn.	57
Boraginaceae (Heliotrope or Borage Family)	57
<i>Cordia subcordata</i> Lam.	57
<i>Tournefortia argentea</i> L. f.	57
Brassicaceae or Cruciferae (Cabbage or Mustard Family)	58
<i>Brassica oleracea</i> L. var. <i>capitata</i> L.	58
<i>Brassica rapa</i> L. subsp. <i>chinensis</i>	58
<i>Brassica</i> x <i>hybrida</i> “Saladeer”	58
Capparidaceae (Caper Family)	58
<i>Capparis mariana</i> Jacq.	58
<i>Capparis quiniflora</i> DC.	59
<i>Cleome rutidosperma</i> DC.	59
<i>Cleome viscosa</i> L.	59
Caricaceae (Papaya Family)	59
<i>Carica papaya</i> L.	59
Casuarinaceae (Casuarina Family)	60
<i>Casuarina equisetifolia</i> L.	60
Clusiaceae or Guttiferae (Mangosteen Family)	60
<i>Calophyllum inophyllum</i> L.	60
Combretaceae (Terminalia Family)	61
<i>Quisqualis indica</i> L.	61
<i>Terminalia catappa</i> L.	61
<i>Terminalia litoralis</i> Seem.	61
Convolvulaceae (Morning-Glory Family)	62
<i>Ipomoea batatas</i> (L.) Lam.	62
<i>Ipomoea pes-caprae</i> Roth	62
<i>Ipomoea violacea</i> L.	62
Cucurbitaceae (Melon Family)	62
<i>Citrullus lanatus</i> (Thunb.) Matsum. and Nakai	62
<i>Cucumis melo</i> L.	63
<i>Cucumis sativus</i> L.	63
<i>Cucurbita pepo</i> L.	63
Euphorbiaceae (Spurge Family)	63
<i>Acalypha lanceolata</i> Willd.	63
<i>Acalypha wilkesiana</i> Müll.-Arg.	63
<i>Acalypha wilkesiana</i> f. <i>circinata</i> Müll. Arg.	64
<i>Cnidoscolus chayamansa</i> McVaugh	64
<i>Euphorbia atoto</i> G. Forst.	64
<i>Euphorbia cyathophora</i> Murray	64
<i>Euphorbia hterophylla</i> L.	65
<i>Euphorbia hirta</i> L.	65
<i>Euphorbia hypericifolia</i> L.	65
<i>Euphorbia prostrata</i> Aiton	65
<i>Euphorbia thymifolia</i> L.	65
<i>Manihot esculenta</i> Crantz	66
<i>Pedilanthus tithymaloides</i> (L.) Poit.	66
<i>Phyllanthus amarus</i> Schumach. and Thonn.	66
<i>Phyllanthus societatis</i> Müll. Arg.	66
<i>Ricinus communis</i> L.	66
Fabaceae (Pea Family)	67

<i>Acacia farnesiana</i> (L.) Willd.	67
<i>Alysicarpus vaginalis</i> (L.) DC.	67
<i>Bauhinia monandra</i> Kurz	67
<i>Caesalpinia bonduc</i> (L.) Roxb.	67
<i>Canavalia cathartica</i> Thouars	67
<i>Cassia grandis</i> L.f.	68
<i>Crotalaria pallida</i> Aiton	68
<i>Delonix regia</i> (Bojer ex Hook.) Raf.	68
<i>Derris trifoliata</i> Lour.	68
<i>Desmodium triflorum</i> (L.) DC.	68
<i>Gliricidia sepium</i> (Jacq.) Kunth ex Walp.	69
<i>Leucaena leucocephala</i> (Lam.) de Wit	69
<i>Millettia pinnata</i> (L.) Panigrahi	69
<i>Mimosa pudica</i> L.	70
<i>Mucuna gigantea</i> (Willd.) DC.	70
<i>Peltophorum pterocarpum</i> (DC.) Backer ex K. Heyne	70
<i>Senna occidentalis</i> (L.) Link	70
<i>Sophora tomentosa</i> L.	70
Goodeniaceae (Naupaka Family)	71
<i>Scaevola taccada</i> (Gaertn.) Roxb.	71
Lamiaceae (Mint Family)	71
<i>Ocimum basilicum</i> L.	71
<i>Ocimum tenuiflorum</i> L.	71
Lauraceae (Laurel Family)	71
<i>Cassytha filiformis</i> L.	71
Lecythidaceae (Brazilnut Family)	72
<i>Barringtonia asiatica</i> (L.) Kurz	72
Loganiaceae (Strychnine Family)	72
<i>Polypremum procumbens</i> L.	72
Lythraceae (Loosestrife Family)	72
<i>Pemphis acidula</i> J. R. Forst. and G. Forst.	72
Malvaceae (Mallow Family)	73
<i>Abelmoschus manihot</i> (L.) Medik.	73
<i>Abutilon indicum</i> (L.) Sweet	73
<i>Hibiscus rosa-sinensis</i> L.	73
<i>Hibiscus schizopetalus</i> (Dyer) Hook. f.	74
<i>Hibiscus tiliaceus</i> L.	74
<i>Malvastrum coromandelianum</i> (L.) Garcke	74
<i>Sida acuta</i> Burm. f.	74
<i>Sida fallax</i> Walp.	74
<i>Sida rhombifolia</i> L.	75
<i>Thespesia populnea</i> (L.) Sol. ex Correa	75
Meliaceae (Mahogany Family)	75
<i>Melia azedarach</i> L.	75
Moraceae (Mulberry Family)	75
<i>Artocarpus altilis</i> (Parkinson) Fosberg	75
<i>Artocarpus mariannensis</i> Trec.	76
<i>Ficus benghalensis</i> L.	76
<i>Ficus prolixa</i> G. Forst.	76
<i>Ficus tinctoria</i> G. Forst.	76
Myrtaceae (Myrtle Family)	77

<i>Psidium guajava</i> L.	77
Nyctaginaceae (Four-O'Clock Family)	77
<i>Boerhavia repens</i> L.	77
<i>Bougainvillea x buttiana</i> Holttum and Standley	77
<i>Bougainvillea glabra</i> Choisy	77
<i>Mirabilis jalapa</i> L.	78
<i>Pisonia grandis</i> R. Brown	78
Oleaceae (Olive Family)	78
<i>Jasminum sambac</i> (L.) Aiton	78
Passifloraceae (Passion Flower Family)	78
<i>Passiflora foetida</i> L.	78
Polygalaceae (Polygala Family)	79
<i>Polygala paniculata</i> L.	79
Polygonaceae (Buckwheat Family)	79
<i>Antigonon leptopus</i> Hook. and Arn.	79
Portulacaceae (Purslane Family)	79
<i>Portulaca oleracea</i> L.	79
Rubiaceae (Coffee Family)	80
<i>Aidia cochinchinensis</i> Lour.	80
<i>Guettarda speciosa</i> L.	80
<i>Hedyotis corymbosa</i> (L.) Lam.	80
<i>Ixora casei</i> Hance	80
<i>Ixora chinensis</i> Lam.	81
<i>Ixora coccinea</i> L.	81
<i>Ixora finlaysoniana</i> Wall. ex G. Don	81
<i>Morinda citrifolia</i> L.	81
<i>Spermacoce assurgens</i> Ruiz and Pav.	82
Rutaceae (Rue Family)	82
<i>Citrus aurantiifolia</i> (Christm.) Swingle	82
<i>Citrus x aurantium</i> L.	82
<i>Citrus x limon</i> (L.) Osbeck	82
<i>Citrus reticulata</i> Blanco	83
<i>Citrus sinensis</i> (L.) Osbeck	83
<i>Murraya paniculata</i> (L.) Jack	83
Sapindaceae (Soapberry or Lichi Family)	83
<i>Dodonaea viscosa</i> (L.) Jacq.	83
Sapotaceae (Sapodilla Family)	83
<i>Manilkara zapota</i> (L.) P. Royen	83
Scrophulariaceae (Snapdragon Family)	84
<i>Russelia equisetiformis</i> Schltdl. and Cham.	84
Solanaceae (Nightshade Family)	84
<i>Capsicum annuum</i> L. vars.	84
<i>Nicotiana tabacum</i> L.	84
<i>Physalis angulata</i> L.	84
<i>Solanum lycopersicum</i> L.	85
<i>Solanum melongena</i> L.	85
Sterculiaceae (Cocoa Family)	85
<i>Waltheria indica</i> L.	85
Surianaceae (Suriana Family)	85
<i>Suriana maritima</i> L.	85
Turneraceae (Turnera Family)	85

<i>Turnera ulmifolia</i> L.	85
Urticaceae (Nettle Family)	86
<i>Laportea ruderalis</i> (G. Forst.) Chew	86
<i>Pilea microphylla</i> (L.) Liebm.	86
Verbenaceae (Verbena Family)	86
<i>Lantana camara</i> L.	86
<i>Premna serratifolia</i> L.	86
<i>Stachytarpheta jamaicensis</i> (L.) Vahl	87
<i>Stachytarpheta cayennensis</i> (Rich.) Vahl.	87
<i>Vitex trifolia</i> L.	87
<i>Volkameria inermis</i> L.	87
ACKNOWLEDGMENTS	88
NOTES	88
REFERENCES	89

VASCULAR PLANTS, VEGETATION AND ETHNOBOTANY OF BANABA (OCEAN ISLAND), REPUBLIC OF KIRIBATI

R. R. THAMAN* AND MALOSI SAMUELU†

ABSTRACT

We present a compilation and analysis of the vascular plants, vegetation, and ethnobotany of Banaba (Ocean) Island in the Republic of Kiribati in the tropical Central Pacific Ocean. It is based on a 2005 field survey, plus analysis of available information in the literature. The flora of the small, raised phosphatic limestone island of Banaba is very limited compared to the floras of larger limestone and volcanic islands of the tropical Pacific Ocean. Isolation, small size, prolonged droughts and water scarcity, almost 80 years of open-cast phosphate mining, abandonment of the island by most people after cessation of mining in 1979, and widespread destruction, relocation and death of the Banaban people during and after World War II have led to serious degradation, disturbance, displacement and loss of the flora, vegetation, knowledge and ancient cultural traditions related to plants. This paper attempts for the first time to document the nature of Banaba's flora and vegetation and provide background on the reasons for their impoverished and endangered state and the loss of Banaban ethnobotanical knowledge. The recorded flora of Banaba consists of approximately 205 species, of which only 50 are possibly native and none endemic. The balance of the flora is composed of ornamentals, weedy exotics, food plants, and a limited number of other useful cultigens. Although greatly outnumbered by exotics, indigenous species still dominate most areas including some of the most disturbed habitats, as well as constituting the most culturally and ecologically important resources on the island. Most plants had traditional native names and associated cultural knowledge, many serving as "trees of life." It is argued that the protection and enhancement of the native and long-established non-indigenous flora and associated knowledge are crucial to the ecological integrity and survival of the people of Banaba and the culture and traditions of the Banaban people, most of who now live on Rabi Island in Fiji or elsewhere overseas.

DEDICATION

To past, present and future generations of Banabans who have had their life-giving island, plants and associated rich cultural traditions destroyed and desecrated to enrich and fulfil the development aspirations of other people's lands, plants and cultures.

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INTRODUCTION

OH BANABA BANABA

You stand alone in vastness of the
Kiribati paradise
Looking like a beautiful capsized canoe
from afar

Oh Banaba Banaba
Where birds of such beauty fly
Oh Banaba Banaba
Reminds me of sunny days

Re-settled in Rabi we cannot forget our
origins, our paradise
Always in our hearts and thoughts for
all time RORO NI BANABA

GENERATIONS OF BANABA

Generations of Banaba look up
This is an important day to us all
Old men and old women
In memory of sustained life
Since we first arrived on Rabi
Our God given land

December the 15th
Our feet touched Rabi soil
Such eternal love
Crowned with health, peace and
prosperity

We remember the coming of Japan
Bringing tears, death and sadness
We were sent to Tarawa, Kosrae and
Nauru
We still are thankful to God
For his ever guiding hand

We plead you Father our God
To bless the race of Banaba
Instil in them patriotism
Peace to all people
So as to ensure lasting blessings
For eternal love and peace

“Banaba Anthem,” verses 3 and 4 (MISA 2008)

This is a study of the flora, vegetation and limited cultural knowledge of one of the most physically and culturally devastated and degraded islands on Earth, the upraised phosphatic limestone island of Banaba located near the Equator in the tropical western Pacific Ocean. The study is based on three intensive field surveys on-foot around the island and in-depth community-based biodiversity questionnaire surveys conducted from 29 September to 5 October 2002. During this period 202 plants were identified, and the scientific, Banaban, and Kiribati names of all plant species found on the island were recorded and listed alphabetically to provide working lists for use in the field and during interviews. These lists were then cross-checked, consolidated, amended and augmented, both during and after the field studies. A limited number of herbarium specimens were collected and lodged in the South Pacific Regional Herbarium (SPRH) at The University of the South Pacific in Suva and digital photos taken of almost all recorded species.

To our knowledge, this was the first systematic study of the vegetation and flora of Banaba, although there have been more in-depth earlier studies on the floras of two other similar phosphatic limestone islands in the Pacific that have long histories of phosphate mining. These are Makatea in the Tuamotu Archipelago of French Polynesia (Wilder 1934), and Nauru, a phosphatic limestone “sister” island, located some 200 km to the west of Banaba (Thaman 1992b; Thaman et al. 1994). The senior author has also worked on the flora, vegetation, ethnobotany and agroforestry of the main Gilbert Islands (Tungaru Group) of the Republic of Kiribati (Thaman 1987, 1990, 1992b; Thaman and Whistler 1996); Kiritimati Atoll in the Line islands of Kiribati (Thaman et al. 1997); and the raised limestone island of Tongatapu, Tonga (Thaman 1976; Thaman and Whistler 1996), all of which contain some elements of the flora of Banaba. The senior author was involved in the re-survey of the flora and vegetation of Nauru in 2007 (Thaman et al. 2008a, 2008b), which provides a time-depth view of the changing nature of the flora, vegetation, ethnobotany and recovery of a mined raised phosphatic limestone island.

This report contains (1) geographical, demographic, cultural, historical and developmental information on Banaba that are important for understanding the natural and political factors responsible for the degraded status of the flora and vegetation of Banaba; (2) a synopsis of previous studies and information available on the flora of Banaba; (3) an analysis and discussions of the flora, vegetation and the vernacular Banaban names for plants; (4) a systematic annotated listing, “Vascular Plants of Banaba, Republic of Kiribati,” containing detailed information about vascular plants currently or formerly present on Banaba; and (5) bibliography of referenced materials and other source materials used as a basis for plant descriptions, origins and other relevant information.

BANABA AND THE REPUBLIC OF KIRIBATI

Banaba, formerly known by its English name Ocean Island, is an uplifted phosphatic-limestone island located close to the Equator at 0°52'S and 169°32'E (Figure 1; Overmars and Butcher 2001). It is politically part of the Republic of Kiribati that became an independent state in 1979, after formerly being part of the British Gilbert and Ellice Islands Colony (GEIC). The Ellice Islands, now also independent and known by their indigenous name Tuvalu, formally seceded from Kiribati and the rest of the GEIC in 1975. The Banabans unsuccessfully tried to gain independence during the breakup of the GEIC (Carter 1984).

The 33 islands of the Republic of Kiribati include three groups of 32 low-lying atolls,¹ which rarely reach an elevation above 3 m; plus Banaba, an isolated uplifted phosphatic limestone island that, with an elevation of 81 m, is the highest island in Kiribati. The islands are extremely isolated and fragmented, covering an ocean area of some 13 million km² of the central Pacific Ocean, and straddle both the Equator and the International Date Line between 4°43'N and 11°25'S latitude and 169°32'E and 150°14'W longitude. They extend some 3,870 km from Banaba on the west to Kiritimati (Christmas Is.) in the east and 2,050 km from Teraina (Washington Is.) in the Northern Line Islands to Flint Island in the Southern Line Islands. The three main island groups include (1) the Gilbert Islands (known locally as Tungaru) in the west, a group of 16 atolls lying some 932 km² north of Fiji; (2) the Phoenix Islands, a group of 8 atolls lying some 1,800 km southeast of the Gilberts; and (3) the Northern and Southern Line Islands, a group of 9 atolls lying some 2,051 km east of the Gilberts.² Banaba is located in the far west of Kiribati (Figure 1).

The total land area of Kiribati is about 823 km². Kiritimati Atoll in the Northern Line Islands, which is considered to be the largest atoll in the world with a land area of 364 km², makes up 44% of the total area. Few of the atolls have elevations higher than 3 m above sea level. Tarawa Atoll, the most populous island and the administrative centre, is located in the middle of the Gilbert group about 1,800 km north of Suva, Fiji (Carter 1984; Thaman et al. 1997). As of 2005 the population of Kiribati was 46,921 and the population of Banaba 301, consisting of 164 males and 137 females (MISA 2008).

Physically Banaba has a somewhat circular but crescentic shape with a circumference of about 10 km, an area of about 6.9 km², and a maximum elevation of about 81 m, making it by far the highest island in the Republic of Kiribati (Figures 2, 3).

In profile the island rises from the coast (Figures 4, 5) and is encircled almost entirely by a subtidal fringing reef that extends about 20–60 m from the shoreline (Figure 6). There is very little low-lying coastal plain, except for a small area along the southeast corner of the island in Uma (Figures 2, 3), with most of the island bordered by wave-cut uplifted, karstified limestone terraces ranging in gradient from vertical cliffs to gradually-sloping areas of colluvial soil and phosphate deposits interspersed with rugged limestone outcrops and pinnacles (Figures 5, 6).

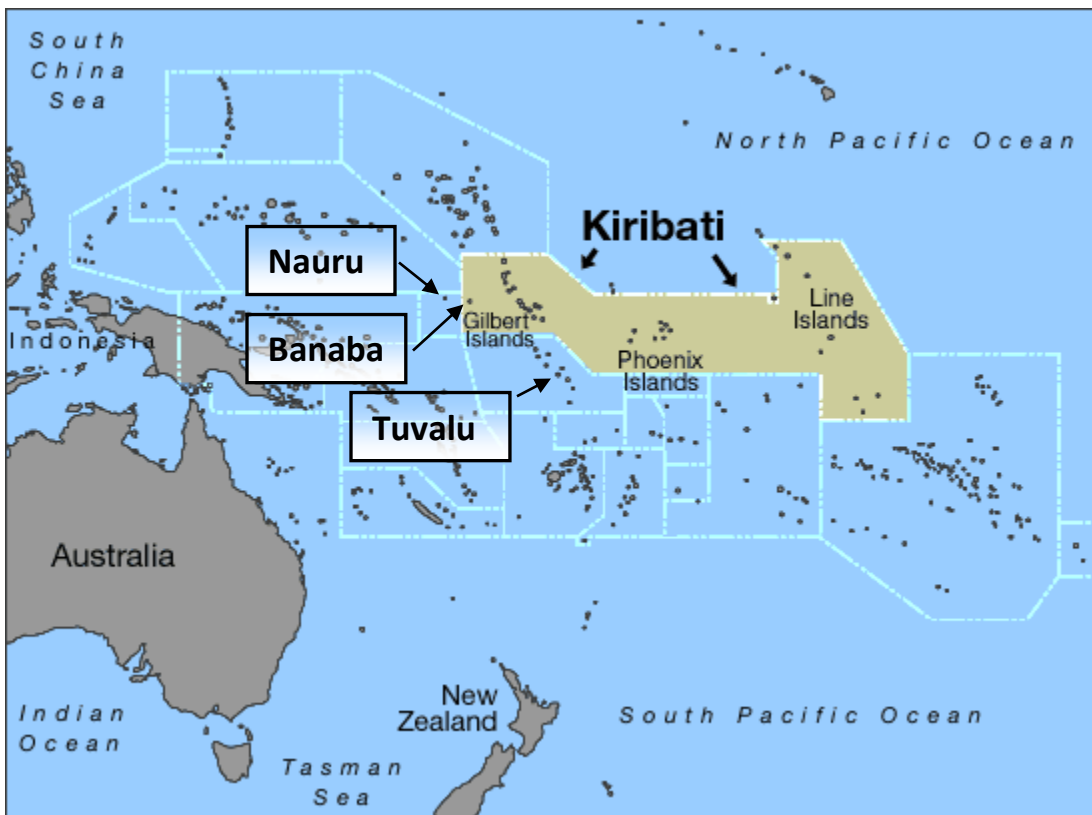


Figure 1. Map showing the locations of the Republic of Kiribati, the Gilbert, Phoenix and Line Islands, Tuvalu and the locations of the two raised phosphatic limestone islands of Banaba and Nauru. (Adapted from <http://www.climate.gov.ki/about-kiribati/>)

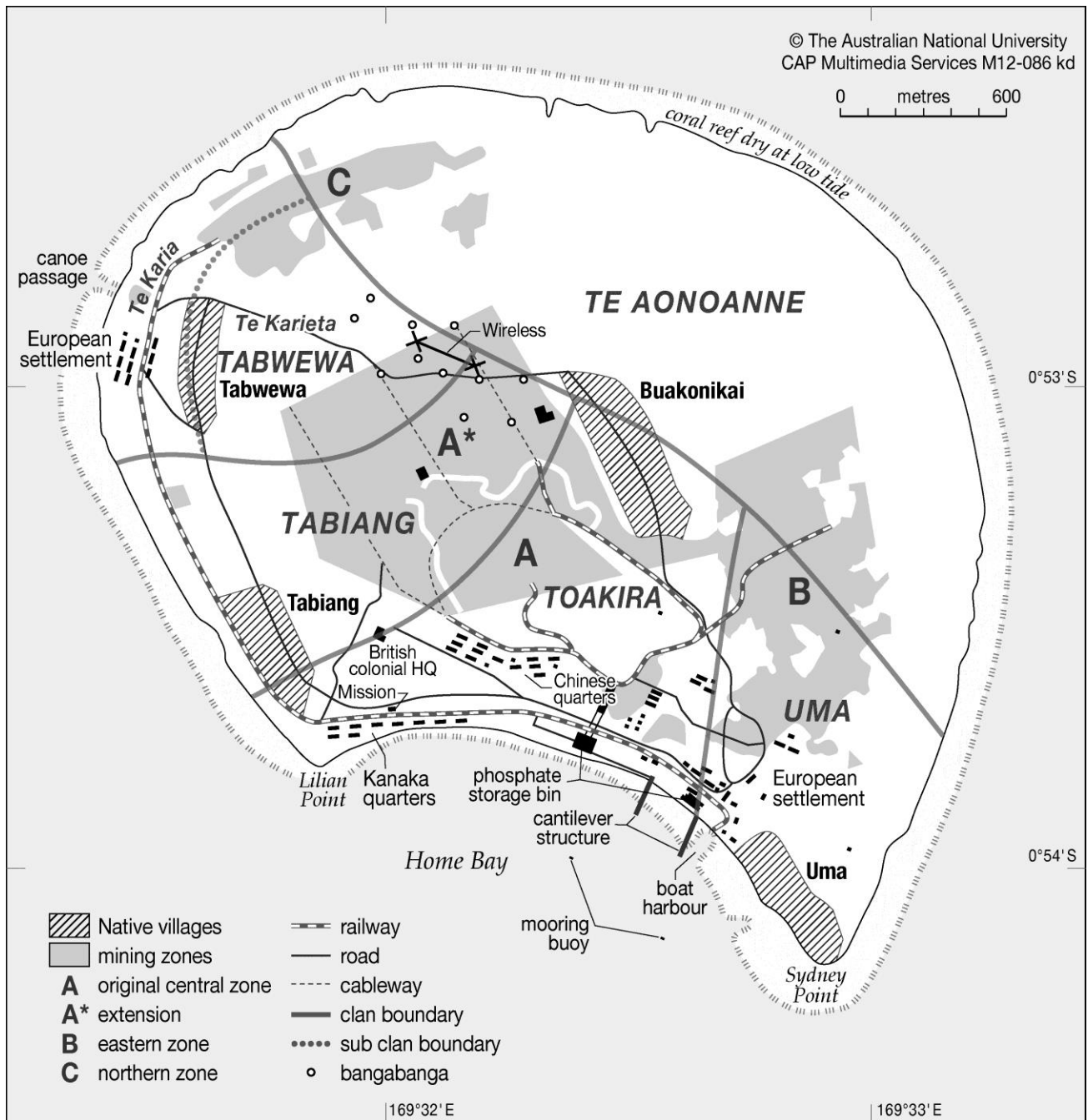


Figure 2. Map of Banaba showing main districts, settlements, place names, surrounding fringing reef, and indigenous Banaba and mining company land divisions, as they were in the 1930s. (Source: Teiawa 2015; prepared by ANU CAP Multimedia Services, Canberra)³



Figure 3. Map of Banaba showing (1) the main areas of settlement in the south and west of the island; (2) Fatima Village inland from Tabwewa in the northwest; (3) Tabiang Village in the southwest; (4) abandoned phosphate mining infrastructure and Uma Village inland from the southeastern part of Home Bay; (5) the sports ground towards the southwest-central part of the island; (6) the uninhabited east and north coasts; and (7) the mined central and northern parts of the island. Banaba House is denoted as BH, the cemetery as C. (Image from Google Earth. Image © 2016 CNES/Astrum.)



Figure 4. First view of Banaba, from the east, from the *Summer Spirit*, on the morning of 29 September 2005. The island looks like an upside down canoe or, as Teaiwa (2015) said when seeing her ancestral homeland for the first time on the horizon, “the gentle hump of a turtle floating on the ocean.” (Photo: R. Thaman 2005)



Figure 5. View of Banaba from the ocean off Home Bay showing the vegetation and the coastal limestone terraces, cliffs and escarpment rising to the central upland. Phosphate mining infrastructure remains, including the rusting cantilever used to load phosphate ships during the time of mining. (Photo: Thaman 2005)



Figure 6. Intertidal flat and wave-cut limestone coastal terraces and coastal vegetation on north coast of Banaba. (Photo: Thaman 2005)

The central upland inland from the cliffs consists of coral-limestone pinnacles and limestone outcrops, between which extensive deposits of soil and high-grade tricalcic phosphate rock used to be found before the long history of mining (Viviani 1970; Tyrer 1962; Taylor 2005).

There are no surface fresh or brackish water bodies on the island. Groundwater is present as a "lens" of slightly brackish freshwater hydrostatically "floating" on higher density saltwater. The height of the freshwater lens above sea level and the level of salinity vary with changes in elevation, geology, texture and shape of the island, as well as the amount of water use and rainfall (Jacobsen and Hill 1988). Replenishment or recharge of the lens is dependent on rainfall. Groundwater, which is of critical importance during periods of drought, is accessible in underground water caves, known as **bwangabwanga** (Figure 7; Overmars and Butcher 2001).

Climatically, Banaba is located in the dry belt of the equatorial oceanic zone, with mean daily temperatures ranging from 26 to 32°C. Like Nauru, annual rainfall is extremely variable, averaging about 1500 mm per year with a range of 300 to 4572 mm. Prolonged droughts are common and place severe stress on even the most hardy coastal strand species, leading to the death of non-coastal exotics (such as breadfruit), and drastically restricting the production of even coconut palms (Catala 1957). For example, in 1883 a prolonged three-year drought reportedly killed over three-quarters of the population and “almost all trees,” with many survivors leaving the island on passing ships (Office of Te Beretitenti 2012). Similar droughts are reported from Nauru, where during an unprecedented drought between 1917 and 1918, when only 465 and 483 mm of rain fell, “thousands of coconuts and other fruit trees died” (Griffiths 1923).

Although no technical reports are available, we observed the soils of Banaba, like those of Nauru, to be shallow, coarse-textured, presumably alkaline, and of carbonatic mineralogy. They are composed of a variable layer of organic matter and coral sand, gravel and fragments overlaying a limestone platform. Potassium levels are often extremely low, and pH values of up to 8.2 to 8.9 and high CaCO₃ levels make scarce trace elements, particularly iron (Fe), manganese (Mn), copper (Cu) and zinc (Zn), unavailable to plants. Calcium dominates the exchange complex and exchangeable magnesium is also high, while extractable phosphate values are generally high and sulphate moderate. Fertility is, therefore, highly dependent on organic matter for the concentration and recycling of plant nutrients, lowering soil pH, and for water retention in the excessively well-drained soils (Morrison 1987, 1994).



Figure 7. Entrance to an active well or water cave (**bwangabwanga**) with *Microsorium grossum te keang ni Makin* growing on the walls inland from stock pile on Topside of Banaba. (Photo: Thaman 2005)

The People and Culture of Banaba

The indigenous people of Banaba are today considered Micronesian, although according to archaeological and genealogical evidence and oral history, the original inhabitants, known as Te Aka, the name of the original inland settlement, were probably from nearby Melanesia (Figure 8). Whatever their true origin, the first Banabans were reportedly darker-skinned, frizzy-haired, and more Melanesian-looking than the current inhabitants (Maude and Maude 1932; Sigrah and King 2001).

The original Te Aka culture was subsequently overlain by those of later settlers. An invasion from the East Indies in about the sixteenth century by taller, lighter-skinned people dominated the existing population and were the ancestors of today's Auriaria clan of Tabwewa District. In the seventeenth century an invasion by people from Beru Atoll in Kiribati established their own clans, the most notable being the Anginimaeao clan. They intermarried with existing inhabitants, including the Te Aka, and began to dominate much of the language and culture of Banaba. Sustained European influence and the introduction of Christianity began in the 1880s (Lampert 1965; Sigrah and King 2001; Teaiwa 2015). As on Nauru, archeological evidence indicates groups of mixed origin, with the people possibly divided into distinct, originally totemic, matrilineal clans that may have spoken different dialects, all of which, as suggested above, have been largely replaced by the Kiribati language used by the final wave of settlers from Kiribati and for translation of the Bible by European and Kiribati missionaries early last century (Viviani 1970). As stressed by Sigrah and King (pers. com. 2007), very little remains today of the Banaban language except in chants, songs, and dance lyrics.

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Figure 8. Banaban women (left) and Banaban man Malosi Samuelu (right), co-author of this paper. (Photos: Thaman 2005)

The traditional subsistence economy of Banaba was, like Nauru, probably based on coconut and pandanus as the main staple food crops, a limited range of wild terrestrial food products, sea birds (such as the black noddy, *Anous tenuirostris*, and a very wide range of finfish and other marine foods. Their housing, tools, clothing, medicines, fuel, fishing equipment, canoes, dyes, ornamentation, perfumes, toys and other material, and many of their non-material needs were satisfied from their environment, especially from plants. The snaring and taming of frigatebirds **te eitei** *Fregata minor*, in both Banaba and Nauru, is a sacred competitive sport that was reportedly practiced before the arrival of the ancestors of the Auriauria and Anginimaeao clans (Maude and Maude 1932; Sigrah and King 2001).

The traditional Banaban land tenure system, similar to that in Nauru, was flexible and different from many of the communal systems found elsewhere in the Pacific. Land, which usually had coconut palms, pandanus, breadfruit, tropical almonds, other useful trees, water sources, and other valued resources, was held, passed on to, and inherited by individuals, both men and women, through both the male and female lines. This allowed Banabans to have familial connections with different parts of the island, and a range of options for accessing resources, acquiring new knowledge, building relationships and receiving support in times of need. Some areas were seen as much more productive, with water resources more resilient to drought. Land and trees were also used as payment in ritual exchange or as compensation for crimes or transgressions, such as murder or killing someone's frigate bird, and the means by which justice and peace were maintained on the island (Maude and Maude 1932, 1994; Sigrah and King 2001; Teaiwa 2015).

The introduction of Christianity, the discovery of phosphate, the monetization of land and fixation of land tenure, British colonial governance, and lack of understanding by the British of this complexity all contributed to the breakdown of the system and paved the way for the wholesale alienation, dispossession and degradation of Banaban lands and associated knowledge and practices.

Central to the resultant hybrid Banaban culture were the I-Kiribati concepts of **te aba**—an all-embracing holistic concept of “land” that linked “people in deep corporeal and psychic ways to each other, to their ancestors, to their history and to their physical environment,” and to their extended family or **kainga** (Teaiwa 2015). Sadly, as stressed by Teaiwa (2015:9), “both **te aba** and **kainga** were completely transformed as mining consumed the original island, and the ideas of people, place, and home were reconstructed in new ways on a different island, Rabi, 1,600 miles (2,575 kilometers) away in Fiji.” In addition to mining, the physical destruction of Banaba and relocation to Rabi, there were other significant contributing factors that devastated the Banaban population and the links Banabans had with their land, history, culture and language, including the loss of their life-giving plants and their names, taxonomies and cultural and ecological importance.

Post-European Contact Development History

This land is mine land
it used to be our land
from tabiang to tabwewa
from buakonikai to uma
birds made this land for posterity

This land is mine land
it used to be our land
but then we leased it to greedy miners
who only saw it as something called phosphate
and used it for their own prosperity

Teresia Teaiwa (1995), “Mine Land: An Anthem”

As alluded to by Teaiwa, the post-European contact history of Banaba is one of the most tragic on Earth. The almost total degradation of, and alienation from, their island due to phosphate mining led to the devastation of the vegetation. The human population suffered drastic losses due to relocation, persecution and

murder, both during and after World War II. The almost enforced dependence on the colonial administration, the church and the Pacific Phosphate Company for their basic needs, further undermined their culture and links to their island. Overlaying this have been the damaging effects of periodic prolonged droughts on the island and its population (Ellis 1935; Carter 1984; Sigrah and King 2001; Teaiwa 2015).

The first recorded European sighting of Banaba was in 1801 by Captain Jared Gardner of the American ship *Diana*, who named it Rodman's Island. In 1804 it was renamed Ocean Island by Captain John Mertho of the ship *Ocean*, who assumed he was the first European to sight it (Carter 1984; Sigrah and King 2001). Except for occasional visits by whalers, traders and blackbirders (slave traders), there were few recorded subsequent visits until the arrival of Christian missionaries in the 1880s. Phosphate was discovered in 1900 by Albert F. Ellis, who negotiated with the Banabans to give his company the sole right to work the deposits for 999 years (!) for an annual payment of only £50. Shortly thereafter the island was declared a British possession, and eventually made part of the British Gilbert and Ellice Islands Colony (GEIC) (Ellis 1935). Gilbertese was made the official language, despite the fact that Banabans still spoke a mixture of Gilbertese and the more ancient Banaban language (Bingham 1953). As mentioned above the Bible was also translated into Gilbertese, thus reinforcing the demise of the original language, a change that "further challenged the transmission of Banaban cultural knowledge and practices" (Benaia 1991 in Teaiwa 2015).

During this initial period, the Pacific Phosphate Company was established, and by 1909 about 2 million tons of phosphate was exported. Apart from the £50 annual payment, the only financial benefits received by the Banabans were about £20 per acre for land "bought" from them, plus compensation for "fruit trees" destroyed, such as coconuts and pandanus, although no compensation was given for other trees destroyed, which, like in Nauru, had traditional cultural uses and values. As Teaiwa (2015) relates, the Company agreed not to remove phosphate from cultivated land; this proved to be a "technical tool" that allowed the Company to mine areas where pandanus groves, which to outsiders appeared to be growing wild, were deliberately planted cultivars. Similar arrangements in Nauru led to the loss of many named cultivated varieties of pandanus (Thaman et al. 1994), which in the Kiribati language are referred to as **te kaina**, whereas wild pandanus are known as **te rekenibeti** (Figure 9).

This situation changed in 1913 when, after the Banabans refused to sell additional land, the company agreed to pay a 6d (pence) royalty for every ton of phosphate mined. Continuing unfavourable "press" about the conditions of exploitation helped contribute to the formal establishment of the GEIC; the industry was run by Europeans with contract labourers from the GEIC (Gilbertese and Ellice Islands) and China, with Banabans having little to do with the actual mining (Ellis 1935; Munro and Schломowitz 1992; Wilmott 2007).

After WWI when Great Britain, Australia and New Zealand were given a League of Nations mandate over Nauru, the three countries bought out the Pacific Phosphate Company for £3.5 million. The British Phosphate Commission (BPC) replaced it to exploit the deposits of both Nauru and Banaba to supply phosphate to Australia, New Zealand and Britain, with some early pre-WWII exports also going to Japan. In the late 1920s (and again in 1931), when the Banabans refused to sell more land, the British government compulsorily purchased it for a "reasonable price," with the royalty being increased to 10.5d. per ton, a price unchanged until 1942. It was clear during arbitration in 1931 that there was extreme dissatisfaction over the compulsory purchase terms of an additional 150 acres of the most productive land at £150/acre and a 10.5d. royalty per ton. Additionally, the BPC was taking an additional 27.75 acres at a rental of £3/acre and £2 per coconut tree (Ellis 1935; Carter 1984). During the arbitration, the spokesperson for the Banabans, Rotan Tito, said, to no avail, that they instead wanted £180/acre and payments for specified trees (Table 1).

Throughout this latter period the government began to put money away on behalf of Banabans, anticipating a future when the island was mined out. Some was used in May 1942, after the Japanese invaded Banaba (see below), to purchase Rabi Island in Fiji for £25,000 from Levers Brothers as a future Banaban home. An annuities scheme in the late 1930s was serviced from the trust fund that established an annual rate of £8 per adult and £4 per child, although the dividends paid to BPC staff and European employees during periods of increased phosphate sales and low costs were far greater. Annuities were distributed equally regardless of the amount of land owned by respective Banabans, the differences in which were considerable and didn't take into account traditional land tenure rights (Maude and Maude 1994; Teaiwa 2015).



Figure 9. Planted edible pandanus **te kaina** *Pandanus* cultivar on land south of the cemetery (see Figure 3). Pandanus trees, coconut palms and other useful trees were traditionally gifted or inherited with land in Banaba. (Photo: Thaman 2005)

Table 1. Payments requested during arbitration in 1931 as payment for specified trees destroyed as a result of land acquisition and mining on Banaba (adapted from Teaiwa 2015).^a

English Name	Banaba Name	Species Name	Class	Payment Requested (£ s. d.)
Coconut	te ni	<i>Cocos nucifera</i>	Large	£2 0s. 0d.
			Small	£1 10s. 0d.
Pandanus	te kaina	<i>Pandanus</i> cultivars	Bearing	£1 10s. 0d.
			Small	£0 10s. 0d.
Almond	te kunikun	<i>Terminalia catappa</i>	–	£1 0s. 0d.
Mango	te manko	<i>Mangifera indica</i>	–	£1 0s. 0d.
Beach vitex	te kaitu	<i>Vitex trifolia</i>	–	£0 10s. 0d.
All other trees	–	–	–	£0 5s. 0d.

^a Although indicative of the trees most highly valued by Banabans at the time, this list excludes and seriously undervalues a wide range of other culturally and ecologically valuable multipurpose trees and plants that are central to cultural and environmental sustainability, many of which in 2006 were rare or in short supply on the island. The situation remained unresolved at the commencement of World War II.

After the Japanese World War II attack on Pearl Harbor, Hawai'i in December 7 1941, the BPC and the colonial administration had already made preparations to leave the island and had evacuated most of the European women and repatriated many Chinese workers with compensation. When a force of some 500 Japanese attacked and occupied Banaba in August 1942, there were still about 2,413 people on the island, including a small group of Europeans, about 700 Banabans, and about 800 Gilbertese and Tuvaluans and their wives and children. The Banabans along with some of the I-Kiribati and Tuvaluans were deported to Japanese war camps in Kosrae in the Caroline Islands, in what is now the Federated States of Micronesia, and others sent to camps in Nauru or Tarawa under Japanese occupation. Some I-Kiribati and Tuvaluans were kept on the island to fish and produce food to support the Japanese garrison. All were treated badly on both Banaba and Kosrae and some died or were murdered, including all of the Europeans left on the island. Most tragically, with the news of the Japanese surrender in August 1945, the Japanese inexplicably massacred all the remaining I-Kiribati and Tuvaluans, except one, who survived and later gave evidence of war crimes which led to the sentencing to death of the persons responsible (Sigrah and King 2001; Teaiwa 2015).

In September 1945, the approximately 1003 Banabans, I-Kiribati, and Tuvaluans remaining on Kosrae were brought from the Japanese war camps to Tarawa because Banaba was in a state of devastation. About 1000 Banabans and 300 or so Gilbertese and Tuvaluans were reluctantly persuaded to be resettled on Rabi in Fiji, where they have remained, as Fiji citizens, a move that many of them thought was temporary. In 1947, after a return trip by some Banabans from Rabi to Ocean Island during which land boundaries were marked and further leases granted, a majority of the Banabans voted to remain on Rabi. The resettlement of the Banabans on Rabi gave the BPC "unfettered access to all phosphate deposits, some of which were under villages, homes and burial sites" (Sigrah and King 2001; Teaiwa 2015).

This was the situation when the BPC re-commenced mining on Banaba with exports increasing from 120,360 tonnes in 1947 to well over 500,000 tons in 1969. Royalties were 1/3d per ton from 1947–58, 1/9d from 1958–64 then 2/8d per ton, a figure adopted by BPC, which also paid a royalty of 23/d per ton to the GEIC. This very low payment remained, despite the fact that the independent Nauruans were at the same time receiving 13/6d per ton. This inequity, as well as increasing resentment on the part of the Banabans on Rabi, led in April 1965 to violent protests, after which the British Government treated them more fairly, increased phosphate revenues, and in 1968 made an ex gratia payment to them as compensation for the impacts of phosphate mining on the island since 1900 (Carter 1984; Sigrah and King 2001; Teaiwa 2015).

Unsatisfied, the Banabans took their case to the United Nations in 1968 and sought independence from the GEIC. In 1975 they sued the British Government claiming £7 million for back royalties and unspecified amounts for the irreparable damage to Banaba. Eventually in 1978, the British, Australian and New Zealand governments offered £6.5 million (Australian \$10 million) plus damages, and established a trust fund for the Banaban people, most of who were on Rabi. With phosphate due to run out in 1979 and the GEIC moving towards independence and separation into Tuvalu and Kiribati, the Banabans (like the Nauruans) sought independence for their original homeland. In 1979 some 100 young Banaban men and women went to "regain" the island. Despite protests, including a bomb attack on the mining plant and the death of a Banaban man, attempts to gain independence were unsuccessful. With Kiribati Independence in 1979, the British disregarded the Banaban's continual plea and kept Banaba as an integral part of Kiribati. Although rights to land ownership on Banaba have been guaranteed and representation in the Kiribati House of Assembly given under the Kiribati Constitution, Kiribati's phosphate earnings from Banaba have formed the basis for Kiribati's "revenue equalisation fund," which is today valued at US\$ 400 million (Carter 1994; Sigrah and King 2001; Teaiwa 2015).

At the end of phosphate mining in 1979 it was estimated that Banaba, despite its small size, had in less than 80 years been depleted of twenty-two million tons of phosphate rock as well as the vegetation of most of the island (Tyrrer 1962; Teaiwa 2015). Time-depth studies of the recovery of vegetation in the mined-out areas on Nauru in the early 1980s showed that over 70 years after mining there had been only limited regeneration or regrowth of the pre-mining flora and vegetation. Many of the trees, shrubs and other plants found in the pre-mining forest were missing (Manner et al. 1984, 1985). This is similar to the situation on Banaba, where only a sparsely vegetated pit-and-pinnacle moonscape remains (Figure 10). Studies also indicate that mining had an indirect impact on water resources with four of the seven known traditional wells or water caves (**bangabanga**) on Banaba having been removed as a result of mining (Dupont et al. 1989).

As suggested by Dupont et al. (1989):

The damage to the natural environment has been accompanied by harm to the human environment. The landowners and political entities to which the islands belong have gradually seen their right to tangible compensation recognised but, either because of its own needs, or as a result of the Second World War, the mining industry has uprooted island populations in very painful circumstances Now partly inhabitable, these islands no longer justify regular and frequent communications with the outside world for their tiny populations. They appear to have been left to fend for themselves.

At the time of our visit to Banaba in 2005, the resident population was reportedly 301 (dropping to 295 in 2010). Of these 165 were Banaban, 125 from other islands of Kiribati and 5 from other Pacific Islands (Office of Te Beretitenti 2012). All were reportedly living mainly in three villages (Tabwewa, Antereen [also called Tabiang], and Uma), located along the coast and accessed by a modern coal tar road. A fourth village, Buakonikai (Te Aonoanne) “has been totally mined out leaving a mere plot amidst the rising pinnacles” (MISA 2008). There is no airstrip on the island and no scheduled boat service, with highly irregular transport to and from Banaba by charter vessel. When ships fail to arrive, the island runs short of imported foodstuffs, such as rice, sugar and flour, and other essential supplies including fuel. Finally, although still very attached to their ancestral homeland, most people of Banaban descent now live on Rabi in the Fiji Islands, where in 2010 the population was over 5,000 people who speak the Kiribati language and hold both Fiji and Kiribati passports. There are also 173 and 45 people from Banaba living on South Tarawa or other islands of Kiribati, respectively (Office of Te Beretitenti 2012).



Figure 10. Sparsely vegetated impoverished pit-and-pinnacle moonscape in a mined out area of central Banaba showing little regeneration of original vegetation over forty years since the cessation of mining. (Photo: Thaman 2005)

Previous Studies

The only available previous listings of plants of Banaba in the literature include some 33 species in Fosberg, Sachet and Oliver's geographical checklists of the Micronesian Dicotyledonae (1979), Pteridophyta and Gymnospermae (1982), and Monocotyledonae (1987) which were based on analyses of herbarium specimens and limited published material. The 33 listed species include: 1 indigenous fern and no gymnosperms (Fosberg et al. 1982); 2 indigenous and 4 non-indigenous monocotyledons (Fosberg et al. 1987); and 16 indigenous and 10 non-indigenous dicotyledons (Table 2; Fosberg et al. 1979). Of these 33 species, only 6 species were not recorded during the 2005 study.

There is also a listing in Sigrah and King (2001) of the names (along with local names) of 16 species of trees and plants found on Banaba, which were traditionally used for building, foods and medicines (Sigrah and King 2001). One of these plants, **te obu**, is unidentified, but may possibly refer to beach derris root *Derris trifoliata*, the roots of which were reportedly used to stun fish; this plant was also present on Nauru in the early 1980s. Two species, **te ibi** and **te ukin**, are probably misidentified as the Tahitian chestnut *Inocarpus fagifer* and sea grape *Coccoloba uvifera*, when they are probably *Ochrosia elliptica* and beach or coastal almond *Terminalia litoralis*, respectively. Both were positively identified and named by local informants in 2005. There is also a list of five trees species for which Banabans wanted compensation if destroyed when lands were compulsorily acquired for mining by the NPC (Teaiwa 2015). Various other plants are mentioned by different observers in a number of publications, such as pumpkins grown by the Japanese during WWII (Teaiwa 2015).

Current Studies

This study is based on field surveys conducted on Banaba over a four-day period from 29 September to 2 October as part of a South Pacific Applied Geoscience Commission (SOPAC) geodetic trip from Tarawa Atoll to Nauru via Banaba on the 80-foot charter boat *Summer Spirit*. During this period the author and field assistants Neneteiti Teariki and Isaac Rounds disembarked at Banaba, where they spent four full days surveying most of the island while the boat continued on to Nauru to conduct geodetic surveys.

During the four days of the survey, accessible points on most of the island were visited, including three trips around the entire island. Trips were made inland, where possible, to inventory plants away from the coast.

During field surveys scientific names of all species encountered were entered into a field notebook, along with local vernacular names (when known by informants), information on location, habitat, abundance and local cultural uses or knowledge. Local vernacular Banaban and Kiribati names were recorded and listed alphabetically to provide working lists for use in the field and during interviews. For most species and most sites visited, digital photos were taken by R. Thaman, including close-ups and whole plant and vegetation association perspectives. A limited number of voucher specimens were also collected to either validate the presence or to help confirm the identity of a given species. The voucher specimens are lodged with the South Pacific Regional Herbarium at The University of the South Pacific, Suva, Fiji. The annotated/curated digital images were also copied onto computer files in both the Geography Department and the South Pacific Regional Herbarium at The University of the South Pacific, Suva, Fiji and at the Agricultural Division in Tenaia and University of the South Pacific Centre in Teoraereke, both on South Tarawa, Kiribati.

An in-depth, community-based biodiversity questionnaire survey was also conducted to gather information on the names, habitats, abundance, uses and cultural importance of plants. These lists were then cross-checked, consolidated, amended, augmented, and discussed with the survey team and informants, particularly with co-author and main local lead informant, plant expert and field assistant, Malosi Samuelu, both during and after the field studies.

THE FLORA OF BANABA

The 2005 Banaba study identified 201 species still present on the island. These plus the 6 species reported by Fosberg et al. (1979, 1982, 1987), but not seen in 2005, puts the current reported vascular plant flora of Banaba at 207 species, of which only 49 (23%) are considered to be indigenous (Table 2). Before phosphate mining in the early 1900s we surmise there would have been a number of additional indigenous species. During the phosphate mining era before and after World War II, we expect there would have been a number of introduced annual and perennial ornamental, food and multipurpose plants and weeds that depended on human care or continued disturbance for survival. This is supported by the similar history of Nauru where two recent in-depth studies of the flora in 1980–81 and 2007 (Thaman 1992b; Thaman et al. 1994; Thaman et al. 2008a, 2008b) reported 510 species, of which 63 are indigenous. The 2007 survey showed a significant decrease to only 53 indigenous and 316 introduced species. This drop in numbers in Nauru, especially of introduced species, is largely due to the recent economic downturn, the greatly reduced frequency in flights and the cessation of the national ornamental gardening competitions of the 1980s to the mid-1990s (Thaman et al. 2008a, 2008b). Such a trend would have been more pronounced on Banaba since the cessation of phosphate mining in 1979 due to its depopulation and isolation.

The 49 indigenous species on Banaba include six ferns or fern allies; six monocotyledons; 37 dicotyledons and no gymnosperms. The 158 introduced (non-indigenous) species include one fern, one gymnosperm, 39 monocotyledons, and 117 dicotyledons (Table 2). The following sections will briefly discuss the native species and some of the more common introduced species. When available or appropriate, scientific names in the text are included with family names, common English names and vernacular Banaban or Kiribati names, with the scientific names italicized (often in parentheses) and the local Banaban names bolded to differentiate them from the scientific names, for example, coconut palm **te ni** *Cocos nucifera*. The details about each of the existing 207 species, including their vernacular names, abundance and habitat, uses and other information are included in the systematic listing. Most of the more important species are discussed in the section on the vegetation of Banaba.

We stress that the main reason for assuming that a species might be indigenous is based on the assumed natural distribution of the species, although it is possible that some could have been early aboriginal introductions or post-European contact introductions. Some of these may have been introduced during the 80 years of phosphate mining via phosphate ships, cargo, equipment (including large earth-moving equipment and vehicles) and people travelling between Australia, Nauru and elsewhere. Recent introductions include short-term food plants and ornamentals that had been extirpated on Banaba during WWII or during the abandonment of the island after the cessation of phosphate mining in 1979.

Ferns and Fern Allies

The indigenous fern or fern allies species include a fern ally, the reed fern (*Psilotum nudum*), reported by Fosberg et al. (1982), but not seen in 2005, but still reported present on Nauru (Thaman et al. 1994; Thaman et al. 2008a, 2008b). Five other presumably indigenous ferns not reported by Fosberg et al. (1982) that are now occasional to abundant include *Microsorium grossum* (**te keang ni Makin**) and *Nephrolepis biserrata*, *N. hirsutula*, *Pteris tripartita* and *P. vittata* (all known as **te keang**). There is a single introduced ornamental fern, *Nephrolepis biserrata* var. *furcans*.

Gymnosperms

There is only one gymnosperm, a cycad, *Cycas rumphii* (**bam**), an introduced species that is occasionally planted as an ornamental and is also found on Nauru and in Kiribati.

Table 2. Total indigenous and introduced ferns, gymnosperms and monocotyledon and dicotyledon angiosperm vascular plants reported present on Banaba (Ocean Island) by Fosberg, Sachet and Oliver (Fosberg et al. 1979, 1982, 1987) and by this study. Numbers in parentheses indicate the number of the total species reported by Fosberg et al. that were not seen and recorded during the 2005 study. These numbers in parentheses have been added to the total scores and the grand total.

Study Taxon	Indigenous	Introduced	Total
Fosberg et al. (1979–1987)			
Ferns	1 (1)	0	1 (1)
Gymnosperms	0	0	0
Monocotyledons	2	4 (1)	6 (1)
Dicotyledons	16 (3)	10 (1)	26 (4)
<i>Study subtotal</i>	<i>19 (4)</i>	<i>14 (2)</i>	<i>33 (6)</i>
This study (2005 data)			
Ferns	5	1	6
Gymnosperms	0	1	1
Monocotyledons	6	38	44
Dicotyledons	34	116	150
<i>Study subtotal</i>	<i>45</i>	<i>156</i>	<i>201</i>
All studies combined			
Ferns	6 (1)	1	7 (1)
Gymnosperms	0	1	1
Monocotyledons	6	39 (1)	45 (1)
Dicotyledons	37 (3)	117 (1)	154 (4)
<i>Grand total</i>	<i>49 (4)</i>	<i>158 (2)</i>	<i>207 (6)</i>

Monocotyledons

Two indigenous monocotyledons included by Fosberg et al. (1987) were pandanus *Pandanus tectorius* and coconut palm *Cocos nucifera*. Four additional indigenous monocotyledons present in 2005 include the sedges (Cyperaceae) *Fimbristylis cymosa* **tuteute ni maane** and *Cyperus javanicus* **te titania**, and the grasses (Poaceae) *Lepturus repens* and *Stenotaphrum micranthum* (both known generally as **te uteute**).

The only introduced monocotyledons listed by Fosberg et al. (1987) were two grasses (Poaceae) and two amaryllis lilies (Amaryllidaceae), both known as **te kiebu**. Grasses include cultivated bamboo *Bambusa* sp. and love grass *Eragrostis amabilis*, a common weed of ruderal sites. The beach spider lily *Hymenocallis littoralis* is still common on the island, and grand crinum lily *Crinum asiaticum*, which was not seen in 2005, was reportedly very common in the past and is still common and well-known on Nauru.

Introduced monocotyledons recorded in 2005 but not by Fosberg et al. (1987), include a wide range of ornamental, food, and multipurpose plants and weedy or ruderal plants, including escaped ornamentals or food plants. Occasional to abundant types included members of the agave family (Agavaceae)—sisal hemp *Agave sisalana* and bowstring hemp *Sansevieria trifasciata* (both **te robu**), and ti plant *Cordyline fruticosa*, the former two having escaped and become naturalized in a number of sites—and an amaryllis lily, pink zephyr flower *Zephyranthes rosea*. Members of the arum or taro family (Araceae) include three taro species—true taro **te taro** *Colocasia esculenta*, giant taro **te kabe** *Alocasia macrorrhizos*, and an American taro **taru n tana** *Xanthosoma sagittifolium*—and two ornamentals, artist’s pallet *Caladium bicolor* and taro vine *Epipremnum aureum*. Palms (Arecaceae) include date palm *Phoenix dactylifera* and Pacific fan palm. We also recorded **te bam** *Pritchardia pacifica*, tradescantia or oyster plant **te kiebu** *Tradescantia spathacea*, well-known weedy sedges (Cyperaceae) *Cyperus compressus* and *C. rotundus* **te mumuta**, four banana or plantain clones *Musa* cultivars, a range of weedy grasses (Poaceae):

Bothriochloa bladhii, *Brachiaria subquadripara*, sand bur or burrgrass **te kateketeke** *Cenchrus echinatus*, *Chloris inflata*, Bermuda grass *Cynodon dactylon*, *Dactyloctenium aegyptium*, *Digitaria radicata*, *Eleusine indica* and Natal grass *Melinis repens*, and sugarcane **te kai tioka** *Saccharum officinarum*.

Uncommon monocotyledon food plants included yam **te iam** *Dioscorea alata* and Polynesian arrowroot **te makemake** *Tacca leontopetaloides*, an ancient staple food and emergency or famine food plant that was probably an aboriginal introduction into Banaba and other Pacific Islands. Uncommon ornamental plants include Indian shot or canna lily *Canna indica*, purple tradescantia *Tradescantia pallida*, and glory lily *Gloriosa superba*.

Dicotyledons

The 26 dicotyledons listed by Fosberg et al. (1979) included 16 presumably indigenous species and 10 introduced species. Indigenous species (in alphabetical order by family, with local names provided from the 2005 survey, when known) included: *Cerbera manghas **te reiango** and *Ochrosia elliptica **te ibi** (Apocynaceae); *Cordia subcordata **te kanawa** and *Tournefortia argentea **te ren** (Boraginaceae); *Calophyllum inophyllum **te itai** (Clusiaceae); *Terminalia catappa **te kunikun** (Combretaceae); *Ipomoea pes-caprae **te ruku** (Convolvulaceae); *Scaevola taccada **te mao** (Goodeniaceae); *Cassytha filiformis **te ntanini** (Lauraceae); *Pemphis acidula **te ngea** (Lythraceae); *Abutilon indicum **te kaura** and *Sida fallax **te kaura** (Malvaceae); *Aidia racemosa* and *Morinda citrifolia **te non** (Rubiaceae); *Suriana maritima **te aroa** (?) and *Vitex trifolia **te kaitu**. Only *Cerbera manghas **te reiango**, *Sida fallax* **te kaura**, and *Suriana maritima* **te aroa** (?) were not seen in 2005 and are possibly now extirpated on Banaba, although all were still present on Nauru in 2007. The other species were still present in substantial numbers and dominated many of the vegetation associations discussed below.****************

The 21 indigenous dicotyledons, not listed by Fosberg et al. (1979), which were found in 2005 (listed in alphabetical order by family) include: *Capparis cordifolia* and *C. quiniflora* (Capparidaceae); *Terminalia litoralis **te ukin** (Combretaceae); *Ipomoea violacea **te ruku** (Convolvulaceae); *Chamaesyce chamissonis **te tarai** and *Phyllanthus societatis* Euphorbiaceae; *Caesalpinia bonduc*, *Millettia pinnata* and *Sophora tomentosa* (**te kirimoua**) (Fabaceae); *Barringtonia asiatica **te baireati** (Lecythidaceae); *Hibiscus tiliaceus* and *Thespesia populnea*, both known as **te kiaiai**, (Malvaceae); *Ficus prolixa **te aiao** and *F. tinctoria **te bero** (Moraceae); *Boerhavia repens **te wao** and *Pisonia grandis **te buka**; *Guettarda speciosa **te uri** (Rubiaceae); *Dodonaea viscosa **te kai boia** (Sapindaceae); *Laportea ruderalis **te uekeueke** (Urticaceae); and *Clerodendrum inerme **te inato** and *Premna serratifolia **te ango** (Verbenaceae). It should be noted that **te aiao** was the only name that did not seem to be in the Kiribati language and is similar to and almost certainly a cognate of the Nauruan name, **eyayo** or **yayo**, for this common native banyan tree (Thaman et al. 1994; Thaman et al. 2008a, 2008b).*************

Conspicuous by their absence on Banaba, because they are present on Nauru and in the Gilbert Islands and Tuvalu, include *Hernandia nymphaeifolia* and *Ochrosia oppositifolia*.

The 11 introduced dicotyledons listed by Fosberg et al. (1979) include: papaya, **te babaia** or **te mwemwemeara** *Carica papaya*; Madagascar periwinkle **te buraroti** *Catharanthus roseus*; royal poinciana or flame tree **te tua** *Delonix regia*; hibiscus hybrids **te roti** *Hibiscus x hybridus*; mango **te mangko** *Mangifera indica*; guava **te kuwau** *Psidium guajava*; and the weedy species, *Sida acuta* and *S. rhombifolia*, and *Tridax procumbens*, all of which are still present and common to abundant on the island; and *Pluchea indica*, which was not seen in 2005, but which is found as a weed in Kiribati and elsewhere in the Pacific.

Other plants that were probably present in the 1970s, because they are still present on Banaba and were recorded present in Nauru in Fosberg et al. (1979), include a range of food and multipurpose plants, ornamentals and widespread weedy species. Some of these species include ornamentals that have escaped from cultivation. These, plus some of the rarer species are discussed below in some detail in the systematic listing of all species.

The more important food plants found only in 2005 include breadfruit trees **te mai** *Artocarpus altilis* and *A. mariannensis*; sweet potato **te kumara** *Ipomoea batatas*; pumpkins **te bangeti** *Cucurbita pepo*; chaya or tree spinach **te tiaia** *Cnidioscolus chayamansa* and cassava **te tabioka** *Manihot esculenta*

(Euphorbiaceae); bush hibiscus spinach **te naibere** *Abelmoschus manihot* (Malvaceae); lime **te raim** *Citrus aurantifolia* and lemon **te remen** trees *Citrus x limon* (Rutaceae); and perennial chili pepper **te beneka** *Capsicum annuum* vars. Interestingly, pumpkins and unspecified melons were mentioned as among the foods supplied by the Banabans, along with coconuts, to reprovision the ship *Wanderer* from Australia in the early 1850s (Maude and Maude 1994).

Less common food or multipurpose plants seen or reportedly grown in recent times include soursop *Annona muricata* and sweetsop *Annona squamosa*, both known as **te tiotabu**; lettuce *Lactuca sativa* (Asteraceae); Chinese cabbage **te kabiti n Tiana** *Brassica chinensis*, English cabbage *B. oleracea* and hybrid cabbages *Brassica x hybridus* (Brassicaceae); watermelon *Citrullus lanatus* and cantaloupe *Cucumis melo*, both **te meren**; cucumber *Cucumis sativus* (Cucurbitaceae); sour orange, mandarin orange, and sweet orange *Citrus* spp. (Rutaceae); sapodilla *Manilkara zapota* (Sapotaceae); tomato **te tomato** *Solanum lycopersicum*; and eggplant *Solanum melongena* (Solanaceae).

Other useful plants include kapok or cotton tree **te baubau** *Ceiba pentandra* (Bombacaceae) and casuarina **te nokonoko** *Casuarina equisetifolia* (Casuarinaceae), the name **nokonoko** (the Fijian name) clearly an indication that it was introduced from Fiji, probably via Banaba, as is probably also the case with the kapok tree that is known as **vauvau**, the Fijian equivalent of **baubau**.

It is stressed that important food and multipurpose plants listed under indigenous species, such as *Pandanus tectorius*, *Ficus tinctoria* and *Morinda citrifolia*, are undoubtedly also represented by aboriginally or recently introduced varieties that are deliberately cultivated as food, handicraft or multipurpose plants.

Ornamental dicotyledons seen in 2005 include Chinese violet *Asystasia gangetica* and porcupine flower *Barleria prionitis* (both of which have escaped and become adventive); false eranthemums *Pseuderanthemum* spp. and bush thunbergia *Thunbergia erecta* (Acanthaceae); purple allamanda *Allamanda blanchetti* and plumerias or frangipanis **te meria** *Plumeria obtusa* and *P. rubra* (Apocynaceae); yellow bells **nei karairai** *Tecoma stans* and African tulip tree *Spathodea campanulata* (Bignoniaceae), which seems to be adventive in some sites; Rangoon creeper *Quisqualis indica* (Combretaceae); copper leaf or beefsteak plant **te toara** *Acalypha wilkesiana* (Euphorbiaceae); gliricidia *Gliricidia sepium* (Fabaceae); Indian banyan **te aiao** *Ficus benghalensis* (Moraceae); bougainvillea **te akanta** *Bougainvillea* spp.; Indian jasmine, **te bitati** *Jasminum sambac* (Oleaceae); Mexican creeper **te bin** *Antigonon leptopus* (Polygonaceae), which has become adventive and spreading in mined areas near Banaba House (Polygonaceae); two ixoras, Case's ixora **te kaituru** or **te katuru** *Ixora casei* and red ixora **te kai tangira** *I. coccinea* (Rubiaceae); firecracker plant **te kai baun** *Russelia equisetiformis* (Scrophulariaceae); and yellow elder *Turnera ulmifolia* (Ulmaceae).

Uncommon to rare ornamental plants include caricature plant *Graptophyllum pictum*; hedge panax *Polyscias guilfoylei* (Araliaceae); *Pedilanthus tithymaloides* (Euphorbiaceae); pink bauhinia *Bauhinia monandra*, pink shower tree *Cassia grandis*, yellow poincianna *Peltophorum pterocarpum* (Fabaceae); coral hibiscus *Hibiscus schizopetalus* (Malvaceae); Indian lilac *Melia azedarach* (Meliaceae); four-o'clock **te aoa aua** *Mirabilis jalapa*; two rare ixoras, Chinese ixora *Ixora chinensis* and white ixora *I. finlaysoniana* (Rubiaceae); and mock orange *Murraya paniculata* (Rutaceae).

Occasional to abundant weeds include: the amaranths, *Amaranthus tricolor* and *Amaranthus viridis* (Amaranthaceae); *Cleome ruidosperma* and *Cleome viscosa* (Capparidaceae); ironweed (*Cyanthillium cinereum*), nodeweed (*Synedrella nodiflora*), wild daisy (*Tridax procumbens*); the weedy spurges *Chamaesyce hirta*, *C. hypericifolia*, *C. prostrata* and *C. thymifolia*, *Euphorbia cyathophora* and *E. heterophylla*, *Phyllanthus amarus* and castor bean *Ricinus communis*; the legumes, *Alysicarpus vaginalis*, rattlepod (*Crotalaria pallida*), *Desmodium triflorum*, leucaena **te waiwai** *Leucaena leucocephala* (which is very abundant), sensitive plant *Mimosa pudica* and coffee senna *Senna occidentalis* (Fabaceae); *Polypremum procumbens* (Loganiaceae); false mallow *Malvastrum coromandelianum* (Malvaceae); stinking passionflower **te bin** *Passiflora foetida* (Passifloraceae); polygala *Polygala paniculata* (Polygalaceae); pigweed **te boi** *Portulaca oleracea* (Portulacaceae); Old World diamondflower *Hedyotis corymbosa*; buttonweed *Spermacoce remota*; waltheria or sleepy morning *Waltheria indica* (Sterculiaceae); artillery plant *Pilea microphylla* (Urticaceae); lantana **te kai buaka** *Lantana camara*, which

has escaped to become a common weed; and Jamaica vervain and blue rat's-tail both **te kai buru** *Stachytarpheta jamaicensis* and *S. cayennensis* (Verbenaceae), both of which are now adventives.

Rare or uncommon weeds include cobbler's peg *Bidens pilosa* (Asteraceae), *Acalypha lanceolata* (Euphorbiaceae), sweet acacia *Acacia farnesiana* (Fabaceae), and cape gooseberry **te tomato** *Physalis angulate* (Solanaceae).

Plants recorded as commonly planted in houseyard gardens, but not seen in 2005, probably because there had been no boat for seven months, the extreme dry spell and/or the fact that they were out of season, include marigold *Tagetes erecta* and zinnia *Zinnia elegans* (Asteraceae); sweet and sacred basil *Ocimum basilicum* and *O. tenuiflorum* (Lamiaceae); and tobacco **te kaibake** *Nicotiana tabacum*. Finally, there is also a range of other annual and perennial food plants, ornamentals and weeds that were either planted in the past during the height of the phosphate mining period or annuals which (because of infrequent boats or the current dry spell) were not seen in 2005. These include a range of beans, vegetables, ornamental plants and some weeds that were undoubtedly planted and/or present in Banaba over the past century, as they have been on Nauru since 1980 during the height of the phosphate boom. At this same time the senior author's team carried out their first study, a date that corresponds with the end of phosphate mining on Banaba.

VEGETATION OF BANABA

The main vegetation types found on Banaba include (1) coastal strand or littoral vegetation; (2) coastal limestone terrace and cliff vegetation; (3) inner coastal pinnacle and karstified limestone vegetation; (4) lowland and escarpment forest and woodland; (5) inland forest and woodland; (6) disclimax successional vegetation in the mined areas; (7) secondary vegetation in abandoned settlements and industrial areas; (8) houseyard and settlement gardens; (9) food gardens; and (10) ruderal vegetation. Unlike Nauru and some of the other islands of Kiribati there are no mangroves or wetland vegetation and only limited areas of coastal strand vegetation along sandy beaches and coastal plains.

Coastal Strand or Littoral Vegetation

Coastal strand or littoral vegetation is defined as vegetation found in the limited areas of sandy or low-lying coastal plain just inland from the mean high tide line. These are areas along the main beach immediately east of the main boat harbor, along and inland from the longest stretch of beach on the southeast corner of the island in Uma District and in a number of larger pockets of sand between limestone terrace headlands or in raised areas of sand (dunal ridges) accumulated slightly inland from some of the lower elevation terraces. The vegetation in these areas consists of the outpost, predominantly herbaceous, zone on the outer margins of the vegetated areas and an inner shrub and/or tree zone (Figure 11).

The dominant species in the herbaceous outpost zone include beach morning-glory **te ruku** *Ipomoea pes-caprae*, which often dominates this zone, and, less commonly, the common beach grass, **te uteute** *Lepturus repens* (Figure 11). Uncommon in this zone on the southeast of the island is the beach spurge **te tarai** *Chamaesyce chamissonis*. Occasional in shady areas slightly inland on the lower terraces is the more shade-tolerant grass *Stenotaphrum micranthum* and moon flower or night-blooming morning-glory **te ruku** *Ipomoea violacea*, a climbing vine. Drift seedlings of species such as the fish-poison tree **te baireati** *Barringtonia asiatica* and tropical almond **te kunikun** *Terminalia catappa* are occasionally seen in the herbaceous outpost vegetation on the southeast of the island.

Just inland from the outpost zone, often along with herbaceous species, is a shrub zone with scattered trees. The dominant shrubs include saltbush **te mao** *Scaevola taccada* and silverbush **te kirimoua** *Sophora tomentosa*, which is abundant immediately inland from the beach area on the southeastern corner of the island. Trees in this zone include beach heliotrope **te ren** *Tournefortia argentea* and tropical almond **te kunikun** *Terminalia catappa* (Figure 12).



Figure 11. Coastal strand vegetation dominated by the grass *Lepturus repens* (foreground) and scattered *Scaevola taccada* shrubs and the taller *Tournefortia argentea* (background), Uma, southeastern Banaba. (Photo: Thaman 2005)

The most common introduced species in this zone is leucaena **te waiwai** *Leucaena leucocephala*. Occasional species include pandanus **te kaina** *Pandanus tectorius*. A remnant individual **te uri** *Guettarda speciosa* tree, that had been severely cut, was seen on the inner margin of this zone in the southeast. The coconut palm **te ni** *Cocos nucifera* was conspicuously absent in this zone.

Occasional in the inner portions of the herbaceous outpost vegetation and climbing on the inner shrubs and trees is beach dodder **te ntanini** *Cassytha filiformis*, a leafless parasitic vine found spreading on the ground and climbing over *Scaevola* and other shrubs (Figure 13).

Coastal Limestone Terrace and Cliff Vegetation

The most extensive coastal littoral outpost vegetation type is found on the limestone terraces and cliffs that encircle most of the island. By far the dominant species, which grows as a shrub or small tree directly on the limestone, is pemphis **te ngea** *Pemphis acidula*. This is often found in monospecific stands on large sections of the uplifted limestone terraces, cliffs and headlands. Other common species found in this vegetation include the beach heliotrope tree **te ren** *Tournefortia argentea* and beach saltbush **te mao** *Scaevola taccada* (Figures 14 and 15). Other tree species that occur occasionally as individuals, include wild pandanus **te rekinibeti** or **te kaina** *Pandanus tectorius*⁴ and coconut palm **te ni** *Cocos nucifera*.

Shrubby species occasionally found here include the beach privet **te inato** *Clerodendrum inerme* and the native caper *Capparis cordifolia*. *Clerodendrum* is found in a number of extensive populations climbing over karstified limestone and into and on the shrubs in the low areas between, and slightly inland from, the *Pemphis*-dominated vegetation. *Capparis* is found growing on limestone on the inner margins of small pocket beaches and in open sites at the outer edges of limestone terraces and cliffs.



Figure 12. *Sophora tomentosa* (front right), *Cassytha filiformis* (front left), *Scaevola taccada* (center) and *Tournefortia argentea* (back) in coastal vegetation on coastal strip, Uma, southeast Banaba. (Photo: Thaman 2005)



Figure 13. The leafless parasitic vine, *Cassytha filiformis*, spreading on coastal limestone and *Scaevola taccada* and *Tournefortia argentea*, Uma, southeastern Banaba. (Photo: Thaman 2005)



Figure 14. *Tournefortia argentea* (**te ren**; center) and *Pemphis acidula* (**Te ngea**) on limestone outcrop (left and right) along the inner beach, north coast of Banaba. (Photo: Thaman 2005)



Figure 15. Uplifted limestone terraces and coastal vegetation dominated by **te ngea** (*Pemphis acidula*) and **te ren** (*Tournefortia argentea*) encircled by a subtidal fringing reef in the Uma area on the southeast coast of Banaba. (Photo: R. Thaman 2005)

Inner Coastal Pinnacle and Karstifield Limestone Vegetation

Immediately inland from the coastal littoral and limestone terrace and cliff vegetation is a zone of vegetation growing in more protected sites on, and among, the karstified limestone pinnacles and outcrops. This is found on the eastern, northern and western coasts of the island but is not as common on the highly modified sites in the main settled area on the south of the island, along Home Bay. This zone could actually be considered the inner, more protected portion of the limestone terrace vegetation.

The main tree species in this zone are beach heliotrope **te ren** *Tournefortia argentea* and **te ibi** *Ochrosia elliptica*. Occasional are pandanus **te rekinibeti** *Pandanus tectorius*, fish-poison tree **te baireati** *Barringtonia asiatica*, and beach cordia **te kanawa** *Cordia subcordata* on the inner margins. Uncommon in the inner portions of this zone are beach vitex **te kaitu** *Vitex trifolia* and beach almond **te ukin** *Terminalia litoralis*. Common to occasional understory species include seedlings and saplings of the same species, plus Indian mulberry, a shrub or small tree, **te non** *Morinda citrifolia*; the erect shrub *Phyllanthus societatis*; native caper, a scandent, scrambling shrub *Capparis cordifolia*; the erect herb **te uekeueke** *Laportea ruderalis*; and the ferns, scented fern **te keang ni Makin** *Microsorium grossum*, sword fern *Nephrolepis* sp. and lacy or giant bracken fern *Pteris tripartita*, both known as **te keang**. Occasional is the moonflower **te ruku** *Ipomoea violacea*, which is found creeping between and climbing on the woody vegetation. The Javanese flat sedge **te titania** *Cyperus javanicus* is uncommon in open sites in between limestone outcrops.

Lowland and Escarpment Forest and Woodland

Immediately inland from the vegetation of the coastal limestone terraces and cliffs, the inner karstified pinnacles, and flatter coastal littoral plain are limited areas of lowland and escarpment forest and woodland. In this context, forest refers to vegetation with a relatively closed canopy of trees, whereas woodland refers to areas where trees are still dominant, but where there are openings without trees that are dominated by shrubs, ferns, grasses or herbs. These areas consist mainly of remnant stands of a few trees and associated species and scattered individual trees interspersed among secondary scrubland vegetation or thickets that are commonly dominated by introduced species, such as *Leucaena leucocephala*.

This lowland forest is found mainly on limited areas of relatively flat land on the southeast corner of the island and a more extensive area just inland from the coast in the unmined or hand-mined northwestern portion of the island. On most of the rest of the island there is a gradually sloping escarpment which rises from the inner edge of the coastal limestone terraces and cliffs and the inner karstified pinnacles to the flatter “topside” portion of the island.

Although highly modified in most places due to phosphate mining and the use and development of the land for villages, settlements, processing plants, sports grounds, roads and other associated infrastructure, the remnants of lowland and escarpment forest, including remnant trees, are probably similar in species composition to the original topside vegetation. This assumption is based on studies of remnant vegetation on Banaba and analogous vegetation in Nauru where pre-mining forest was dominated by *Calophyllum inophyllum* with patches of *Pandanus tectorius*. It was, thus, decided to separate it out as a separate subcategory of the inland vegetation. In truth, it is probably only transitional between the inner coastal vegetation and the original inland forest and woodland, which is more protected from coastal and marine influences such as wind and salt spray.

The dominant emergent tree species in this vegetation association are today tropical almond **te kunikun** *Terminalia catappa* and great bird-catcher tree **te buka** *Pisonia grandis* (Figure 16). Lower canopy trees include *Aidia racemosa* **te ibi** *Ochrosia elliptica*, **te non** *Morinda citrifolia* and, in the understory, seedlings and saplings of the canopy species and *Phyllanthus societatis* and the ferns *Microsorium grossum* and *Nephrolepis hirsutula*.

Inland Forest and Woodland

Because most of the unmined area of the island is along the more highly settled western coast between Tabiang and Tabwewa, around Fatima Village (Figures 2, 3), there are very limited remnants of what could be considered the original inland forest. There is a small section of unmined forest in the central part of the island at the site of Te Aka, the ancestral site of the village, which covers about one-fifth of a hectare – “like an island in the middle of the mined out interior, amidst a forest of 18-metre pinnacles” (Sigrah and King 2001). It was not possible during our visit to the island to visit this relatively inaccessible and sacred site.



Figure 16. Remnant *Terminalia catappa* **te kunikun** and *Pisonia grandis* **te buka** forest in unmined area near Tabwewa inland from the north coast of Banaba. (Photo: Thaman 2005)

Based on the small stands and remnant individual trees still found in the interior of the island on “topside” and similar studies of unmined forest on Nauru, the dominant upper canopy tree species of the central inland forest and woodland are **te itai** *Calophyllum inophyllum* (Figure 17), **te kunikun** *Terminalia catappa*, and possibly *Millettia pinnata*, which is very common in unmined areas around the Sports Ground (Figure 3) and the hand-mined areas to the northeast of Fatima. Also occasional as an emergent tree is **te buka** *Pisonia grandis*. Also possibly present as a component of this vegetation type in the past was the native banyan, **te aiao** *Ficus prolixa*, which was only seen on the margins of the settlement and in some of the mined areas in 2005, but was a common component, especially on emergent limestone pinnacles in Nauru (Thaman et al. 1994; Thaman et al. 2008a, 2008b).

Understory vegetation includes the small tree **te ibi** *Ochrosia elliptica*, *Phyllanthus societatis*, a shrub reported from only a few islands, but which is found on all of the three main phosphatic limestone islands, Nauru, Banaba and Makatea in the Tuamotu Archipelago in French Polynesia (Figure 18; Wilder 1934; Thaman et al. 1994).

In open sites and in open-shaded areas, the ferns **te keang ni Makin** *Microsorium grossum* (Figure 19), sword fern *Nephrolepis* spp. and lacy or giant bracken fern *Pteris tripartita*, both known as **te keang**, are dominant.

Disclimax Successional Vegetation in Mined Areas

In the mined areas, there is highly modified and highly variable vegetation ranging from areas dominated mainly by indigenous, primarily coastal species to areas dominated almost entirely by introduced species that have thrived in the highly disturbed landscape. In most cases the areas remain sparsely vegetated pit-and- pinnacle moonscape-like landscape (Manner et al. 1984, 1985).



Figure 17. *Calophyllum inophyllum te itai* at the top of escarpment in mined area inland from the hospital. Formerly the dominant tree in the pre-mining inland forest of Banaba (Photo: Thaman 2005).

The dominant introduced plants include *Leucaena leucocephala*, *Delonix regia* and *Tecoma stans* (Figures 20 and 21). Uncommon is the occasional coconut palm, possibly deliberately or accidentally dispersed into these areas by local inhabitants. The Javanese flat sedge **te titania** *Cyperus javanicus* is uncommon on open sites in between limestone outcrops.

Similar to the original inland forest, open sites and in open-shaded areas, ferns, including *Microsorium grossum*, *Nephrolepis* spp. and *Pteris tripartita*, are common in the understory vegetation and in gaps. Also seen in the mined out areas near main roads and behind the main settlement was Chinese bracken fern (*Pteris vittata*), which, although assumed to be indigenous, could have possibly been introduced from Australia during the phosphate mining period.

Secondary Vegetation in Abandoned Settlements and Industrial Areas

With the cessation of mining and virtual abandonment of the island in 1979, most of the major buildings and mining infrastructure, such as the calcination plant, the Banaba Club House and some of the contract worker housing inland from Home Bay (Figure 2) were abandoned. The vegetation in these areas is somewhat distinct from currently occupied areas and ruderal sites, such as roadsides, path sides and open fields, that are constantly disturbed.

Extensive populations of sisal **te robu** *Agave sisalana* are found as an adventive on limestone outcrops and pinnacles along road to the stockpile and on coastal cliffs to the east of the former boat harbor. Also adventive and covering extensive areas is bowstring hemp or mother-in-law's tongue **te kiebu** *Sansevieria trifasciata*, which is found bordering the mined-out phosphate lands, on topside between Tamavua and the main graveyard, along roadsides and in areas between abandoned buildings.



Figure 18. Small erect shrub, *Phyllanthus societatis*, a common understory species in inland forest and woodland on Banaba along path to the Chinese cemetery. (Photo: Thaman 2005)



Figure 19. The fragrant fern **te keang ni Makin** *Microsorium grossum*, common in understory vegetation in open and open-shaded sties. (Photo: Thaman 2005)



Figure 20. Dominant introduced invasive species *Leucaena leucocephala* and *Tecoma stans* (center, with yellow flowers) in secondary vegetation in degraded, mined-out areas, Banaba. (Photo: Thaman 2005)



Figure 21. Malosi Samuelu in a stand of *Delonix regia* in mined-out area near an old well (**bangabanga**) near Tabiang Settlement. (Photo: Thaman 2005)

Giant taro **te kabe** *Alocasia macrorrhizos* is found as a volunteer adventive in gardens among limestone pinnacles, near settlements and occasionally in mined areas near settlements. The Javanese flat sedge **te titania** *Cyperus javanicus* is uncommon on open sites in between limestone outcrops just off of the Sports Ground.

There were also a couple of sites where remnant patches of almost adventive Arabian jasmine **te bitati** *Jasminum sambac* were encountered, one large population just off the dirt road north of the turnoff to Fatima (Figure 3). Also seen spreading out from the settlement near Banaba House (Figure 3) in mined areas was chain-of-love **te bin** *Antigonon leptopus*.

In the immediate vicinity of the abandoned calcination plant and extending down slope to the main road was an extensive area of the indigenous high-climbing vine, *Mucuna gigantea*, which festooned trees such as *Casuarina equisetifolia* and the rest of the landscape (Figure 22). Also abundant in these sites were *Leucaena leucocephala* and *Delonix regia*, with numerous seedlings seen in the understory. Occasional in open sites were *Nephrolepis hirsutula* and *Pteris tripartita*.

Houseyard and Settlement Gardens

One of the most distinctive, but variable, vegetation types is constituted by the houseyard and settlement gardens found in the settled areas around individual houses, in villages, around houses in the main settlement and near currently occupied housing, schools, churches and the hospital.



Figure 22. Indigenous high climbing vine *Mucuna gigantea* festooned over vegetation, including *Casuarina equisetifolia* trees, in the area of the abandoned calcination plant in the former mining settlement on Banaba. (Photo: Thaman 2005)

These mixed gardens are composed of a range of food, medicinal and other multipurpose plants, a diversity of ornamental plants and a wide range of weeds and other adventive or volunteer native plants. Some of the plants in these gardens are protected remnants or survivors that were planted in the phosphate mining era, prior to 1977. These plants and their relative abundance are included above in the discussion of the flora.

Plants that are obviously survivors from the phosphate mining era include the cycad, *Cycas rumphii* and a date palm, presumably *Phoenix dactylifera* and many of the larger ornamental, fruit and street trees, such as the numerous flamboyants **te tua** *Delonix regia*, mangoes *Mangifera indica*, and large spreading Indian banyans **te aiao** *Ficus benghalensis* (Figure 23). Plants formerly planted in the main settlement, which were reported present by informants or seen in old photographs include the grand crinum lily **te kiebu** *Crinum asiaticum* and the Pacific fan palm **bam** *Pritchardia pacifica*, and a range of short-term food plants and ornamentals, such as lettuce, cabbages, tomatoes, eggplants, marigolds, zinnias, and a range of beans, carrots, and annual flowers. These were not seen or conclusively reported present during the 2005 study, but have certainly been planted on Banaba by Europeans, Chinese, Japanese or other residents at sometime during the heyday of mining or WWII.

Other common ornamental and multipurpose plants such as coconut palms *Cocos nucifera*, frangipanis *Plumeria* spp. (Figure 24), papaya *Carica papaya*, common hibiscus *Hibiscus rosa-sinensis*, Indian mulberry *Morinda citrifolia*, yellow alder *Turnera ulmifolia*. Mexican lilac *Gliricidia sepium* are also common to occasional components of this vegetation type.



Figure 23. Scattered papaya trees (*Carica papaya*; on left of road), a spreading Indian banyan (*Ficus benghalensis*; center) and royal poinciana or flamboyant (*Delonix regia*; right) trees from the mining era in the main settlement of Tabiang, Banaba. (Photo: Thaman 2005)



Figure 24. Coconut palm **te ni** *Cocos nucifera*, white frangipani **te meria** *Plumeria obtusa*, papayas and bananas (*Musa* cultivars; in right foreground) at Banaba House. (Photo: Thaman 2005)

Staple Food Gardens

Staple food gardens are scattered throughout the undeveloped land that is most accessible to the main settlements, often in between mined-out pinnacles and limestone outcrops. By far the dominant crop in these gardens is cassava **te tabioka** *Manihot esculenta*, which is planted in almost every conceivable site in the mined areas between the shorter pinnacles, in open lots surrounding old buildings, along roadsides and in shifting gardens in the secondary vegetation in the unmined areas on the northwestern and southern parts of the island (Figure 25). Cassava is critical to food security on the island due to the acute infrequency of ships and resultant shortages of imported staples, such as rice, flour, cabin biscuits and sugar. Other staple root crops found planted in food gardens include sweet potato **te kumara** *Ipomoea batatas*, tannia or American taro **taro n tana** *Xanthosoma sagittifolium*, and pumpkin **te banke** *Cucurbita pepo*, which is commonly eaten as a supplementary staple and cooked vegetable and was reported present on the island and planted by Banabans as early as 1851 and extensively planted during the Japanese occupation during WWII (Maude and Maude 1994). Occasional as scattered individuals or as adventive volunteers in between mined out pinnacles or on the borders of food gardens is giant taro **te kabe** *Alocasia macrorrhizos*. True taro **te taro** *Colocasia esculenta* is uncommon, and only found in a couple of low-lying sites or areas where there is greater moisture, for example, where water accumulates at the bottom of a slope. Common weeds in these gardens are discussed above under the flora and in the systematic listing.



Figure 25. Cassava **te tabioka** *Manihot esculenta*, the main staple food crop planted in food gardens in the middle of the island south of cemetery. (Photo: Thaman 2005)

Ruderal Vegetation

Ruderal habitats, which are under a constant state of disturbance, include roadsides, trail sides and path sides, open fields and open areas in settled areas, and other sites around cemeteries, picnic areas, coastal lookouts, etc., where people are likely to gather, such as the area around the Tabiteuea Sports Ground.

Occasional to abundant weedy species in ruderal sites include the sedges *Cyperus rotundus* and *Cyperus compressus*, both growing in cement cracks along roads and cement pathways in the main settlement. Introduced grasses include: *Bothriochloa bladhii*, *Brachiaria subquadripara*, sand bur or burgrass *Cenchrus echinatus*, *Chloris inflata*, Bermuda grass *Cynodon dactylon*, *Dactyloctenium aegyptium*, *Digitaria radicata*?, *Eleusine indica*, love grass *Eragrostis amabilis*, and Natal grass *Melinis repens*; the amaranths *Amaranthus tricolor* and *Amaranthus viridis*; *Cleome rutidosperma* and *Cleome viscosa*; composites ironweed *Cyanthillium cinereum*, nodeweed *Synedrella nodiflora*, and wild daisy *Tridax procumbens*; weedy spurge *Chamaesyce hirta*, *C. hypericifolia*, *C. prostrata* and *C. thymifolia*, *Euphorbia cyathophora* and *E. heterophylla*, *Phyllanthus amarus* and castor bean *Ricinus communis*; the legumes *Alysicarpus vaginalis*, rattlepod *Crotalaria pallida*, *Desmodium triflorum*, leucaena *Leucaena leucocephala* (which is very abundant), sensitive plant *Mimosa pudica*, and coffee senna *Senna occidentalis*; *Polypremum procumbens*; false mallow *Malvastrum coromandelianum*, *Sida acuta*, and *S. rhombifolia*; stinking passionflower *Passiflora foetida*; polygala *Polygala paniculata*; Mexican creeper *Antigonon leptopus*; pigweed *Portulaca oleracea*; Old World diamondflower *Hedyotis corymbosa* and buttonweed *Spermacoce remota*; sleepy morning *Waltheria indica*; artillery plant *Pilea microphylla*; and lantana *Lantana camara*, which has escaped to become a common weed, and Jamaica vervain and blue rat's-tail *Stachytarpheta jamaicensis* and *S. cayennensis*, both of which are now adventives.

Rare or uncommon ruderal weeds include cobbler's peg *Bidens pilosa*, dayflower *Commelina diffusa*, *Acalypha lanceolata*, sweet acacia *Acacia farnesiana*, and cape gooseberry *Physalis angulata*. Indigenous

species that are occasional to abundant in ruderal vegetation are the widespread coastal grass *Lepturus repens*, marsh sedge *Cyperus javanicus*, and *Abutilon indicum*.

BANABAN VERNACULAR NAMES

Banaban vernacular plant names are an interesting mix between the Kiribati names for most plants and distinctly Banaban or Rabi names. Some of these are derived from Fijian names for plants, with which the Banaban settlers of Rabi Island and their descendents are very familiar. As stressed in the introduction to the systematic listing, using the current orthography of the Kiribati language, a “t” followed by an “i” (as in the word Kiribati) is pronounced like an “s” as if it were “Kiribas,” with most of the other letters being pronounced close to English.

For many reasons discussed above, the original Banaban language has all but disappeared. Foremost is the long association with Kiribati, including the pre-European-contact settlement of the island by I-Kiribati, which according to genealogies, began in the seventeenth century; the translation of the Bible into the Kiribati language (**te taetae ni Kiribati**) by the early Christian missionaries; and the adoption of the Kiribati language as the official language by the GEIC early last century. Consequently most Banaban plants names are Kiribati names. Others are either adaptations or variation of the Kiribati names, names based on Fijian names or some names of recently introduced species that seem to be distinctly Banaban, as they have been “coined” on the island.

As result of these factors and the long period of dependence on imported products during the phosphate mining period, WWII and on Rabi, many of the people living on Banaba today do not know the names of the less-well-known plants. These include some relatively common indigenous plants, such as *Phyllanthus societatis*, *Capparis cordifolia* and *Millettia pinnata*, which would have undoubtedly had names in the past, the former two which are well-known on Nauru as **ewemangemang** and **ekabobwija** (Thaman et al. 1994). *Millettia pinnata* could have possibly been introduced from Fiji, where it is a common and important medicinal plant, and it is not found on Nauru.

Ferns, of which there are few on the island, are basically referred to as **te keang**. The distinctive scented fern *Microsorium grossum*, so important for making garlands, is known as **te keang ni Makin** (literally the fern from Makin or Butaritari, the northernmost and wettest atoll in the Gilbert Islands). The other ferns *Nephrolepis hirsutula*, *Pteris tripartite*, and *P. vittata* are known more generally as **te keang**.

Whereas in Kiribati, the cycad *Cycas rumphii* is known as **te bam** or **te nii bam**, it is known merely as **bam** in Banaba.

Among the monocotyledons the ti plant or cordyline *Cordyline fruticosa*, known in Kiribati as **te rauti**, is known as **te baa rauti** in Banaba. Whereas in Kiribati **te kiebu** refers mainly to the crinum lilies *Crinum* spp. (no longer present on Banaba in 2002), **te kiebu** refers to the beach spider lily *Hymenocallis littoralis* and to the bowstring hemp or mother-in-law’s tongue *Sansevieria trifasciata* in Banaba.

In terms of food plants, true taro *Colocasia esculenta* is known simply as **te taro** and the coco yam, tannia or American taro *Xanthosoma* spp. as **taro n tana** (an adaptation of the Fijian name **dalo ni tana**) in Banaba, respectively whereas both are known as **te taororo** in Kiribati.

Other plant names that are clearly derivations of Fijian include **te nokonoko** for casuarina *Casuarina equisetifolia*, **te waiwai** (from **vaivai**) for *Leucaena leucocephala* and **te tabioka** (from “**tavioka**”) for cassava. The names, along with some translations of their meaning in English are included in the systematic listing.

USES

The uses of most plants are described in the systematic listing. As would be expected, they are almost the same as the uses in Kiribati or Rabi because of the long association with Kiribati and the long residence of most Banabans on Rabi Island in Fiji, a very different and larger island than Banaba and the low-lying atoll islands of Kiribati.

SYSTEMATIC LISTING OF THE VASCULAR PLANTS OF BANABA (OCEAN ISLAND), REPUBLIC OF KIRIBATI, CENTRAL PACIFIC

This annotated systematic listing includes all vascular plants that have been reported present on Banaba (Ocean Island). It lists Pteridophyta (ferns and fern allies) first, followed by Gymnosperms and then Angiosperms. Within Angiosperms, Monocotyledons precede Dicotyledons. Under these headings, individual families are listed in alphabetical order (e.g., Acanthaceae, Amaranthaceae, Anacardiaceae, etc.), with individual species within each family then listed in alphabetical order by genus (e.g., *Asystasia gangetica*, *Barleria prionitis*, *Graptophyllum pictum*, etc.). The information provided for each species entry in the list, including its organization and the symbols and conventions used under each category, is explained below.

Family Names

Family names (e.g., **POLYPODIACEAE**, **ACANTHACEAE** or **RUBIACEAE**) are centered in bold capitals immediately before the first species entry in each family.

Latin and Scientific Names

The first name listed in bold italics font is considered to be the currently most widely accepted published scientific (Latin) name for a given species (usually the earliest published name or basionym), with many names having been recently revised or corrected and republished. All names follow the *International Code of Botanical Nomenclature*.

The name(s) or the abbreviation of the name(s) of the authority or authorities (persons responsible for describing and publishing a given species name) are provided after each species name, (e.g., *Brassica chinensis* L. indicates that the species was first described and published by Linnaeus (L.), whereas *Ipomoea batatas* (L.) Lam. indicates that the species name was first published by Linnaeus (L.), but was later revised, renamed and republished by Lamarck).

Additional scientific names provided include commonly used synonyms or older names no longer in use for the species, and, in some cases, incorrect names commonly applied to the species, which are indicated by *sensu auct. non*.

Common Names

English or common vernacular names for a species and other widely used names (e.g., coconut palm) are listed below the Latin name.

Banaban and Kiribati Names

When known, the vernacular Banaba names, most of which are Kiribati names or the Kiribati renditions of names not known in Kiribati that are unique to Banaba or Rabi, are provided. These names are based mainly on information gathered on Banaba in 2005 from local respondents. The Kiribati names as used in Kiribati are also listed for comparison and are based on previous studies by the senior author in Kiribati (Thaman and Tebano 1994; Thaman and Whistler 1995). When known, a brief translation of the Banaban and Kiribati names are provided in parentheses, for example, *te roti* (“rose”). In the Kiribati language using the current orthography, a “t” followed by an “i” (as in the word Kiribati) is pronounced like an “s,” as if it were “Kiribas.” Most of the other letters are pronounced reasonably similar to English. Where these headings are not present in the species entry, this indicates that no names were known for that species.

Antiquity Status

Antiquity status indicates whether a given species is presumed to be indigenous to Banaba; an aboriginal introduction by Banabans or other indigenous Pacific Islanders before European contact; or a post-European contact introduction. In some cases, it is suggested that a species may have been successfully introduced prior to European contact, but either not successfully established or brought to extirpation (local extinction) before botanical collections or observations of the flora were made. The question mark (?) indicates that the true status of a species is in doubt (i.e., whether it is really indigenous or an aboriginal or recent introduction).

Antiquity status includes a description of geographical origin. Geographical origin refers to what seems to be origin or the original natural distribution of a given species before humans began to act as dispersal agents for plants. In many cases it is difficult to be sure what the original pre-human or pre-European contact range of a given species was because species introduced either deliberately or accidentally by the Pacific Islander colonizers of the islands have often become naturalized and integral components of what now seems to be indigenous or wild vegetation.

With respect to terminology, Malesia (sometimes confused with the country Malaysia) is a biogeographical term referring to an area encompassing the tropical islands of Indonesia, Malaysia, Philippines, the island of New Guinea and Taiwan; Indo-Malesia refers to an area encompassing the Indian Ocean and Malesia; Indo-Pacific refers to an area extending from the Indian Ocean to the island of the Central Pacific; Paleotropics refers to the Old World tropics including tropical Africa, Asia and the tropical Pacific Islands; pantropical indicates that a species is found throughout the Old World and New World tropics; and cosmopolitan indicates that a species is found almost worldwide. In some cases (usually in the cases of easily dispersed weedy pioneer species) information is provided on both the assumed original distribution and whether a species is now more widespread (e.g., pantropical). In most cases the geographical origins of species are based on Whistler (1992, 1995, 2000).

Abundance or Frequency Occurrence (Conservation Status)

The estimates of abundance or frequency occurrence or whether a given species is now endangered or extirpated (locally extinct) are based on in-the-field observations by the authors, the knowledge of Banaban informants and the very limited number of published accounts or historical photographs (e.g., in the case of the giant crinum lily, *te kiebu* [*Crinum asiaticum*], which was reported present in the past and seen in photos, but was not seen in 2005).

The categories used to indicate the abundance of a given species are:

Extirpated — Reported present in past, but not seen during more recent surveys and now possibly extirpated (locally extinct) on Banaba. The term “extirpated” is used for a species that, although locally extinct or no longer present on Banaba, is still found, and in many cases abundant, on other islands of the Pacific or in other parts of the world.

Rare — Seen present in only one or two locations and possibly in danger of extirpation (local extinction) or is a rare ornamental, food plant, etc. that may be a recent trial introduction, and not really well suited to the Banaba environment.

Uncommon — Found present in only a few locations, such as in the relatively few undisturbed sites, as a remnant in previously settled areas or in a few houseyard gardens and experimental agricultural areas. This category could also pertain to those plants, such as annual flower or food plants that are seasonally planted, but which were not seen or not common during the period of the survey.

Occasional — Occasionally seen in a number of places, or locally common in only a few locations.

Common — Present in a number of locations, but not really dominant, or locally common or abundant in some locations.

Abundant — Widespread in a range of habitats or dominant in a number of different habitats throughout the island.

Very abundant — Abundant in most habitats and found as a dominant in many sites or habitats.

Remarks

Observations and other remarks on the species in question are provided for each species entry. Remarks frequently include the following types of information.

Place Names and Geographical Location on Banaba

Brief descriptions of where species were found are provided, usually referring to portions of the island, habitats, or major landmarks or well-known geographical locations, e.g., northeast corner of the island, mined areas inland from the dynamite storage site, near Tabiteuea Sports Field, north of the Fatima Village turnoff, etc. In some cases, specific buildings or individual residences are mentioned to allow people living on or visiting the island to locate these areas. Unfortunately, as stressed above, many, but not all of these locations are identified on the map in Figure 2. This is because there are no available detailed geographical maps of Banaba and due to the very limited time that we spent on the island it was not possible to draft a new map based on annotated Google images of the island.

Uses and Cultural Utility

Ethnobotanical information (including vernacular names) on uses or cultural utility of the individual plant species was gathered for most species through interviews and surveys conducted in 2005, with many of the uses on Banaba being similar to those in Kiribati or on Rabi Island in Fiji due to the long shared history and interaction.

Reference to Previous Records

The only available previous listings of plants of Banaba in the literature include some 33 species listed in Fosberg, Sachet and Oliver's geographical checklists of the Micronesian Dicotyledonae (1979), Pteridophyta and Gymnospermae (1982), and Monocotyledonae (1987), which were based on analyses of herbarium specimens and limited published material. These are indicated by Fosberg et al. (1982) for ferns and gymnosperms, Fosberg et al. (1987) for monocotyledons and Fosberg et al. (1979) for dicotyledons. Other limited references to species are included in the text in the systematic listing.

Digital Images

The last entries under each species are the reference numbers of the digital images/photos taken to document, validate the presence of and/or help confirm the identity of a given species. The digital photos/images have been copied onto computer files and were lodged in 2005 in the South Pacific Regional Herbarium at The University of the South Pacific, Suva, Fiji, and at the Agricultural Division in Tenaea and the University of the South Pacific Centre in Teoraereke on South Tarawa. A number followed by a lowercase letter, such as a, b, or c, indicates the position of the relevant species in an annotated photo that pictures more than one species.

PTERIDOPHYTA
(FERNS AND FERN ALLIES)

NEPHROLEPIDACEAE (SWORD FERN FAMILY)

Nephrolepis biserrata (Sw.) Schott

Common Names: Sword fern, fishtail fern

Banaban Name: *te keang*

Kiribati Names: *te keang*, *te keang ni Imatang* (“foreign”)

Status: Indigenous. Tropical Africa through Asia, northeastern Australia to Polynesia.

Abundance: Common?

Remarks: Epiphytic and terrestrial fern on rocks and limestone soil. Found in less-exposed and more shaded areas between mined out pinnacles, in open ruderal sites, along trailsides, roads and on flat, open unmined areas and in houseyard gardens. In some cases this species may be confused up with *N. hirsutula* below.

Voucher Photograph: DPBB0131

Nephrolepis hirsutula (G. Forst.) C. Presl.

Common Names: Sword fern, fishtail fern

Banaban Name: *te keang*

Kiribati Names: *te keang*, *te keang ni Imatang*

Status: Indigenous. Pantropical.

Abundance: Abundant.

Remarks: Erect terrestrial fern that is abundant in colonies and dense populations in unmined and hand-mined areas and in pits between pinnacles in mined areas; very extensive populations in areas surrounding the Tabiteuea Sports Ground. One of first plants to colonize mined areas. Occasionally planted or protected as an ornamental in houseyard gardens. Leaves used occasionally in garlands. Some populations seem to be *Nephrolepis biserrata* (see above, as the differentiation of these very similar species requires close inspection).

Voucher Photographs: DPBB0119, DPBB0120, DPBB0121a, DPBB0133, DPBB0328, DPBB0664, DPBB0665, DPBB0668, DPBB0712, DPBB0732, DPBB0847a, DPBB0882a, DPBB0892, DPBB0893, DPBB0894

Nephrolepis biserrata (Sw.) Schott var. *furcans* Hort. ex L. H. Bailey

Common Name: Fishtail fern

Status: Recent introduction. East Asia, Africa, Brazil, Florida.

Abundance: Rare.

Remarks: Ornamental terrestrial fern in one houseyard garden about 1 km from turn to Fatima in the Tabwewa area.

Voucher Photograph: DPBB0316

POLYPODIACEAE (COMMON FERN FAMILY OR POLYPODY FERN FAMILY)

Microsorium grossum (Langsd. and Fisch.) S. B. Andrews

Synonyms: *Phymatosorus grossus* (Langsd. and Fisch.) Brownlie; *Polypodium grossum* Langsd. and Fisch.; Misapplied Names: *Phymatosorus scolopendria* (Burm.f.) Pichi-Serm.; *Polypodium scolopendria* Burm.f.; *Phymatodes scolopendria* (Burm.) Ching; *Microsorium scolopendria* (Burm.) Copel.; *Polypodium phymotodes* L.

Common Names: Scented fern, lawai fern

Banaban Name: *te keang ni Makin*

Kiribati Names: *te keang ni Makin*, *te keang ini Makin*

Status: Indigenous. Paleotropical.

Abundance: Common.

Remarks: Terrestrial and epiphytic fern common on limestone pinnacles, in pits of mined areas, in shady areas along paths, on the rocky escarpment in secondary forest and in *Leucaena* thickets, limestone pinnacles just inland from the coast and occasional as a protected or planted ornamental in houseyard gardens and settlements; found growing on the walls of the entrance to the water cave (**bangabanga**) inland from the dynamite store. *Microsorium grossum* has been widely mistaken for the small, almost exclusively epiphytic species *P. scolopendria*. Fronds (leaves) used for making garlands known as **te teitera** and scenting coconut oil. Also reportedly used in magic or sorcery and traditional medicine.

Voucher Photographs: DPBB0118, DPBB0134, DPBB0454, DPBB0455b, DPBB0456a, DPBB0603a, DPBB0672, DPBB0799, DPBB0824a, DPBB0825b, DPBB0847b

PSILOTACEAE (PSILOTUM FAMILY)

Psilotum nudum (L.) Beauv.

Common Names: Psilotum, reed fern

Kiribati Name: *te kimarawa*

Status: Indigenous. Tropics and subtropics.

Abundance: Extirpated?

Remarks: Small erect terrestrial perennial grass-like fern, up to about 30 cm or higher. Reported present by Fosberg, Sachet and Oliver (1982) but not seen in 2005. Also found on Nauru (Fosberg et al. 1982).

PTERIDACEAE (BRACKEN OR BRAKE FERN FAMILY)

Pteris tripartita Sw.

Common Names: Lacy fern, giant bracken fern, sword brake

Banaban Name: *te keang*

Status: Indigenous. Tropical and subtropical Asia to Micronesia and Polynesia.

Abundance: Common.

Remarks: Large terrestrial fern found as individuals or in isolated clusters at bases of and in the pits between limestone pinnacles in mined and unmined areas; common in karstified limestone vegetation just inland from the coast; also occasional in shady disturbed sites, shady waste places and houseyard gardens.

Fronde occasionally used as body ornamentation by women and girls for waist sashes and head garlands in dancing.

Voucher Photographs: DPBB0062, DPBB0153, DPBB0154, DPBB0155, DPBB0187, DPBB0276, DPBB0321, DPBB0464, DPBB0466, DPBB0733

THELYPTERIDACEAE (FERN FAMILY)

Pteris vittata L.

Banaban Name: *te keang*

Status: Indigenous. Malaysia to the Marquesas.

Abundance: Occasional.

Remarks: Found in disturbed areas, on road cuts, in mined areas near roads, along paths through mined areas, and other relatively shady disturbed sites in mined areas inland from the main settlement.

Fronde used as a substitute for banana leaves in body ornamentation for dancing by men and boys.

Voucher Photographs: DPBB0136, DPBB0637, DPBB0656

**GYMNOSPERMAE
(GYMNOSPERMS)**

CYCADACEAE (CYCAD FAMILY)

Cycas rumphii Miq.

Synonym: *Cycas circinalis* L.

Common Names: Cycad, sago palm, king sago

Banaban Name: *bam*

Kiribati Names: *te bam, te nii bam*

Status: Recent introduction. India to Guam.

Abundance: Occasional.

Remarks: Planted ornamental around houses and buildings in the main settlement near the port and in some other houseyard gardens. Some are obviously very old plants from the mining era and reach 3–4 m in height.

Voucher Photographs: DPBB0364, DPBB0444, DPBB1033

**ANGIOSPERMAE
(ANGIOSPERMS)**

**MONOCOTYLEDONAE
(MONOCOTYLEDONS)**

AGAVACEAE (AGAVE FAMILY)

Agave sisalana Perrine

Common Names: Century plant, sisal, sisal hemp

Banaban Name: *te robu* (“rope”)

Kiribati Name: *te robu*

Status: Recent introduction. Mexico.

Abundance: Occasional.

Remarks: Found as an adventive on limestone outcrops and pinnacles along road to the stockpile and on coastal cliffs to the east of the former boat harbor. Probably introduced in the past as a source of fiber.

Reportedly used as an excellent fishing line in the past after retting; the flower stalk also reportedly used as a fishing pole.

Voucher Photographs: DPBB0591, DPBB0592, DPBB0631, DPBB0632, DPBB0636, DPBB0872

Cordyline fruticosa (L.) A. Chev.

Synonym: *Cordyline terminalis* (L.) Kunth

Common Names: Cordyline, ti-plant

Banaban Name: *te baa n rauti*

Kiribati Name: *te rauti*

Status: Recent introduction. Tropical Asia.

Abundance: Occasional.

Remarks: Planted ornamental in household gardens. Leaves used in body ornamentation and flower arrangements for church services.

Voucher Photograph: DPBB0172

Sansevieria trifasciata Prain

Common Names: Bowstring hemp, mother-in-law's tongue

Banaban Name: *te kiebu*

Status: Recent introduction. Tropical West Africa.

Abundance: Abundant.

Remarks: Widely naturalized in areas bordering the mined-out phosphate lands on topside, along roadsides and in areas between abandoned buildings. Occasional as a planted ornamental.

Voucher Photographs: DPBB0073, DPBB0074, DPBB0116c, DPBB0150, DPBB0375, DPBB0427, DPBB0445, DPBB0484, DPBB0567, DPBB0568, DPBB0612, DPBB0629, DPBB0633a, DPBB0634, DPBB0635a, DPBB0677 DPBB0837

AMARYLLIDACEAE (AMARYLLIS LILY FAMILY)

Crinum asiaticum L.

Common Names: Grand crinum lily, crinum lily, false spider lily

Banaban Name: *te kiebu*

Kiribati Name: *te kiebu*

Status: Recent introduction. Tropical Asia.

Abundance: Extirpated?

Remarks: Planted ornamental lily with green leaves; often planted along borders. Reportedly present in past by Fosberg, Sachet and Oliver (1987) and seen in historical photo in Sigrah and King (2002:22); **te kiebu** is reported to be the plant ("tree" as translated from **te kai** in Kiribati) that was slashed by a Japanese soldier during the war to test the sharpness of his sword before beheading an I-Kiribati prisoner known as Kamoaa (Sigrah and King 2001). Very common on both Nauru and in the Gilbert Islands (Fosberg et al. 1987).

Hymenocallis littoralis (Jacq.) Salisb.

Synonym: *Hymenocallis pedalis* Herb.

Common Name: Beach spider lily

Banaban Name: *te kiebu*

Kiribati Names: *te ruru ni mmane*, *te ruru*

Status: Recent introduction. Tropical America.

Abundance: Abundant.

Remarks: Planted ornamental in gardens. The leaves, flower stalks and flowers used in flower arrangements in houses and in church. Leaves reportedly used in local medicine. Could have been the plant used to test the sharpness of a sword by a Japanese soldier before decapitating a prisoner during World War II (Fosberg et al. 1987).

Voucher Photographs: DPBB0166, DPBB0167, DPBB0977, DPBB1065

Zephyranthes rosea Lindl.

Common Names: Pink lady, pink star of Bethlehem, pink zephyr flower, rain lily

Kiribati Names: *te roti* ("rose"), *te riri* ("lily")

Status: Recent introduction. Guatemala and West Indies.

Abundance: Common.

Remarks: Planted ornamental used as a border planting in private gardens. Naturalized in some household gardens and rural ruderal sites. Attractive pink flowers occasionally used in head garlands (**te bau**).

Voucher Photographs: DPBB0875, DPBB0876, DPBB0969, DPBB0970, DPBB0971, DPBB1110, DPBB1111, DPBB1112

ARACEAE (ARUM FAMILY)

Alocasia macrorrhizos (L.) G. Don

Synonym: *Alocasia macrorrhiza* (L.) Schott

Common Names: Giant taro, elephant ear taro

Banaban Name: *te kabe*

Kiribati Name: *te kabe*

Status: Recent introduction. Tropical Asia.

Abundance: Occasional.

Remarks: Found as cultivated and volunteer plants in gardens among limestone pinnacles, near settlements and occasionally in mined areas near settlements. Starchy lower stem reportedly cooked and eaten as a minor or emergency staple food crop of particular importance in times of food shortage when cargo vessels fail to arrive. Leaves used for parceling food; raw leaves fed to pigs; young leaves reportedly cut up and cooked with coconut cream as a green vegetable.

Voucher Photographs: DPBB0170, DPBB0373, DPBB0496, DPBB0599, DPBB0955, DPBB0985, DPBB0997a, DPBB1008b, DPBB1017

Caladium bicolor (Aiton) Vent.

Common Names: Artist's pallet, caladium

Status: Recent introduction. Brazil.

Abundance: Occasional.

Remarks: Taro-like plant with attractive, heart-shaped, variegated, leaves patterned with green pink, red or white spots. Planted ornamental in a number of houseyard gardens and in a planter box in front of Banaba House.

Voucher Photograph: DPBB0340

Colocasia esculenta L. (Schott)

Common Names: Taro, dasheen

Banaban Name: *te taro*

Kiribati Name: *te taororo*

Status: Aboriginal introduction. Tropical Asia.

Abundance: Occasional.

Remarks: Food plant found in a number of sites with sufficient moisture, such as on the corner of the coastal road down slope from Fatima Village where water accumulates during rainy times, below the kitchen waste water discharge pipe at a building just inland from the boat harbor and in a number of other houseyard gardens. An important Banaban food crop on Rabi Island in Fiji. Starchy corm cooked as a staple food and young leaves cooked as a spinach; is a food source during times of food shortage when cargo vessels fail to arrive. Leaves occasionally fed to pigs.

Voucher Photographs: DPBB0309, DPBB0389, DPBB0976

Epipremnum aureum (Lind. and Andre) Bunt.

Synonyms: *Rhaphidophora aurea* (Lind. and Andre) Birds.; *Scindapsus aureus* (Lind. and Andre) Engl.; *othos aureus* Lind. and Andre

Common Names: Taro vine, pothos aureus, money plant, devil's ivy

Status: Recent introduction. Solomon Is.

Abundance: Uncommon.

Remarks: Planted ornamental climbing vine and pot plant seen at Banaba Junior Secondary School and at the Medical Assistant's house near the hospital.

Xanthosoma sagittifolium (L.) Schott

Common Names: Tannia, yautia, cocoyam, American taro

Banaban Name: *taro n tana*

Kiribati Name: *te taororo*

Status: Recent introduction. West Indies.

Abundance: Occasional.

Remarks: Staple food plant found in a number of houseyard gardens and uncommonly in garden areas away from settlements; planted in gardens between limestone pinnacles near the Sports Ground. Food crop grown by Banabans on Rabi in Fiji. Starchy root cormels cooked as a supplementary staple and

the young leaves cooked as a spinach. Both roots and leaves occasionally fed to pigs when there is a surplus. The planting of **taro n tana** has increased in recent years as a food security measure in times of food shortage and when cargo vessels fail to arrive.

Voucher Photographs: DPBB0063, DPBB0075, DPBB0479, DPBB0480

ARECACEAE OR PALMAE (PALM FAMILY)

Cocos nucifera L.

Common Name: Coconut palm

Banaban Name: *te ni*

Kiribati Name: *te ni*

Status: Indigenous and aboriginal introduction. Southern Asia, Indian Ocean and Pacific Islands.

Abundance: Occasional.

Remarks: Planted in houseyard gardens and settlements and planted or protected along roadsides; uncommon in coastal forest, in coastal vegetation on karstified limestone just inland from coast, and in inland mined-out areas. Coconuts are a major traditional staple food and most parts of the coconut palm have traditional uses. One of the Banaban “trees of life” which were planted in appropriate sites throughout the island. The destruction or “purchase” of coconut palms during the alienation of land for phosphate mining was one of the main Banaban claims for compensation and reasons for long-standing disputes. However, because of shortage of supply in proximity to the main settlements it has been difficult in recent time to obtain sufficient nuts and other coconut products to satisfy local needs. The practice of cutting toddy to obtain the vitamin-rich sap from the sap of the coconut flower spathe by men and boys on the island is still carried out to a certain extent. The flesh of the mature nuts (**te ben**) is an important food and the cream squeezed from it is used as an ingredient in raw fish and cooked curry fish, chicken, greens and deserts. The clarified oil expressed from mature nuts is scented and utilized as body oil (**te kabira**), which is used to anoint the bodies of the groom’s family as part of the traditional wedding ceremony. Most parts of the coconut palm are used medicinally and still play significant roles in traditional healthcare (Thaman 1992a). Parts of the coconut palm are also used in traditional magic and sorcery. Recently, there have been attempts to replant sprouted coconut seedlings (**te uto**) in the shallow pits between limestone pinnacles around the coastal areas to cater for the increasing demand for coconut products on the island. There are also a number of traditional varieties, which include **te niu ra**, **te ni roro**, **te ni wae** and **te bunia**, the husk of the latter which is edible. There is also a recently introduced cultivar known as **te niu Taveuni**, which was reportedly introduced from Taveuni Island a neighboring island of Rabi in Fiji. Reported present by Fosberg, Sachet and Oliver (1987).

Voucher Photographs: DPBB0040, DPBB0163, DPBB0181, DPBB0218, DPBB0376, DPBB0420, DPBB0426, DPBB0436, DPBB0438b, DPBB0474, DPBB0475, DPBB0576a, DPBB0672, DPBB0832c, DPBB0885, DPBB0988b, DPBB0991b

Phoenix dactylifera L.

Common Name: Date palm

Status: Recent introduction. North Africa eastward to India.

Abundance: Rare.

Remarks: Single mature palm tree planted at the former residence of the Chief Accountant just above Banaba House. Also seen on Nauru in early 1980s.

Voucher Photograph: DPBB0575

Pritchardia pacifica Seem. and Wendl.

Common Names: Pacific fan palm, Fiji fan palm

Banaban Name: *te bam*

Kiribati Name: *te bam*

Status: Recent introduction. Fiji, Tonga, and Samoa.

Abundance: Extirpated.

Remarks: Not seen in 2005, but is seen clearly in a 1914 photo by Douthc in Sigrah and King 2001:236) and a reasonably common and well known palm in Fiji and Kiribati where it is seen at the Catholic Church in Bairiki and was reported present in Kiribati on Tabiteuea at the government residency at Uturoa in the 1950s by Katherine Luomala (1953).

CANNACEAE (CANNA FAMILY)

Canna indica L.

Common Names: Indian shot, canna lily

Kiribati Name: *te riti*

Status: Recent introduction. West Indies.

Abundance: Rare.

Remarks: Two plants in cement-bordered flower plots along the roadside of the Banaba Island Council building.

Voucher Photographs: DPBB0903, DPBB0905

COMMELINACEAE (DAYFLOWER OR SPIDERWORT FAMILY)

Commelina diffusa Burm. f.

Common Name: Dayflower

Status: Recent introduction. Southern Asia.

Abundance: Occasional.

Remarks: A few small populations seen in ruderal sites, path sides and an abandoned ornamental garden at the Banaba Club House just inland from the tennis court, in the residence next to the hospital and in a couple of other houseyard gardens.

Voucher Photographs: DPBB0061, DPBB0364, DPBB1027, DPBB1028

Tradescantia pallida (Rose) D. Hunt

Synonym: *Setcreasia purpurea* B. K. Boom

Common Names: Purple tradescantia, purple heart

Status: Recent introduction. Mexico.

Abundance: Rare.

Remarks: One single spreading succulent herbaceous plant with purple leaves seen in a houseyard garden in Tabwewa.

Voucher Photographs: DPBB0877, DPBB0878

Tradescantia spathacea Swartz

Synonyms: *Rhoeo spathacea* (Sw.) Stearn; *Rhoeo discolor* (L'Hér.) Hance ex Walp.

Common Names: Tradescantia, oyster plant, Moses-in-a-boat, dwarf oyster

Banaban Name: *te kiebu*

Kiribati Name: *te ruru ni Buranti*

Status: Recent introduction. Mexico and West Indies.

Abundance: Uncommon.

Remarks: Seen planted in a graveyard and slightly adventive near the back of Fatima Village and in one other houseyard garden. Sometimes used in flower arrangements and for decorative plantings in graveyards.

Voucher Photograph: DPBB0191

CYPERACEAE (SEDGE FAMILY)

Cyperus compressus L.

Common Name: Summer sedge

Banaban Name: *te uteute* (general term for grasses)

Kiribati Name: *te uteute*

Status: Recent introduction. Pantropical.

Abundance: Occasional.

Remarks: Weed growing in cement cracks along roads, cement pathways and in ruderal sites, mainly in the main settlement.

Voucher Photographs: DPBB0351, DPBB1034

Cyperus javanicus Houtt.

Synonym: *Mariscus javanicus* (Houtt.) Merr. and F. P. Metcalf

Common Names: Javanese flat sedge, marsh sedge

Banaban Name: *te titania*

Kiribati Names: *te ritanin* (S), *te itaita* (N)

Status: Indigenous. Paleotropical.

Abundance: Common.

Remarks: Found in isolated clusters and as individual plants on the inner border of the coastal strand, in open areas on the coastal plain, along trail sides and roadsides and in ruderal habitats and in some of the mined and unmined areas and in the area around the Tabiteuea Sports Ground.

Voucher Photographs: DPBB0105, DPBB0201, DPBB0488, DPBB0492, DPBB0710, DPBB0943, DPBB0944

Cyperus rotundus L.

Common Names: Nut sedge, nut grass

Banaban Name: *te mumuta*

Kiribati Name: *te mutemute*, *te mumuta*

Status: Recent introduction. Cosmopolitan.

Abundance: Common.

Remarks: Weed in cassava and flower gardens, along roadsides and in ruderal sites; also a component in the grassland at the Tabiteuea Sports Ground. Small fragrant root nodules used to scent coconut oil and in traditional medicine to treat boils.

Voucher Photographs: DPBB0111a, DPBB0352, DPBB0356, DPBB0366, DPBB0624

Fimbristylis cymosa R. Br.

Common Name: Beach sedge

Banaban Name: *te uteute ni maane* ("men's grass")

Kiribati Name: *te uteute ni maane*

Status: Indigenous. Pantropical.

Abundance: Uncommon to occasional?

Remarks: Not seen or overlooked by authors, but reportedly common in some unvisited inland sites in the mined area; still abundant on Nauru in 2007. Used in traditional medicine to treat eye and ear infection, and the flower heads used as ear buds to clean the ears.

DIOSCOREACEAE (YAM FAMILY)

Dioscorea alata L.

Common Names: Greater yam, common yam

Banaban Name: *te iam*

Kiribati Name: *te iam*

Status: Recent introduction. Southeast Asia.

Abundance: Uncommon.

Remarks: Single plants seen climbing on trees in houseyard gardens in Fatima Village and at Tabwewa; eaten for dinner by the senior author the first day in Banaba in 2005. Could be one of the wild yam species, such as *Dioscorea nummularia*, which is common in Fiji.

Voucher Photographs: DPBB0193, DPBB0194

LILIACEAE (LILY FAMILY)

Gloriosa superba L.

Synonym: *Gloriosa rothschildiana* O'Brien

Common Names: Glory lily, gloriosa lily, fire lily

Kiribati Name: *te riri*

Status: Recent introduction. Tropical Africa in the area of Uganda.

Abundance: Rare.

Remarks: A single non-flowering climbing plant seen in one houseyard garden in the main settlement in 2005.

MUSACEAE (BANANA FAMILY)

The nomenclature for the genus *Musa* is confused, with most of the common seedless cultivars or clones being triploid crosses of the fertile species *Musa acuminata* and *M. balbisiana*. The Latin binomials *M. nana*, *M. sapientum*, and *M. paradisiaca* are commonly used as follows: *M. nana* for the dwarf Cavendish, and *M. sapientum* for the the taller bananas, which are generally eaten ripe, but which are also cooked throughout the Pacific as starchy staples, and *M. paradisiaca* for the starchier bananas or plantains, which are usually eaten cooked as a staple starch, but occasionally eaten ripe as fruit. The nomenclature most widely used by agronomists is that developed by Simmonds, which classifies all cultivars or clones on the basis of their assumed genetic background, for example, *Musa* ABB Group would be a triploid cross of one *M. acuminata* group and two *M. balbisiana* groups. Both nomenclatural systems are presented here to more precisely identify the clones that are currently present in Banaba.

Musa (AAA Group) Simmonds

Synonyms: *Musa sapientum* L.; *Musa paradisiaca* L. var. *sapientum* (L.) Kuntze; *Musa paradisiaca* L. ssp. *sapientum* (L.) Kuntze; *Musa acuminata* Colla cvs

Common Names: Banana, Robusta, poyo, Mons Marie

Banaban Name: *te banana Tiana* ("Chinese banana")

Kiribati Name: *te banana*

Status: Recent introduction. Southeast Asia.

Abundance: Occasional.

Remarks: Planted food plant in some garden areas in between mined out pinnacles, around abandoned buildings, and in houseyard gardens, vacant lots and other undeveloped areas. Ripe fruit eaten raw and green fruit cooked as a starchy staple food. Leaves and stem pieces used to parcel and serve food.

Voucher Photograph: DPBB0602

Musa (AAB Group) Simmonds

Synonym: *Musa x paradisiaca* L. var. hort. "Bluggoe" (*M. acuminata* Colla x *M. balbisiana* Colla)

Common Names: Pacific plantain, cooking banana

Banaban Name: *te buntii* (from Fiji "vundi")

Kiribati Name: *te wae* ("the leg")

Status: Recent introduction. Southeast Asia and Pacific.

Abundance: Uncommon.

Remarks: Food plant in some food gardens, houseyard gardens, undeveloped areas and in pits between the limestone pinnacles. Ripe fruit used to make desserts and green fruit cooked as a staple vegetable.

Musa (AAB Group) "Ney Poovan," "Lady's finger" Simmonds

Synonym: *Musa acuminata* Colla x *Musa balbisiana* Colla

Common Name: Lady's finger banana

Banaban Names: *tabonibae*, *liga ni marama* (Fijian)

Kiribati Names: *te oraora* (S), *te tabonibae* (N)

Status: Recent introduction. South India.

Abundance: Occasional.

Remarks: Food plant in some food gardens, houseyard gardens, undeveloped areas and in pits between the limestone pinnacles.

Voucher Photograph: DPBB0398

Musa (ABB Group) Simmonds

Synonym: *Musa* x *paradisica* L. var. hort. Bluggoe (*M. acuminata* Colla x *M. balbisiana* Colla)

Common Names: Cooking banana, plantain, bluggoe, Ney Mannan (blue Java), Saba (BBB?)

Banaban Name: *te bwibwi*

Kiribati Names: *te banana*, *te umuum*

Status: Aboriginal introduction? Southeast Asia and Pacific.

Abundance: Occasional.

Remarks: Food plant in some food gardens, houseyard gardens, undeveloped areas and in pits between the limestone pinnacles.

PANDANACEAE (PANDANUS FAMILY)

The nomenclature for the genus *Pandanus* is, like *Musa*, confused, with some taxonomists classifying many of the common cultivars and wild clones or species, both edible and non-edible, as forms or varieties of *P. tectorius*. Other taxonomists consider them distinct species, often listing numerous species or varieties for a given area. For example, *P. odoratissimus* L. f. has long been thought to be synonymous with *P. tectorius*, but is not considered, by many authorities, to occur east of Malaysia. Similarly, *P. odoratissimus* L.f. var. *pyriformis* Mart. has been used as a synonym for a wild and doubtful variety of *P. tectorius*, whereas Stone (1970) considers *P. fragrans* Gaud. to be the common wild species on Guam, and does not consider *P. tectorius* to be present. Thus, the identifications here must be considered provisional, with most named cultivars being grouped under *P. tectorius*. Other widespread forms, such as *P. dubius* Spreng., a widespread edible species; and *P. spurius* Miq. cv. PUTAT (Syns. *P. tectorius* Warb. var. *laevis* Warb.; *P. odoratissimus* L. f. var. *laevis* (Warb.) Mart., which are widely cultivated for their leaves for use in plated ware, are also possibly present, but not listed here.

Pandanus tectorius Park.

Common Names: Pandanus, screw pine

Banaban Names: *te kaina* (cultivated varieties), *te rekinibeti* (wild varieties)

Kiribati Names: *te kaina*, *te rekinibeti*

Status: Indigenous, although many important cultivars are almost certainly aboriginal or recent introductions.

Abundance: Occasional.

Remarks: Found in small stands or as individual plants in coastal limestone and coastal plain and strand vegetation, unmined areas, mined areas, both on pinnacles and in pits in between and in secondary vegetation in ruderal sites. Occasionally deliberately planted as an important food plant in food garden areas and houseyard gardens. One of the Banaban "trees of life" which were planted in tree groves, the destruction or "purchase" of which during the alienation of land for phosphate mining was

one of the main Banaban claims for compensation and reasons for long-standing disputes. Very important fresh fruit and staple food, the most important timber for construction of traditional houses and sacred meeting houses (**maneaba**). **Te kaina** was a mainstay of the traditional food and beverage system and all parts are still used in traditional health care (traditional medicine). Pancakes made by women made from the soft part of the seeds (drupes) kept for extended periods and were the main food reserve “against the inevitable “rainy day,” which on Ocean Island meant a drought period.” (Ellis 1935 in Sigrah and King 2001). The white young sprouting male flowers (**te tabwa, tabaa**) are frequently used to scent coconut oil; some women on Banaba use the rotting wood (**te bubu**) inside the bark of the dead branches and main stems. The leaves and young sprouting flowers are also used in magic and sorcery. There were reportedly many cultivars in the past of which four were the original cultivars. The first two, both truly Banaban cultivars and from Uma Village, are **te iriuranti** and **te irirabono**. The second two, which according to legend were brought to Bobonaka in Banaba from Andabanaba by a fisherman, are **te iriandabanaba** and **te iribabwata**. The latter was reportedly rather dark and had a sweet taste like the **te kaina** in Kiribati. Reported present by Fosberg, Sachet and Oliver (1987).

Voucher Photographs: DPBB0079b, DPBB0217a, DPBB0299, DPBB0300, DPBB0301, DPBB0302, DPBB0303, DPBB0304, DPBB0305, DPBB0392, DPBB0460a, DPBB0463a, DPBB0553, DPBB0566 DPBB0835b DPBB0846, DPBB0988a

POACEAE OR GRAMINAE (GRASS FAMILY)

***Bambusa* sp.**

Common Names: Common bamboo, feathery bamboo

Kiribati Name: *te kaibaba*

Status: Recent introduction. Tropical Asia.

Abundance: Uncommon.

Remarks: Seen growing in a number of houseyard gardens in the main settlement and in villages on the southwestern side of the island. Long stems used to make fishing poles and bird nets. Is probably *Bambusa vulgaris* Schrad. ex J. C. Wendl. which is the most common bamboo in Fiji and elsewhere in the Pacific. *Bambusa* sp. was reported present by Fosberg et al. (1987).

Voucher Photographs: DPBB0395, DPBB0979

***Bothriochloa bladhii* (Retz.) S. T. Blake**

Synonyms: *Dichanthium bladhii* (Retz.) Clayton; *Andropogon bladhii* Retz

Common Names: Australian bluestem, Australian beardgrass

Banaban Name: *te uteute* (“grass,” general)

Kiribati Name: *te uteute*

Status: Recent introduction. Tropical Africa through India to China and Australia.

Abundance: Occasional.

Remarks: Grass in open lots, roadsides, trail sides and ruderal sites.

Voucher Photographs: DPBB0128, DPBB0619, DPBB0857, DPBB0945, DPBB1020

***Brachiaria subquadripata* (Trin.) Hitchc.**

Common Names: Green summer grass, two-finger grass, tropical signal grass

Banaban Name: *te uteute* (“grass,” general)

Kiribati Name: *te uteute*

Status: Recent introduction. South Asia, Malesia and Australia, now pantropical.

Abundance: Occasional.

Remarks: In disturbed sites, along trail sides, roadsides, open degraded areas near cemeteries, houseyard gardens and food gardens.

Voucher Photographs: DPBB0071, DPBB0078, DPBB0106, DPBB0915

***Cenchrus echinatus* L.**

Common Names: Burgrass, sand bur

Banaban Name: *te kateketeke*

Kiribati Names: *te kateketeke*, *te anti* (N. Gilbert Is.)

Status: Recent introduction. Tropical America.

Abundance: Abundant.

Remarks: Weed occurring in clusters or tufts in open and ruderal habitats, along roadsides, trail sides and in sandy areas in the open areas on the inner margins of coastal vegetation.

Voucher Photographs: DPBB0294, DPBB0350, DPBB0354, DPBB0355, DPBB0394, DPBB0910, DPBB1022

***Chloris inflata* Link**

Synonym: *Chloris barbata* sensu auct. non (L.) Sw.

Common Names: Finger grass, swollen fingergrass

Banaban Name: *te uteute* ("grass," general)

Kiribati Name: *te uteute*

Status: Recent introduction. Tropical America.

Abundance: Occasional.

Remarks: Weed occurring locally in isolated clusters or tufts in open and ruderal places, particularly along roadsides, trail sides and open lots.

Voucher Photographs: DPBB0282b, DPBB0283, DPBB0297, DPBB0946, DPBB0947, DPBB1025

***Chrysopogon aciculatus* (Retz.) Trin.**

Common Names: Seed grass, golden beard grass

Banaban Name: *te uteute* ("grass," general)

Kiribati Name: *te uteute*

Status: Recent introduction. Southeast Asia and Pacific Islands.

Abundance: Uncommon.

Remarks: A mat-forming grass with stolons covered by old leaf sheaths and erect long-stalked panicles with many spikelets. Seen as scattered clumps in the field at the Tabiteuea Sports Ground at topside.

Voucher Photograph: DPBB0623

***Cynodon dactylon* (L.) Pers.**

Common Name: Bermuda grass

Banaban Name: *te uteute* ("grass," general)

Kiribati Name: *te uteute*

Status: Recent introduction. Old World.

Abundance: Occasional.

Remarks: The dominant grass at the Tabiteuea Sports Ground on topside. Seen in a couple of other locations in ruderal habitats.

Voucher Photographs: DPBB0110, DPBB0124, DPBB0621

***Dactyloctenium aegyptium* (L.) P. Beauv.**

Common Names: Four-finger grass, beach wiregrass, crowfoot grass

Banaban Name: *te uteute* ("grass," general)

Kiribati Name: *te uteute*

Status: Recent introduction. Paleotropics.

Abundance: Common.

Remarks: Weed in isolated clusters in open and disturbed habitats along roadsides, in food gardens, houseyard gardens, waste places and other ruderal sites.

Voucher Photographs: DPBB0907, DPBB0949, DPBB1035

Digitaria radicata (J. Presl) Miq.

Synonyms: *Panicum radicosm* J. S. Presl; *Digitaria timorensis* (Kunth) Balansa

Banaban Name: *te uteute* ("grass," general)

Kiribati Name: *te uteute*

Status: Recent introduction. Tropical Asia?

Abundance: Common.

Remarks: Found in waste places, roadsides and other ruderal sites. Identification unsure; could be another species or two different *Digitaria* spp.

Voucher Photographs: DPBB0325, DPBB0355a, DPBB0678, DPBB0679, DPBB0685, DPBB0961, DPBB0983

Eleusine indica (L.) Gaertn.

Common Names: Wiregrass, goosegrass

Banaban Name: *te uteute* ("grass," general)

Kiribati Name: *te uteute*

Status: Recent introduction. India; long naturalized in Old World.

Abundance: Abundant.

Remarks: Growing in rather dense concentrations or colonies in gardens, near pig pens, waste places, roadsides and other ruderal habitats. Young grass is eaten by pigs.

Voucher Photographs: DPBB0052, DPBB0419, DPBB0619

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

Synonym: *Eragrostis amabilis* (L.) Wight and Arn.

Common Names: Lovegrass, Japanese lovegrass

Banaban Name: *te uteute* ("grass," general)

Kiribati Name: *te uteute ni aine* ("women's grass")

Status: Recent introduction. Old World.

Abundance: Common.

Remarks: Occurring in scattered dense clusters in villages, around buildings, along paths and roadsides, and other ruderal places, and in sandy areas near the coast. Inflorescences used in garlands; children attach inflorescences to sticks to chase flies. Reported present by Fosberg, Sacht and Oliver (1987).

Voucher Photographs: DPBB0293, DPBB1038

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

Common Name: Beach bunch grass

Banaban Name: *te uteute* ("grass," general)

Kiribati Name: *te uteute*

Status: Indigenous. Pacific Islands.

Abundance: Common.

Remarks: Occurring in clusters, forming tufts among strand vegetation and in other open sandy habitats; also found in inland sites on mined limestone pinnacles; also found along the borders of the Tabiteuea Sports Ground. The most dominant plant in the outpost zone of the sandy beaches to the east of the main settlement.

Voucher Photographs: DPBB0107, DPBB0220, DPBB0223a, DPBB0798b

Melinis repens (Willd.) Zizka

Synonyms: *Tricholaena rosea* Nees; *Tricholaena repens* (Willd.) Hitchc.; *Rhynchelytrum roseum* (Nees) Staph and C. E. Hubb.

Common Names: Natal grass, Natal red top

Banaban Name: *te uteute* ("grass," general)

Kiribati Name: *te uteute*

Status: Recent introduction. Southern Africa.

Abundance: Common.

Remarks: Erect perennial grass bearing dark red or purplish feathery flowers, which fade to silver-pink when old. Found in clusters along trail sides, in waste places on coastal strip and in residual soil in mined areas.

Voucher Photographs: DPBB0137, DPBB0138, DPBB0139, DPBB0192

***Saccharum officinarum* L.**

Common Name: Sugar cane

Banaban Name: *te kai tioka* ("sugar tree/plant")

Kiribati Name: *te kai tioka*

Status: Recent introduction. New Guinea and Tropical Asia.

Abundance: Occasional.

Remarks: Food plants in a number of houseyard gardens in most parts of the island.

Voucher Photographs: DPBB0103, DPBB0898

***Sorghum sudanense* (Piper) Stapf**

Synonym: *Sorghum halepense* of some authors.

Common Name: Sudan sorghum

Status: Recent introduction. North Africa?

Abundance: Rare.

Remarks: One small spreading population found along a pathways leading up to the main road past a small church below Banaba House.

Voucher Photographs: DPBB0950, DPBB0952, DPBB0953

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

Banaban Name: *te uteute* ("grass," general)

Kiribati Name: *te uteute*

Status: Indigenous. Mascarene Is. in the Indian Ocean through Malesia to eastern Polynesia and the Marshall Islands in Micronesia.

Abundance: Uncommon.

Remarks: Seen in shady areas inland from the uplifted limestone coast about 1 km east of Fatima and in a number of other sites slightly inland from the coast.

Voucher Photographs: DPBB0306, DPBB0307, DPBB0818

TACCACEAE (POLYNESIAN ARROWROOT FAMILY)

***Tacca leontopetaloides* (L.) Kuntze**

Synonym: *Tacca pinnatifida* J. R. Forst. and G. Forst.

Common Name: Polynesian arrowroot

Banaban Name: *te makemake*

Kiribati Name: *te makemake*

Status: Aboriginal introduction, although according to Catala (1957) some people think it was brought to Kiribati from the Marshall Islands by an I Kiribati who married a Marshallese women. Malay archipelago.

Abundance: Extirpated.

Remarks: Reported present in the past and an important famine food, but not seen for many years. The starchy corms were formerly used as an emergency food and a traditionally important source of starch; in Kiribati the flower stalks and flowers are used for garlands and for perfume and the fibrous flower stalks split, boiled, sundried and made into hats in the main islands of Kiribati.

**DICOTYLEDONAE
(DICOTYLEDONS)**

ACANTHACEAE (ACANTHUS FAMILY)

Asystasia gangetica (L.) T. Anderson

Synonym: *Justicia gangetica* L.

Common Names: Asystasia, Chinese violet

Status: Recent introduction. Paleotropics.

Abundance: Occasional.

Remarks: Planted ornamental seen in houseyard gardens and as an adventive in abandoned gardens, vacant lots, and around buildings. Planted ornamental that is now naturalized in ruderal sites on both Banaba and Nauru.

Voucher Photographs: DPBB0312, DPBB0362, DPBB1011

Barleria prionitis L.

Common Name: Porcupine flower

Status: Recent introduction. Paleotropics.

Abundance: Occasional.

Remarks: Seen in two large adventive populations along the road immediately behind the hospital and along the inland trail along the coastal plain just to the east of the main settlement; another population near the Tabiteuea Sports Ground. Erect shrub with flowers with yellow corollas and bracts converted into three-forked thorns. Formerly a planted ornamental that is now naturalized in ruderal sites on both Banaba and Nauru.

Voucher Photographs: DPBB0090, DPBB0091, DPBB0092, DPBB0431, DPBB0502, DPBB0503, DPBB1117

Graptophyllum pictum (L.) Griff.

Common Names: Caricature plant, morado

Status: Recent introduction. New Guinea.

Abundance: Uncommon.

Remarks: Planted ornamental seen at the abandoned BPC Clubhouse and in a number of other houseyard gardens.

Voucher Photographs: DPBB0368, DPBB0369

Pseuderanthemum carruthersii (Seem.) Guill. var. *carruthersii*

Synonym: *Eranthemum carruthersii* Seem.

Common Name: False eranthemum

Banaban Name: *te iamaii*

Kiribati Names: *te iaro*, *te iamaii*

Status: Recent introduction. Melanesia?

Abundance: Occasional.

Remarks: Planted ornamental shrub and hedge plant seen in houseyard gardens and around abandoned buildings. Flowers and leaves used in garlands.

Pseuderanthemum carruthersii (Seem.) Guill. var. *atropurpureum* (Bull) Fosb.

Synonyms: *P. atropurpureum* (Bull) Radlk.; *Eranthemum atropurpureum* Bull.

Common Names: Purple false eranthemum, false face

Banaban Name: *te iaro*

Kiribati Name: *te iaro*

Status: Recent introduction. Melanesia?

Abundance: Occasional.

Remarks: Planted ornamental shrub and hedge plant in houseyard gardens and around buildings.

Voucher Photographs: DPBB0067, DPBB0446

Pseuderanthemum reticulatum (Bull) Radlk.

Synonym: *Pseuderanthemum carruthersii* (Seem.) Guill. var. *reticulatum* (Bull) Fosb.

Common Name: Yellow-veined pseuderanthemum

Banaban Name: *te iamaii*

Kiribati Name: *te iaro*

Status: Recent introduction. Melanesia?

Abundance: Occasional.

Remarks: Planted ornamental shrub and hedge plant with yellowish upper leaves with a netted variegated pattern. Planted in houseyard gardens and around buildings. One large plant seen at hospital.

Voucher Photographs: DPBB0100, DPBB0922, DPBB1075, DPBB1076

Thunbergia erecta (Bentham) T. Anderson

Common Name: Bush thunbergia

Status: Recent introduction. Tropical West Africa.

Abundance: Uncommon.

Remarks: Planted ornamental erect shrub with purple flowers seen in houseyard gardens in Fatima, Tabwewa, and the main settlement.

Voucher Photographs: DPBB0171, DPBB0180, DPBB1099, DPBB1100

AMARANTHACEAE (AMARANTH FAMILY)

Amaranthus dubius Mart. ex Thell.

Common Names: Spleen amaranth, Chinese spinach

Banaban Name: *te tumbua* (from Fijian “tubua”)

Kiribati Names: *te mota*, *te moota*

Status: Recent introduction. Tropical America but a very early introduction to Asia where it is an important green vegetable in China, India and elsewhere.

Abundance: Occasional.

Remarks: Found growing as roadside and ruderal plant in the main settlement. Reportedly more abundant during the wet season. Common on Rabi in Fiji. Leaves occasionally eaten as a pot herb and in times of food shortage.

Voucher Photographs: DPBB0093, DPBB0916, DPBB0917

Amaranthus viridis L.

Synonym: *Amaranthus gracilis* Desf.

Common Names: Slender amaranth, green amaranth, pigweed

Banaban Name: *te moota*

Kiribati Name: *te moota*

Status: Recent introduction. Pantropical.

Abundance: Occasional.

Remarks: Found in a number of roadside ruderal sites and as an adventive in houseyard gardens. Probably an early post-European contact introduction.

Voucher Photographs: DPBB0042, DPBB0089

ANACARDIACEAE (CASHEW OR RHUS FAMILY)

Mangifera indica L.

Common Name: Mango

Banaban Names: *te mangko*, *te mangko ni Banaba*

Kiribati Name: *te mangko*

Status: Recent introduction. Indo-Burma.

Abundance: Common.

Remarks: Tree found in main settlements along roads, near labor housing, in houseyard gardens and occasionally in mined areas closer to settlements and uncommonly in the more recently mined areas as a volunteer. Fruit eaten ripe and somewhat green; green fruit grated to make chutneys for curries. Apparently a late-nineteenth century introduction to Banaba because there are reports of a sacred family ancestral burial cairn (**bangota**), the name of which was **te Burita** (the meaning of which was “an enchanted place, dangerous to visit”), located under a mango tree near the site of the former maneaba (meeting house) in the ancient hamlet of te Aka in the early 1900s (Maude and Maude 1994 in Sigrah and King 2001:28–29). The cairn was reportedly still present as late as 1963, apparently “until the ground surface beneath the tree was bulldozed flat so that workmen’s huts could be erected in the shade” (Lampert 1965:3). Mango trees were also among the trees that Banabans wanted compensation for their destruction during mining (Teaiwa 2015). Reported present by Fosberg et al. (1979).

Voucher Photographs: DPBB0099, DPBB0178, DPBB0363, DPBB0670, DPBB0895a, DPBB0923b, DPBBs0927, DPBB0933

ANNONACEAE (CUSTARD APPLE FAMILY)

***Annona muricata* L.**

Common Name: Soursop

Banaban Name: *te tiotabu*

Status: Recent introduction. Tropical America.

Abundance: Extirpated?

Remarks: Fruit tree reportedly present in past, but not seen in 2005. Also present and naturalized in some places on Nauru. Ripe fruit eaten.

***Annona squamosa* L.**

Common Names: Sweetsop, sugar apple

Banaban Name: *te tiotabu*

Status: Recent introduction. Tropical America.

Abundance: Occasional.

Remarks: Fruit tree seen in houseyard gardens and around unoccupied BPC labor block along the main road at Anteeren BPC Workers housing. Also seen growing spontaneously in natural vegetation on Nauru. Ripe fruit eaten.

Voucher Photograph: DPBB0881

APOCYNACEAE (DOG-BANE FAMILY)

***Allamanda blanchetti* A. DC.**

Synonym: *Allamanda violacea* Gardn. and Fielding

Common Name: Purple allamanda

Status: Recent introduction. Brazil.

Abundance: Uncommon.

Remarks: One single large flowering plant growing next to the entrance of the BPC Clubhouse; seen in one other houseyard garden.

Voucher Photographs: DPBB0370, DPBB0371, DPBB1015, DPBB1016

***Catharanthus roseus* (L.) G. Don**

Common Name: Madagascar periwinkle

Banaban Name: *te buraroti* (“rose-like”)

Kiribati Names: *te buraroti*, *te bunonon* (N. Gilbert Is.)

Status: Recent introduction. Madagascar.

Abundance: Common.

Remarks: Planted ornamental and potted plant, often planted in borders along paths; sometimes planted in cemeteries and abandoned camps; seems to be somewhat adventive in waste places and disturbed coastal sites. White, pink and reddish cultivars exist. Reported present by Fosberg, Sachet and Oliver (1979).

Voucher Photographs: DPBB0080, DPBB0587, DPBB0701, DPBB0901

Cerbera manghas L.

Common Names: Cerbera, sea mango

Kiribati Name: *te reiangō*? (K)

Status: Indigenous. Tropical Asia to the Pacific Is.

Abundance: Extirpated.

Remarks: Medium-sized tree, with white sap; fragrant, white frangipani-like flowers and shiny green to deep purple-black fruit with a poisonous woody seed. Reported present by Fosberg, Sachet and Oliver (1979), but not seen in 2005. On Nauru, where it is known as **dereiongo**, it was only seen present in settled areas. No reported use by Nauruans, but its poisonous fruit is reportedly used medicinally and to poison fish in Samoa, Tonga, Fiji and elsewhere in the Pacific (Fosberg et al. 1979).

Ochrosia elliptica Labill.

Synonym: *Bleekeria elliptica* (Labill.) Koidz.

Banaban Name: *te ibi*

Status: Indigenous. Australia to the Pacific Is.

Abundance: Common.

Remarks: Small to medium-sized tree with white milky sap, small, cream-colored flower clusters at or near the branch tips and bright red, ovoid drupe, slightly keeled fruit surrounding. Tree in forest remnants on rocky outcrops on the central plateau, in escarpment forests on southern half of the island, and occasionally in home gardens on coastal strip. Probably misidentified as **ipi** (*Inocarpus fagifer*) and reportedly “useful for building” in Sighra and King (2001); and although no uses mentioned on Banaba apart from general construction, on Nauru the wood is used by Nauruans for rafters and small timber. Leaves used medicinally, being crushed with coconut cream to treat rashes, especially for children. Fruit used in children's games, and fruit and flowers used in garlands. Reported present by Fosberg, Sachet and Oliver (1979).

Voucher Photographs: DPBB0142, DPBB0259, DPBB0803, DPBB0805, DPBB0814b, DPBB0815b

Plumeria obtusa L.

Common Names: White frangipani, Singapore plumeria

Banaban Name: *te meria mainaina* (“white”)

Kiribati Name: *te meria*

Status: Recent introduction. Tropical America.

Abundance: Occasional.

Remarks: Planted ornamental tree in houseyard gardens and around buildings and along roadsides.

Flowers used for making garlands and leis, and for scenting coconut oil.

Voucher Photographs: DPBB0957, DPBB0960, DPBB0965, DPBB1071, DPBB1072

Plumeria rubra L.

Synonyms: *Plumeria acuminata* Ait. f.; *Plumeria acutifolia* Poir.

Common Names: Frangipani, plumeria, temple tree

Banaban Names: *temeria*, *te meria babobo* (“yellow”), *te meria uraura* (“red”), *te meria binke* (“pink”), *te meria ni Banaba*?

Kiribati Name: *te meria*

Status: Recent introduction. Tropical America.

Abundance: Common.

Remarks: Planted ornamental tree in settlements, houseyard gardens and in cemeteries. White with yellow-throats, light pink, darker pink and red cultivars are present. Flowers used for making garlands and leis and for scenting coconut oil.

Voucher Photographs: DPBB0077, DPBB0182, DPBB0314, DPBB0393, DPBB0402, DPBB0438a, DPBB1073

ARALIACEAE (PANAX FAMILY)

Polyscias guilfoylei (W. Bull) L. H. Bailey

Synonym: *Nothopanax guilfoylei* (W. Bull) Merrill

Common Name: Panax

Banaban Name: *te toara*

Kiribati Names: *te toara* (S. Kiribati), *te batatara* (N. Gilbert Is.)

Status: Recent introduction. Melanesia to Southern Polynesia.

Abundance: Rare.

Remarks: Ornamental shrub commonly planted as a hedge or living fence. Not seen in 2005, but reportedly common in past. Distinctive and attractive trifoliolate variegated green and white leaves used in garlands and for body ornamentation for dances; also reportedly used along with **te uekeueke** (*Laportea ruderalis*) in local magic. One of the most common hedge plants during the mining period in Nauru and obviously present and used in the same way in the past on Banaba.

ASTERACEAE OR COMPOSITAE (ASTER, SUNFLOWER OR COMPOSITE FAMILY)

Bidens pilosa L.

Common Names: Cobbler's peg, Spanish needles, beggars tick, burr-marigold

Status: Recent introduction. Tropical America; now pantropical.

Abundance: Rare.

Remarks: One small population seen at the Island Project Officer's houseyard garden on the way to Tamavua.

Voucher Photographs: DPBB0593, DPBB0594, PBB0595

Cyanthillium cinereum (L.) H. Rob.

Synonym: *Vernonia cinerea* (L.) Less.

Common Names: Iron weed, little iron weed

Status: Recent introduction. Tropical Asia.

Abundance: Occasional.

Remarks: Weed around houses, in food gardens, along roadsides, in waste places and ruderal sites.

Voucher Photographs: DPBB0045, DPBB0870, DPBB1108, DPBB1109

Lactuca sativa L.

Common Name: Lettuce

Status: Recent introduction. Southern Europe and western temperate Asia.

Abundance: Uncommon.

Remarks: Seasonal food plant in private gardens in the past, but rarely planted now because of unavailability of seeds.

Pluchea indica (L.) Less.

Common Name: Indian pluchea

Status: Recent introduction. Southern Asia.

Abundance: Extirpated.

Remarks: Reported present by Fosberg, Sachet and Oliver (1979), but not seen in 2005. Quite common on South Tarawa in Kiribati.

Synedrella nodiflora (L.) Gaertn.

Common Names: Synedrella, nodeweed, Cinderella weed

Banaban Name: *te kai biraoki*

Status: Recent introduction. Tropical America.

Abundance: Common.

Remarks: Weed of food gardens, waste places, roadsides ruderal sites around houses.

Voucher Photographs: DPBB0175, DPBB0391, DPBB0960, DPBB1087

Tagetes erecta L.

Common Names: Marigold

Status: Recent introduction. Mexico.

Abundance: Extirpated?

Remarks: Planted ornamental annual that used to be replanted from year to year using imported packaged seeds. Not seen in 2005. Occasional in Kiribati. Because of lack of ships over the years seeds have not been brought to the island.

Tridax procumbens L.

Common Names: Wild daisy, coat buttons

Status: Recent introduction. Tropical America.

Abundance: Common.

Remarks: Weed of roadsides, trail sides, waste places, cemeteries, around buildings, ruderal sites and occasionally near beaches and in mined areas. Reported present by Fosberg, Sachet and Oliver (1979).

Voucher Photographs: DPBB0068, DPBB0443, DPBB0671b, DPBB0911, DPBB1010, DPBB1103, DPBB1104, DPBB1105, DPBB1106

Zinnia elegans Jacq.

Synonym: *Zinnia violacea* Cav.

Common Names: Zinnia, elegant zinnia

Status: Recent introduction. Mexico.

Abundance: Extirpated.

Remarks: Planted ornamental annual and potted plant in houseyard gardens that used to be replanted from year to year using imported packaged seeds.

BIGNONIACEAE (BIGNONIA FAMILY)

Spathodea campanulata P. Beauv.

Common Names: African tulip tree, flame of the forest, fountain tree

Status: Recent introduction. Tropical Africa.

Abundance: Occasional.

Remarks: A number of large trees and some seedlings seen in houseyard gardens and around the main settlement areas. A few trees seen growing in what seems to be an adventive state in secondary vegetation. A potentially serious weedy species that should be considered for removal. Perhaps, the most serious noxious weed in parts of Fiji where it takes up significant areas of shifting cultivation land.

Voucher Photographs: DPBB0357, DPBB0517b, DPBB0576c

Tecoma stans (L.) Juss. ex Kunth.

Synonym: *Stenolobium stans* (L.) Seem.

Common Names: Tecoma, yellow elder, ginger Thomas

Banaban Name: *nei karairai* (“Lady Karairai”)

Kiribati Name: *nei karairai*

Status: Recent introduction. Tropical America.

Abundance: Very abundant.

Remarks: Planted ornamental shrub with bright yellow flowers found in houseyard gardens. Has escaped and become naturalized dominant plant along trail sides, in extensive areas of the mined out land, near the settlements and on Topside near the main cemetery. Flowers used in making garlands and headbands and flower arrangements for weddings and church services.

Voucher Photographs: DPBB0094a, DPBB0095a, DPBB0116a, DPBB0121b, DPBB0132a, DPBB0253a, DPBB0256, DPBB0493, DPBB0508, DPBB0560a, DPBB0639, DPBB0658, DPBB0659a, DPBB0666, DPBB0676, DPBB0713, DPBB0718b, DPBB0883a, DPBB0895b, DPBB0900a, DPBB0929a, DPBB1088

BOMBACEAE (BOMBAX FAMILY)

Ceiba pentandra (L.) Gaertn.

Common Names: Kapok tree, silk-cotton tree

Banaban Name: *te baubau* (from Fijian “vauvau”)

Status: Recent introduction. India or Africa.

Abundance: Rare.

Remarks: A number of large mature trees growing behind the BPC workers compound at Antereen near Tabwewa. Tall deciduous, soft-wooded, light grey-barked tree and fruit with oblong-ellipsoid fruit filled with numerous long, soft silky or cotton-like fibers and many brown seeds. The cotton-like kapok fibers formerly commonly used to stuff mattresses and pillows, but now mainly replaced by foam rubber. Common useful tree in Nauru in the past.

Voucher Photograph: DPBB0255

BORAGINACEAE (HELIOTROPE OR BORAGE FAMILY)

Cordia subcordata Lam.

Common Names: Beach cordia, sea trumpet, island walnut

Banaban Name: *te kanawa*

Kiribati Name: *te kanawa*

Status: Indigenous. Indian Ocean to Hawaii.

Abundance: Occasional.

Remarks: Seen in inner coastal forest and along roadsides on the coastal strip on the southwest side of the island. Also seen occasionally in the mined out areas inland from the main settlement and on the escarpment on the north side of the island. Plant used medicinally, flowers used in head garlands and flower arrangements for weddings and church services; roots and the flowers used in love magic to gain favor with desired partners. In Kiribati it is a sacred tree that is the totem of some kinship groups and mentioned in many legends; wood is valued, especially for woodcarving, prows and sterns of canoes and fishnet floats; flowers used in garlands; leaves added to compost for taro pits; twigs and bark used for medicine; branches of shrubby trees for fishing poles; inner bark reportedly used, in the past, for a girdle for pregnant women to give them magical protection. The decayed parts of the tree accumulated inside the bark of the tree is often used by women in Banaba to scent coconut oil.

Reported present by Fosberg, Sachet and Oliver (1979).

Voucher Photographs: DPBB0152, DPBB0826, DPBB0830, DPBB0831, DPBB0832a

Tournefortia argentea L. f.

Synonym: *Messerschmidia argentea* (L. f.) I. M. Johnst.

Common Names: Heliotrope tree, beach heliotrope

Banaban Name: *te ren*

Kiribati Name: *te ren*

Status: Indigenous. Indian Ocean to Southeastern Polynesia.

Abundance: Common.

Remarks: Dominant plant in strand forest on coastal flats and also very common in limestone cliff, terrace and escarpment vegetation on the coastline surrounding the entire island. Occasionally found in houseyard gardens and in settlements and along roadsides, ocean shores and in household gardens and as a street tree. Wood an important fuel and sometimes used to replace **te itai** (*Calophyllum inophyllum*) for main canoe bows in Kiribati; leaves one of the most important sources of mulch or compost for taro and coconut trees. One of Kiribati's and Nauru's most important medicinal plants for women and infants, the young leaves, roots, small branches and growing tips used medicinally and considered one of the most important medicines. The decayed parts accumulated inside the bark of the tree are used by women in Banaba to scent coconut oil and the leaves were used in a special oil used in the traditional embalming process (Fosberg et al. 1979; Sigrah and King 2001).

Voucher Photographs: DPBB0158, DPBB0225d, DPBB0228, DPBB0279b, DPBB0530b, DPBB054, DPBB0548c, DPBB0748b, DPBB0749, DPBB0752b, DPBB0784a, DPBB0873

BRASSICACEAE OR CRUCIFERAE (CABBAGE OR MUSTARD FAMILY)

Brassica oleracea L. var. *capitata* L.

Common Names: English cabbage, head cabbage

Banaban Name: *te kabiti ni Imatang*

Kiribati Name: *te kabiti ni Imatang*

Status: Recent introduction. Europe.

Abundance: Uncommon.

Remarks: Not seen in 2005, but reportedly commonly planted in houseyard vegetable gardens and in food gardens when seeds are available.

Brassica rapa L. subsp. *chinensis*

Synonym: *Brassica chinensis* L. subsp. *chinensis* (L.) Hanelt

Common Names: Chinese cabbage, Chinese white cabbage, pa'ak tsoi

Banaban Name: *te kabiti n Tiana* ("Chinese cabbage")

Kiribati Name: *te kabiti n Tiana*

Status: Recent introduction. Asia.

Abundance: Uncommon and seasonal.

Remarks: Not seen in 2005, but reportedly commonly planted in houseyard vegetable gardens and in food gardens when seeds are available.

Brassica x hybridus "Saladeer"

Common Name: Saladeer hybrid Chinese cabbage

Banaban Name: *te kabiti n Tiana* ("Chinese cabbage")

Kiribati Name: *te kabiti n Tiana*

Status: Recent introduction. Asia.

Abundance: Uncommon.

Remarks: Not seen in 2005, but reportedly commonly planted in houseyard vegetable gardens and in food gardens when seeds are available.

CAPPARIDCEAE (CAPER FAMILY)

Capparis mariana Jacq.

Synonyms: *Capparis cordifolia* Lam.; *C. spinosa* var. *mariana* (Jacq.) K. Schum.

Common Name: Oceanic caper

Status: Indigenous. Micronesia and Polynesia.

Abundance: Occasional to locally common.

Remarks: Seen growing on bare karstified limestone on the tops of limestone terraces and cliffs and at the bases of pinnacles in sandy areas and slightly inland from the coast within coastal pinnacles; one large flowering plant seen on the edge of the cliff above Corcoran's Camp north of the turnoff to Fatima. No reported uses or local names, although some persons may have this information. In Nauru, where it is common, it is known as **ekabobwiya**.

Voucher Photographs: DPBB0237, DPBB0239, DPBB0242, DPBB0277, DPBB0278, DPBB0280, DPBB0281, DPBB0801, DPBB0850, DPBB0851, DPBB0852, DPBB0853, DPBB0854

***Capparis quiniflora* DC.**

Synonym: *C. richii* A. Gray

Banaban Name: *te katama* ("the cat")

Status: Indigenous. Eastern Indonesia (Celebes and Lombok) to Melanesia, Nauru and Banaba.

Abundance: Occasional.

Remarks: Thorny, woody, high-climbing vine, with paired recurved spines, found growing on exposed limestone pinnacles and on a number of buildings and cement water tanks and walls in the main settlement; occasionally seen climbing on *Leucaena leucocephala* and other vegetation. Vine with small recurved thorns used by children to try to catch or "claw" each other with the cat paw-like thorns.

Voucher Photographs: DPBB0332, DPBB0333, DPBB0442, DPBB0442, DPBB0450, DPBB0452, DPBB0453, DPBB0455a, DPBB0457b, DPBB0459a, DPBB0597, DPBB0601

***Cleome ruidosperma* DC.**

Common Names: Fringed spiderflower, purple cleome

Status: Recent introduction. Tropical Africa.

Abundance: Common.

Remarks: Weed with bluish-purple flowers found in houseyard gardens, food gardens, roadsides, trail sides, waste places and other ruderal sites.

Voucher Photographs: DPBB0173, DPBB0322, DPBB0618

***Cleome viscosa* L.**

Common Names: Asian spiderflower, yellow spiderflower, cleome

Status: Recent introduction. Tropical Asia or Old World Tropics.

Abundance: Abundant.

Remarks: Erect, sticky, scarcely branching annual herb with yellow flowers and curved pod-like fruit.

Common weed in cassava gardens, houseyard gardens, roadside, waste places and ruderal sites.

Voucher Photographs: DPBB0041, DPBB0055, DPBB0102, DPBB0174, DPBB0367, DPBB0613, DPBB0614, DPBB0616, DPBB0697b, DPBB0867, DPBB0868a DPBB0886, DPBB0938, DPBB0939, DPBB1026

CARICACEAE (PAPAYA FAMILY)

***Carica papaya* L.**

Common Names: Papaya, pawpaw

Banaban Names: *te babaia*, *te mwemweara*

Kiribati Names: *te babaia*, *te mwemweara*

Status: Recent introduction. Tropical America.

Abundance: Common.

Remarks: Planted fruit tree in household gardens, around food gardens, at various places in settlements and occasionally as a volunteer in mined out sites, around buildings, secondary vegetation and waste places. Fruit eaten ripe and cooked green or unripe as a vegetable and made into jams and chutneys.

An important food plant when the supply boat fails to arrive, but reportedly one of the first plants to die during prolonged droughts (Fosberg et al. 1979; Sigrah and King 2001).
Voucher Photographs: DPBB0076, DPBB0079a, DPBB0430a, DPBB0583a, DPBB0731b, DPBB0975

CASUARINACEAE (CASUARINA FAMILY)

Casuarina equisetifolia L

Synonym: *Casuarina litorea* L. ex Fosberg and Sachet

Common Names: Casuarina, coastal she-oak, ironwood

Banaban Name: *te nokonoko* (from Fijian “nokonoko”)

Kiribati Names: *te burukam* (“blue gum”), *te katiurina* (“casuarina”)

Status: Recent introduction. Indian Ocean to Polynesia and Micronesia.

Abundance: Common.

Remarks: Occasional in household gardens, as a roadside tree, near laborers’ accommodation and as planted windbreaks; particularly common along the ocean coast in the south of the island; occasional as a volunteer in the mined out phosphate areas and on Topside. The name **nokonoko** (the Fijian name) clearly indicates that it was introduced from Fiji.

Voucher Photographs: DPBB0132b, DPBB0326, DPBB0473, DPBB0509, DPBB0659c, DPBB0675, DPBB0786a, DPBB0787a, DPBB0789b DPBB0883b, DPBB0896, DPBB0897, DPBB0928, DPBB0930b, DPBB0941, DPBB0942, DPBB1002a

CLUSIACEAE OR GUTTIFERAE (MANGOSTEEN FAMILY)

Calophyllum inophyllum L.

Common Names: Alexandrian laurel, beach calophyllum, tomano, punai nut

Banaban Name: *te itai*

Kiribati Name: *te itai*

Status: Indigenous. Tropical Africa to eastern Polynesia and Micronesia.

Abundance: Occasional.

Remarks: Large hardwood tree in main settlement and villages and occasionally in unmined and hand-mined areas. As in Nauru, the tree is undoubtedly one of the trees that dominated the pre-phosphate mining forest and woodland of the interior of Banaba. Reportedly still present in the old Te Aka Village site in the north-central part of the island; and “the one tree that could usually withstand the worst of droughts . . . (and) were situated mostly over the crest of the island and survived by sending down long twisting roots in search of water into the moist caverns far below” (Sigrah and King 2001).

In Kiribati, the hard, fine-grained wood is used in canoes, for canoe paddles and in frames of traditional skin-diving goggles; fruits used in children’s games; tissues inside nut crushed and a crude oil extracted, which is spread on sores; juice from roots mixed with water to treat headaches; also used medicinally to treat morning sickness, chicken pox and conjunctivitis; flowers used to perfume coconut oil; skin and outer flesh of the fruit can be eaten; flowers used in garlands. The decayed parts (**te bubu**) of the mature tree accumulated inside the bark of the tree are used by women to scent their coconut oils.

Te itai was evidently very sacred to the early Banabans, the early Te Aka people referring to it as the “ship tree.” Two large trees reportedly grew at a sacred site known as Te Burita, after one of the trees known by the same name, which is also the name of a war canoe in Te Aka legends. The other tree was called Te Itimoa, meaning “first lightening” (Sigrah and King 2001:29). **Te itai** also features in the “Legend of the Swaying Trees Dance” in which a young Te Aka man, who was to marry an Auriaria girl from Tabwewa District, while on his way from Te Aka to Tabwewa to practice a ritual wedding dance, sat down under a **te itai** tree to eat his meal and saw the beautiful swaying of the tree branches around him which reminded him of the ritual dance. Instead of practicing the customary Auriaria wedding dance at the parents’ residence in Tabwewa, he decided to practice his new dance there, imitating the branches of the trees swaying in the breeze. After three days the girl’s parents

inquired where he had been. He explained to them what he had been doing, and they insisted that the dancing trees could not be his tutors and that he must return to Tabwewa for proper practice sessions, although he couldn't understand as he thought he was doing them a special favor (Sigrah and King 2001:53–54). **Te itai** also played an important part in love magic and sorcery (Fosberg et al. 1979).
Voucher Photographs: DPBB0109, DPBB0470, DPBB0580a, DPBB0604, DPBB0620, DPBB0899, DPBB1021

COMBRETACEAE (TERMINALIA FAMILY)

Quisqualis indica L.

Common Name: Rangoon creeper

Status: Recent introduction. Tropical Asia.

Abundance: Uncommon.

Remarks: An erect, climbing shrub, growing into a large woody vine, with fragrant dark pink to light red and white flowers. Planted ornamental seen at one residence near the hospital, one in Tamavua and one in another houseyard garden.

Voucher Photographs: DPBB0433, DPBB0434, DPBB0435, DPBB0478, DPBB1078, DPBB1079, DPBB1080

Terminalia catappa L.

Common Names: Beach almond, Indian almond, Malabar almond

Banaban Name: *te kunikun*

Kiribati Names: *te kunikun* (S. Kiribati), *te ntarine* (N. Gilbert Is.)

Status: Indigenous. Tropical Asia and Australia to Western Polynesia and Micronesia.

Abundance: Common.

Remarks: Medium to large semi-deciduous tree planted in household gardens, at labor accommodation and one of the dominant emergent and tallest trees in the unmined or less disturbed inland and topside forest and regrowth after phosphate mining. Occasional in coastal vegetation on coastal plain and in the inner coastal vegetation among the limestone pinnacles. Mature seeds are eaten raw and one of the only edible wild foods on the island; leaves used to wrap food for cooking in the earthen oven; wood sometimes used in houses and for woodcarving in the past. Young leaves used medicinally to treat sore throats. One of the trees that Banabans specified they wanted compensation for because of their destruction during mining.

Voucher Photographs: DPBB0240b, DPBB0274b, DPBB0460b, DPBB0481, DPBB0528, DPBB0630, DPBB0633b, DPBB0696, DPBB0716b, DPBB0718c, DPBB0739, DPBB0778b, DPBB0820, DPBB0822a, DPBB0823a

Terminalia litoralis Seem.

Synonyms: *Terminalia samoensis* Rechinger by some authors; *Terminalia saffordii* Merr.

Common Name: Beach almond

Banaban Name: *te ukin*

Kiribati Name: *te ukin*

Status: Indigenous. Indonesia to Micronesia and Eastern Polynesia.

Abundance: Uncommon to occasional.

Remarks: One mature tree seen in the inner coastal vegetation on limestone outcrops near the road about 1 km northwest of Fatima Village. Probably misidentified as the sea grape (*Coccoloba uvifera*) in Sigrah and King (2001). Reportedly present in a number of other sites. Reportedly used medicinally in Banaba and a very important medicinal plant in Kiribati and Nauru; roots used in treating mouth sores; part of plant used in a drink to treat coughing blood.

Voucher Photographs: DPBB0268, DPBB0269

CONVOLVULACEAE (MORNING-GLORY FAMILY)

Ipomoea batatas (L.) Lam.

Common Names: Sweet potato, kumara

Banaban Name: *te kumara*

Kiribati Name: *te kumara*

Status: Recent introduction. Tropical America.

Abundance: Occasional.

Remarks: Food plant occasionally found in food gardens and houseyard gardens in settlements. Cook tubers eaten; cooked leaves edible and fed to pigs; important in times of food shortage when the supply boat fails to arrive.

Voucher Photograph: DPBB0064

Ipomoea pes-caprae Roth

Synonym: *Ipomoea pes-caprae* var. *brasiliensis* (L.) A. St.-Hil.

Common Names: Beach morning-glory, goat-foot beach morning-glory

Banaban Name: *te ruku*

Kiribati Names: *te ruku*, *te ruku ni maeao*

Status: Indigenous. Pantropical.

Abundance: Common.

Remarks: Vigorous creeping vine which is dominant in coastal vegetation in sandy sites to the east of the main settlement, on open sites on the outer limestone terraces and escarpment; also common along roadsides in settlements, at the main harbor, in cemeteries, waste places and other ruderal sites. In Kiribati, the leaves and stems used to treat dandruff; stems mixed with coconut oil for treating boils; leaves mixed with water to treat dysentery; leaves washed in oil applied directly to wounds. Reported present by Fosberg, Sachet and Oliver (1979).

Voucher Photographs: DPBB0140, DPBB0216, DPBB0222, DPBB0524, DPBB0530a, DPBB0531, DPBB0704, DPBB0798a, DPBB0840, DPBB0871, DPBB0874, DPBB0990a, DPBB1049

Ipomoea violacea L.

Synonyms: *Ipomoea macrantha* Roem. and Schult; *Ipomoea tuba* (Schltdl.) G. Don

Common Names: Wild moon flower, white morning-glory

Banaban Name: *te ruku*

Kiribati Name: *te ruku*

Status: Indigenous. Pantropical.

Abundance: Occasional.

Remarks: Occasional climbing vine or liana with bright white night-blooming morning-glory-like flowers in coastal limestone terrace vegetation, in inner coastal forest and sometimes in regenerating vegetation on mined-out phosphate lands. In Kiribati, the stems and leaves are crushed in water and used as a shampoo, which is used in a concentrated form to treat lice; a preparation of the leaves is used to treat vomiting of blood; also reported to have aphrodisiacal properties.

Voucher Photographs: DPBB0275, DPBB0279a

CUCURBITACEAE (MELON FAMILY)

Citrullus lanatus (Thunb.) Matsum. and Nakai

Synonym: *Citrullus vulgaris* Schrad. ex Eckl. and Zeyh.

Common Name: Watermelon

Banaban Name: *te meren* ("melon")

Kiribati Name: *te meren*

Status: Recent introduction. Southern Africa.

Abundance: Occasional.

Remarks: Food plant seen in only one garden in Tamavua in 2005. Reportedly occasionally planted on the island as a food crop in houseyard and food gardens. Unspecified melons reportedly grown by Banabans in 1851 at the time of the visit of the Australian ship, *Wanderer* (Maude and Maude 1994).
Voucher Photograph: DPBB0596

***Cucumis melo* L.**

Synonym: *Cucumis melo* L. var *cantalupensis* Naud.

Common Name: Cantaloupe

Banaban Name: *te meren* (“melon”)

Kiribati Name: *te meren*

Status: Recent introduction. Southwest Asia, and possibly Africa, to the Mediterranean.

Abundance: Uncommon.

Remarks: Not seen in 2005, but reportedly planted occasionally in houseyard food gardens.

***Cucumis sativus* L.**

Common Name: Cucumber

Banaban Name: *te kiukamba* (“cucumber”)

Kiribati Name: *te kukamba*

Status: Recent introduction. North India.

Abundance: Uncommon.

Remarks: Seen in only one houseyard garden in 2005, but reportedly occasionally planted in houseyard and food gardens. Fruit produced on the island eaten during stay on the island.

***Cucurbita pepo* L.**

Common Name: Pumpkin

Banaban Name: *te bangketi*

Kiribati Names: *te baukin*, *te banke* (“pumpkin”)

Status: Recent introduction. Tropical America.

Abundance: Common.

Remarks: Common food plant in food gardens, houseyard gardens and waste places; often adventive in waste places around villages and buildings in settlements. An important supplementary staple food and vegetable in times of food shortage when the supply boats have not come. Pumpkins reportedly grown by Banabans in 1851 at the time of the visit of the Australian ship *Wanderer*, and along with coconuts and fish among the foods provided to reprovision the ship (Maude and Maude 1994).

Voucher Photographs: DPBB0291, DPBB0397, DPBB0526

EUPHORBIACEAE (SPURGE FAMILY)

***Acalypha lanceolata* Willd.**

Synonym: *A. boehmerioides* Miq.

Status: Recent Introduction. Indigenous to the Old World tropics, and possibly an aboriginal introduction into Fiji.

Abundance: Uncommon.

Remarks: Seen as a weed in old un-maintained gardens along the path from the main road to the Old Club House and on the opposite side of the road along a cement pathway to residence below.

Voucher Photographs: DPBB0360, DPBB0361, DPBB0958b, DPBB0959

***Acalypha wilkesiana* Müll.-Arg.**

Synonym: *Acalypha amentacea* Roxb. subsp. *wilkesiana* (Müll.-Arg.) Fosb.

Common Names: Joseph's coat, copper leaf, beefsteak plant

Banaban Name: *te toara*

Kiribati Name: *te aronga*

Status: Recent introduction. Melanesia.

Abundance: Occasional.

Remarks: Planted ornamental and hedge plant with red leaves found in houseyard and village gardens.

Voucher Photograph: DPBB0164

Acalypha wilkesiana f. *circinata* Müll. Arg.

Synonyms: *Acalypha hamiltoniana* Bruant; *Acalypha amentacea* f. *circinata* (Müll. Arg.) Fosberg

Common Name: Picottee acalypha

Banaban Name: *te toara*

Kiribati Name: *te aronga*

Status: Recent introduction. Pacific Islands.

Abundance: Uncommon.

Remarks: Planted ornamental with green cupped leaves with toothed white margins seen in a number of houseyard gardens; sometimes planted as a hedge; leaves uncommonly used in body ornamentation.

Voucher Photographs: DPBB0081, DPBB0400, DPBB0921

Cnidoscolus chayamansa McVaugh

Common Names: Chaya, tree spinach

Banaban Name: *te tiaia* ("chaya")

Kiribati Name: *te tiaia*

Status: Recent introduction. Mexico.

Abundance: Occasional.

Remarks: Food plant in household gardens and along roadsides in settlements. Introduced into Kiribati the early 1990s as part of the European Community Pacific Regional Agricultural Project (PRAP) program for atolls. Now firmly established as a nutritious green vegetable plant throughout the atolls; one of the few recent introductions that seems to be well-suited to the atoll environment.

Voucher Photographs: DPBB0497, DPBB0498, DPBB0980

Euphorbia atoto G. Forst.

Synonyms: *Chamaesyce atoto* (G. Forst.) Croizat; *Euphorbia chamissonis* (Kl. and Garcke) Boiss.

Common Name: Beach spurge

Banaban Name: *te tarai*?

Kiribati Name: *te tarai*

Status: Indigenous. Tropical Pacific.

Abundance: Occasional.

Remarks: Spreading small sub-shrub on sandy beaches seen in the herbaceous coastal strand vegetation to the east of the main settlement on beaches on the southeast of the island. In Kiribati, the plant is used as a purgative; the milky latex is collected in the shell of **te koikoi** (*Asaphis violascens*), mixed with the juice of a green coconut (**moimoto**) and administered to people who have been saved from drowning to make them vomit out the salt water they have swallowed; also said to have been used as an abortifacient.

Voucher Photographs: DPBB0226, DPBB0232, DPBB0233

Euphorbia cyathophora Murray

Synonym: *Euphorbia heterophylla* sensu auct. non L.

Common Names: Mexican fire plant, hypocrite plant, dwarf poinsettia, painted spurge

Banaban Name: *te kabekau* ("painted lady," "prostitute")

Kiribati Name: *te kabekau*

Status: Recent introduction. Tropical America.

Abundance: Occasional.

Remarks: Weed with bright scarlet flower bracts and milky sap. Found along roadsides, along paths throughout the mined-out phosphate lands, food gardens, cemeteries and waste places. Leaves sometimes used in garlands.

Voucher Photographs: DPBB0115, DPBB0432, DPBB0615, DPBB0697a, DPBB0839, DPBB1039, DPBB1040

***Euphorbia hterophylla* L.**

Synonym: *Euphorbia geniculata* Ortega

Common Names: Milkweed, wild spurge

Status: Recent introduction. Texas, Mexico and the W. Indies.

Abundance: Common.

Remarks: Found as a weed of roadsides, waste places, houseyard gardens and food gardens. Erect annual herb similar in appearance to *E. cyathophora*, but with light-green, instead of bright scarlet, floral bracts.

Voucher Photographs: DPBB0056, DPBB0057, DPBB0868b, DPBB0891, DPBB0935a, DPBB0936

***Euphorbia hirta* L.**

Synonym: *Chamaesyce hirta* (L.) Millsp.

Common Names: Garden spurge, asthma plant, hairy spurge, old blood

Kiribati Name: *te tarai*

Status: Recent introduction. Pantropical.

Abundance: Abundant.

Remarks: Weed in waste places, open areas, roadsides, cemeteries, houseyard gardens, and food gardens.

Voucher Photographs: DPBB0044a, DPBB0188, DPBB0404c

***Euphorbia hypericifolia* L.**

Synonym: *Chamaesyce hypericifolia* (L.) Millsp.

Common Name: Graceful spurge

Kiribati Name: *te tarai*

Status: Recent introduction. Tropical America.

Abundance: Uncommon.

Remarks: Seen in only a couple of roadside and ruderal sites.

***Euphorbia prostrata* Aiton**

Synonym: *Chamaesyce prostrata* (Ait.) Small

Common Name: Prostrate spurge

Kiribati Names: *te tarai*, *te amerika* ("America," an old name, probably so named because it is believed that the American troops introduced it during WWII)

Status: Recent introduction. Tropical America.

Abundance: Occasional.

Remarks: Weed along paths, roadsides and in houseyard gardens and dry ruderal sites.

Voucher Photographs: DPBB0189, DPBB0403a, DPBB0404a DPBB0841

***Euphorbia thymifolia* L.**

Synonym: *Chamaesyce thymifolia* (L.) Millsp.

Common Name: Thyme-leafed spurge

Kiribati Name: *te tarai*

Status: Recent introduction. India.

Abundance: Common.

Remarks: Weed along roadsides, in ruderal sites and in houseyard gardens. More common than *E.*

prostrata and is a more recent introduction that may be replacing it in roadside and disturbed habitats.

Voucher Photographs: DPBB0044b, DPBB0403b, DPBB0404b, DPBB0909, DPBB1023, DPBB1024

Manihot esculenta Crantz

Common Names: Cassava, manioc, tapioca

Banaban Name: *te tabioka* (“tapioka”)

Kiribati Name: *te tabioka*

Status: Recent introduction. Tropical America.

Abundance: Abundant.

Remarks: Food plant in food gardens, houseyard gardens, and in small plots between mined out pinnacles and other available sites with soil. Reportedly the main staple on the island throughout most the year, especially when the supply boats do not arrive. The importance of cassava is reportedly due greatly to its familiarity to the Banabans who have lived on Rabi Island in Fiji or elsewhere in Fiji, where most of the original inhabitants and their descendents now live. The tubers are boiled, baked and roasted as a staple food, fed to pigs and grated to make into starch and puddings.

Voucher Photographs: DPBB0085, DPBB0117b, DPBB0202a, DPBB0311, DPBB0374, DPBB0384, DPBB0465, DPBB0483, DPBB0485, DPBB0486, DPBB0505a, DPBB0565, DPBB0610, DPBB0611, DPBB0804, DPBB0859, DPBB0888, DPBB0954a, DPBB0956, DPBB0955, DPBB0958a

Pedilanthus tithymaloides (L.) Poit.

Common Names: Slipper flower, shoe spurge, red-bird cactus

Status: Recent introduction. Caribbean.

Abundance: Uncommon.

Remarks: One large adventive green-leaved population seen spreading just to the east of the abandoned Chinese housing above the harbor. Normally as planted as an ornamental and hedge plant.

Voucher Photographs: DPBB0681, DPBB0682, DPBB0683

Phyllanthus amarus Schumach. and Thonn.

Synonym: *Phyllanthus niruri* L.

Common Names: Sleeping plant, six-o'clock, stonebreaker

Banaban Name: *te kaimatu* (“sleeping plant”)

Kiribati Name: *te kaimatu*

Status: Recent introduction. Africa.

Abundance: Abundant.

Remarks: Weed of food gardens, houseyard gardens, roadsides, waste places and other ruderal sites; one of the most common herbaceous weeds on Banaba.

Voucher Photograph: DPBB0584

Phyllanthus societatis Müll. Arg.

Status: Indigenous. Polynesia and Micronesia.

Abundance: Occasional.

Remarks: Erect, or half-erect, rarely branching shrub with simple but appearing pinnately compound leaves.

Found as scattered individuals in unmined areas to the southwest of Fatima on the inner portions of the limestone terraces and occasionally in the understory vegetation in the mined out areas on the northern part of the island. Also seen in similar habitats on Nauru and reportedly present on the phosphatic limestone island of Makatea in the Tuamotu Archipelago in French Polynesia. Known in Nauru as **ewemangemang**, but no known name on Banaba.

Voucher Photographs: DPBB0270b, DPBB0273, DPBB0806, DPBB0807, DPBB0814a, DPBB1068, DPBB1069, DPBB1070

Ricinus communis L.

Common Names: Castor bean, castor oil plant

Kiribati Name: *te katia*

Status: Recent introduction. Africa.

Abundance: Common.

Remarks: Shrubby weed of roadsides, waste places and ruderal sites around abandoned buildings. Seeds very poisonous.

Voucher Photographs: DPBB0320a, DPBB0327 DPBB0835a DPBB0836, DPBB1081

FABACEAE (PEA FAMILY)

Acacia farnesiana (L.) Willd.

Common Names: Sweet acacia, West Indian blackhorn, cassie flower

Banaban Name: *te kai bakoa* (“shark tree,” possibly because of the sharp thorns)

Kiribati Name: *te kai bakoa*

Status: Recent introduction. Tropical America.

Abundance: Rare.

Remarks: One small population seen in a small thicket near the open area along the road near the stockpile and close to the entrance to the path to the dynamite store and the entrance to the underground water source (**bangabanga**). Reportedly much more common in the past in Banaba, Nauru and Kiribati, but now existing as a remnant. Large shrub with sharp thorns and fragrant yellow flowers that are used in garlands.

Voucher Photographs: DPBB0640, DPBB0641, DPBB0642, DPBB0643, DPBB0644

Alysicarpus vaginalis (L.) DC.

Common Names: Alysicarpus, one-leaved clover

Status: Recent introduction. Paleotropics.

Abundance: Occasional.

Remarks: More or less prostrate, somewhat spreading herb, with jointed stems and prominent pinkish flowers and jointed pods. Weed along roadsides and in waste places and in the turf at the Tabiteuea Sports Ground on Topside.

Voucher Photographs: DPBB0518, DPBB0904, DPBB0940

Bauhinia monandra Kurz

Common Names: Pink bauhinia, orchid tree, pink butterfly tree, St. Thomas tree

Status: Recent introduction. Burma.

Abundance: Rare.

Remarks: A single mature, flowering tree seen in the front yard of Banaba House above the main harbor.

Voucher Photographs: DPBB0406, DPBB0407, DPBB0967

Caesalpinia bonduc (L.) Roxb.

Common Names: Beach nicker, gray nickers, wait-a-bit

Kiribati Names: *te bunikai* (“eggs of the blackbird”), *te rato* (“contents of the testicles”)

Status: Indigenous. Pantropical.

Abundance: Uncommon.

Remarks: Large thorny shrub with yellow flowers and prickly testicle-like seed pods containing glossy grey seeds. Seen in one very large population spreading along the trail leading from the large cemetery on topside to the coast on the northeast of the island.

Voucher Photographs: DPBB0715, DPBB0716a, DPBB0717, DPBB0718a, DPBB0719, DPBB0720

Canavalia cathartica Thouars

Synonym: *Canavalia microcarpa* (DC.) Piper

Common Name: Purple beach pea

Banaban Name: *te kitoko*

Kiribati Name: *te kitoko*

Status: Indigenous. Pantropical.

Abundance: Rare.

Remarks: One seen growing along a road near the pinnacle monument to phosphate mining in the mined out area. Occasional on Nauru. Voucher photograph lost.

Cassia grandis L.f.

Common Names: Pink shower tree, horse cassia

Status: Recent introduction. Central America.

Abundance: Uncommon.

Remarks: Two large, non-flowering trees seen in houseyard gardens at a residence below the Club House in the main settlement and in Fatima Village to the left of the Catholic Church.

Voucher Photographs: DPBB0195, DPBB0196, DPBB1006a, DPBB1007

Crotalaria pallida Aiton

Common Names: Rattlepod, smooth rattlepod

Banaban Name: *te kai kinango* (“ant plant”)

Status: Recent introduction. Tropical Africa, but now found throughout the tropics.

Abundance: Occasional.

Remarks: Erect subshrub with yellow flowers, alternate, trifoliate leaves and beaked pods. Weed of roadsides, trail sides and waste places, roadsides and other ruderal sites.

Voucher Photographs: DPBB0135, DPBB0288, DPBB0289, DPBB0290, DPBB0428, DPBB0654, DPBB1030, DPBB1031

Delonix regia (Bojer ex Hook.) Raf.

Common Names: Poinciana, flame tree, flamboyant

Banaban Names: *te tua* (“government”), *te kai tetua*

Kiribati Names: *te tua*

Status: Recent introduction. Madagascar.

Abundance: Abundant.

Remarks: Medium-sized spreading tree with broad plank-like buttresses, grey bark, frond-like compound leaves and bright orange-scarlet orchid-like flowers. Planted ornamental tree along roadsides, in houseyard gardens, around buildings and adventive in some ruderal habitats and mined out areas on Nauru near the main settlements. Bright orange-scarlet and white flowers used in garlands and flower arrangements. Reported present by Fosberg, Sachet and Oliver (1979).

Voucher Photographs: DPBB0145, DPBB0146, DPBB0147a, DPBB0148, DPBB0151, DPBB0162a, DPBB0206a, DPBB0448, DPBB0449, DPBB0456b, DPBB0525b, DPBB0580b, DPBB0600a, DPBB0603b, DPBB0680, DPBB0703a, DPBB0882b, DPBB0908, DPBB0923a, DPBB0925, DPBB0972, DPBB0973, DPBB0974, DPBB1113, DPBB1114

Derris trifoliata Lour.

Common Names: Beach derris root, beach poison vine

Banaban Name: *te obu*

Status: Indigenous from tropical Africa to Polynesia.

Abundance: Extirpated?

Remarks: Possibly present in the past, but not seen in 2005 and only tentatively identified as “**te obu**,” a plant unidentified in Sigrah and King (2001), with “roots (that) stun fish.” Also reported without a name from Nauru as uncommon in forest on cliffs and on steep slopes of the escarpment the early 1980s but not seen in 2007 (Thaman et al. 1994; Thaman et al. 2008a, 2008b).

Desmodium triflorum (L.) DC.

Common Names: Tropical trefoil, three-flowered beggarweed

Status: Recent introduction. Pantropical.

Abundance: Abundant.

Remarks: Diminutive prostrate freely-branching perennial creeping herb, commonly forming a thick mat, with alternate, trifoliate, clover-shaped leaves and pale or rich purple-pink flowers. Weed in gardens, lawns, along roadsides, in sunny and shaded ruderal habitats on plateau; often seen as an almost carpet-like herb land, such as on topside near the stockpile; sometimes found in mined out areas. Possibly deliberately introduced as a green manure and cover crop.

Voucher Photographs: DPBB0053, DPBB0054b, DPBB0104, DPBB0111b, DPBB0646, DPBB0647, DPBB1036, DPBB1037

Gliricidia sepium (Jacq.) Kunth ex Walp.

Common Names: Gliricidia, mother of cocoa, Mexican lilac, quick stick

Status: Recent introduction. Central and northern South America.

Abundance: Common.

Remarks: Pink-flowered ornamental tree planted in houseyard gardens, as a roadside tree and occasionally in or near rural gardens areas. Reportedly first planted in the late 1940s by a British administrator.

Voucher Photographs: DPBB0160, DPBB0200, DPBB0706

Leucaena leucocephala (Lam.) de Wit

Synonym: *Leucaena glauca* Benth.

Common Names: Leucaena, leadtree, white popinac, wild tamarind

Banaban Name: *te waiwai* ("vaivai," the Fijian name)

Kiribati Name: *te kai tetua*

Status: Recent introduction. Southern Mexico and Central America.

Abundance: Very abundant.

Remarks: A thornless erect shrub or small tree with bipinnate compound leaves, numerous small globose white flowers and pods with dark-brown shiny seeds. The dominant invasive plant in many of the mined out sites on the northern part of the island. Found in fallow areas, in food garden lands and as a weedy plant in disturbed sites throughout the island; also occasionally found in the inner coastal vegetation and on limestone terraces. Reported by Catala (1957) to have been introduced from Fiji into Kiribati and planted in 1951.

Voucher Photographs: DPBB0094b, DPBB0116b, DPBB0159, DPBB0162b, DPBB0202b, DPBB0261b, DPBB0296, DPBB0310b, DPBB0458, DPBB0459b, DPBB0468, DPBB0490, DPBB0494, DPBB0504, DPBB0505b, DPBB0525, DPBB0600b, DPBB0607, DPBB0694, DPBB0702b, DPBB0703b, DPBB0721, DPBB0726, DPBB0727, DPBB0728, DPBB0729, DPBB0731a, DPBB0809a, DPBB0895c, DPBB0900b, DPBB0932, DPBB0935b, DPBB0948, DPBB0954b, DPBB0982, DPBB0991a, DPBB0997b, DPBB1061

Millettia pinnata (L.) Panigrahi

Synonym: *Pongamia pinnata* (L.) Pierre.

Common Names: Beach walnut, pongam

Status: Indigenous from the Indian Ocean to Fiji and Samoa and into the large islands of Micronesia and Banaba.

Abundance: Common.

Remarks: Occasional in coastal limestone terrace and escarpment forest, often just inland from the coastal littoral vegetation; one of the main dominant species in secondary forest in mined-out areas in the pinnacles and in the unmined and hand-mined areas to the north of Fatima Village on the northwest part of the island. Although probably indigenous, it was not found present in Nauru and could possibly have been introduced from Fiji were it is a common and culturally valuable species for medicinal purposes.

Voucher Photographs: DPBB0108, DPBB0112, DPBB0113, DPBB0114, DPBB0117a, DPBB0261a, DPBB0471, DPBB0564, DPBB0635b, DPBB0693, DPBB0707, DPBB0750, DPBB0855

***Mimosa pudica* L.**

Common Name: Sensitive plant

Banaban Name: *te kai matu* (“sleeping plant”)

Kiribati Name: *te kai matu*

Status: Recent introduction. Tropical America.

Abundance: Occasional.

Remarks: Weed of roadsides, trail sides, houseyard gardens and ruderal sites.

Voucher Photograph: DPBB0058

***Mucuna gigantea* (Willd.) DC.**

Banaban Name: *te kiri teniba*

Status: Indigenous. Africa and Indian Ocean islands to India and China and eastward in the Pacific to the Society Islands and Hawai’i.

Abundance: Common.

Remarks: Very abundant in the area around the phosphate processing (decalcination) plant where it dominates the entire landscape and festoons the large trees and other vegetation; occasional in a number of other places climbing in trees in the inland vegetation.

Voucher Photographs: DPBB0149, DPBB0318, DPBB0320b, DPBB0323, DPBB0324, DPBB0930a, DPBB1062

***Peltophorum pterocarpum* (DC.) Backer ex K. Heyne**

Common Names: Yellow poinciana, copperpod, golden flamboyant, yellow flame tree

Status: Recent introduction. Malaysia to Northern Australia.

Abundance: Rare.

Remarks: Medium-sized, broad-crowned tree, with bipinnate leaves, bright yellow flowers and copper-colored, red-brown or brown pods. Single large tree seen along road just to the west of the Tabiteuea Sports Ground.

Voucher Photographs: DPBB0625, DPBB0626, DPBB0627

***Senna occidentalis* (L.) Link**

Synonym: *Cassia occidentalis* L.

Common Names: Coffee senna, arsenic bean

Kiribati Names: *te ang*, *te bin*

Status: Recent introduction. Tropical America.

Abundance: Abundant.

Remarks: Common weed of roadsides, trail sides, houseyard gardens and waste places and ruderal sites.

Voucher Photographs: DPBB0050, DPBB0869

***Sophora tomentosa* L.**

Common Names: Silverbush, necklace pod

Banaban Name: *te kirimoua*

Kiribati Names: *te nikamatutu*, *te kaimatu*

Status: Indigenous. Indian Ocean to eastern Polynesia and Micronesia.

Abundance: Common.

Remarks: Bush with silvery-grey leaves, yellow flowers and necklace-like seed pods. Locally common to abundant in the inner coastal littoral vegetation to the east of the main settlement and in a number of other areas of disturbed vegetation, such as bordering the Tabiteuea Sports Ground on topside.

Reportedly introduced to Tarawa in Kiribati from Onotoa Atoll as an indigenous nitrogen-fixing tree.

Voucher Photographs: DPBB0123, DPBB0122, DPBB0217b, DPBB0223b, DPBB0225a, DPBB0529, DPBB0534, DPBB0535, DPBB0536

GOODENIACEAE (NAUPAKA FAMILY)

Scaevola taccada (Gaertn.) Roxb.

Synonym: *Scaevola sericea* Vahl

Common Names: Beach saltbush, half-flower

Banaban Name: *te mao*

Kiribati Name: *te mao*

Status: Indigenous. Tropical Asia to Hawaii.

Abundance: Common.

Remarks: An important component of the coastal strand vegetation on flatter sandier stretches of the coast and occasional on limestone terraces and headlands and in the mined-out pinnacle vegetation. Also occasional in houseyard gardens, in settlements and in some ruderal sites; forms thickets that protect coastlines from wave erosion. Flowers used in garlands; and in Kiribati fruits used in traditional magic; juice of fruit applied directly to sore eyes and used as a drink to induce abortion; branches sometimes used for roofing strips; stem tips used with water as an astringent. Two varieties exist, a white-flowered and a white-flowered with a purplish centers of the petals. Reported present by Fosberg, Sachet and Oliver (1979).

Voucher Photographs: DPBB0225c, DPBB0231b, DPBB0244, DPBB0246, DPBB0248, DPBB0249, DPBB0548b, DPBB0669, DPBB0735, DPBB0737, DPBB0738, DPBB0824b DPBB0832c DPBB0834, DPBB0989, DPBB1001

LAMIACEAE OR LABIATAE (MINT FAMILY)

Ocimum basilicum L.

Common Names: Basil, sweet basil

Banaban Name: *te namori* (from the Fijian “tamole”)

Kiribati Name: *te marou*

Status: Recent introduction. Africa to Pacific Islands (Paleotropics).

Abundance: Rare.

Remarks: Reportedly much more common in the past. Planted in houseyard gardens. Leaves used in garlands and to scent coconut oil.

Ocimum tenuiflorum L.

Synonym: *Ocimum sanctum* L.

Common Names: Sacred basil, holy basil

Banaban Name: *te namori* (from the Fijian “tamole”)

Kiribati Name: *te marou*

Status: Aboriginal introduction. Pantropical.

Abundance: Uncommon.

Remarks: One single plant seen in houseyard garden at the residence just above Banaba House. Leaves used in garlands and to scent coconut oil. Reportedly much more common in the past.

Voucher Photographs: DPBB0585, DPBB0586

LAURACEAE (LAUREL FAMILY)

Cassytha filiformis L.

Common Names: Laurel dodder, beach dodder; devil's twine

Banaban Name: *te ntanini*

Kiribati Name: *te ntanini*

Status: Indigenous. Pantropical.

Abundance: Occasional to locally common.

Remarks: Leafless light-green to yellow-orange parasitic vine. Parasite on other plants, generally on natural vegetation; found in inner coastal strand vegetation and in some sites to the southwest of Fatima. In Kiribati, the slightly acidic fruit sometimes eaten by children; dried stems sometimes used in **riri** (dancing skirts) or as garlands; crushed stem used to treat jellyfish stings. Reported present by Fosberg, Sachet and Oliver (1979).

Voucher Photographs: DPBB0212, DPBB0219, DPBB0225b, DPBB0231a

LECYTHIDACEAE (BRAZILNUT FAMILY)

Barringtonia asiatica (L.) Kurz

Common Names: Fish-poison tree, barringtonia

Banaban Name: *te baireati*

Kiribati Names: *te baireati*, *te bairiati*, *te uti* (N)

Status: Indigenous. Indo-Pacific.

Abundance: Occasional.

Remarks: Large trees seen in lower escarpment vegetation on the eastern coast of the island and in a number of sites in the limestone terrace and karstified pinnacles just inland from the coast. There is one large tree behind the canoe shed in the main boat harbor and one on the coast above the main beach. A number of drift seedlings were seen in the coastal littoral vegetation to the east of the main settlement. No uses were known for this tree, although the seeds are used as a fish poison in many parts of the Pacific.

Voucher Photographs: DPBB0227, DPBB0236a, DPBB0861, DPBB0862, DPBB0863, DPBB0864, DPBB0865, DPBB0866, DPBB1002b, DPBB1003

LOGANIACEAE (STRYCHNINE FAMILY)

Polypremum procumbens L.

Common Name: Polypremum

Status: Recent introduction. America.

Abundance: Occasional.

Remarks: Prostrate spreading herb with needlelike leaves and small white flowers found in moist areas on rocky limestone soil along roadsides and ruderal sites.

LYTHRACEAE (LOOSESTRIFE FAMILY)

Pemphis acidula J. R. Forst. and G. Forst.

Common Names: Pemphis, small-leaved mangrove

Banaban Name: *te ngea*

Kiribati Name: *te ngea*

Status: Indigenous. Tropical East Africa to southeastern Polynesia and Micronesia.

Abundance: Very abundant.

Remarks: Dominant species on the seaward margins of most of the coastal limestone terraces and cliffs that encircle the island; small, almost mono-specific, groves occur on rocky limestone outcrops. One of the most useful trees in the traditional economy of Banaba because of its hard, durable wood. Leaves reportedly mixed with a special coconut oil used in the traditional Banaban embalming process (Sigrah and King 2001). In Kiribati, the roots are used medicinally to treat post-partum hemorrhage; hardwood used in canoe parts, particularly for connectives, pipes for smoking, coconut huskers, fish hooks, digging sticks, combs, war clubs, and eel traps; the rotted heartwood of some trees that are diseased or dead, known as **te ngea arabo** (which is considered rare) is used to scent coconut oil. Reported present by Fosberg, Sachet and Oliver (1979).

Voucher Photographs: DPBB0210, DPBB0230, DPBB0240a, DPBB0271, DPBB0298, DPBB0527, DPBB0545, DPBB0548a, DPBB0549, DPBB0740, DPBB0748a, DPBB0750, DPBB0752a,

DPBB0755, DPBB0778a, DPBB0784b, DPBB0785, DPBB0786b, DPBB0791, DPBB0792,
DPBB0793, DPBB0794, DPBB0795

MALVACEAE (MALLOW FAMILY)

Abelmoschus manihot (L.) Medik.

Synonym: *Hibiscus manihot* L.

Common Names: Bush hibiscus spinach, edible hibiscus, pele

Banaban Names: *naimbere* (from Fijian “bele”), *naimbere keang*

Kiribati Names: *nambere*, *te bere*

Status: Recent introduction. Tropical Asia.

Abundance: Common.

Remarks: Found in houseyard gardens and food gardens and planted near Banaba Junior Secondary School and labor housing. An important green vegetable or spinach on the island. Food plant presumably introduced by from Fiji, where it is known as bele; there is also a variety with longer, thinner, finger-like wavy-edged lobed leaves introduced from the Solomon Islands, known as *naimbere keang* because of the resemblance of its leaves to the leaves of **te keang**, the scented fern (*Microsorium grossum*). In Banaba, the rest of Kiribati and Nauru the plant has at various times been promoted as a nutritious leafy green vegetable to address problems of vitamin A and iron deficiency.

Voucher Photographs: DPBB0377, DPBB0378, DPBB0590, DPBB0978

Abutilon indicum (L.) Sweet

Synonym: *Abutilon asiaticum* (L.) Sweet.

Common Names: Indian abutilon, Indian mallow

Banaban Name: *te kaura*

Kiribati Name: *te kaura n Banaba* (“Banaba kaura”)

Status: Indigenous. Southeast Asia to the Pacific Is.

Abundance: Occasional.

Remarks: Erect velvety-pubescent subshrub, with lobed downy gray-green leaves and small hibiscus-like orange-yellow flowers and flattened, wheel-like circular fruits. Found along roadsides and path sides in disturbed sites; particularly common along the dirt road leading to the northwestern part of the island from the turnoff to Fatima Village. As in Nauru, it was probably among pioneering weeds in disturbed sites in topsoil in areas recently cleared (“developed”) for phosphate mining. Tender stems used in Nauru to scent coconut oil; flowers used in garlands and headbands. Reported present on Tarawa by Fosberg et al. (1979), but not seen on Tarawa by the senior author since 1984. The Kiribati name indicates that it was introduced to Tarawa from Banaba where it was reportedly very common. It is a threatened plant in Nauru where it is known and **ekaura** or **inen ekaura**. Reported present by Fosberg, Sachet and Oliver (1979).

Voucher Photographs: DPBB0203, DPBB0204, DPBB0205, DPBB0257, DPBB0258, DPBB0284
DPBB0285, DPBB0286, DPBB0287 DPBB0295, DPBB0532, DPBB0724, DPBB0725, DPBB0800,
DPBB0810, DPBB0824a, DPBB1013, DPBB1014

Hibiscus rosa-sinensis L.

Common Names: Hibiscus, red hibiscus, China rose

Banaban Name: *te roti* (“rose”)

Kiribati Name: *te roti*

Status: Recent introduction. Tropical Asia.

Abundance: Common.

Remarks: Planted ornamental in houseyard gardens, around settlements, along roadsides, and occasionally in graveyards. Flowers used in body ornamentation and in flower arrangements. *Hibiscus* hybrids reported present by Fosberg, Sachet and Oliver (1979).

Voucher Photographs: DPBB0082a, DPBB0342, DPBB0577, DPBB1045, DPBB1046, DPBB1047

Hibiscus schizopetalus (Dyer) Hook. f.

Common Names: Coral hibiscus, dragon flower

Banaban Name: *te roti* ("rose")

Kiribati Name: *te roti*

Status: Recent introduction. East Africa.

Abundance: Rare.

Remarks: Shrub with hibiscus-like pink and white to coral-red flowers with deeply dissected petals. A single planted ornamental seen next to the health centre at the old hospital.

Voucher Photographs: DPBB0086, DPBB0087, DPBB0088, DPBB1048

Hibiscus tiliaceus L.

Common Names: Beach hibiscus, beach mallow, hibiscus tree

Banaban Name: *te kiaiai*

Kiribati Names: *te kiaiai*, *te rau* (N. Gilbert Is.)

Status: Indigenous, but possibly introduced to the island. Pantropical.

Abundance: Occasional.

Remarks: A number of large trees seen near the main settlement, around buildings just behind the boat harbor; occasional in coastal inland forest bordering dirt road to the west of Fatima and in a number of other secondary forests. In Kiribati, the retted bast fiber used to make dancing skirts (**riiri**); branches sometimes used in outrigger booms; straight young stems or branches used to make fishing poles; flowers used in garlands; leaves used as mulch in taro pits and to wrap food and cover the earthen oven.

Voucher Photographs: DPBB0998, DPBB0999, DPBB1000

Malvastrum coromandelianum (L.) Garcke

Common Names: Broom weed, false mallow, clock plant

Status: Recent introduction. Central America to southern United States.

Abundance: Occasional.

Remarks: Weed of trail sides, roadsides, lawns, waste places and ruderal sites.

Voucher Photographs: DPBB0069, DPBB0924

Sida acuta Burm. f.

Common Names: Spiny-headed sida, broom weed

Status: Recent introduction. Pantropical.

Abundance: Abundant.

Remarks: Freely-branching perennial subshrub, up to 1 m tall, with slender stems, a strong taproot and yellow flowers. Common weed of roadsides, trail sides, waste places and other ruderal sites. Reported present by Fosberg, Sachet and Oliver (1979).

Voucher Photographs: DPBB0051, DPBB0125, DPBB0405, DPBB1084, DPBB1085

Sida fallax Walp.

Common Name: Ilima (Hawaii)

Banaban Name: *te kaura*

Kiribati Name: *te kaura*

Status: Indigenous. Indo-Pacific.

Abundance: Extirpated?

Remarks: Small downy, often almost prostrate, shrub, up to 50 cm high, with scalloped-edged, glaucous (greyish), downy leaves and light yellow to rich orange flowers and a wheel-like fruit. Reported present by Fosberg, Sachet and Oliver (1979), but not seen in 2005. Found in the past but now rare or extirpated in Nauru, where it used to be found on the coastal strip and in areas cleared recently for phosphate mining. Unopened flower buds used, after soaking in coconut oil to retard their opening and make them last, to make headbands and necklaces worn by dancers and sportsmen during special occasions in

Nauru; used in chiefly head garlands and leis for special occasions in Kiribati; dried and treated leaves used in Kiribati as a very strong fertilizer and mulch in ceremonial giant swamp taro, *te babai* (*Cyrtosperma merkusii*) gardens.

Sida rhombifolia L.

Common Names: Broomweed, broom plant, Cuba jute, Paddy's lucerne, coffee bush

Kiribati Names: *te kaura* ("yellow"), *te kaura ni Imitang* ("foreign")

Status: Recent introduction. Pantropical.

Abundance: Uncommon.

Remarks: Seen along roadsides, trail sides, waste places and ruderal sites. Much less common than *Sida acuta*. Reported present by Fosberg, Sachet and Oliver (1979).

Thespesia populnea (L.) Sol. ex Correa

Common Names: Thespian's tree, Portia tree, Pacific rosewood

Banaban Name: *te kiaiai*

Kiribati Name: *te kiaiai*

Status: Indigenous, but possibly a recent introduction. Paleotropics and the Pacific Islands.

Abundance: Uncommon.

Remarks: A couple of large trees seen on the slope just above the boat harbor; a number of other trees seen in other locations in the main settlement.

Voucher Photographs: DPBB0519, DPBB0520, DPBB0521, DPBB1005

MELIACEAE (MAHOGANY FAMILY)

Melia azedarach L.

Common Names: Indian lilac, China berry, Persian lilac, pride of India

Status: Recent introduction. Tropical Asia.

Abundance: Uncommon.

Remarks: A number of large trees seen in the main settlement above the boat harbor and in the area near the Tabiteuea Sports Ground. The tree is more common on Nauru, where it is often seen as an adventive and was reportedly an early introduction during the phosphate mining days.

MORACEAE (MULBERRY FAMILY)

Artocarpus altilis (Parkinson) Fosberg

Synonyms: *Artocarpus incisus* (Thunb.) L.f.; *Artocarpus communis* J. R. Forst. and G. Forst.

Common Name: Breadfruit

Banaban Name: *te mai*

Kiribati Name: *te mai* (general term)

Status: Aboriginal introduction. Malayo-Pacific.

Abundance: Occasional.

Remarks: Planted staple food tree in settlements and household gardens. There are a number of cultivars including **mbarekana** (from "balekana" in Fijian, a Fijian variety), **motiniwae** ("modern way," a seedless smooth-skinned variety also found on Nauru and in Kiribati), **bukiraro** (seedless variety) and **mae keang** (seedless oblong fruit with deeply dissected lobed leaves that can be eaten raw). Like people of the other Kiribati islands, the Banabans have reservations against planting **bukiraro** because of the superstition that people will not stay long and emigrate overseas or have family problems, such as divorce. Many Banabans regard **te mai** as an important alternative staple food starch in times of cargo shortage when it replaces imported foodstuffs such as rice, flour and cabin biscuits. Attempts to replant **te mai** have taken place on the island. Decayed parts of the branches and stems accumulated inside the bark of the tree are used to scent coconut oil by some people on the

island. Several parts (sap, tender tips of the sprouting leaves, roots) are used in traditional health care, magic and sorcery. Leaves used to parcel food.

Voucher Photograph: DPBB0396

Artocarpus mariannensis Trec.

Common Name: Marianas breadfruit

Banaban Name: *te mai koraa*

Kiribati Names: *te mai tarika*, *te mai kora*

Status: Aboriginal introduction Micronesia.

Abundance: Uncommon.

Remarks: Planted staple fruit tree in household gardens and near settled areas. Rough skinned seeded fruit with the ripe flesh that can be eaten raw.

Ficus benghalensis L.

Common Names: Indian banyan, Bengal fig, Vada tree

Banaban Names: *te aioo* (aiyo), *te kiriaua*

Status: Recent introduction. India.

Abundance: Occasional.

Remarks: Common very large spreading roadside tree which dominates the landscape in the main settlement above the harbor and in some settlements. Reported present on Tarawa by Fosberg et al. (1979).

Reported as **te kiriaua** by Sigrah and King (2001:238), which is the name for the native banyan, *Ficus prolixa* in Tamana in the southern Gilbert Islands.

Voucher Photographs: DPBB0206b, DPBB0341, DPBB0343, DPBB0382, DPBB0383, DPBB0422, DPBB0423, DPBB0424, DPBB0476, DPBB0581, DPBB0686, DPBB0687b, DPBB0688b, DPBB0963, DPBB0966, DPBB1006a, DPBB1009, DPBB1041, DPBB1042, DPBB1043

Ficus prolixa G. Forst.

Common Name: Banyan tree

Banaban Name: *te aioo* (aiyo)

Kiribati Names: *te kiriawa*, *te kiriaua*

Status: Indigenous. New Caledonia and Vanuatu in Melanesia and Micronesia east to the Tuamotus, Marquesas and the Line Islands.

Abundance: Uncommon.

Remarks: One large tree on the corner turning into the hospital and a couple other trees seen on the margins of the settlement areas and the mined areas. Like Nauru, this tree could have been one of the important components of the original pre-mining forest of Banaba, especially on and around emergent limestone pinnacles. Aerial roots reportedly used as cordage. The name **te aioo**, probably represents one of the only original Banaban names, which is similar to the Nauruan name **eyayo**.

Voucher Photographs: DPBB0571, DPBB0588, DPBB0589, DPBB0605, DPBB0606, DPBB0687a, DPBB0688a

Ficus tinctoria G. Forst.

Common Names: Dyer's fig, native fig

Banaban Name: *te bero*

Kiribati Name: *te bero*

Status: Indigenous. Malesia to Micronesia and Rapa Island in southeastern Polynesia.

Abundance: Occasional.

Remarks: A number of trees seen directly behind the main harbor planted at residential housing and in houseyard gardens. Although possibly originally native to Banaba, it could have also been an aboriginal introduction and, like in Nauru, is now found only in cultivation. The fruit is cooked and pounded to make a traditional staple pudding or drink (**te berobero**); the leaves and bark are used

medicinally, the inner bast fiber is used as cordage by I Kiribati living on the island. The sap, branches, leaves and roots have important uses in traditional health care (traditional medicine).
Voucher Photographs: DPBB0072, DPBB0934, DPBB0986

MYRTACEAE (MYRTLE FAMILY)

Psidium guajava L.

Common Name: Guava

Banaban Name: *te kuwau*

Kiribati Name: *te kuwawa*

Status: Recent introduction. Tropical America.

Abundance: Occasional.

Remarks: Food tree found planted or protected in a number of houseyard gardens and near labor housing; occasional in secondary vegetation and in the regeneration in the mined-out phosphate lands. Ripe fruit eaten as an important snack food. Reported present by Fosberg, Sachet and Oliver (1979).

Voucher Photographs: DPBB0500, DPBB0695, DPBB0895d, DPBB0931

NYCTAGINACEAE (FOUR-O'CLOCK FAMILY)

Boerhavia repens L.

Synonym: *Boerhavia diffusa* sensu auct non L.

Common Names: Boerhavia, pigweed

Banaban Name: *te wao*

Kiribati Name: *te wao*

Status: Indigenous. Pantropical.

Abundance: Occasional.

Remarks: Weed of houseyard gardens, food gardens, roadsides, waste places, and ruderal sites. Plant fed to pigs; used as a vegetable in time of food scarcity; leaf petioles crushed and boiled in toddy to treat **te ba** (rickets?).

Voucher Photographs: DPBB0054a, DPBB0190, DPBB0379

Bougainvillea x buttiana Holttum and Standley

Synonym: Mistakenly identified as *Bougainvillea spectabilis* Willd.

Common Name: Hybrid bougainvillea

Banaban Name: *te akanta*

Kiribati Name: *te akanta*

Status: Recent introduction. Tropical America; horticultural origin.

Abundance: Occasional.

Remarks: Planted ornamental in houseyard gardens and around buildings. According to Whistler (2000), it is commonly misidentified as the Brazilian species, *B. spectabilis* Willd. and is apparently a hybrid of two other species, one of which is possibly *B. spectabilis*. Flowers used in garlands and flower arrangements.

Voucher Photographs: DPBB0165, DPBB0329

Bougainvillea glabra Choisy

Common Names: Lesser bougainvillea, red bougainvillea

Banaban Name: *te akanta*

Kiribati Name: *te akanta*

Status: Recent introduction. Tropical America.

Abundance: Occasional.

Remarks: Planted ornamental with small white flowers and magenta bracts. Flowers used in garlands.

Voucher Photograph: DPBB0082b

***Mirabilis jalapa* L.**

Common Names: Four-o'clock, marvel of Peru, false jalap

Banaban Name: *te aoaaua* ("four o'clock")

Kiribati Names: *te auaua*, *te awa aua*

Status: Recent introduction. Mexico.

Abundance: Rare.

Remarks: Single yellow-flowered plant seen in drum planted at building just to the east of the Banaba Island Council Office inland from the boat harbour. Reportedly much more common in the past, but still common in Nauru and Kiribati. Flowers used in head garlands (**te bau**).

Voucher Photographs: DPBB0912, DPBB0913, DPBB0914

***Pisonia grandis* R. Brown**

Common Names: Pisonia, lettuce tree, great birdcatcher tree

Banaban Name: *te buka*

Kiribati Name: *te buka*

Status: Indigenous. Indo-Pacific.

Abundance: Common.

Remarks: Soft-wooded tree with whitish-gray bark and soft light-green leaves which is one of the dominant species in remnant patches of inland forest on the escarpment surrounding the island; found in relatively intact stands to the west of Fatima; and occasional in the inner coastal forest on limestone terraces and in the regenerating vegetation on the mined-out phosphate lands. The most important seabird rookery species on both Banaba and Nauru. Soil under *Pisonia* groves is deep in bird guano deposits and very acidic. Soft wood sometimes used to make outrigger and fishnet floats; some unspecified medicinal uses reported. Young leaves edible and fed to pigs; the planting of *Pisonia* as a green vegetable for human consumption has been promoted since the 1980s in Kiribati as a source of nutritious green vegetable to address the problem of vitamin deficiency, especially vitamin-A deficiency in the urban diet.

Voucher Photographs: DPBB0198, DPBB0253b, DPBB0274a, DPBB0430b, DPBB0461, DPBB0467, DPBB0736, DPBB0809b, DPBB0821, DPBB0823b, DPBB0823b, DPBB0832b

OLEACEAE (OLIVE FAMILY)

***Jasminum sambac* (L.) Aiton**

Common Names: Indian jasmine, sampargita (Philippines), pikake (Hawai'i)

Banaban Names: *te bitati* ("pikake"), *te bitati ni Banaba*

Kiribati Name: *te bitati*

Status: Recent introduction. India.

Abundance: Occasional.

Remarks: Planted ornamental in houseyard gardens; also seen as a spreading adventive along the dirt road just to the west of the turn on the main road leading to Fatima; also seen as an adventive in limestone pits and near abandoned buildings behind the main settlement. Fragrant white flowers are used in head garlands and to scent coconut oil; plant also used in traditional magic and sorcery (**te kakaraoi**).

Voucher Photographs: DPBB0168, DPBB0169, DPBB0308, DPBB0387, DPBB0388, DPBB0608, DPBB0845, DPBB0981

PASSIFLORACEAE (PASSION FLOWER FAMILY)

***Passiflora foetida* L.**

Common Names: Stinking passion flower, love-in-a-mist

Banaban Name: *te bin* ("bean")

Kiribati Names: *te bin*, *te biku*

Status: Recent Introduction. Tropical America.

Abundance: Very abundant.

Remarks: One of the dominant weeds on roadsides, trail sides and in thickets, waste places, poorly maintained cemeteries and disturbed inner coastal vegetation. Commonly in very large populations festooned on trailside vegetation, often climbing quite high in trees. Small ripe passionfruit eaten by children.

Voucher Photographs: DPBB0083, DPBB0095b, DPBB0252, DPBB0506a, DPBB0702a, DPBB0723, DPBB0929b, DPBB1066, DPBB1067

POLYGALACEAE (POLYGALA FAMILY)

***Polygala paniculata* L.**

Common Names: Orosne, snakeroot

Status: Recent introduction. Tropical America.

Abundance: Occasional.

Remarks: Small erect much-branched herb with fibrous wintergreen-scented roots, small leaves and terminal racemes with small white flowers. Seen in between pinnacles in mined out phosphate land to the west of Tamavua Settlement and in the mined area on Topside along the trail to the water cave (**bangabanga**) inland from the topsoil stockpile and dynamite store.

Voucher Photographs: DPBB0451, DPBB0671a

POLYGONACEAE (BUCKWHEAT FAMILY)

***Antigonon leptopus* Hook. and Arn.**

Common Names: Mexican creeper, chain of love, Mexican love vine, coral vine

Banaban Name: *te bin* ("bean")

Status: Recent introduction. Mexico.

Abundance: Very abundant.

Remarks: Planted ornamental high climbing vine with pink or white flowers that has escaped and is found almost everywhere as an adventive in the settled areas on the southern side of the island and in nearby thickets. Found along roadsides, in poorly maintained gardens, in thickets, graveyards, in houseyard gardens and around buildings; seen spreading out from the settlement near Banaba House into mined areas. There are two distinct color forms, a common pink variety and a less common pure white variety that is common near Banaba House.

Voucher Photographs: DPBB0060, DPBB0344, DPBB0345, DPBB0346, DPBB0347, DPBB0348, DPBB0349, DPBB0353b, DPBB0506b, DPBB0507, DPBB0516, DPBB0517a, DPBB0598, DPBB0962, DPBB0968, DPBB1018, DPBB1019

PORTULACACEAE (PURSLANE FAMILY)

***Portulaca oleracea* L.**

Common Names: Pigweed, purslane

Banaban Name: *te boi*

Kiribati Name: *te boi*

Status: Recent introduction. Europe.

Abundance: Occasional.

Remarks: Weed in houseyard gardens, food gardens, in abandoned gardens, waste places and ruderal sites. Leaves and stems cooked as a green vegetable and fed uncooked to pigs. Plant mentioned as one of the emergency plants that kept survivors alive during the World War II Japanese occupation of the island (Sigraph and King 2001).

Voucher Photographs: DPBB0399, DPBB0401

RUBIACEAE (COFFEE FAMILY)

Aidia cochinchinensis Lour.

Synonym: *Randia cochinchinensis* (Lour.) Merr.

Status: Indigenous. Tropical Asia to the Pacific Islands.

Abundance: Common.

Remarks: Small, glabrous tree or shrub, up to 1 to 2 m high with creamy white flowers and red to purplish small fruits. One of the commonest species in the relatively undisturbed forests on the hand-mined areas to the west of Fatima and in secondary regrowth in the topside phosphate areas and on the escarpment. Fruits reported to be edible on Nauru. Reported present in the Gilbert Islands. Name forgotten on Banaba but well known by older people on Nauru as **enga** or **enguh** and where the ripe fruit is eaten, especially by children. Not found in the main islands of Kiribati. Reported present by Fosberg, Sachet and Oliver (1979).

Voucher Photographs: DPBB0144, DPBB0147b, DPBB0185, DPBB0263, DPBB0264, DPBB0265, DPBB0708, DPBB0709, DPBB0711, DPBB0811, DPBB0812, DPBB0813, DPBB0815a, DPBB0816, DPBB0817, DPBB0818

Guettarda speciosa L.

Common Names: Guettarda, beach gardenia

Banaban Name: *te uri*

Kiribati Name: *te uri*

Status: Indigenous. Tropical Asia to the Pacific Islands.

Abundance: Occasional.

Remarks: Found planted in houseyard gardens and around buildings. Not seen in undisturbed coastal forest. One of the “trees of life” in Kiribati where the wood is used for rafters, wall frames, small outside tables for placing and hanging kitchen wares and toddy containers, and canoe hulls and ribs; formerly used in fire-making by friction; the fragrant, night-blooming flowers are popular for making garlands, in scenting coconut oils and in love magic; leaves used to parcel food, as a wrapper for traditional pudding dish in earth ovens, as plates and to cover the earthen oven. Roots, leaves, flowers and branches are commonly used in traditional health care (traditional medicine) to treat influenza in small babies and children, hepatitis, headaches, women sickness, coughing. Leaves considered one of the best mulches and fertilizer for taro. On Banaba the leaves were reportedly used in performing rituals and the decayed parts (**te bubu**) of the mature tree accumulated inside the bark of the tree are used by women to scent coconut oils.

Voucher Photographs: DPBB0250, DPBB0425, DPBB0919, DPBB0920, DPBB1029

Hedyotis corymbosa (L.) Lam.

Synonym: *Oldenlandia corymbosa* L.

Common Name: Old World diamondflower

Banaban Name: *te kikinito*

Status: Recent introduction. Africa.

Abundance: Occasional.

Remarks: Weed of gardens, roadsides and ruderal areas; also at the Tabiteuea Sports ground; often found on rocky limestone soil.

Voucher Photographs: DPBB0129, DPBB0358, DPBB0359, DPBB1012, DPBB1086

Ixora casei Hance

Synonym: *Ixora carolinensis* var. *volkensii* (Hosok.) Fosberg

Common Names: Flame of the forest, Case's ixora, Caroline Island ixora

Banaban Name: *te katuru*

Kiribati Names: *te kaituru*, *te katuru*, *te katiru* (N Gilberts)

Status: Recent introduction. Caroline Islands.

Abundance: Occasional.

Remarks: Planted ornamental bush with dense clusters of scarlet flowers in household gardens in most settlements. Probably originally an introduction from Pohnpei or another Micronesian island where it is a native endemic species. Common on Nauru and in the Gilbert Islands. Bright red flowers used in garlands and flower arrangements.

Voucher Photograph: DPBB0101

Ixora chinensis Lam.

Common Name: Chinese ixora

Status: Recent introduction. China and East Indies.

Abundance: Uncommon.

Remarks: Planted ornamental, seen in two houseyard gardens.

Voucher Photograph: DPBB0315

Ixora coccinea L.

Common Names: Red ixora, flame of the woods, flame flower

Banaban Name: *te kai tangira* (“tree of love”)

Kiribati Names: *te kaituru*, *te katuru*?

Status: Recent introduction. Southeast Asia.

Abundance: Occasional.

Remarks: Planted ornamental bush with clusters of light red or pink-orange flowers in houseyard gardens; seen planted near the Catholic Church in Fatima.

Voucher Photographs: DPBB0176, DPBB0177

Ixora finlaysoniana Wall. ex G. Don

Common Names: White ixora, fragrant ixora

Status: Recent introduction. Thailand and Southeast Asia.

Abundance: Rare.

Remarks: Seen in one houseyard garden. Planted ornamental.

Voucher Photographs: DPBB1057, DPBB1059

Morinda citrifolia L.

Common Names: Beach mulberry, Indian mulberry

Banaban Name: *te non*

Kiribati Name: *te non*

Status: Possibly indigenous although possibly an aboriginal introduction. Tropical Asia and Australia to Southeast Polynesia.

Abundance: Common.

Remarks: Cultivated and growing wild in household gardens; occasional in inner coastal vegetation, in the mined phosphate lands and a common shrub and understory plant in the unmined and hand-mined areas. In Kiribati, wood used to build houses, especially roofs, small outside tables for placing and hanging kitchen wares and toddy containers; inner parts of roots mixed with ash and boiled to yield a red dye used to color mats, hats, fans, etc.; small leaves used to treat measles and often used as a ear flower in small babies travelling with the parents to protect them from ghostly spirits and in adults to prevent nightmares; ripe and unripe fruit used to relieve coughing, ripe fruit eaten, after boiling, as an elixer, usually by old people, over-ripe fruit squashed and applied to warts; juice from the leaves used to treat boils. Many of the women have increasingly used young **te non** leaves as an alternative green vegetable on Banaba Island due to shortage of fresh vegetables available in local stores. Many people have planted **te non** in their front or back yards because it is believed to keep away the ghostly spirits from the houses but also because of its importance in traditional health care. A large fruited variety from Solomon Islands was introduced during the PRAP program and is now found on a number of atolls including Banaba Island and in many of the Agricultural Division nurseries in the outer islands

of Kiribati. People living on Banaba generally refer to both varieties as **te non** whereas people in other islands of Kiribati refer to this large fruited variety as **te non n toromon** ("Solomon"). Reported present by Fosberg, Sachet and Oliver (1979).

Voucher Photographs: DPBB0084, DPBB0462, DPBB0495, DPBB0576b, DPBB0583b, DPBB0659b, DPBB0660, DPBB1008a, DPBB1062

Spermacoce assurgens Ruiz and Pav.

Synonym: *Borreria laevis* (Lam.) Griseb.

Common Name: Buttonweed

Status: Recent introduction. Tropical America.

Abundance: Common.

Remarks: Weed of roadsides, trail sides, waste places, sports fields and food gardens.

Voucher Photographs: DPBB0386, DPBB0700, DPBB1115

RUTACEAE (RUE FAMILY)

Citrus aurantiifolia (Christm.) Swingle

Common Name: Lime

Banaban Name: *te raim* ("lime")

Kiribati Name: *te raim*

Status: Recent introduction. A hybrid cultivar probably indigenous to Southeast Asia or Indonesia, but an early European introduction into the Pacific Islands.

Abundance: Occasional.

Remarks: Planted fruit tree in household gardens and around buildings in workers quarters. Formerly more common, but with failure to replant many of the old trees have died. The only citrus species which seems to do well in the atoll environment.

Voucher Photographs: DPBB0126, DPBB0127, DPBB0330, DPBB0331, DPBB0515b

Citrus x aurantium L.

Synonyms: *Citrus aurantium* L; *Citrus vulgaris* Risso; *Citrus maxima* x *C. reticulata*

Common Names: Sour orange, Seville orange, bigarade orange, bitter orange, marmalade orange

Banaban Name: *te remen* ("lemon")

Kiribati Name: *te remen*

Status: Recent introduction. Probably indigenous to somewhere in Southeast Asia and an early European introduction into the Pacific Islands, but based on recent biological marker studies, *C. aurantium* seems to be a hybrid cross between the pomelo (*C. maxima*) and mandarin orange (*C. reticulata*; USDA Plants 2015).

Abundance: Rare.

Remarks: Small tree up to 10 m with fragrant white flowers and round green to orangish fruit that almost always appears to have rough scale-like patches on the skin and orange pulp. Planted fruit tree with fruits with bright orange flesh. Used to make drinks, to marinate raw fish and to squeeze on food.

Voucher Photograph: DPBB0515a

Citrus x limon (L.) Osbeck

Synonyms: *Citrus medica* var. *limon* L.; *Citrus limonum* Risso.

Common Names: Lemon, rough lemon

Banaban Name: *te remen* ("lemon")

Kiribati Name: *te remen*

Status: Recent introduction. Possibly indigenous to Southeast Asia, but, true lemon cultivars, which are reportedly all hybrids, are a late European introductions to the Pacific Islands.

Abundance: Occasional.

Remarks: Planted fruit tree in houseyard gardens; seen in one food garden. The fruit is used to make drinks, marinate raw fish, and season or garnish food, as well as having medicinal value; young leaves are boiled to make tea.

Voucher Photograph: DPBB0065

Citrus reticulata Blanco

Common Names: Tangerine, mandarin orange

Status: Recent introduction. East Asia.

Abundance: Rare.

Remarks: Reported present by informants; one tree sited in a houseyard garden.

Citrus sinensis (L.) Osbeck

Synonym: *C. aurantium* var. *sinensis* L.

Common Names: Orange, sweet orange

Banaban Name: *te aoranti* ("orange")

Kiribati Name: *te aoranti*

Status: Recent introduction. Indigenous to South China or Southeast Asia, and a modern introduction to the Pacific Islands. The orange is believed to be a hybrid between the pomelo (*C. maxima*) and the mandarin orange (*C. reticulata*), which has been cultivated and selected for centuries (Xu et al. 2013).

Abundance: Rare.

Remarks: Single tree with fruit seen in a houseyard garden in one of the old British Phosphate Commission Houses just inland from the boat harbor.

Voucher Photograph: DPBB0385

Murraya paniculata (L.) Jack

Common Names: Mock orange, orange jessamine, orange jasmine

Status: Recent introduction. Tropical Asia, Malesia and Australia.

Abundance: Rare.

Remarks: A single plant, reportedly introduced from New Zealand seen in a houseyard garden in the Tabwewa area.

Voucher Photograph: DPBB0313

SAPINDACEAE (SOAPBERRY OR LICI FAMILY)

Dodonaea viscosa (L.) Jacq.

Common Name: Native hop bush

Banaban Name: *te kai boia* ("smelly bush")

Kiribati Name: *te kaiboia*

Status: Indigenous. Pantropical.

Abundance: Uncommon.

Remarks: Seen growing on limestone pinnacles in mined-out areas to the east of the trail between the main topside cemetery and Tamavua and in regenerating vegetation on pinnacles in the mined-out area inland from the dynamite store and water cave (**bangabanga**). Paper-like fruits used in garlands; young leaves used to perfume coconut oil; pliant stems make good fishing poles and frames for dip nets.

Voucher Photographs: DPBB0560b, DPBB0561, DPBB0562, DPBB0563, DPBB0652, DPBB0653, DPBB0655, DPBB0657

SAPOTACEAE (SAPODILLA FAMILY)

Manilkara zapota (L.) P. Royen

Synonym: *Achras zapota* L.

Common Name: Sapodilla

Status: Recent introduction. Mexico and Central America.

Abundance: Rare.

Remarks: One single immature tree seen planted to the east of the boat harbor in the houseyard garden of the Seventh Day Adventist pastor. Also seen as a planted fruit tree in the Agricultural Department nursery and orchard in Bikenibeu, South Tarawa.

SCROPHULARIACEAE (SNAPDRAGON FAMILY)

Russelia equisetiformis Schlttdl. and Cham.

Common Names: Firecracker flower, coral plant

Banaban Name: *te kai baun*

Kiribati Name: *te kai baun*

Status: Recent introduction. Mexico.

Abundance: Occasional.

Remarks: Seen in a garden in Fatima and in a large population as an adventive on limestone in mined-out land to the east of the trail between the main Topside Cemetery and Tamavua. Planted ornamental. Red flowers used in garlands and flower arrangements.

Voucher Photographs: DPBB0179, DPBB0690, DPBB0691, DPBB0692, DPBB1082, DPBB1083

SOLANACEAE (NIGHTSHADE FAMILY)

Capsicum annuum L. vars.

Synonym: *Capsicum frutescens* L.

Common Names: Tabasco, bird chili, perennial chili, annual chili

Banaban Name: *te beneka* (“vinegar”)

Kiribati Name: *te beneka*

Status: Recent introduction. Tropical America.

Abundance: Occasional.

Remarks: Planted spice in household gardens in a number of places. Placed in bottles of fermented sour toddy and used as a spicy condiment (**te beneka**) for food.

Voucher Photographs: DPBB0380, DPBB0381

Nicotiana tabacum L.

Common Name: Tobacco

Banaban Name: *te kai bake* (“bacco plant”)

Kiribati Name: *te kai bake*

Status: Recent introduction. Central and South America and the West Indies.

Abundance: Extirpated?

Remarks: Reportedly present and commonly planted on Banaba in the past but no longer planted.

Physalis angulata L.

Synonym: *Physalis lanceifolia* Nees

Common Names: Cape gooseberry, bladderberry, ground cherry

Banaban Name: *te tomato* (“tomato”)

Kiribati Names: *te bin* (“bean”; N), *te baraki*, *te mato*

Status: Recent introduction. Tropical and subtropical America.

Abundance: Rare.

Remarks: A single individual plant seen in a cassava garden below Banaba Junior Secondary School. Weed of waste places, ruderal sites and recently disturbed vegetable gardens. Reportedly more common in the past and also present in Nauru and Kiribati.

***Solanum lycopersicum* L.**

Synonym: *Lycopersicon esculentum* Mill.

Common Name: Tomato

Banaban Name: *te tomato*

Kiribati Name: *te tomato*

Status: Recent introduction. Tropical America.

Abundance: Uncommon.

Remarks: Not seen in 2005 but reportedly planted yearly, but few planted or surviving because of the extended dry period in the latter half of 2005 and the failure of arrival of seeds on ships.

***Solanum melongena* L.**

Common Names: Egg plant, aubergine

Banaban Name: *te baingan* (from the Fiji Indian “baigan”)

Kiribati Name: *te baingan*

Status: Recent introduction. South Asia.

Abundance: Occasional.

Remarks: Uncommon. Not seen in 2005 but reportedly planted yearly, but few planted or surviving because of the extended dry period in the latter half of 2005.

STERCULIACEAE (COCOA FAMILY)

***Waltheria indica* L.**

Synonym: *Waltheria americana* L.

Common Names: Sleepy morning, waltheria

Status: Recent introduction. Tropical America, and possibly the Pacific, at least Hawai'i.

Abundance: Abundant.

Remarks: Weed of dry waste places, roadsides, trail sides, vacant lots and ruderal habitats.

Voucher Photographs: DPBB0070, DPBB0282a, DPBB0292, DPBB0372, DPBB0510, DPBB0926, DPBB0937, DPBB0990b

SURIANACEAE (SURIANA FAMILY)

***Suriana maritima* L.**

Common Names: Bay cedar, suriana

Kiribati Name: *te aroa*

Status: Indigenous. Pantropical.

Abundance: Rare.

Remarks: Shrub or small tree, often dwarfed and wind-trimmed when exposed to salt spray, with small leaves and small, yellow 5-petalled flowers. Reported present by Fosberg, Sachet and Oliver (1979), but not seen in 2005. It is rare on Nauru and seen inland from beaches on some atoll islets in Kiribati (Fosberg et al. 1979).

TURNERACEAE (TURNERA FAMILY)

***Turnera ulmifolia* L.**

Common Names: Yellow alder, sage rose, Marilopez, West Indian holly

Kiribati Name: *te kakai nea* (“the teaser”)

Status: Recent introduction. Mexico and the Caribbean to northern South America.

Abundance: Common.

Remarks: Planted ornamental shrub in household gardens; has become naturalized in Fiji and some other countries; a recent introduction after 1993, probably from Tarawa via Nauru where it was common by

the mid-1990s; spreading rapidly in gardens on Banaba because of its attractive bright yellow flowers. Flowers used in garlands and flower arrangements.

Voucher Photographs: DPBB0043, DPBB0408, DPBB0409, DPBB0906

URTICACEAE (NETTLE FAMILY)

Laportea ruderalis (G. Forst.) Chew

Synonym: *Fleurya ruderalis* (Forst. f.) Gaud. ex Wedd. (unresolved)

Banaban Name: *te uekeueke*

Kiribati Names: *te uekeueke*, *te ukeuke*

Status: Indigenous. Malayo-Pacific.

Abundance: Occasional.

Remarks: Growing in shady sites both on limestone pinnacles and in limestone soil; found in inner limestone cliff and terrace vegetation at the base of pinnacles and on limestone; occasional in the mined out phosphate lands, often amongst or on the bases of pinnacles. Sometimes used to treat **te ba** (a feverish condition) and stomach disorders in Kiribati.

Voucher Photographs: DPBB0157, DPBB0183, DPBB0260, DPBB0267, DPBB0270a

Pilea microphylla (L.) Liebm.

Common Names: Artillery plant, artillery fern

Status: Recent introduction. Tropical America.

Abundance: Occasional.

Remarks: Weed in potted plants, houseyard gardens, along paths and on limestone rock walls, especially moist shaded sites.

Voucher Photographs: DPBB0066, DPBB0186

VERBENACEAE (VERBENA FAMILY)

Lantana camara L.

Common Name: Lantana

Banaban Name: *te kai buaka*

Kiribati Name: *te kai buaka*

Status: Recent introduction. Tropical America.

Abundance: Common.

Remarks: Adventive shrub in secondary thickets, along trail sides, and in the inner portions of coastal limestone vegetation. Occasional in mined-out phosphate areas. Sometimes kept as an ornamental in houseyard gardens. Flowers used in garlands; flowers said to be used by some people in Kiribati to treat infantile diarrhea. Although poisonous, the fruits are reportedly eaten by some children. Two varieties *L. camara* var. *camara* and var. *aculeata* are present. Local people recognize three distinct color forms.

Voucher Photographs: DPBB0463b, DPBB0609, DPBB0650, DPBB1060

Premna serratifolia L.

Synonyms: *Premna obtusifolia* R. Br.; *P. taitensis* Schauer

Common Names: False elderberry, premna

Banaban Name: *te ango*

Kiribati Name: *te ango*

Status: Indigenous. Indopacific.

Abundance: Occasional.

Remarks: A number of large trees seen in settlements and houseyard gardens; two large trees seen at Anteeren Housing area. Not seen outside of settlements in 2005, but possibly originally found in pre-mining vegetation because it is common in the escarpment forest in Nauru. Branches and leaves used

in traditional medicine; young flower clusters and young leaves used to scent coconut oil and in head garlands along with **te meria** (*Plumeria* spp.).

Voucher Photographs: DPBB0879, DPBB0880, DPBB0887

Stachytarpheta jamaicensis (L.) Vahl

Common Names: Jamaica vervain, blue rat's tail

Banaban Name: *te kai buru* ("blue plant")

Kiribati Name: *te uti* ("lice")

Status: Recent introduction. Tropical America.

Abundance: Occasional.

Remarks: Weed of roadsides, waste places, fallow vegetable plots and other ruderal sites around abandoned buildings. More common in areas near the main settlement and not found inland as much as the following species, *S. cayennensis*.

Voucher Photographs: DPBB0317, DPBB0437, DPBB0482, DPBB0628, DPBB0645, DPBB0889, DPBB0890, DPBB0918

Stachytarpheta cayennensis (Rich.) Vahl.

Synonym: *Stachytarpheta urticaefolia* Sims

Common Names: Blue rat tail, false verbena

Banaban Name: *te kai buru* ("blue plant")

Kiribati Name: *te uti* ("lice")

Status: Recent introduction. Tropical America.

Abundance: Common.

Remarks: Weed of roadsides and along trails crossing the islands, fallow garden areas and long-abandoned areas in the middle of the island. Used in traditional medicine to treat boils.

Voucher Photographs: DPBB0096, DPBB0097, DPBB0487, DPBB0570

Vitex trifolia L.

Common Names: Blue vitex, mosquito bush

Banaban Name: *te kaitu*

Kiribati Name: *te kaitu?*

Status: Indigenous. East Africa to the Pacific Islands.

Abundance: Occasional.

Remarks: Seen in mined-out areas to the northeast of the hospital, above the coastal limestone cliffs behind Banaba Junior Secondary School and in a number of locations in the disturbed vegetation in the inner coastal areas to the west of Fatuma. Reported present by Fosberg, Sachet and Oliver (1979).

Voucher Photographs: DPBB0130, DPBB0860

Volkameria inermis L.

Synonym: *Clerodendrum inerme* L

Common Name: Beach privet

Banaban Name: *te inato*

Kiribati Name: *te inato*

Status: Indigenous. Indomalaysia, Australia and the Pacific Islands.

Abundance: Common.

Remarks: Arching, scrambling shrub in coastal vegetation on limestone terraces just inland from the coast, often climbing among shrubs; occasional in inland vegetation; occasional in houseyard gardens and around buildings and as a planted ornamental or hedge plant. In Kiribati the leaves mixed with coconut cream are applied to open sores and to treating prickly heat (**te nimariri**); dye from plant used as a hair dye to darken hair; leaves and flowers used in garlands.

Voucher Photographs: DPBB0235, DPBB0236b, DPBB0243, DPBB0245, DPBB0390, DPBB0649, DPBB0787b, DPBB0788, DPBB0789a, DPBB0790

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Randy Thaman
Suva, Fiji
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NOTES

1. Although the common dictionary definition of atoll varies from a “ring-like coral island enclosing a lagoon” (Bryan 1972) to “a circular coral reef or string of coral islands surrounding a lagoon,” as stressed by Wiens (1962), Bryan (1953) and others, these definitions are far too simplistic because most groups of “atolls,” like the Gilbert Group, consist, not only of “true atolls” with lagoons, but also of other small, single, lagoon-less, low-lying limestone islands, sometimes referred to as “table reefs” Similarly, the classic “true atolls” often have multiple lagoons or numerous ponds or basins separated by reefs, sand bars, islets or portions of the main island, and are not really circular, but consist of a series of islets, often strung out in irregular directions, that surround, or partially surround or border, a lagoon (Thaman 2008). The term “coral island” is also misleading because it has been applied to islands of biological origin that are, in truth, consolidated calcareous sand or limestone deposits in which coral may be an insignificant element or only one of many significant elements (Wiens 1962). Adapting the definitions of Bryan (1953), Wiens (1962) and Thaman (2008), the term “atoll” here is defined as: all low-lying oceanic limestone reef islands, with or without lagoons, that have formed on barrier reefs or in the shallow lagoons along the coastlines, or that encircled, long-submerged ancient volcanoes, but which are NOT associated with a nearby high island or a continent. Banaba would clearly be defined as a raised or uplifted limestone island and NOT an atoll.

2. These numbers do not include atolls in the Line Islands that are not part of Kiribati, but territories of the USA.

3. There are no available up-to-date geographical maps of Banaba that show all place names mentioned in the text; and the limited time spent on the island did not allow for the drafting of a more appropriate original map based on annotated Google images of the island. The Google Image in Fig. 3 attempts to show the locations of many of these place names to indicate the relative locations of plants or vegetation types for people who know or might visit the island in the future.
4. **Te rekinibeti** normally refers to wild pandanus, whereas **te kaina**, a more general term refers to cultivated pandanus varieties.

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