A Survey of Flora and Vegetation of the Proposed Jaco–Tutuala–Lore National Park, Timor-Leste (East Timor)

report to Birdlife International

from Northern Territory Herbarium

Version 1.0

May 2006

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Cover photo: Buttressed trunk of *Ficus* sp. near Ira Malaro

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SUMMARY

Approximately 730 plant species are recorded for the proposed Jaco–Tutuala–Lore National Park with 391 taxa (54%) presently identified to species level. It is considered likely that further survey would reveal the flora to be around 1,200–1,500 vascular plant species. The Park supports a well developed tropical closed forest flora with a mixture of dry and wet adapted species. On the present, preliminary figures 22 species are new records for the island of Timor and this represents 4.7 % of the vouchered plant specimens. Once identifications from the current survey are complete, the final percentage may reasonably be in the order of 10% new records for the island. Three IUCN Red List Species for Timor-Leste & Indonesia were recorded in the Park (*Intsia bijuga, Pterocarpus indicus, Santalum album*). Additional species that may be threatened include *Antiaris toxicaria, Neoalsomitra podagrica, Carallia brachiata* and *Eleocharis geniculata.* The area also contains significant populations of *Cycas rumphii* a taxon listed by IUCN as Near Threatened.

The natural vegetation of the proposed NP is dominated by largely contiguous closed forest communities occurring over an intact altitudinal/rainfall/edaphic gradient from sea level to nearly 1000m. Smaller but significant areas of grass/sedgeland occur on the floodplain of Lake Ira Lalaro while *Borassus* palm savanna, grassland and shrubland occur along the coastal plain. The proposed Park area contains what is probably the largest remaining area of natural closed forest vegetation on the island of Timor and includes excellent examples of several communities that are of national, regional and international significance (coastal forest, deciduous forest, *Canarium* forest, thorn forest, swamp forest). Substantial areas of nationally and regionally significant semi evergreen, evergreen and montane forest and seasonally inundated grassland, all in very good condition, are also present.

It is recommended that primary forest communities and the old secondary deciduous forest be given full protected status within the context of an IUCN category 5 national park. Connecting corridors of natural vegetation need to be maintained between the Lore and Paitaxau Range primary forest blocks as do buffer zones dominated by native tree species adjacent to primary forest. There are a number of ongoing management issues for the proposed park including illegal logging, slash and burn agriculture, fire, weeds and grazing. In the longer term, improved agricultural systems that do not rely on the unsustainable clearing and burning of primary forest need to be developed. Better management of grazing animals is needed in some vegetation types to reduce impacts. The scrambling shrub *Chromolaena odorata*, one of the world's worst weeds, is the dominant weed species in the area but is largely absent from primary forest and floodplain grass/sedgeland. Management of this species is likely to be difficult. There is potential for the limited, small scale, sustainable harvesting of some forest products or to cultivate (outside the fully protected zone) some native species for food, medicinal, timber or other forest products.

There is a considerable need for further research on the flora, vegetation and its management. Areas that would benefit include plant identification tools, flora survey, recording of local names (and ethnobotany), vegetation mapping and phytosociology, rare and threatened species, small scale sustainable harvesting and cultivation of forest products, weed management and improved agricultural and grazing systems in the context of the Park.

It is expected that an updated version of the report will be produced as further identifications of plant specimens are made.

1 INTRODUCTION

Since Indonesian withdrawal from East Timor, the country has been the recipient of a major overseas aid program to assist in rebuilding the social, physical and governmental infrastructure and in capacity building amongst the East Timorese population. The international conservation organisation BirdLife International has been involved in Timor-Leste for several years, mainly through biological surveys, but also in the development of a protected areas network working in particular with the Ministry of Agriculture, Forestry and Fisheries in the Government of Timor-Leste. It was identified that further biological surveys were needed to help produce management guidelines, identify conservation priorities and build national capacity. The Timor Government also requested capacity building as an urgent priority.

BirdLife International raised funds from the Australian Regional Natural Heritage Programme (RNHP, in the Commonwealth Department of the Environment and Heritage) to expand and accelerate the programme and specifically to survey the site of the first proposed National Park in the Tutuala–Lake Ira Lalaro–Jaco Island area. The RNHP funding is initially for a year only, until June 2006, but it is hoped that this can be renewed. The project is entitled "Building partnerships and conservation priorities for East Timor's first national park" and focuses on the area of highest biodiversity value in East Timor. It seeks to establish a foundation for community-based in-situ conservation via a national protected areas network. This project will build a consultation framework involving government, local communities and NGOs as a foundation for sustainable management in East Timor's pilot protected area. The project builds on preparatory activities conducted by the Ministry for Agriculture, Forestry and Fisheries since 2002 and will assist in the development of national protected area legislation and policy frameworks.

1.2 DESCRIPTION OF THE PROPOSED RESERVE

1.2.1 Location

The study area and proposed National Park comprises the eastern most end of the island of Timor and has a land area of approximately 650 km^2. It is in the far east of Timor-Leste, in the Lautem District, specifically in the Tutuala–Lake Ira Lalaro–Jaco Island area and includes the villages of Bauro, Com, Lore, Malahara, Mehara and Tutuala.

1.2.2 Physical and Biological Features

Physical features and climate

Topographically the area is bordered by a narrow, flat coastal plain in the vicinity of Com on the north coast and Lore on the south coast. The centre of the area consists of an elevated basin (350 metres above sea level) draining internally to Lake Ira Lalaro and bounded on the south by the rugged Paitxau range which rises to nearly 1000 metres asl. To the north and east of this basin lies a low plateau which drops relatively steeply to the sea. The lake is drained by the river Ira Siquero which runs southwards into the Paitxau range where it drains into a sink hole, only to reappear to the south of the range near sea level. South of the Paitxau Range lies a shallow valley bound on its seawards side by a low rise. Just off the east coast of the main island lies the smaller Jaco Island. The whole area is underlain by Quaternary marine limestone formations which have been up lifted by the rafting north of the Australian tectonic plate and this limestone now outcrops extensively in the Paitxau Range and low plateau north of Bauro.

The area is subject to a predominantly tropical monsoonal climatic regime (Monk *et al.* 1997). Within this broad climatic regime there is a strong gradient in rainfall and length of dry season from the dry north coast to the wetter south coast and nearby mountains. Northern coastal areas receive an annual rainfall of less than one metre and have 9–12 dry months (those with <100 mm rain) in contrast to the south of the area and the Paitxau Range which receive a short dry season of perhaps two to four months with more than two metres annual rainfall. Some areas of higher elevation in the Paitxau Range give every indication of having a tropical ever wet climate.

The dominant natural vegetation of the area appears to have originally consisted of closed forest with probably with natural areas of sedge and grassland on the floodplain of Lake Ira Lalaro. Primary forest around Los Palos and in the Lake Ira Lalaro basin has been extensively converted by humans into grassland, cropland and secondary forest vegetation. The ranges and southern coastal areas continue to support primary closed forest and these are now probably the largest areas of natural primary vegetation left on the island of Timor.

1.2.3 Previous Botanical Exploration of Timor

The island of Timor has been the subject of intermittent collecting by botanists over the last 200 years or so, predominantly during the European colonial era (Forbes *et al.* 1885; de Wit 1949; van Steenis-Krusemann 1950). This effort appears to have been concentrated more on west Timor that in the east. According to the accounts of de Wit (*loc. cit.*) and van Steenis-Krusemann (1950), the major collectors in East Timor have included Gaudichaud (1817), H.O.Forbes (1882–3, c. 700 collections), F.Newton (1897); Mrs Walsh-Held (1928–9), G.Stein (1931–32) E.Meijer Drees (1946–57) and R.Cinatti (c. 1957). In West Timor, most notable collectors have included J.B.Spanoghe (1831–36), for a time the Dutch resident at Kupang, the eminent British botanist R.Brown in 1803, and J.E.Teysmann (1873) (de Wit *loc. cit.*). A number of surveys of parts of Timor have been conducted over the past 50 years, with collectors based at Bogor or various foreign institutions (Monk *et al.* 1997). Often this latter collecting has been for specific purposes such as ethnobotanical study or to investigate the taxonomy of specific groups, rather than broad scale biodiversity survey. Specimens from these past collections now reside predominantly in major European herbaria such as Leiden, Kew, British Museum, Paris and at Bogor on Java. Over the years, checklists for the island have been prepared by Decaisne (1835), Spanoghe (1841) and Forbes *et al.* (1885), although all of these are now badly outdated.

Previous botanical work known for the Park area includes collecting by Van Steenis (in 1953) and survey by Whistler (2001). Van Steenis made c. 80 collections at Lore, Mehara, Maupitine and Los Palos in 1953 as well as at a number of other places in Timor-Leste (van Steenis-Kruseman, 1958). The taxa involved are not known at this stage. In a short survey conducted in March 2001, Whistler (2001) visited study sites in the Tutuala area and at Lake Ira Lalaro. Relative dominance of tree species was estimated by measuring basal area of a number of random samples of trees and a checklist of both local and scientific names of plants was compiled. A small number of plant specimens (c. 20) were collected for further identification and most of the names on the checklist appear to have been based on field identifications.

Despite this effort, it is considered highly likely that the Island and Timor-Leste are not adequately surveyed in terms of floristics. Plant collection density for an area has been used as a measure of adequacy of floristic inventory. For Malesian islands, Whitten *et al.* (1987) considered 100 collections per 100 km^2 to be an adequate level of survey. Using Whitten's

figure as a bench mark, the island of Timor would require 28,500 plant specimens to be adequately surveyed and Timor-Leste more than 14,000. Van Steenis (1979) estimated the total number of collections from the entire Lesser Sunda Islands at 38,500 with collecting effort spread across many islands. However, it is difficult to ascertain the exact number of collections made from Timor, as specimens are widely dispersed in various herbaria. Most collecting on Timor appears to have been as part of short-term visits to the islands and even diligent collectors such H.O. Forbes collected only around seven hundred specimens (Forbes *et al.* 1885). It is considered highly likely that the actual number of collections made is well below 100 collections per 100 km^2, and that the Island and Timor-Leste are not adequately surveyed by this standard.

However, it is considered that this measure is not appropriate for smaller areas such as the proposed Park. For small areas, the species richness is likely to far exceed 100 species per $100km^2$ which is the maximum that could be detected at this intensity of collection. As Monk *et al.* (1997) note, the floristics of many of the islands of the Nusa Tenggara region of Indonesia (then including East Timor) is so poorly known that new collections from any island frequently extend the range of otherwise well known species.

1.2.4 The Flora of Timor

The Malesian region of which Timor-Leste is a part is recognised as a region of high plant biodiversity with an estimated 41,000 plant species, including 70% of species endemic to that region (Roos *et al.* 2004; van Welzen *et al.* 2005). The most recent checklist for Timor lists 983 species (Forbes *et al.* 1885). No modern census or complete flora for Timor or Timor-Leste exists from which to establish the size of the flora. However, using the species-area relationship ($y=0.0097x^{0.5324}$, where y = no. species and x = area of island) derived from five major Malesian islands (Sumatra, Java, Borneo, Suluwesi and New Guinea) by Roos *et al.* (2004) it can be predicted that the flora of Timor Island should consist of around 2,500 species of vascular plants. Although Timor is considerably smaller than the five islands considered by Roos *et al.* (*loc. cit.*), it is still considered to belong to the large island group for which the species area relationship was derived. In comparison, this level of species richness is less than 50% of that found on Java for example, although the land area is also less than 25% of the area of Java.

The composition of the flora of Timor is influenced by its location in Central Malesia (Wallacea), a transition zone between the main rainforest blocks of the Sunda (Peninsula Malaysia, Sumatra, Borneo, West Java) and Sahul (New Guinea) shelves (van Welzen *et al.* 2005). While Timor thus has a flora that is in may ways transitional between these areas it is lacking in diversity of many of the major rain forest elements found in those blocks (e.g. Dipterocarpaceae, Rhododendron, Myristicaceae). The geological history, climate, dispersal pathways, soils and topography appear to have had an additional influence on the flora (van Steenis 1979). Timor has a generally drier monsoonal climate than those adjoining areas in New Guinea and West Malesia which has probably limited the diversity of wet forest flora but given it a flora richer in dry adapted species (Cyperaceae, Malvaceae, Poaceae). At the same time Timor is a geological relatively recent environment, having been up lifted from the ocean floor by the northwards drifting Australian tectonic plate over the last 10 my and the time for species to have evolved is thus less than in many other parts of Malesia (Barlow 1981; van Welzen *et al.* 2005). Even during geologically recent ice ages (e.g. 17,000 & 170,000 years bp), when sea levels were 120-200 m lower than at present, sea barriers were still present between most islands in central Malesia, limiting dispersal of plants between them (Monk *et al.* 1997; van Welzen *et al.* 2005). More than in west Malesia, the flora has been influenced by

proximity to Australia. During these ice ages, the north-west coast of Australia lay perhaps only one 100 - 200km from Timor and Roti with an extended land frontage to a common sea of many hundreds of kilometers (Barlow 1981; O'Brien & Glenn 2005). This appears to have facilitated the exchange of especially plants and birds between the regions (van Steenis 1979; Mayr 1944), in addition to the major exchange of flora between Australian and New Guinea. Van Steenis (1979) details a large widespread Australian component in the Malesian flora and also lists 14 Australian species in the Timor flora which are not found elsewhere in Malesia. The latter include species such as the herb *Ptilotus conicus* which is a common component of coastal calcareous dunes and chenier plains in Northern Territory, the herb *Thecanthes concreta* which occurs on clay soils in north or north west Australia as well as on Timor and the parasitic shrub *Exocarpos latifolius* which is widespread in northern Australia but has a limited distribution in Malesia and including Timor.

Similarly, there is an identifiable proportion of the Lesser Sunda Island flora that in Australia is known only from the north or north-west (Kimberley or Northern Territory). Such elements include *Lepisanthes rubiginosa, Melochia umbellata* and *Secamone timorensis*, all on Timor and known in Australia only from monsoon forest in the north-west Kimberley. Other examples include the vines *Cyathostemma glabrum, Dichapetalum timorense*, shrubs *Hibiscus vitifolius* and *Pentapetes phoenicea* and trees *Pittosporum moluccanum, Santalum album* and *Suregada glomerulata* which are all known from Timor and in Australia are only in the Northern Territory. A number of taxa occur in Kimberley, Northern Territory and Timor but are not known from Cape York (e.g. *Syzygium nervosum, Harrisonia brownii*). *Eugenia reinwardtiana, Garuga floribunda, Lagerstromea archeriana* and *Proiphys amboinensis* all occur in Timor, the Kimberley and Cape York but not the Northern Territory raising the interesting possibility that dispersal of these taxa to Australia has occurred independently across both the Quaternary Timor Sea and the New Guinea–Torres Strait land bridge (or that they have become extinct in Northern Territory). A large proportion of the dry adapted monsoon forest flora of Northern Territory and Kimberley also occurs in Timor, but this flora is also frequently widespread in Central and Eastern Malesia and elsewhere in Northern Australia, with few biogeographic clues regarding dispersal pathways to Australia (Wheeler 1992; Liddle *et al.* 1994). As van Steenis (1979) notes, the exchange of flora has probably also been influenced by climatic, edaphic and geological factors. North and north-western Australia is generally drier and has large areas of sandstone lithology with sandy or lateritic soils (but also with significant area of clays derived from limestone, basalt or other rocks). In comparison, Timor-Leste is dominated by shale and limestone lithology with clayey soils and mostly has a less extreme dry season.

The most recent estimate of the proportion of endemic plant species for the Lesser Sunda Islands (based on families treated in Flora Malesiana) is 5.2%, a figure slightly below the average for Malesian phytographic areas (van Welzen *et al.* 2005). The flora of Timor is characterised by a low levels of endemic genera (3) and at the species level, endemism is estimated at 10.3% (Monk *et al.*, 1997; van Steenis 1979). However, it is not clear if the figures of Monk and van Steenis are revised downwards by the work of Van Welzen *et al.* (2005) or if Timor is unusually rich in endemic species compared to the rest of the Lesser Sunda Islands.

1.3 SCOPE AND OBJECTIVES

1.3.1 Purpose

The purpose of the work was to “contribute information on flora to the identification of conservation priorities and management guidelines for the proposed Park”.

1.3.2 Objectives

The major objectives were to

build knowledge of the floristics of the proposed Park;
provide baseline data on the distribution and abundance of the flora of the proposed Park;
provide preliminary assessment of species’ distribution and abundance in the proposed Park, including preliminary identification of those that are of restricted distribution and
train East Timorese staff in rapid vegetation assessment, systematic botanical survey and site survey techniques.

1.3.3 Activities

Under the terms of the agreement the following activities were to be undertaken:

Agree equipment needs with project staff, and obtain equipment;
rapid field surveys to collect key plants species to assist preliminary identification and conservation status assessment of plant communities in the park;
in the field training programme for c. 15 trainees from Forestry, Environment Dept, District staff, local community, local NGOs, other govt. areas;
Dili-based training programme for same staff;
participation, as appropriate, with project staff and counterparts, in meetings with Government agencies, NGOs, universities and embassies;
presentations of tentative survey results to District level govt and MAFF (recognising that few species identifications will have been made at this time); and
coordination, preferably working in the field, with a zoologist carrying out faunal surveys to be contracted separately.

1.3.4 Outputs

Outputs from the work were to include:

A written report covering field survey results and discussion, including previous data; narrative sections, with full datasets in appendices and electronically; a training report and recommendations for further capacity-building; and recommendations on priorities for conservation and management for the Park, based on flora survey data collected.

Specimens of each plant collected, where possible, were to be retained in the Northern Territory Herbarium, with a duplicate also stored for a possible future herbarium in East Timor, and 1 or 2 duplicates to be sent to specialists elsewhere for final identification. Label data are to be stored on databases and made available to the public at least partially on the Australian Virtual Herbarium.

2 METHODS

2.1 TIMING OF SURVEYS

A two-week trip to East Timor was made from Monday 26th September returning to Darwin on Monday 10th October with a second trip from Saturday 18th February, 2006 to Thursday 9th March, 2006. On each of the two visits, seven days were spent on field survey and field training in the proposed National Park area with a days travel at either end of the survey. Other time in Timor was spent in preparing and delivering training material, organizing and preparing equipment for the field trip, in debriefings, in a workshop to delineate and put forward recommendations on the proposed Park, in other meetings, in preparing plant specimens and completion of quarantine clearances and CITES declarations for export of plant specimens.

2.2 BACKGROUND ON FLORA AND VEGETATION SURVEY

In assessing biodiversity of an area, two main types of plant survey are commonly undertaken:

Flora survey – a survey of the plant species occurring in an area together with distribution, abundance and habitat, either quantitative or descriptive.

Vegetation survey – An assessment (identification, delineation) of plant communities and their distribution, floristic composition and structure.

In practice, both types of survey can be done at the same time provided sufficient trained staff, time and resources are available. However, there are often important distinctions between the two in terms of goals and outcomes. In many cases, **vegetation surveys** seek to document the plant communities in an area and these are usually defined by the dominant woody species. More emphasis is placed on vegetation structure and dominant species cover values and less common, minor or difficult-to-identify species are in some cases neglected. This is can be because of an emphasis on documenting the dominant stratum for mapping purposes, because field work tends to be undertaken during the dry season when most annual and many perennial herbaceous plants are inactive and in some cases due to lack of specialist plant identification expertise in field staff. The fundamental unit of vegetation description and mapping in Australia is the plant association. This is a vegetation community of defined floristic composition and structural form. Outputs from vegetation surveys can include vegetation or land unit maps, descriptions of communities and assessment of their distribution and abundance, together with lists of the more common species.

Flora surveys attempt to document the diversity of plant species occurring in an area and often place less emphasis on quantitative sampling and documenting the structural attributes. They usually include information on the floristic and habitat associations of the species, but this may not be as quantitative as for a vegetation survey. Flora surveys are ideally undertaken at the best time of year for detecting the most plant species. In areas with highly seasonal rainfall distribution and many annual species this is at the end of the wet season. However, field work at other times of year is also needed to detect the full range of species. For example in the monsoonal tropics of Australia, geophytic perennial species frequently emerge from the ground and flower early in the wet season while closed forest trees often flower during the stormy period before the monsoon arrives. Outputs from a flora surevey would include at a minimum a checklist for the area, but could include an annotated checklist or report with quantitative or descriptive information on habitat preferences of species, associated flora, lifeforms, threatened status of species, weed status, endemic status, and coarse or detailed distributional information.

2.3 SURVEY OF THE PROPOSED PARK

Given that the surface geology of the Park area is dominated by just one rock type (limestone), the area was broadly stratified for sampling purposes on the basis of topography. Sampling (both floristic inventory and vegetation quadrats) were then focused in different vegetation units around 4 base camp sites (Malahara, Ira Malaro, Lore and Mt Paitxau) which encompassed much of this topographic variation. Additional collections were made and additional quadrats were laid out in some other vegetation units as opportunity presented (such as the swamp forest and floodplain near Bauro), so as to achieve better coverage. In total 12 vegetation types were sampled both opportunistically and using cover / abundance quadrats. The location of quadrats and of collecting sites is shown on Fig. 1. Monk *et al.* (1997) note the difficulty of undertaking botanical work in primary rainforest because of the high diversity of tree species, difficulty of accessing the canopy to collect specimens for identification and the often long non-flowering periods of trees (5 yrs or more). The frequency of fertile individuals in any one species, even 'in season", can also be very low. The quadrat methodology adopted is similar to that for many surveys undertaken in Northern Territory and the plot proforma for recording data is included in an associated Excel spread sheet in both English and Indonesian (draft) versions.

Figure 1. Location of vegetation plots + and collecting sites ○ in the proposed Park, 2005-06. Location of tree frequency transects are also indicated ▲ (from data of Santana 2005).

In this instance, more emphasis was given to flora survey than vegetation survey for a number of reasons. First, a good knowledge of the flora is a prerequisite to and underpins vegetation survey work in the proposed Park. Flora survey is also fundamental to any assessment of rare and threatened species there. Good documentation of the flora would also allow better evaluation of pre-existing tree survey data for that area (by linking local names used by Santana (2005) with scientific names). Also, the development of tools for plant identification derived from flora survey allows the western scientific names to be connected to local knowledge of the flora and the many locally used common names of trees. To do an extensive vegetation survey of the area in the time available would have required using a rapid vegetation assessment methodology recording dominant species only and assessing many geographically dispersed quadrats.

In order to make any reasonable description of the flora and vegetation at other than a general or structural level it was necessary to collect many plant specimens. Specimens were field-preserved using a modern variation of the Schweinfurth technique developed in Africa for use in wet tropical conditions (Forman and Bridson 1989). Specimens were numbered with soft pencil, pressed between folds of newspaper and tied in bundles. These bundles were placed in heavy duty plastic bags and soaked in 70 % ethanol to preserve them until they could be returned to NT herbarium where they were placed into normal plant presses and dried at 50°C. On return to Australia, specimens were heat treated or Gamma irradiated to meet Australian Quarantine and Inspection Service requirements.

2.3.1 Identification of the Flora

A number of resources proved useful for identification of the flora. First among these was Flora Malesiana which covers around 45 % of Malesian plant families. However, in many instances perfect specimens (i.e. leaves, flowers and fruits) are required to use this reference effectively for identification and much of the material available was far less than perfect. The interactive 'Australian Tropical Rain Forest Plants' was of particular use here with perhaps 10-20 % of its c. 2150 species known from Malesia as was 'Spot Characters of Malesian Plants' (van Balgooy 1997; Hyland *et al.* 2002). Also of particular use were the recently published Native Plants of Christmas Island (Claussen 2005) (50 % or more of its 118 species are known from Timor), 'Flora of Java' (Baker & van den Brink 1963-8), 'Ferns of Queensland' (Andrews 1990), 'A Manual of New Guinea Legumes' (Verdcourt 1979), and the interactive DELTA based, generic level 'Key to Borneo Trees and Shrubs' (Jarvie & Ermayanti 1995). A proportion of the flora also occurs in Northern Australia and was already known to the author, with specimens in NT Herbarium against which to check identifications. In addition, a host of other papers and journals were also consulted. There were numerous species that were not seen with any reproductive parts during the survey and for many of these attempts at identification of sterile material proved futile. Thus, many of the species recorded on plots remain without scientific names. As indicated previously there are no recent checklists less than 120 years old for the Island or Timor-Leste, no field guides or local floras and no scientifically knowledgeable locals.

2.3.2 Resources for Plant Identification

One objective of the work was to develop and provide resources so that plant identification would be easier for future survey work and a number of relevant more popular publications were provided to work shop participants and MAFF. To this end, it was also intended that plant material would be collected to make a field reference herbarium for use by MAFF staff in Timor-Leste. During the first field trip many specimens were collected for this purpose. Also

on this trip, many photos of fresh-pressed plant specimens were taken in the field to be used as a supplement to the field herbarium. However, it soon became evident that the reference collection photos had a number of practical advantages over dried specimens. Photos can be distributed to many places (either electronically or in hard copy) rather than just one place, they can be reprinted when copies wear out rather than needing to be recollected and they do not need mounting on sheets of paper or careful storage like dried specimens. Also, because specimens are fresh when the photos are taken, plants look more life like, which is an advantage for many potential users. Disadvantages are that details such as fine structures, flower parts and hair types can't be examined and that reprinting photos may be relatively expensive in Timor-Leste. However, the inability to examine detail appears to be a minor disadvantage in the present circumstances as none of the training participants are expected to operate at the level required of a professional botanist and do not show such inclinations. The expense of reprinting is certainly much less than the cost of recollecting specimens for a new reference herbarium.

On the second trip, most plant species collected were photographed as fresh pressed specimens, with some others photographed in the field as live specimens. Photographs of a number of species were already known to be available from the NT Herbarium photograph collection and these species were not photographed further. As tropical forest trees are frequently identified by their bark and bark blazes, a number of photos of these were also taken to assist identification.

3 RESULTS AND DISCUSSION

3.1 INVENTORY OF VASCULAR PLANT SPECIES

3.1.1 Number of Species and New Timor Records

Approximately 730 plant species are recorded for the proposed Park area, utilising available information from a variety of sources (Whistler 2001, C. Trainor *et al.*; Appendix 1). Of these, 391 taxa (54%) are presently identified to species level although many of these identifications are tentative and need to be checked against herbarium specimens overseas. During the two field trips, approximately 600 names were recorded with 450 vouchered plants specimens collected for identification or checking purposes. At the time this report was prepared only the first 250 specimens were available for identification, with collections from the Feb-Mar 2006 trip arriving in Darwin from AQIS on 10th April. It is expected that drying and initial identification of these will take 3-4 weeks. Consequently, plant identifications for the second trip are based on photographs or are field identifications and should be regarded as preliminary. In addition, specimens of many taxa need to be sent to specialists interstate or overseas for final identification or checking. Thus, it is expected that the checklist from the present survey may not be reasonably settled for another 6-12 months. During both field surveys many species were sterile and not readily identifiable and in October a large number of tree species from the deciduous forest were leafless as well. Thus 43 species are known only by a local name and a large number of taxa remain to be recorded (see below). Species names, local names, collectors voucher numbers and type of collection made are given in Appendix 1. Appendix 2 gives names sorted alphabetically by Bahasa Fataluku name.

On the present, preliminary figures 22 species are new records for the island of Timor and this represents 4.9 % of the vouchered specimens. This number is likely to increase significantly as more collections are identified and distributional information checked. However, for many species distributional information is not available in the literature and can only be derived by examining collections in overseas herbaria. Considering that only 54% of taxa are identified to species level, the final proportion of new records for the island of Timor may reasonably be in the order of 10%. The proportion of new records for Timor-Leste is likely to be significantly higher, given that much of the early flora survey work seems to have been concentrated in West Timor. Detailed analysis of the composition of the flora and comparison with other areas is probably premature at this stage. No Timor endemic species are recorded at this stage. Further preliminary comments on the flora are made below.

3.1.2 Features of the Flora

Although data are far from finalised, some preliminary observations on the flora of the area are made. Numbers of species by life form were 212 tree species, 84 shrub species, 194 herbaceous species, 104 vines, 47 ferns and 11 epiphytes (non ferns) with 67 unclassified. The Park contains a well developed tropical closed forest flora as reflected by the large number of tree and vine species. However, diversity is likely to be lower than on the wetter, older islands of the region (e.g. Seram, Sulawesi) or in larger areas such as North Queensland, Borneo or New Guinea. For example, 47 species of fern were recorded during the survey and most of these were from higher elevations in the Paitxau Range. Considering only one site has been sampled in that area, it is likely that many more species will be found to occur in the Park. However, the fern flora of Seram is regarded as exceptionally rich with some 700 species known and it would appear highly unlikely that the Timor fern flora would approach this level (Kato 1992 in

Monk *et al.* 1997). At the same time the Park is likely to support a suite of dry adapted trees and shrubs which are absent from wetter islands.

A particular feature of the primary forests surveyed (ever-wet, semi evergreen, moist deciduous forests) is the abundance and frequently dominance of tree species with relatively large fleshy fruits. While fleshy or other bird attractive fruits are the most common fruit type among woody plants in all the closed forest communities examined, the primary forests feature among their dominant trees a suite of species with fruits of 30-50 mm length or diameter (e.g. *Syzygium* sp. (red paper bark), *Pouteria nitida, P. linggensis, Canarium vulgare, Syzygium* sp. (white bark), *Myristica rumphii, Cerbera manghas* (fruit are smaller than NT, and there are red and white fruited forms). Notably, these large fruited taxa are absent from the (secondary) dry deciduous forest and thorn forest. These large fruited tree species may well be linked to the restricted distribution of a number of larger pigeon species (C.Trainor pers. com). In turn, the trees are likely to be dependent on these pigeons and probably also flying foxes for dispersal of seed. Likewise, the presence of large fruited trees in intact natural closed forest communities across an altitudinal gradient from sea level to over 800 m ASL may provide these vertebrates with a spread of food resources ripening at different times through the year.

Apart from these large fruited species the rest of the flora of the Park appears to be dominated by species which produce fleshy or other bird or bat attractive fruits. A similar phenomenon has been noted for the closed forest flora of the Northern Territory by Liddle *et al.* (1994) while Hyland *et al.* (2002) record that 63 % of all tropical Australian rainforest flora have fleshy fruit with many additional species in the dry fruit category also having bird attractive fruit or seeds. Birds and bats may have played an important role in dispersal of species both locally and between islands. For example, flying foxes (*Pteropus alecto*) are recorded as foraging on fruits of rain forest trees including *Timonius timon, Syzygium nervosum, Nauclea orientalis* and *Ficus* spp. at distances of up to 29 km from roosting sites, with rates of gut passage for seeds of < 1 hr (Palmer & Woinarski 1999; Palmer *et al*. 2000). Forbes (1885) recorded the occasional appearance of vagrant flying foxes on the Cocos Keeling islands, more than 1000 km from the nearest island (Sumatra) and it may be possible that seeds are sometimes dispersed such distances by these animals.

Overall the diversity of fig (*Ficus*) species in the area is of interest, with around 15 taxa recorded. In many cases, these fig species can be regarded as so called keystone species which support extensive communities of fruit eating birds and are likely to be particularly important, especially where they occur at a permanent water source or spring which acts a refuge in an otherwise seasonally dry landscape. These large fruit bearing trees, especially where left in a disturbed area or abandoned ladung, may also act as founder sites for forest regeneration because they attract large numbers of birds and bats and these in turn deposit seeds of many other forest species.

3.1.3 Adequacy of Flora Survey

Survey of the flora of the Park area is likely to be far from complete. The approx 730 species recorded certainly represent only a fraction of those likely to occur in the area. As can be seen from Fig. 2, new species were still being recorded at a high rate even after 12 full days and five partial days of survey. Although the curve does show some flattening out during the course of the two survey periods, this may be as much for logistic reasons (such as persistent heavy rain reducing the efficiency of survey, increased time spent in photographing plants and extra time needed to access the Paitxau range (Ira Mimiraka) site) as due to declining rates of detection for extra species. On surveys of this type, all species recorded on the first day are new records

for the survey. The proportion of new species at any particular site then declines rapidly as the common species are recorded in the first few days. The process is repeated on moving to a different site and habitats, but as the sampling of habitats and different geographic areas becomes more complete the number of new records for the survey gradually declines. At the time of the September /October survey, the dry season was at its height with many woody species sterile, leafless and not readily identifiable, while the annual flora was largely senescent. The deciduous forest types were not revisited during the February-March 2006 survey and so many of these deciduous trees remain unidentified. In addition, another 200 or so species were recorded as unidentified sterile collections or by local names only and have not been included in this graph. Considering the range of climate types and habitats and given that the flora of Timor is estimated at 2,500 species it is considered that the flora of the National Park area could realistically be of the order of 1,200–1,500 vascular plant species.

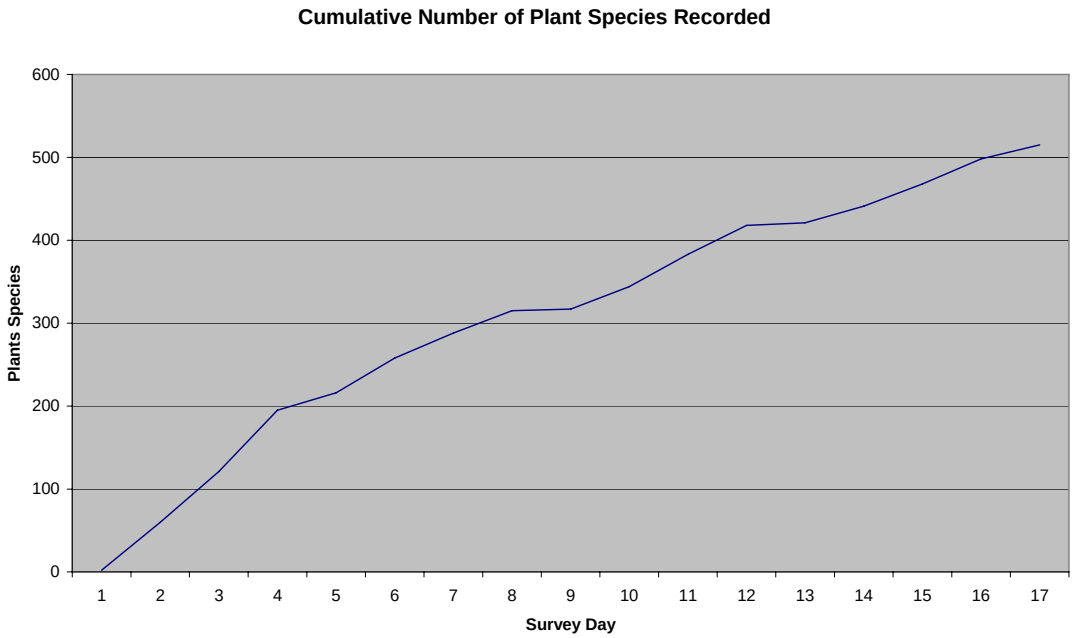

Figure 2. The cumulative number of plant species recorded as collections during the survey. Flat spots on the curve represent days when the base camp was moved or established and few plants were collected.

3.1.4 Plant Species of Particular Conservation Interest

Three species, all commercial timber tree species, are listed as threatened by IUCN (IUCN 2004) (see below). There are likely to be many more species that are data deficient with little known of population size, extent of occurrence, area of occupancy, population trends and threats. Considering that many of the forest communities in which these species occur are under pressure from various destructive human uses, a number may well prove to be threatened after a full assessment is complete. This is likely to be especially true of Timor endemic species restricted to habitats that have been extensively converted for human use (deciduous forest, thorn forest, coastal forest). In addition, it is likely that for rarer or more specialised plants, the distribution of the broad community types in which they occur will over estimate the extent of occurrence and they will be more restricted.

The number of endemic, restricted range and threatened plant species known from the area is likely to increase significantly as further identifications are complete. As discussed above, the species list for the area is far from finalised. Widespread species are generally easier to identify as they are more likely to be covered in the literature. For example the widespread *Barringtonia asiatica* and *B. racemosa*, although not yet treated in Flora Malesiana, are described and in some cases illustrated in publications dealing with the flora of parts of northern Australia (Henderson 1982; Hyland *et al.* 2002; Claussen 2005), Java (Backer and van den Brink 1963-8) and other parts of Asia such as Sri Lanka (Macnae and Fosberg 1981) or are already known to the author. On the other hand endemic and restricted-range species are usually more difficult to identify, unless they are treated in Flora Malesiana or a recent revision. In many cases, the only available literature is often inadequate in modern terms, consisting of the brief (and difficult to access) original 1700's or 1800's description, frequently without an illustration. Also, herbarium specimens of these taxa are likely to be fewer and more difficult to access from Timor-Leste or Australia as they are largely held in major European herbaria such as Kew and Leiden. In any case, sterile or incomplete collections or those from large, complex genera can be difficult to identify with certainty from the literature and particularly need to be checked against specimens.

IUCN Red List Species for Timor-Leste & Indonesia

Intsia bijuga (IUCN Red List VU A1cd) – A scattered and reasonably common tree of primary semi-evergreen rain forest, moist deciduous forest and coastal forest. A major commercial timber species which is the subject of illegal harvesting. Occurred at low to moderate frequencies south of the main range from Tutuala to west of Lore (Santana 2005) but also at Malahara.

Pterocarpus indicus (IUCN Red List VU A1d) – A major commercial timber species which is subject to illegal harvesting. Occurred at low frequency on Jaco Island and near Lore and low to moderate frequencies south of the main range between Tutuala and Lore (Santana 2005).

Santalum album (sandalwood) (IUCN Red List VU A1d) – A small evergreen, parasitic tree occasionally present in the dry deciduous forest near Ira Malaro and in dry coastal forest near Lore. Illegal harvesting is reported to be rife and the few individuals seen at Ira Malaro had deep machete cuts in the trunk. This species is also listed as a threatened plant in Nusa Tenggara by Monk *et al.* (1997).

The name *Dalbergia latifolia* (IUCN Red List VU A1cd) has been used in the Park. During the survey, this name was applied locally to a purple-flowered leguminous tree species found in the dry deciduous/thorn forest around limestone outcrops at Ira Malaro and perhaps elsewhere. However, the specimen collected against this name appears to be *Millettia xylocarpa* (Fabaceae) rather than a species of *Dalbergia.* From the limited available distributional information it appears that *Dalbergia latifolia* may not occur in Timor.

Species that may be threatened

Antiaris toxicaria (Fig. 3.) – A deciduous tree common in the dry deciduous forest at Ira Malaro between Com and Mehara. This species is listed as a threatened plant of Indonesia by Monk *et al.* (1997). Also recorded at low frequencies south of the main range in the Tutuala to Lore area (Santana 2005).

Neoalsomitra podagrica (provisional id) – This peculiar Cucurbitaceous vine with a spiny, swollen base was common in dry deciduous forest at Ira Malaro between Com and Mehara. It is a limestone specialist species and is reported to be otherwise known only from West Timor, Semau, Alor and southwestern Sulawesi (de Wilde & Duyfjes 2003).

Carallia brachiata (Oi) – An occasional component of semi-evergreen rain forest and swamp forest but widespread in the region. This tree species is listed as a threatened plant of Indonesia by Monk *et al.* (1997).

Cycas rumphii – This taxon is listed by IUCN as Near Threatened and in decline and thus the remaining wild stands in conservation areas are particularly important. Cycads world wide are recognised as being in decline through habitat destruction and over harvesting for horticulture. An occasional component of semi-evergreen forest at Malahara and moist deciduous rain forest near Lore. Also recorded occasionally south of the main range between Tutuala to Lore (Santana 2005).

Eleocharis geniculata – According to van Steenis (1979) a rare sedge and in the Lesser Sunda Islands only found in Timor. Recorded as an occasional component of vegetation on the floodplain of Lake Ira Lalaro.

New plant species records for Timor

As indicated previously, 22 species are currently thought to be new literature records for the Island of Timor. The number of new records for Timor-Leste is not known, as in most cases distributional information in the literature is not detailed enough. Although few data on distribution and abundance are available, the fact that they have not been recorded previously suggests that some are likely to be rare or of restricted distribution on the island.

Aglaonema marantifolia (Araceae) Fig. 3. A common understorey herb at Malahara and also present at Lore. The genus has not previously been recorded for Timor and the species is otherwise known to occur from the Moluccas to New Guinea (Hay *et al.* 1995).

Aglaia lancilimba or affin. (Meliaceae). A tree recorded at Malahara in semi-evergreen rain forest. The species is known to occur from Bali to the Philippines but was not recorded from Timor (Pannell 1992).

Alchornea rugosa (Euphorbiaceae) – An occasional shrub recorded as an understorey in dry deciduous forest at Ira Malaro. Occurs naturally from the Nicobar Islands to Northern Australia, but not previously recorded from Timor (Airy Shaw 1982).

Alstonia actinophylla (Apocynaceae) Fig. 3. – A corky barked tree with milky sap which occurs in the dry deciduous forest and thorn forest at Ira Malaro. Otherwise known from the Moluccas, New Guinea and northern Australia (P.Forster pers.comm.). Although the name *A. microphylla* has been used locally for this species, the name appears to be not validly published according to the International Code of Botanical Nomenclature.

Baumea rubiginosa (Cyperaceae) – A robust perennial sedge common in the floodplain sedge/grassland around Lake Iralalara. A polymorphic species otherwise known from Sri Lanka to New Zealand but previously thought to be absent from Timor (Kern 1974).

Colocasia gigantea (Araceae) – An occasional understorey herb in primary forest at Malahara and in the swamp forest at Bauro. The species has not previously been recorded for the Lesser Sunda Islands or Timor but is known from Java and the Malay Peninsula (Hay *et al.* 1995).

Crateva religiosa (Capparaceae) – This tree species was recorded from the swamp forest at Bauro. It also occurs from India to Northern Australia, typically in periodically inundated forest communities. In some countries, the species is of spiritual significance and is planted around temples. Not recorded from Timor by Jacobs (1960).

Dendrophthoe curvata (Loranthaceae) (provisional id) – A mistletoe species recorded from secondary forest on the upper lake margin. Widespread from Sumatra to Northern Australia but previously thought to be absent from the Lesser Sunda Islands (Barlow 1997).

Dimocarpus longan ssp. *malesiana* (Sapindaceae) – The wild progenitor of the cultivated longan and widespread in the Malesian region (Adema *et al.* 1994). Recorded from the semi evergreen rain forest as an occasional component.

Euroschinus falcata (Anacardiaceae) Fig. 3. – This genus was previously thought to be restricted to Australia, New Caledonia and New Guinea and the species restricted to Australia (Ding Hou 1978). One tree was recorded in dry deciduous forest at Ira Malaro and it appears to be a rare species in the area.

Ficus microcarpa (Moraceae) – A fig species found from Sri Lanka to N Australia but not apparently recorded from Timor previously (Berg & Corner 2005). Occurs in swamp forest at Bauro and dry deciduous forest at Ira Malaro. Previously confused with *F. benjamina* in the field.

Ficus gul (Moraceae) – A fig species known from Flores & Borneo to Solomon Is but not apparently recorded from Timor previously (Berg & Corner 2005). Recorded from primary semi evergreen forest at Malahara and from dry deciduous forest at Ira Malaro.

Haplolobus floribundus (Burseraceae) (provisional id). – This genus has not been recorded in the literature from Timor (Leenhouts 1956, 1972). The species was provisionally recorded by Whistler (2001) but apparently with out collecting a voucher specimen for checking. No fertile material was seen during the current survey so positive identification remains problematic but from Leehouts (1972) *H. floribundus* subsp. *moluccanus* appears most likely. Common in semi evergreen forest at Malahara and in moist deciduous forest at Lore.

Homalomena sp. (Araceae) – A common understorey herb at Lore. The genus has not previously been recorded for the Lesser Sunda Islands or Timor but is widespread in the Malesian region (Hay *et al.* 1995).

Horsfieldia sp. (Myristicaceae) – A tree of the nutmeg family and an occasional component of the moist deciduous forest at Lore. The genus has not previously been recorded for Timor (de Wilde 2000).

Hypoxis aurea (Liliaceae) – A small perennial herb with yellow flowers produced at ground level. This species was found on the edge of Teak plantation adjoining grassland at Lore. The collection made represents the first record of the genus from Timor (Geerinck 1993). The population occurred over an area of c. 0.5 ha, although non flowering plants are difficult to distinguish from sterile grasses and it is thus difficult to survey.

Myristica lancifolia (Myristicaceae) – A tree of the nutmeg genus and an occasional component of the semi evergreen forest at Malahara and moist deciduous forest at Lore. Occurs from the Moluccas to Northern Australia (de Wilde 2000).

Ochrosia oppositifolia (Apocyanaceae) – A small tree found in strand vegetation at Lore. Occurs from Sri Lanka to Tahiti but not recorded in the literature from Timor (Hendrian 2004).

Pouteria nitida (Sapotaceae) (provisional id) – One of the dominant tree species in semi-evergreen forest at Malahara and also common in the lowland evergreen rain forest at higher elevations. An important timber species in the region and subject to some illegal harvesting. Widespread from Sumatra to western New Guinea but not recorded from Timor by van Royen (1957) in his revision of the genus.

Pouteria linggensis (Sapotaceae) (provisional id) – A large fruited forest tree recorded in swamp forest at Bauro. Occurs from the Malay Peninsula to N Australia and Fiji but not recorded from Timor by van Royen (1957).

Polyscias nodosa (Araliaceae) (provisional id) – Neither the genus or species has been recorded from Timor in the literature (Philipson 1979). The species occurs from Java to the Solomon Islands and was recorded in primary, semi evergreen forest at Malahara

Ptychosperma sp. affin. *P. macarthurii* (Arecaceae) – A palm species recorded from lowland evergreen rain forest near Mt Paitchau. The genus has not previously been recorded from Timor but was known to extend from the Moluccas to northern Australia (Essig 1978). Species delimitation remains problematic and the genus is in need of further collection and ultimately revision.

3.2 PLANT IDENTIFICATION TOOLS

Photographs were taken in Timor of 257 mostly fresh-pressed plant specimens as well as of the bark/blaze (slash) of 45 species of tree. Additional photos of 82 species where taken from the NT herbarium photograph collection, giving coverage of approximately 370 species, allowing for some overlap of species between categories. Photographs have been grouped by life form (tree, shrub, herb) and put onto CD for distribution. Examples of each of the three types of photograph are shown in Fig 3. In addition, line drawings from NT Herbarium publications are available in digital form for many species, although these are yet to be assembled. Higher quality photos are also available from the Herbarium collection for some taxa, but again are yet to be assembled. Another project is to fill in gaps in the coverage of common species in the images and assemble these and other available images, with identification notes, into an electronic publication.

Extra material of more than 100 species was collected specifically to build a reference herbarium for the project. These are stored under temperature, humidity and insect controlled conditions at NT Herbarium, Darwin until such time as they may be required in TL.

As part of this activity, local names of plants were recorded and databased along with scientific names. While some progress was made in recording local names, the task was complicated by the fact that Tetun and Fataluku language names are in use and names used at Lore are different again (people were moved there from the mountains during Indonesian times). In

some cases, usage of the same name varied between informants. Many visits would be necessary to resolve inconsistencies and there is still much work that could be done in this area.

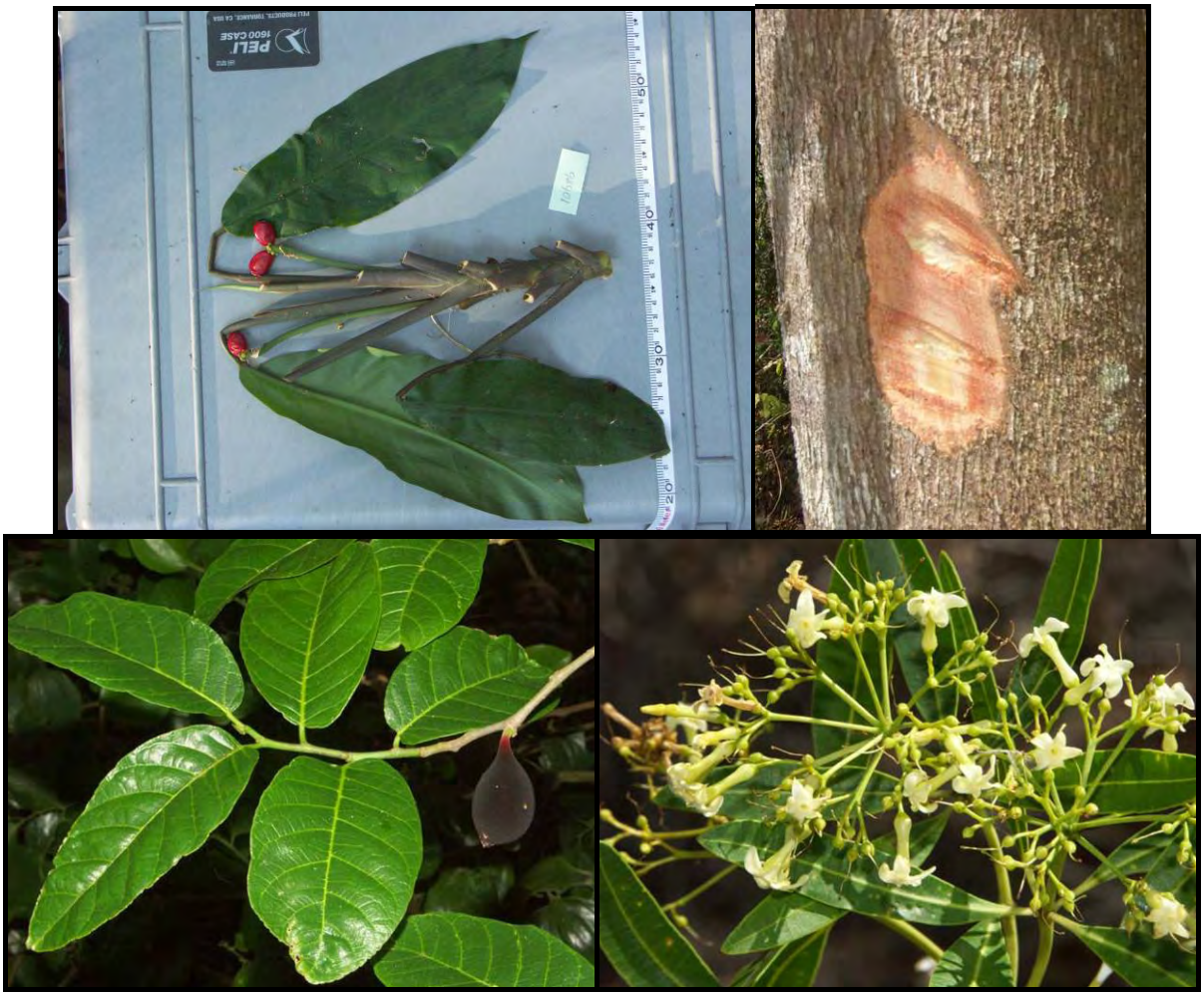

Figure 3. Examples of photographs taken for use in plant identification. A – *Aglaeonema ?marantifolia* (fresh-pressed plant specimen); B – *Euroschinus falcata* (bark blaze); C – *Antiaris toxicaria* (living specimen photographed in field near Darwin, from NT Herbarium collection); D – *Alstonia actinophylla* (living specimen photographed in field near Ira Malaro). All photos by author.

3.3 PLANT COMMUNITIES

The natural vegetation of the proposed NP is dominated by closed forest communities, with the exception of vegetation associated with Lake Ira Lalaro and its floodplain and some small areas of palm savanna, grassland and shrubland along the coast. The intact vegetation of the proposed Park includes an entire altitudinal/edaphic/climatic continuum from sea level to the crest of the Paitxau range, an extended rainfall gradient receiving over 2000 m (ever wet) at one end and probably less than 1000 mm (strongly seasonal) at the other and a drainage gradient from well drained to permanently flooded. As a consequence a broad range of closed forest and other plant communities are represented with many of the links between different communities and organisms still intact. For example, climatic differences can mean that fruiting plants may be present in different communities at different times of the year and because these communities are in close proximity and not fragmented, foraging birds and bats can effectively utilise these resources. In turn the birds and bats are also likely to disperse seed

from place to place, assisting seeds to find suitable sites for establishment and aiding re-establishment. There is considerable value in maintaining the integrity of the area as a whole as it can then support wide ranging organisms that need to use a number of forest types at different times. Its value as a whole is much greater than the sum of the component parts. However, from a wider perspective, a number of natural vegetation types known from Timor-Leste are not represented in the Park, including *Eucalyptus* and *Acacia* dominated savannas. Conservation these types can only be achieved by setting aside areas elsewhere.

The proposed park area contains what is probably the largest remaining area of natural closed forest vegetation on the island of Timor. Existing forest cover in Timor is shown in scattered areas along the south coast but with smaller remnants elsewhere as well (Monk *et al.* 1997). From aerial photographs, aerial observation and ground survey the former closed forest areas of Timor-Leste typically consist of a mosaic of secondary forest and grassland perhaps with primary forest fragments. Monk *et al.* (*loc. cit.*) also shows some areas of perhaps 1000 ha of "mixed tropical monsoon forest" in west Timor as well as a number of small areas. The quality and degree of fragmentation of these is not indicated. On-ground surveys have revealed there are no other areas of closed forest of anywhere near this size in Timor-Leste and the largest remaining forest area in west Timor is in poorer condition than the Park (C. Trainor pers. comm.).

3.3.1 Classification of Plant Communities in the Region

The classification of closed forest communities used here follows that used by Monk *et al.* (1997) and was developed using a wide body of knowledge derived from the two main blocks of rainforest in SE Asia, including Peninsula Malaysia, Sumatra, Borneo, Sulawesi and New Guinea. This system is based on structure, life forms present and on the environment - that is on water availability (rain fall and number of dry months), soil type and altitude and is quite broad. These environmental characteristics in turn affect the predominant leaf size, life forms present, degree of deciduousness and height of vegetation and in many situations vegetation can be further classified both structurally and floristically. Relevant parts of the classification are summarised in Table 1.

As background in assessing the relative abundance of communities, Monk *et al.* report that 41% of ET is covered with forest (based on 1972–86 satellite imagery), apportioned as follows (in km^2): Tidal (mangrove forest) – 0; Coastal forest – 11; Swamp forest – 57; Heath-like – 161; Moist primary lowland forest below 1000 m asl – 3301; Moist submontane forest at 1000–2000 m asl – 98; forest on limestone rock – 400; mixed savanna – 1707; Total forest cover – 5735. It should be kept in mind that these forest cover values are likely to have declined substantially in the past 20–30 years due to increasing population pressure. Also, these figures take no account of quality or degree of fragmentation and disturbance of remnant vegetation.

Forest Formation (Monk *et al.* 1997)	**equivalent Whistler community**	**Climate**	**Soil Water**	**Elevation**	**Type Soils**	**Dominant influence**	**Climatic type**	**Biological features**
Freshwater swamp forest	Swamp forest	Everwet	Periodically high	Lowlands	Aquepts	Regular inundation	NA	
Lowland evergreen rain forest		Everwet	constant	0–1200m	Utisols	Climate	>2000 mm rainfall; <2 dry months	Evergreen, >30m in ht; lge vines, epiphytes common; epiphytic filmy ferns, *Nepenthes* present; *Calamus* main palm; buttresses, cauliflory/ ramiflory common
Forest on limestone rocks		Everwet		0–1200m	Mollisols	Soil depth	>2000 mm rainfall	Not known
Semi-evergreen rain forest		Seasonally dry	Short seasonal water shortage	0–1200m	Utisols	Climate	>2000 mm rainfall; 2–4 dry months	Up to 33 % deciduous spp; lower diversity; vines abundant; less buttresses & cauliflory/ramiflory
Moist Deciduous forest	Lowland alluvial forest; Lowland limestone forest?	Seasonally dry	Moderate seasonal water shortage	0–1200m	Tropepts	Monsoon climate	1500–4000 mm rain fall; 4–6 dry months	Dominants > 50% deciduous spp; canopy >25 m, rarely dense and even; lge woody climbers pres; bamboos in undergrowth; sub dominants and understorey evergreen.
Dry deciduous forest	Lowland limestone forest?	Seasonally dry	Marked seasonal water shortage	0–1200m	Tropepts	Monsoon climate	<1500 mm rainfall; 6+ dry months	>90 % deciduous canopy; rarely over 25 m, close but uneven; undergrowth of shrubs and some grasses.
Thorn forest		Seasonally dry	Marked seasonal water shortage	0–1200m	Tropepts	Monsoon climate	<1000 mm rainfall; 9+ dry months	Deciduous; xerophytes and low thorny trees dominant, esp. Acacia; canopy ± broken, few climbers, thin grasses & much bare soil
Savanna		Seasonally dry	Marked seasonal water shortage	0–1200m	Tropepts	Monsoon climate	<1000 mm rainfall; 9+ dry months	<70 % projective foliage cover of trees; presence of a well developed grassy stratum.

Table 1. Environmental relationships of closed forest formations in Nusa Tenggara and Maluku (adapted from Monk *et al.* 1997)

3.3.2 Limitations of the Conceptual System and Difficulties of Application

As Monk *et al.* (1997) stress, these community concepts are not always easy to interpret in the context of Nusa Tenggara and thus Timor-Leste because of differences in soils, climate and flora from the areas where the system was developed. In particular, differentiation of tropical rainforest types from so called monsoon forest is problematic. Essentially, the forest types recognised above are spread along a climatic/edaphic continuum and there are no clear lines of demarcation between types. Conceptually, the term rainforest has been applied to the wet end of the continuum and monsoon forest to the dry end. In the field, application of the concepts can also be difficult. Differentiation between types can depend on the relative abundances of a suite of characteristics (e.g. proportion of deciduous trees, frequency of various life forms and different structural features) rather than the strict presence or absence of particular diagnostic features. For example semi evergreen rain forest is reported to be difficult to distinguish from lowland rain forest except at the height of the dry season when the degree of deciduousness is apparent (Monk *et al.* 1997).

A second difficulty is in the identification of montane forest formations. In the small island ecosystems found in the region, forests similar to aseasonal montane forest can occur at elevations from 500 to 1000 m asl – much lower than the 900 to 1200 m normal in the main rain forest blocks elsewhere in SE Asia. It is the opinion of Monk *et al.* (with which I agree) that this lowering of montane forest zonation is correlated with the low cloud base attracted to isolated peaks and ridges and the local increase in moisture availability and cooling this causes. However, a variety of other causes are also proposed in the literature and some authors would probably not consider the montane forests in the NP to be true montane forest.

A third problem may arise in applying the concept of limestone forest. Most of the closed forest in the NP occurs on shallow soils over either broken or sometimes massive limestone and sometimes on steep slopes, yet exhibits much variation in floristic composition, structure, life forms and deciduousness. Lumping all of this variation into a single ‘limestone forest’ category did not appear a satisfactory solution to describing the vegetation of the proposed NP. In this report vegetation has been treated under the conceptual scheme for ‘normal’ closed forest vegetation. However, it must be recognised that the peculiar soil chemical properties associated with a limestone substrate (high Ca, Mg, pH) are likely to influence the composition of the vegetation in the NP and it may be distinct from closed forest formations on different soils elsewhere in the region. Whistler (2001) uses a category ‘lowland limestone forest’ which is apparently different from the Monk *et al.* concept of forest on limestone rocks (Table 1) but possibly equivalent to the dry or moist deciduous forest categories used here. It is not known if closed forest in the NP has been treated as limestone forest in published forest cover figures for Timor (e.g. Monk *et al.* 1997).

As discussed further below, interpreting the concept of coastal forest is also not necessarily straight forward.

3.3.3 Plant Community Types in the Proposed Park and their Status

Monk *et al.* (1997) have broadly mapped the putative, original vegetation formations for Timor based primarily on climatic and topographic evidence. For the proposed Park their map shows:

Evergreen rain forest associated with the higher slopes of Mt Paitxau Range,

Semi evergreen rain forest associated with the foot slopes of the Mt Paitxau Range, especially to the north and west,

Moist deciduous forest around Tutuala, in a narrow band along the south coast and on the southern slope of the Ira Malaro range,

Dry deciduous forest on the northern aspect of the Ira Malaro range,

Thorn forest on the northern aspect of the Ira Malaro range to the west of Com and nearer to Lautem.

Plant communities recognised for the Park and their significance are further described below and summarised in Table 2. The survey results and interpretation presented here should be regarded as preliminary and are based primarily on field observations and limited quadrat data from few locations without classification or ordination of the latter. The field information collected in Sept–Oct 2005, Feb–Mar 2006 has been supplemented using the previous work of Whistler (2001), Monk *et al.* (1997), C. Trainor (pers. comm.), aerial photography and inference from climatic and topographic information. In discussing the distribution of communities, although excellent digitised aerial photography is available it has not been possible to distinguish readily between different closed forest types on this imagery. It should be kept in mind that in reality many of the plant communities intergrade both floristically and structurally and the boundaries and distinctions between these are arbitrary and difficult to determine in the field.

At this point in time there is no structural/ floristic classification derived from vegetation data collected in the region. Development of such a classification would be the preferred alternative for describing the vegetation of the area in the longer term. To achieve this objective a more complete investigation of the phytosociology of vegetation in the Park and mapping of communities is ultimately needed and would be a study in itself. Such studies would often include: mapping of photo patterns; a combination of full species / dominant species structural & floristic quadrats (100–200 or more) to achieve extensive ground truthing of mapped patterns; recording of environmental attributes at each site and classification and ordination of full quadrat data.

Evergreen rain forest

Description The evergreen rain forest sampled was around 40 m tall and dominated by *Syzygium* sp. (red paper bark) and *Pouteria obovoidea* with occasional *Pouteria nitida* and *Pometia pinnata*. The mid storey comprised trees such as *Pisonia umbellifera* and *Myristica rumphii* and vines (*Flagellaria indica*, *Anamirta cocculus*, *Entada phaseoloides* and *Stephania japonica*) and epiphytes (both ferns and orchids) were also common. The understorey was dominated by ferns (e.g. IDC 11024) and shrubs particularly *Codiaeum variegatum*, *Lasianthus strigosus* and *Syzygium* seedlings. Twenty nine species were recorded in the one quadrat laid out in this community which is similar to quadrats in other forest types in the area. Eighty nine species were recorded altogether in this community and the montane forest. Vegetation at a spring at Ira Malaro probably also belongs in this category. That site was dominated by a number of fig species including the large (40 m), green trunked ‘suvule’ (*Ficus sp*). That area was not surveyed intensively due to lack of time and only 10 species were recorded.

Distribution This community occurred on the higher slopes on the Paitxau Range at altitudes of around 700 m but where there was deeper soil and is of relatively limited extent. Probably reasonably widespread in Timor-Leste at one time but less so than drier forest types. Outside the Park, most of this forest type is though to have been converted to agriculture and is represented there by secondary forest and fragments of primary forest.

Threats and Status Near Mt Paitaxu the community is not under immediate threat but this may not be the case elsewhere. Conversion for agriculture, illegal logging and harvesting of plants and other plant products are longer term threats. In the proposed NP, the habitat is often less accessible than the semi evergreen and moist deciduous forest and the immediate pressure thus less intense. In the longer term, it is likely to be converted as it can be found on pockets of better soil.

Species of particular interest Most collections are still to be identified but the palm genus *Ptychosperma* has not been recorded previously from Timor (Essig 1978).

***Pouteria nitida* - *Pometia* - *Syzygium* forest (putative semi-evergreen rain forest)**

Description Dominant tree species included *Pouteria nitida* (amachu), *Pometia pinnata* (malahu), *Syzygium nervosum* (akamu), *Syzygium* sp. (vahuro) and mucili (unidentified taxon, possibly a legume) with a wide variety of other species also present. Canopy height was around 30 m with emergent trees to 45 m. Common mid storey species included *Aglaia argentea, Calophyllum, Syzygium nervosum, Diospyros maritima, Pterospermum diversifolium* (deciduous) and various Lauraceae. Vines (e.g. *Anamirta cocculus, Cansjera leptostachya, Piper, Epipremnum pinnatum, Raphidophora*) were common, but ferns were rare. The ground layer may be sparse or more dense where the forest is disturbed. Common species included *Aglaonema marantifolia, Psychotria* and tree regeneration. In terms of species richness of this habitat, 217 species have been recorded with 115 not recorded at any other site (including collections both from the current survey and work of C. Trainor *et al.*), more than any other habitat (Fig. 4). However, it has also been the subject of more collecting effort than most other sites. On the quadrats 18 and 30 species respectively were recorded, which is slightly lower that moist deciduous and deciduous forest (Fig. 5). As Monk *et al.* note, a few species tend to dominate in a particular area. Many of the species are known only from sterile material and follow up work is needed to collect fertile material to enable identification.

Distribution Relatively large areas of good quality forest are present on the foot slopes of Paitxau range, to the south of Lake Ira Lalaro and probably extend to the east and west for some distance. Some areas of moist deciduous forest may also be included. The community was sampled near Malahara. This vegetation type was probably once relatively widespread in Timor and appears to be one of the more extensive of the remaining forest communities still occurring in the NP. It is associated with the high scenic values of the Paitxau range.

Species of particular interest Threatened species found in this vegetation included *Intsia bijuga*. *Carallia brachiata* occured in this vegetation type and is regarded as threatened by some authorities. Scattered populations of Cycas rumphii also occurred. New Timor records to date included *Aglaeonema marantifolia, Polyscias nodosa, Myristica lancifolia, Ficus gul, Dimocarpus longan, Colocasia gigantea,* and *Aglaia lancilimba*.

***Canarium - Calophyllum* forest (putative moist deciduous forest)**

Description This forest type has a canopy height of around 30–35 m with emergent trees to 40–45 m with *Canarium vulgare* a prominent component. Other constituent species included *Syzygium nervosum, Pterospermum diversifolium, Pometia pinnata, Calophyllum inophyllum* and *Corypha utan*. The more common mid layer species were *Cryptocarya* sp. *Haplolobus floribundus, Myristica lancifolia* and *Miliusa* sp. while common vines included *Cyathostemma glabrum, Embelia* sp. and *Hiptage benghalensis*. In the ground layer were juveniles of a number of tree species such as *Diospyros maritima, Drypetes* sp. *Corypha utan* and *Cryptocarya* sp. This forest occurred on gentle slopes or flat land, with good soil depth and may be equivelant in part to the lowland alluvial forest of Whistler (2001).

Distribution Extant moist deciduous forest appears to be restricted to the south coast of the proposed park around Lore and perhaps in small pockets between Lore and Tutuala (for example in Vero River valley), where access is more difficult. Similar forests would once have been widespread in wetter parts the wider region and SE Asia.

Threats and Status The area at Lore is under intense ongoing pressure from conversion to agriculture and is unlikely to survive another 10 years at current rates of conversion. The proposed park contains probably the best remaining example in Timor-Leste and it is also likely to be of regional (Timor–Nusa Tenggara) and international significance. This vegetation has been heavily exploited throughout Asia (including Timor) for agriculture (i.e. cleared and converted to coconut plantation and other forms of agriculture). Monk *et al.* (1997) note that there is little of any type of monsoon forest left in the region. The community is also under pressure from small scale illegal logging.

Species of particular interest Although most collections are still to be identified to species level, both the genera *Homalomena* and *Horsfieldia* are not recorded in the literature for Timor.

Dry deciduous forest

Description This community was dominated by trees 10–25 m tall. *Alstonia scholaris* was a frequent emergent with the deciduous trees *Vitex* sp., *Pterospermum diversifolium*, vaya hara, ete lukuwaru and ete piti dominant in the upper stratum. The mid and lower layers were dominated by frequently thorny or prickly vines, shrubs and small tree species such as *Euphorbia antiquorum, Streblus* sp., *Dysoxylum gaudichaudianum* and Rutaceae spp. The most common vines included *Luvunga monophylla, Capparis micrantha, Anamirta cocculus* and *Cyathostemma glabrum*. Few herbaceous species were seen, perhaps partly because of the seasonally dry conditions, although a number of fern species were found growing from rock faces in some places. There is surprisingly little overlap in species composition between this forest and the semi evergreen rainforest. Most dominant trees were leafless and infertile at the time of the survey and identification of species was thus difficult and more than 20 tree species as well as many shrubs remain known only by their local name. Some 134 species were recorded in this vegetation with 60 not recorded in other habitats. The areas sampled were largely old secondary forest (>30 years old) rather than primary forest. However, they had a considerable diversity of tree and shrub species, with many species not found elsewhere in the NP.

Distribution Occurs in areas with a strongly seasonal rainfall and well represented at Ira Malaro on the ranges between Com and Tutuala. Probably the original dominant vegetation over much of the northern part of Timor but mostly now converted for swidden agriculture.

Threats and Status This forest type is under ongoing pressure from conversion to agriculture. Elsewhere in the region, this vegetation has also been heavily exploited for swidden agriculture and largely converted to anthropogenic grassland/*Chromolaena* shrubland. As Monk *et al.* (1997) note regarding Nusa Tenggara, "It is striking that the deforested areas are mainly where the primary forest cover is thought to have been dry deciduous forest." As this community is seasonally dry, it is more subject to fire and more easily converted to agriculture than wetter forest communities. There may be no substantial areas of primary deciduous forest remaining in Timor-Leste and the advanced secondary forest in the proposed park probably is probably best remaining example. It is also almost certainly of greater regional significance as there is some doubt as to whether primary lowland monsoon forest still exists any where in Indonesia although this is coloured by differences in definition (Whitten *et al.* 1987).

Species of particular interest These include the locally common, co-dominant forest tree *Antiaris toxicaria* and common vine *Neoalsomitra podagrica* (both listed by Monk *et al.* as threatened in Indonesia and Nusa Tengarra). At this stage the extent of populations of *Antiaris* and *Neoalsomita* is not known, although they were locally common. New Timor records to date include *Alchornea rugosa*, *Alstonia actinophylla*, *Euroschinus falcata*, *Ficus microcarpa* and *Ficus gul*. A number of fern species were found growing from rock faces.

Thorn forest/scrub (putative)

Description Around limestone outcrops the forest is of a lower stature than else where (5–10 m tall) and often quite patchy and open. This community may fit the concept of thorn forest and is similar to the deciduous vine thicket/forest of NW Australia which is of similar height, deciduousness and can be quite patchy with clumps of closed forest tree species interspersed with grassland. It is not entirely clear where the distinction between thorn forest and deciduous forest lies. Although plants were collected in this vegetation to build an inventory for the area, it was not recognised as being different from the deciduous forest at the time of the survey and structure and species abundance were not sampled.

Distribution Probably originally limited to small areas along the north coast of Timor-Leste where rainfall is lowest and now virtually all converted to other uses or heavily grazed.

Threats and Status This community is under pressure through conversion to agriculture. Monk *et al.* (1997) report that it is especially vulnerable to clearing using fire and that little is left in the Nusa Tenggara region of Indonesia. This formation was probably always of limited distribution in that region and is reported to occur on karst topography along the north coast of Sumba and probably also occurred in similar situations in Timor-Leste.

Species of particular interest These included *Santalum album* (IUCN listed) and the locally common vine *Neoalsomitra podagrica* (listed by Monk *et al.* as threatened in Indonesia and Nusa Tengarra). At this stage the extent of populations of *Neoalsomita* is not known.

Coastal vegetation

Apart from mangroves, three main types of coastal vegetation are commonly recognised in the Malesian region (Whitten *et al.* 1987). Specifically, these are the Pes-caprae formation (a community of sandy foreshores dominated by low herbs, trailing vines and grasses such as *Ipomoea pes-caprae*, *Canavalia rosea*, *Euphorbia atoto* and *Cyperus pedunculatum* but also including *Casuarina equisetifolia*); the *Barringtonia* formation (occurring on sandy soils

behind the previous formation or on abrading coasts and typically dominated by species such as *Barringtonia asiatica, Calophyllum inophyllum* and *Terminalia catappa* and other woody species) and vegetation of rocky shores (low sparse vegetation which may comprise many species of the *Barringtonia* formation.) A feature of these communities is the dominance by species which are often widespread in the tropical Indo-Pacific oceans. These concepts very loosely fit what was seen in the Park area where coastal vegetation can include areas of interspersed grassland, shrubland, *Casuarina* open forest and palm savanna (=Pes-caprae formation?) and the seaward fringe of closed forest composed of strand species with propagules dispersed primarily by the sea such as *Calophyllum inophyllum* and *Hernandia nymphaefolia* (=*Barringtonia* formation?). Whistler (2001) also records areas of rocky foreshore dominated by *Pemphis acidula* and *Suriana maritima*. Monk *et al.* (1997) do not define coastal forest but comment that coastal forest is regarded as an open forest (as opposed to closed forest) community. Coastal vegetation can be interpreted as strand vegetation and the associated non closed forest vegetation formations of coastal dunes and chenier dune/plain systems (but excluding mangroves). Alternatively, the definition could also include closed forest formations containing a significant proportion of what are essentially strand species such as *Calophyllum inophyllum*.

Mangrove vegetation Small areas are present along the north and along the south coast. Near Com, mangrove communities were dominated by *Avicennia marina, Sonneratia alba* and *Lumnitzera racemosa.* Between Lore and the Namalutu River small areas of brackish lagoon or swamp behind the coastal dunes were supported *Excoecaria agallocha, Avicennia marina* or *Lumnitzera racemosa*, while *Heritiera littoralis* occurred near the river mouth and occasional *Sonneratia alba* were also present on the seaward side.

Pes-caprae formation

Description This formation was structurally and floristically diverse comprising a mosaic of grassland, shrubland, woodland and open forest. Species composition varied with the exposure of the coastline and the width of the coastal dune/chenier plain. Common species include *Borassus flabellifer, Pandanus ?tectorius, Vitex trifolia, Casuarina equisetifolia, Ipomoea pes-caprae, Spinifex longifolius* and *S. littoreus*, as well as the introduced weeds *Chromolaena odorata* and *Catharanthus roseus*. It was not sampled quantitatively during the current survey.

Distribution Commonly on sandy substrates.Whistler (2001) reports variants of this community from the Tutuala area.

Threats and Status This vegetation has been extensively modified throughout the region. Because it is flat, open, well drained and has good access to the sea it is prime vegetation for human settlement and is commonly used for houses, gardens and grazing of goats, buffalo and banteng. The village of Lore is located in this vegetation and the surrounding area is heavily grazed. The introduced shrub *Jatropha curcas* and weedy trees such as *Prosopis pallida* and *Ziziphus mauritiana* have invaded this community along the north coast and do not appear to have reached Lore as yet but some are within 10 km. Areas of this vegetation in good condition are rare.

Species of particular interest A few plants of the IUCN listed *Santalum album* were seen in this community near Lore. As noted above, this community is dominated by species which are often widespread in the tropical Indo-Pacific oceans.

Barringtonia formation

Description In the Lore-Namalutu River area, this closed forest community formed a narrow fringe between the coastal lowland forest and the sea. Constituent species varied along the coast but the most common were the trees *Calophyllum inophyllum, Cerbera manghas, Hibiscus tiliaceus, Terminalia catappa, Cordia subcordata, Guettarda speciosa* and *Mammea odorata,* the shrubs *Premna serratifolia* and *Scaevola taccada* and the vines *Derris scandens, D. trifoliata* and *Ryssopterys timoriensis.* Although an inventory was compiled for this community it was not sampled quantitatively.

Distribution This community was located between the Namalutu River and Lore and is thought to be of very limited distribution in Timor-Leste and the proposed Park. No other areas of this vegetation were seen in Timor-Leste and it seems unlikely that it would ever have occurred on the drier north coast. Much of the coast of the proposed NP is likely to be too steep or rocky to support this vegetation.

Threats and Status This vegetation has been extensively modified throughout the region. Because it is flat, well drained, relatively open and has good access to the sea it provides good sites for human settlement. It is commonly used for houses, gardens and grazing of goats, buffalo and banteng. Although many of the species are widespread strand species in the Indo-Pacific wet tropics, this vegetation type is subject to high human pressure and is widely converted.

Species of particular interest The white flowered tree, *Ochrosia oppositifolia* (which is related to and looks similar to *Cerbera manghas*) has not previously been recorded in the literature from Timor. Most of the species recorded in this habitat are specialised strand species, with propagules adapted to dispersal by sea.

Montane forest (**aseasonal)**

Description Vegetation above c. 750 m in the Paitxau Range appeared to best fit this category, although there may be some doubt that ‘true’ montane forest occurs on Timor. Certainly, this forest had many of the characteristic normally associated with montane forest *viz.* an abundance of ferns, epiphytes and pendant mosses on trees and rocks, few pinnate leaved species and few large woody climbers. Dominant tree species included ?*Sundacarpus* and *Myristica rumphii* with *Clerodendrum buchananii* and Rubiaceae sp in the shrub layer. Unfortunately due to time constraints, persistent heavy rain from a developing tropical low pressure system and the very wet, slippery, jagged rocks no quadrats were laid out. This community occurred on steep, rocky limestone slopes and is thought to be subject to frequent mist and rain from low cloud. It is regarded here as an aseasonal type of montane forest and may even fall within the concept of mossy forest.

Distribution In the NP, probably limited to the Paitxau Range above about 750 m ASL.

Threats and Status Probably always of limited distribution in Timor and largely converted to agriculture elsewhere in TL. There is some doubt as to whether montane forest in other areas would have been similar to that on the Paitxau Range. In the proposed NP, some areas have probably been converted while others such as at Malahara are not under immediate pressure from agriculturally orientated clearing as the terrain is too steep and rocky and there is better primary forest available. However, if the population pressure where high enough it would probably be converted as for example there are very rocky areas around Baucau used for agriculture. Elsewhere, this community may have been subject to intensive harvesting of plants

for the horticulture trade although the proposed NP is generally too far from markets for this to have occurred in that area yet.

Species of particular interest Most specimens collected from this community are yet to be identified. The community had a high diversity of epiphytes and ferns compared to other sites and it is likely that some of these will be of restricted distribution, new Timor records or new species.

Swamp forest

Description This community supported species tolerant of inundation during the wet season. With a height of c. 30 m, dominant tree species in this community were *Timonius timon, Syzygium nervosum* and *Syzygium* sp. (vaharu), the mid storey was dominated by *Barringtonia racemosa*, the two *Syzygium* species and also *Crateva religiosa*. The ground layer was sparse and dominant species were *Blechnum indicum, Drynaria quercifolia* and *Colocasia gigantea* as well as tree regeneration. Other species that were locally dominant included *Pandanus*, *Scleria* and *Hibiscus tiliaceus*.

Distribution A good stand is present near Bauro on the floodplain of Lake Ira Lalaro, but this is a relatively small area. A second patch which was present in the same general area has already been heavily logged.

Threats and Status This community appears not to be under immediate threat, although another nearby area of this forest type has been heavily logged. The community was probably always of very limited distribution in the greater region (Nusa Tenggara) due a paucity of flat swampy areas and the generally steep topography. It is an important component of the biodiversity of the region but is particularly vulnerable because of the small size of the area, proximity to Bauro and because it does contain timber resources.

Species of particular interest This community contained scattered *Carallia brachiata*, a species regarded as threatened in Indonesia by Monk *et al.* (1997). New Timor records from this community included: the herb *Colocasia gigantea* and the trees *Crateva religiosa, Ficus microcarpa* and *Pouteria ?linggensis*.

Nauclea forest and woodland

Description *Nauclea orientalis* is the dominant tree on the upper margin of the Lake littoral zone and forms a woodland or open forest formation there. Although plants were collected in this vegetation to build an inventory for the area, structure and species abundance were not sampled. The most common understorey species is the scrambling shrub *Phyllanthus reticulatus* but in places, the understorey vegetation is heavily invaded by *Chromolaena odorata* and other weeds, probably as a result of heavy utilisation of the habitat by buffalo. On the other hand the trees themselves support a diverse community of epiphytic species not observed elsewhere including the “ant” plants (*Dischidia major* and *Myrmecodia tuberosa*), orchids (*Dendrobium* sp., *Vanda* sp.), epiphytic ferns (*Drynaria quercifolia*; *Pyrrosia lanceolata*) and vines (*Hoya* sp., *Dischida nummularia, Piper* sp.). This vegetation type is included under swamp forest by Whistler (2001). Although it may be seasonally water logged or briefly flooded, it is floristically and structurally quite different to the forest near Bauro and has been treated separately here.

Distribution Occurs near Malahara at the Lake out flow and in patches along the River Ira Siquero. Probably always of limited distribution in Timor-Leste and not documented from elsewhere in the region.

Threats and Status As noted above, this community is utilised by buffalo and the understorey is heavily invaded by weeds in some places. Generally, it does not appear attractive for conversion to agriculture as it is probably too poorly drained, although rice cultivation may be the exception. Distribution and status in the wider region is not known.

Species of particular interest These include the "ant" plants *Dischidia major* and *Myrmecodia tuberosa*, Orchids (*Dendrobium* sp., *Vanda* sp.) and vine *Dischida nummularia* which were not recorded elsewhere.

Floodplain grassland / sedgeland

Description This community was dominated grasses and sedges to 1.8 m tall. The dominant species were *Ischaemum* (2 species), the sedge *Baumea rubiginosa*, and the herb *Pouzolzia hirta*. In some places the large sedge *Cladium mariscus* was dominant, while Whistler (2001) reports that depressions may be dominated by the sedge *Eleocharis dulcis*. The species composition of floodplain vegetation can change spatially with subtle changes in period of inundation and water depth and may also change from year to year depending on recent rainfall and flooding regimes (Taylor & Dunlop 1985; Finlayson *et al* 1989).

Distribution Occurs on clay soils on the floodplain of Lake Ira Lalaro in areas that are seasonally inundated or heavily water logged. Found on a rare landform and thus almost certainly of restricted distribution in Timor-Leste.

Threats and Status Probably always a rare plant community in Timor-Leste and the greater region. Although the habitat is extensively grazed by buffalo, it is generally little affected by weed invasion and remains of high conservation value. The community appears to be in good condition and relatively stable under the present grazing regime. The most likely future threat is the potential for conversion for intensive agriculture such as broad scale rice farming. In the longer term, weeds like the invasive shrub *Mimosa pigra*, which has transformed many floodplain areas in northern Australia from sedgelands to shrublands, could also threaten the community. This species is not yet known to occur on Timor, but is common in some parts of Asia and Northern Territory and could be accidentally introduced relatively easily.

Other vegetation

Herbaceous aquatic vegetation Areas of permanent water supported limited communities of fully aquatic species. Although structure and species abundances were not sampled, specimens were collected in compiling an inventory of species. In places on the Ira Siquero, aquatics such as the submerged *Ceratophyllum demersum* and *Ottelia alismoides* floating leaved *Potamogeton distinctus* and the emergent sedge *Schoenoplectus mucronatus* were locally dominant. Vegetation is patchy probably because current flow is too great in many places for plants to be established. In addition, it is likely that water chemistry (probably alkaline and high in calcium carbonate) limits the diversity of aquatic species to those capable of surviving in such conditions. Species present are similar to those known from hard-water environments in the Northern Territory. This vegetation occurred on the River Ira Siquero and probably also parts of Lake Ira Lalaro and has probably always been of limited distribution in the greater region due to a paucity of suitable habitat.

Herbland At Ira Malaro a small drainage depression was also sampled. The area was dominated by widespread ephemeral wetland (mudflat) herbs such as *Glinus lotoides, Coldenia procumbens, Cardiospermum halicacabum, Heliotropium indicum* as well as weeds such as *Sida rhombifolia* and *Stachytarpheta*.

Secondary vegetation This community is common in the area and results from the logging or 'slash and burn' of primary or secondary forest types. The successional sequences in regeneration of this community have not been documented in Timor-Leste. Composition and structure appear to change considerably with time since initial disturbance and the type of ongoing land use. If secondary vegetation is left undisturbed for 30 or more years and there are nearby areas of forest to act as a seed source, then it can regenerate to vegetation of importance for biodiversity conservation. For example much of the deciduous forest at Ira Malaro appeared to be old secondary forest and has been left undisturbed for long enough that quadrats were of similar floristic diversity to primary forest and probably approaching primary forest in species composition. Given that no areas of primary deciduous forest were seen in the area and region it has been treated as the next best alternative in this report. Even though these old secondary forests area diverse, it is likely that some forest habitats (e.g. tree hollows used for nesting by some species) may take 100 or more years to develop.

At the other extreme, repeated cycles of slash and burn at sort intervals with frequent firing and heavy grazing by goats appear to all but eliminate tree regeneration and result in grassland or introduced weed communities (*Chromolaena* shrubland or *Prosopis* / *Zizyphus* / *Jatropha* / *Calotropis* savanna) of low to very low biodiversity value. Extensive areas of such vegetation can be seen along the north coast and from Baucau area to Mehara. While some inventory of remnant native and weedy species was done in this type of vegetation, only one plot was laid out in anthropogenic grassland (planted with teak) near Lore. This plot was dominated by grasses with an average canopy height of 1 m, in particular *Imperata cylindrica, Sorghum timorense, Capillipedium parviflorum, Bothriochloa bladhii* and the leguminous herb *Pycnospora lutescens* with a sparse layer of emergent *Tectona grandis* trees to 10 m tall. Species richness, with only 8 species, was low. In comparison, around 30 species were recorded on most forest plots in the Park (Fig. 5) and 0.04 ha plots in natural grasslands on clay soils in northern Australia typically contain 20–50 species (NT Herbarium unpublished data).

Teak (*Tectona*) plantation Areas of this vegetation occurred near Lore, and were generally not sampled. Field observations showed that species diversity in this community was very low.

Weed communities Weed species were recorded or collected in or near ladung at Malahara and Lore. Weed species included the common widespread species *Chromolaena odorata, Lantana camara, Emilia sonchifolia, Tridax procumbens, Cleome viscosa, Ipomoea pes-tigridis, Xenostegia tridentata, Euphorbia hirta, Hyptis capitata, Hyptis suaveolens, Sida acuta Zizyphus mauritiana, Jatropha gossypifolia* and *Calotropis gigantea*. The scrambling shrub *Chromolaena* dominates over large areas of secondary vegetation while *Zizyphus*, *Jatropha* and *Calotropis* are the major species in savanna along the dryer north coast. *Chromolaena* and *Lantana* are regarded as some of the world's worst weeds and among the worst weeds in tropical Asia (Holm *et al.* 1977).

Vegetation Formation (Monk *et al.*, 1997)	**Vegetation communities (Whistler, 2001)**	**Inferred Vegetation Formation (current study)**	**Inferred distribution**	**Current threats to vegetation**	**Inferred status**
Freshwater swamp forest	Swamp forest	Swamp Forest	Bauro area adjacent to lake; mouth of Vero River; a naturally rare community;	None imminent	Nationally & regionally significant
Lowland evergreen rain forest		Lowland evergreen rain forest	>650 m ASL, Paitxau Range, deeper soils	Conversion for agriculture, illegal logging	Nationally & regionally significant
Montane forest		Montane forest (aseasonal)	>750 m ASL, rocky areas in Paitxau Range	None imminent	Nationally & regionally significant
Semi-evergreen rain forest		*Pouteria nitida* - *Pometia* - *Syzygium* forest (putative semi-evergreen rain forest)	Mid to foot slopes of Mt Paitxau Ra, especially west side (c. 420–650 m ASL)	Active, ongoing conversion for agriculture, illegal logging	Nationally & regionally significant
Moist Deciduous forest	lowland alluvial forest	*Canarium* - *Calophyllum* forest (putative moist deciduous forest)	Lore area on coastal plain; Vero river valley	Active, ongoing conversion for agriculture, illegal logging	Nationally & regionally significant
	lowland limestone forest	Not seen	Lore to Tutuala; limestone ridge adjacent to coast	Probably conversion for agriculture, illegal logging	
Dry deciduous forest		Dry deciduous forest	Ira Malaro range (secondary but of good quality)	Active, ongoing conversion for agriculture	Nationally & regionally significant
Thorn forest		Thorn forest (dry vine thicket) (putative)	Small areas around limestone outcrops at Com–Ira Malaro; if extant, north coast near Lautem.	Conversion for agriculture	Nationally & regionally significant
Coastal forest	Littoral forest; Sandy beach strand; Rocky cliff strand	Coastal and strand vegetation	Namalutu R to Tutuala, scattered	intensive grazing by banteng & goats, conversion for agriculture, weed invasion	Nationally & regionally significant
Tidal forest		mangroves	Namalutu R to Tutuala; small, scattered areas	?Fire wood harvesting	Locally significant
	Marsh	herbaceous wetland and aquatic communities	Lake Ira Lalara and adjacent floodplain	None imminent; potentially conversion for rice	Nationally & regionally significant
	Swamp forest	Nauclea forest/woodland	Adjacent to Ira Siquero in Lake outflow area	Intensive grazing by buffalo, weed invasion	Nationally & regionally significant??

Table 2. Summary of vegetation types, their distribution in the proposed Jaco-Tutuala-Lore National Park, threats and inferred status.

3.3.4 Species Richness of Habitats and Quadrats

While habitat data (Fig. 4) are biased by uneven collecting effort, the graph serves to illustrate that the semi evergreen and deciduous forests are quite diverse. Further, the quadrat data (Fig 5.) shows that on most primary forest plots 25–35 species were recorded. If any thing, these figures are likely to underestimate richness and allowance needs to be made for the difficulty of differentiating or identifying the many sterile or juvenile woody plants frequently present on such plots, especially before the flora is well known to those doing the assessments. In contrast, the anthropogenic grassland, drainage depression and floodplain grassland sites had the lowest species richness. In the case of the wetlands, this is thought to be natural as wetland plant communities in northern Australia also typically have low species richness, probably because of the extreme environment (Taylor and Dunlop 1985).

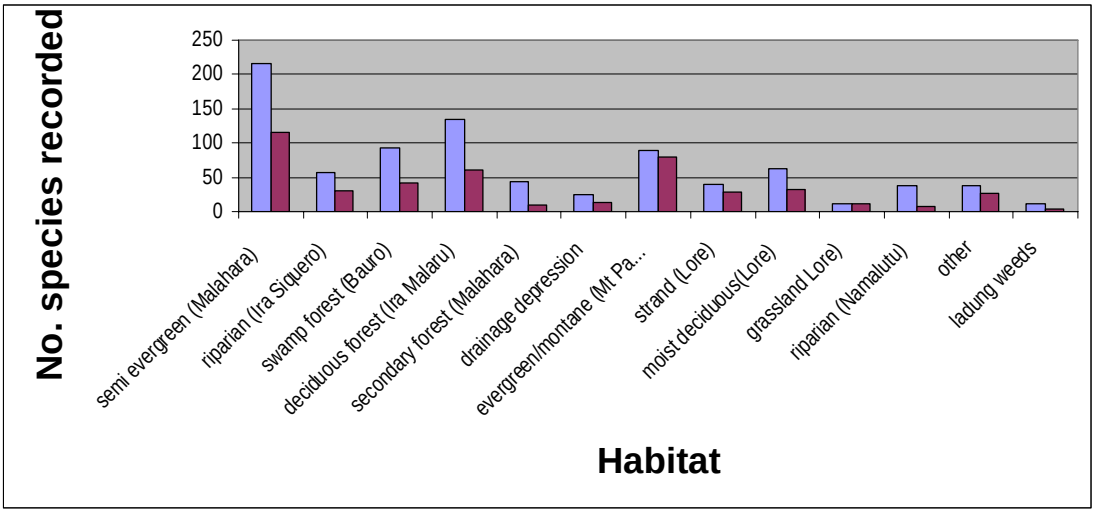

Figure 4. Comparison of total numbers of plant species (left hand column) and number of unique species (right hand column) recorded in 13 different habitat categories. Data are indicative only as sampling effort varied considerably between habitats and collections made independently by C. Trainor *et al.* in semi evergreen forest and swamp forest are also included.

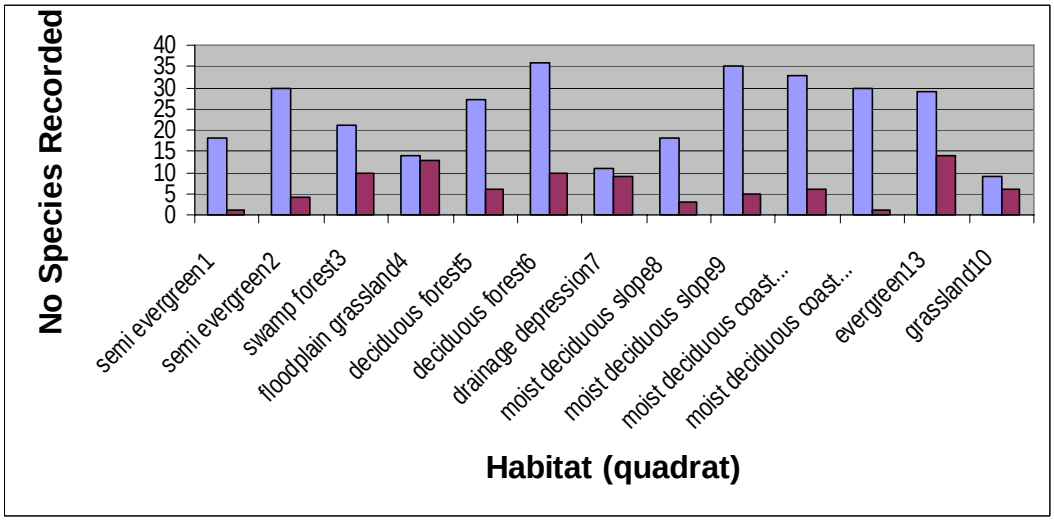

Figure 5. Comparison of total numbers of plant species (left hand column) and number of unique species (right hand column) recorded on 20 x 20 m quadrats in different vegetation

formations. Note that where there is more than one quadrat in the same habitat the number of species unique to that quadrat is likely to be reduced.

3.4 VEGETATION MANAGEMENT ISSUES

3.4.1 Slash and Burn Agriculture (Ladung)

Slash and burn agriculture (ladung) is the predominant form of agriculture in the proposed Park area. Local informants indicate that after cutting and burning, an area may be used for food production for 2–6 yrs, before it is left to regenerate for around 15–20 yrs when the cycle is repeated. The area under cultivation at any one time by a family appears to be around 2 ha so that pehaps 5–20 ha would be needed to sustain a family. While little hard data on floristic changes are available, it would appear from even casual observation that there is usually a long term loss of diversity associated with repeated ladung cycles (see section on secondary vegetation above). This loss of floristic diversity is probably also associated with a loss of soil and soil fertility (Whitten *et al.* 1987).

However, available evidence suggests that longer ladung cycles with little ongoing disturbance during the regeneration phase and good forest nearby to act as seed source, may result in floristically diverse secondary forest. Sites sampled at Ira Malaro had been allowed to regenerate for 30 yrs or more and supported secondary forest with similar plot diversity to primary forest. As noted previously, 134 species were recorded in this vegetation with 60 species not recorded in other habitats. However, old secondary forest in the Park appears to have resulted largely from an Indonesian policy of moving people out of certain areas rather that any decision to extend the ladung cycle for other reasons. Now that this restriction has gone, people appear ready to move back to many of these areas and renew the cycle.

There is clearly a need to protect primary forest and good quality secondary forest from the loss of biodiversity associated with repeated ladung cycles. Ideally, a buffer zone of long cycle ladung should be left adjacent to the protected primary forest areas. In the longer term, improved agricultural systems that do not rely on forest clearing may be possible and need to be investigated.

3.4.2 Harvesting of Plant Resources

Small scale illegal timber harvesting (both commercial and non commercial) occurs in the proposed park and is targeted at species such as *Intsia bijuga*, *Pouteria nitida* (amachu), and *Pometia pinnata* occurring in primary forest where trees are large enough to give a good timber yield. Logs are mostly milled in the field using a chainsaw, with (usable) off cuts left to rot. A by product of logging is the development of vehicular tracks which then facilitates access for other forest exploitation and conversion to ladung.

Ratan (*Calamus* spp) and vines (e.g. *Anamirta cocculus*) are both harvested, mainly for local use. It is not known how intensive this harvesting is or what impact it is having on forest communities. Plant harvesting for ornamental horticulture (e.g orchids; various herbs) does not yet appear to be an issue as the area is probably too far from any sizable market.

Harvesting of some wild foods for local, even immediate, consumption occurs in the area. Most notable during the survey was the utilization of *Canarium vulgare* seed in the Lore area although it is likely there are other foods that are also harvested.

As discussed further below, there is potential for the limited, small-scale sustainable harvesting of some forest products both for local use and for commercial purposes. This would give local communities more stake in having areas of natural vegetation set aside and potential alternative sources of income. However, sustainable harvesting needs to be undertaken carefully and with scientific input into sustainable harvesting levels and minimising impact on primary forest. For *Santalum* and other species there may be potential to use enrichment planting to expand wild populations or to plant native timber or other native species as crops in buffer zones adjacent to primary forest or elsewhere.

3.4.3 Grazing

Four species of domestic grazing animal were observed in the park (buffalo, pig, goat and banteng). Although feral deer (*Cervus timorensis*) and the arboreal spotted cuscus (*Phalanger maculatus*) are also reported to occur in the Park, no impressions were formed regarding their impact and they are not discussed further here. Overall the effects of grazing appear to be mixed, probably depending primarily on the type of vegetation but also on the species of grazing animal involved and the grazing pressure. The main effect of grazing appears to be weed invasion of some vegetation types although grazing pressure may also influence the direction of succession in secondary vegetation. Some areas such as the floodplain grass/sedgeland were in good condition with little weed invasion, others such as the coastal plain at Lore had some weeds, while the upper floodplain margin was heavily invaded by weeds.

On the coastal plain at Lore, the coastal grassland and Lontar (*Borassus*) palm savanna was grazed by banteng. There was some invasion of this vegetation by the shrub *Chromolaena* and herb *Catharanthus roseus* and even during the wet season, grass was short. There was no evidence of a rotational grazing regime where stock are moved so that some areas are rested to allow regeneration of pasture. While the rainfall is higher at Lore than on the north coast, continuous grazing is likely to lead to further weed invasion, especially if other weed species such as *Jatropha gossypifolia* reach the area so that in time the coastal plain may more closely resemble the introduced weed savannas of the north coast dominated by *Zizyphus*, *Jatropha* and *Calotropis*. There is probably a need for better grazing management and for fencing to facilitate this.

Grassland/sedgeland vegetation on the floodplain of Lake Iralalara appeared in good condition with little weed invasion in spite of grazing by buffalo. Some weed infestation by *Hyptis capitata* was observed in areas that appeared to be used as camps by buffalo, such as the edges of the swamp forest. Like wise, the upper margins of the floodplain including much of the *Nauclea* woodland were very heavily invaded by *Chromolaena*. In Northern Territory, these floodplain margin areas are similarly reported to be heavily invaded by weeds due to their heavy use as camping and resting areas by buffalo throughout the year (Braithwaite *et al.* 1984; Cowie and Werner 1993).

Much of the secondary vegetation is also grazed (probably throughout the year) by goats and pigs, especially around villages and these areas support extensive (but not diverse) communities of weeds.

3.4.4 Weeds

Weeds are a major part of the secondary vegetation in many places and have also invaded some natural communites. Heavy grazing may have played a role in weed invasion in some areas.

The scrambling shrub *Chromolaena* dominates over large areas of secondary vegetation and appears to be a major invader of abandoned ladung, coastal vegetation, around limestone outcrops, floodplain margin communities and along watercourses. It forms a thick tangled mass that excludes most other plant species while of very limited grazing value itself. The part that *Chromolaena* plays in forest succession in abandoned ladung is not known but it may provide cover for the establishment of shade tolerant tree species which eventually overtop it and shade it out, much as can occur with *Lantana* in Australia or gorse (*Ulex europaeus* L.) in New Zealand closed forest areas. (This assumes there is a nearby source of seed of these shade tolerant tree species, food sources in the *Chromolaena* to attract fruit eating birds and the birds themselves to disperse seeds.) However, in areas where vegetation is naturally more open (e.g. coastal vegetation, *Nauclea* woodland), successional processes may never result in the replacement of *Chromolaena* by native species. Seed production in *Chromolaena* is copious and the small seeds are readily dispersed, primarily by wind, but also they have small barbs which enable them to stick to clothing or fur.

Zizyphus mauritiana, *Jatropha gossypiifolia* and *Calotropis gigantea* are the major weeds species on the coastal plain along the dryer north coast, often dominating the vegetation. It is thought that invasion by these species is partly a response to continuous grazing and possibly fire. Although presently free of these species, the coastal plain at Lore would seem to be especially vulnerable to invasion in future.

3.4.5 Zoning of the Proposed Park

Zoning of land uses within the Park is probably the best way to manage the area and this is envisaged in the concept of an IUCN Category 5 Park. Ideally, the core conservation area of the Park would be a fully protected zone of natural vegetation comprising all the primary forest and good quality deciduous secondary forest. Adjoing this would be a buffer of long rotation ladung, native species plantation or other land uses which still maintain some biological conservation values (see above). Corridors of natural vegetation to connect the main natural forest blocks such as the Lore block and the Paitxau range are also needed. Ideally, these corridors should be fully protected and incorporate as much primary forest as possible or where this is not possible, be allowed to regenerate to forest. A second-best solution would be long rotation ladung or some form of native species plantation. Such corridors help maintain biological links between the areas by allowing the movement of fauna and seeds between the blocks.

Three natural vegetation communities are known to be currently used for grazing (coastal vegetation, floodplain grass/sedgeland and Nauclea woodland. While the current grazing regime seems to be having little impact on the floodplain grassland and could be allowed to continue there with monitoring, there is room to improve grazing management to reduce impacts and especially weed invasion in coastal vegetation at Lore and the *Nauclea* woodland near Malahara. This is discussed further above.

4 CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER WORK

The proposed Park has a well developed closed forest flora and supports probably the largest remaining area of this forest type on Timor. Excellent examples of a broad range of closed forest plant communites occur along an intact altitudianal/edaphic/climatic gradient. A number of plant communities in the park are thought to be endangered at a regional and national level and badly in need of conservation. In addition, three IUCN listed threatened plant species are known from the Park. Twenty two species of plant recorded during the survey have not previously been recorded from Timor in the literature. There are a number of ongoing management issues for the proposed park including illegal logging, slash and burn agriculture, weed invasion and grazing by livestock. As outlined below, there is considerable need for further research on the flora, vegetation and its management.

Flora Survey As discussed above, the inventory of flora of the proposed Park is far from complete. Much work remains to be done to collect suitable material to enable identification of the numerous species which were sterile at the time of the surveys, especially in the deciduous forest. Many common species are included in this group. In addition the survey needs to be extended to sample a greater variety of habitats, at different places and in different seasons. It is expected that 10 or more trips over a 2 year period would be needed to do a thorough job of surveying the flora.

Plant taxonomy Careful work is need at a regional (Malesian) and wider level to sort out the taxonomy and nomenclature of many of the plant genera and species. Such work underpins basic assessments of biodiversity, ethnobotanic survey and of rare and threatened species, as well as the development of identification tools such as photographic guides and local floras.

Recording of local names (and ethnobotany) There is still much work to be done to record local names and link them to scientific names. While some progress was made, the task was complicated by the fact that both Tetun and Fataluku language names are in use and plant names used at Lore are different again (people were moved there from the mountains during Indonesian times). In some cases, usage of the same name varied between informants. A number of visits would be necessary to resolve inconsistencies. While some ethnobotanical work has been done in TL, if not the Park area, there appears to be scope to extend this to traditional uses of plants in primary forest.

Vegetation mapping and phytosociology At this point in time there is no structural/ floristic classification derived from vegetation data collected anywhere in the Lesser Sunda Islands. To achieve this objective a more complete investigation of the phytosociology of vegetation in the Park and mapping of communities is ultimately needed and would be a study in itself. Such studies would often include: mapping of photo patterns; a combination of full species / dominant species structural & floristic quadrats (200 or more) to achieve extensive ground truthing of mapped patterns; recording of environmental attributes at each site and classification and ordination of full quadrat data.

Identification tools Although there are digital images to cover approximately 370 species, there are still many gaps even in the coverage of common species. Field work needs to be done in conjunction with floristic survey and collectin of specimens so that images can be accurately named. There is scope to record further images, search out other available images (for example from NT Herbarium) and assemble these with identification notes into an electronic publication. In some cases, even photographs of dried plant specimens would be very useful. Identification notes would probably need to be translated into Tetun, Portuguese or Indonesian.

Rare and threatened species Evaluation of the IUCN status of species in the Park is still not possible for many species and is preliminary for others. To achieve a better evaluation of rare and threatened species, further work is required both in botanical inventory to understand the flora and to build spatial data on the distribution and abundance of species by sampling at other sites both in the Park and Timor-Leste. Once this is more advanced, particular species can be targeted for surveys of distribution and abundance, extent of occurrence, area of occupancy and threats.

Small scale sustainable harvesting and cultivation of forest products There is potential for the limited, small-scale sustainable harvesting of some forest products both for local use and for commercial purposes and this would give local communities more stake in having areas of natural vegetation set aside and a potential source of income. However, sustainable harvesting needs to be undertaken carefully and with scientific input into sustainable harvesting levels and minimising impact on primary forest. Some product development and marketing ground work may also be needed. This type of work as has been done with harvesting of bush products by Aboriginal communities in Northern Territory with input from staff at both Charles Darwin University and NT Herbarium. Some examples that could possibly be developed are the harvesting of *Canarium* seed for sale to the developing tourist market as a "bush tucker" food and limited harvesting of *Cycas* seed for sale to nurseries or horticulturalists overseas. Similarly, fruit from the vine *Anamirta cocculus* were once harvested extensively for use as a treatment for head lice (Forman 1986) and there may be potential to again sell these as a natural product for this purpose. This vine is quite common in both semi evergreen and deciduous forest. *Morinda citrifolia* occurs naturally in the area and juice from the fruit of this species is sold elsewhere for its medicinal properties. While natural populations are probably far to limited to support any sustainable form of wild harvesting, *Santalum album* was recorded occurring naturally in the deciduous forest and in strand vegetation on the coastal plain near Lore, indicating that at least some areas are suitable for the species.

For *Santalum* and other species there may be potential to use enrichment planting to expand wild populations or to plant them as crops in buffer zones adjacent to primary forest or elsewhere. Similarly, there would seem to be potential for development of plantation forestry in the area to act as an alternative source of sawn timber and for local use as fire wood. Species requirements for these two uses and where they would be planted are probably quite different in each case. For fire wood, a fast growing hardwood species that can be planted near communities and harvested after 5–10 years at a relatively small size is probably all that is required. For sawn timber production, longer rotations and larger growing species would be needed. It would be far more preferable to plant native species adjacent to protected natural areas than introduced species such as teak (*Tectona*) which produce a forest of low biodiversity. Local species such as *Intsia bijuga*, *Pouteria nitida* (amachu) and *Pometia pinnata* are known timber producing species which may have potential for forestry plantation (Thaman *et al.* 2006; Yelu 2001; UNEP-WMC 2006).

Other areas that require further work include management and control of *Chromolaena* and other weeds in the NP. However, *Chromolaena* is very common in the Park area and elsewhere that biological control would seem the best long term option.

Research into improved agricultural and grazing systems in the context of the NP is also needed, both to reduce the impact on existing native coastal vegetation and the need to unsustainably clear primary forest.

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APPENDIX 1. Preliminary checklist of vascular plants recorded from the proposed Jaco-Tutuala-Lore National Park

The list is ordered by family and scientific name. Life form (**t**ree, **s**hrub, **h**erb, **v**ine, **f**ern) and Bahasa Fataluku name are indicated where known. Names used in this list should be treated with caution. While every care and has been taken in the indentification of specimens, many have yet to be checked by specialists and against accurately determined herbarium specimens. In addition, many specimens from the second field trip are yet to be identified (i.e. voucer numbers greater thatn 10900). Thus, many names will change in time. Bahasa Fataluku names were provided by Fernando Santana, Almaieda Xavier, John dos Santos and others. Voucher numbers or source of each record are indicated in the "CT No" and "Source/Voucher" columns (W = from Whistler 2001, usually a sight record; IDC indicates this study, with number indicates a herbarium voucher collection; SR indicates a sight record; SN or a date indicates a sterile unnumbered collection for checking purposes).

Scientific name	LifeForm	Bahasa Fatuluku	CT No	Source/Voucher
ACANTHACEAE Barleria prionitis L.	H			IDC10652
ACANTHACEAE Blechum pyramidatum	H			W
ACANTHACEAE Dicliptera spicata	H			IDC10718
ACANTHACEAE Genus indeterminate	H			IDC10972
ACANTHACEAE Genus indeterminate	H			IDC10999
ACANTHACEAE Genus indeterminate		Suka piti		IDC_SN
ACANTHACEAE Hemigraphis affin brunelloides (Lam.) Bremek.	H			IDC10866
ACANTHACEAE Hemigraphis sp.	H			IDC10859
ACANTHACEAE Hypoestes affin polythrysa Miq.	H			IDC10858
ACANTHACEAE Justicia procumbens	H			W
ACANTHACEAE Justicia sp.	H			W
ACANTHACEAE Lepidagathis affin eucephala Miq.	H			IDC10834
ACANTHACEAE Rostellularia sp.	H			IDC10717
ACANTHACEAE Ruellia prostrata	H			W
ACANTHACEAE Ruellia sp.	H			W
ACANTHACEAE Thunbergia sp.	H			IDC11036
ADIANTACEAE Cheilanthes sp.	F			IDC11080
ADIANTACEAE Taenitis sp.	F			IDC11040
AGAVACEAE Agave sisalana	H	sisil		W
AGAVACEAE Cordyline sp.	S	cenupeleku		IDC_SN
AGAVACEAE Pleomele angustifolia (Medik.) N.E.Br.	S	koikoiferehu		IDC10852
AGAVACEAE Pleomele sp.	S			W
AIZOACEAE Sesuvium portulacastrum (L.) L.	H			IDC11037
AMARANTHACEAE Achyranthes aspera L.	H			IDC11088
AMARANTHACEAE Alternanthera sessilis (L.) R.Br.	H	konokasa		IDC10771
AMARANTHACEAE Deeringia amaranthoides (Lam.) Merr.	H			IDC10678
AMARANTHACEAE Ptilotus conicus R.Br.	H			IDC11088
ANACARDIACEAE Buchanania arborescens (Blume) Blume	T	luapayahu		IDC10721
ANACARDIACEAE Euroschinus falcatus Hook.f.	T			IDC10828
ANACARDIACEAE Genus indeterminate		muyapayahu		W
ANACARDIACEAE Mangifera indica L.	T	fuik, has fuik, mangas, mango		IDC_SR
ANACARDIACEAE Mangifera timorensis Blume	T	Muamica Pauhu	47	IDC10667,10924
ANACARDIACEAE Pleiogynium timoriense (DC.) Leenh.	T	Ulu meru	20	IDC_SR
ANACARDIACEAE Rhus taitensis Guill.	T	Arik	114	IDC_SR
ANNONACEAE Annona glabra L.	T	koanano		IDC_SR
ANNONACEAE Cyathostemma glabrum (Span.) Jessup	V	tarulakuwara;lalahoto		IDC10907;10827
ANNONACEAE Genus indeterminate	T			IDC11000
ANNONACEAE Genus indeterminate		lalahoto		W
ANNONACEAE Meiogyne cylindrocarpa (Burck) Heusden	T			IDC_SN
ANNONACEAE Meiogyne sp.	T	velavise		IDC_SN
ANNONACEAE Miliusa sp.	T			IDC_SN26_2
ANNONACEAE Uvaria rufa Blume	V	la la		SN;IDC11106

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ANNONACEAE Uvaria sp.	V	paiparuntaru		IDC10724
APOCYNACEAE Alstonia actinophylla (A.Cunn.) K.Schum.	T	wayaharhoto		IDC10875,10843
APOCYNACEAE Alstonia scholaris (L.) R.Br.	T	Waja hara	54	IDC_SR
APOCYNACEAE Alyxia spicata R.Br.	V			IDC10844
APOCYNACEAE Catharanthus roseus (L.) G.Don	H			IDC_SR
APOCYNACEAE Cerbera manghas L.	T	amiwaya	7,B33	IDC10726;10983
APOCYNACEAE Genus indeterminate	V			IDC_SN2_3_06
APOCYNACEAE Hoya sp.	V			IDC11030
APOCYNACEAE Ochrosia oppositifolia (Lam.) K.Schum.	T			IDC10978
APOCYNACEAE Parsonsia sp	V			IDC10711
APOCYNACEAE Tabernaemontana pandacaqui Lam.	S	Wata wata		IDC10687
APOCYNACEAE Wrightia javanica A.DC	T	upur ete (F); ailalar		IDC11107
ARACEAE Aglaonema marantifolia Blume	H	kalakalahu		IDC10686
ARACEAE Allocasia sp.	H			IDC11059
ARACEAE Amorphophallus paeoniifolius (Dennst.) Nicolson	H	maek		IDC10937
ARACEAE Colocasia gigantea(Blume) Hook.f.	H	wacasu		IDC_SR
ARACEAE Epipremnum pinnata (L.F.) Schott	V	naenae ru		W,IDC_SR
ARACEAE Homalomena sp.	H			IDC10928
ARACEAE Pothos sp.	V	naenae ru		IDC_SN
ARACEAE Raphidophora sp.	V	naenae ru	B28	IDC_SR
ARACEAE Typhonium sp.	H			IDC11032
ARALIACEAE Delarbrea collina Vieill.	S	Baiminik	34	IDC10876
ARALIACEAE Gastonia sp.	T	mutu mutu		IDC_SN
ARALIACEAE Schefflera elliptica (Bl.) Harms.	V	tufu tu	B62	IDC10818
ARECACEAE Arenga pinnata Merr.	T	tua marau		W,IDC_SR
ARECACEAE Borassus flabellifer L.	T	Lontar plam (E)		IDC_SR
ARECACEAE Calamus sp.	V			IDC_SR
ARECACEAE Calamus sp.1	V	pua kaikai	B12	IDC_SR
ARECACEAE Calamus sp.3	V	seweru		IDC_SR
ARECACEAE Caryota rumphiana Mart.	T	luwaru, luara	B20	99;IDC2_3_06
ARECACEAE Cocos nucifera L.	T	coconut		W
ARECACEAE Corypha utan Lam.	T			IDC_SR
ARECACEAE Genus indeterminate	T	akadiru (I), kalala		W
ARECACEAE Genus indeterminate	T	pua hoto		W
ARECACEAE Genus indeterminate	T	tali		W
ARECACEAE Metroxylon sp.	T	akar		W
ARECACEAE Ptychosperma affin macarthurii (H.Wendl. ex Veitch) H.Wendl. ex Hook.f.	T			IDC11067
ASCLEPIADACEAE Asclepias curassavica L.	H	ira eipi eipi mimireke		IDC10772
ASCLEPIADACEAE Calotropis gigantea (L.) W.T.Aiton	S	cipileku		W,IDC_SR
ASCLEPIADACEAE Dischidia major (Vahl) Merr.	V	lawalawano		IDC10794
ASCLEPIADACEAE Dischidia nummularia R.Br.	V			IDC10795
ASCLEPIADACEAE Genus indeterminate				IDC11034
ASCLEPIADACEAE Hoya sp.	V			IDC_SR
ASCLEPIADACEAE Secamone elliptica R.Br.	V			IDC11095
ASCLEPIADACEAE Tylophora sp.	V	api ete asa		W
ASPLENIACEAE Asplenium ensiformis	F			W
ASPLENIACEAE Asplenium nidus L.	F	acha oloolo, bird's-nest fern	48	IDC_SR
ASPLENIACEAE Asplenium polyodon G.Forst.	F			IDC10706
ASTERACEAE Ageratum conyzoides L.	H			W
ASTERACEAE Bidens pilosa L.	H			W,IDC_SR
ASTERACEAE Bidens sp.	H			W
ASTERACEAE Blumea sp.	H			IDC11083
ASTERACEAE Blumea sp.	H			IDC10744
ASTERACEAE Blumea sp.	H			IDC10860
ASTERACEAE Chromolaena odorata (L.) R.M.King & H.Rob.	V	sukapiti	B64	IDC_SR
ASTERACEAE Conyza bonariensis	H			W
ASTERACEAE Crassocephalum crepidioides (Benth.) S.Moore	H			W
ASTERACEAE Eclipta prostrata (L.) L.	H			IDC10816

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ASTERACEAE Elephantopus scaber L.	H			IDC_SR
ASTERACEAE Emilia sonchifolia (L.) DC.	H			W,IDC_SR
ASTERACEAE Genus indeterminate				IDC10770
ASTERACEAE Genus indeterminate				IDC11085
ASTERACEAE Genus indeterminate		aruda		W
ASTERACEAE Melanthera biflora (L.) Willd.	H	sukapiti?		IDC10961
ASTERACEAE Pluchea indica (L.) Less.	S			IDC10662
ASTERACEAE Synedrella nodiflora (L.) Gaertn.	H			IDC10938
ASTERACEAE Tridax procumbens L.	H	macha macha		W,IDC_SR
BIGNONIACEAE Dolichandrone spathacea	T			IDC10984
BLECHNACEAE Blechnum indicum Burm.f.	F			IDC_SR
BLECHNACEAE Blechnum sp.	F			IDC11111
BOMBACACEAE Bombax ceiba L.	T	tatafu hotu		IDC_SR
BOMBACACEAE Ceiba pentandra	T	tatafu		W,IDC_SR
BORAGINACEAE Coldenia procumbens L.	H			IDC10815
BORAGINACEAE Cordia dichotoma G.Forst.	T	vihivihi lu		IDC10948
BORAGINACEAE Cordia monoica Roxb. subsp. subpubescens (Decne.) Reidl	T	pia pia		IDC10761;10855
BORAGINACEAE Cordia sp.		Piamusul Ete	104	IDC_SR
BORAGINACEAE Cordia subcordata Lam.	S	jave		IDC10995
BORAGINACEAE Heliotropium indicum L.	H			IDC10813
BORAGINACEAE Tournefortia argentea		lorovahu?		W
BURSERACEAE Canarium vulgare Leenh.	T	kiaru		IDC10914
BURSERACEAE Garuga floribunda Decne.	T	Erua	79	IDC10659;11089
BURSERACEAE Haplolobus floribundus (K.Schum.) H.J.Lam.	T	Vatu Fuan	9,B32	IDC_SR
CACTACEAE Opuntia sp.				IDC_SR
CAESALPINIACEAE Bauhinia sp.		lualolonia		W
CAESALPINIACEAE Caesalpinia bonduc (L.) Roxb.	V	ukuleku		W
CAESALPINIACEAE Caesalpinia furfuracea (Prain) Hattink	V	maca uku nainailu		IDC10766
CAESALPINIACEAE Cassia fistula L.		iparakulayhu		IDC10768
CAESALPINIACEAE Intsia bijuga (Colebr.) Kuntze		fara	24	IDC10927
CAESALPINIACEAE Peltophorum pterocarpum (DC.) Backer ex K.Heyne	T	moro	109	W,IDC_SR
CAESALPINIACEAE Senna sophora (L.) Roxb.		oteote		W
CAESALPINIACEAE Senna surattensis (Burm.f.) H.S.Irwin & Barneby	S	iha iha rala		IDC10743
CAESALPINIACEAE Senna timorensis (DC.) H.S.Irwin & Barneby	S	moro		IDC10731
CAESALPINIACEAE Senna tora (L.) Roxb.	S	netiku		W,IDC_SR
CAESALPINIACEAE Tamarindus indica L.	T	Kailemu,sukaer	62	IDC_SR
CAPPARACEAE Capparis cordifolia		kajakaja		W
CAPPARACEAE Capparis micrantha DC. subsp micrantha	V			IDC10833
CAPPARACEAE Capparis sepiaria L.	V	ukuleku		IDC10655
CAPPARACEAE Cleome sp.	H	kalau		W
CAPPARACEAE Cleome viscosa L.	H	ote ote		IDC_SR
CAPPARACEAE Crateva religiosa G.Forst.	T			IDC10804
CARICACEAE Carica papaya	T	aidila, papaya		W
CASUARINACEAE Casuarina equisetifolia J.R.Forst. & G.Forst.	T	kemari, aikakeiu (Tetum)		W,IDC_SR
CERATOPHYLLACEAE Ceratophyllum demersum L.	A	ira sikir kemukemur		IDC10798
CHRYSOBALANACEAE Maranthes corymbosa Blume	T			IDC_SN
CLUSIACEAE Calophyllum inophyllum L.	T			W,IDC_SR
CLUSIACEAE Calophyllum soulattri Burm.f.	T	Puapasuna	59;B3	IDC_SR
CLUSIACEAE Mammea odorata (Raf.) Kosterm.	T			IDC10991
CLUSIACEAE Mammea sp.	T	arapuru		W
COMBRETACEAE Combretum sp.				IDC10935
COMBRETACEAE Lumnitzera littorea (Jack) F.Voigt	T			W
COMBRETACEAE Lumnitzera racemosa Willd.	T			IDC10651
COMBRETACEAE Terminalia sp.	T	Akilisu Ete	102	IDC_SR
COMBRETACEAE Terminalia sp.	T	Kali Ete	106	IDC_SR
COMBRETACEAE Terminalia catappa L.	T	katapa		W,IDC_SR

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COMBRETACEAE Terminalia soembawana Sloot.	T	Akilisu Ete		IDC_SN
COMMELINACEAE Commelina diffusa	H	chilachila		W
COMMELINACEAE Commelina sp.	H			IDC10786
COMMELINACEAE Genus indeterminate	H			IDC11012
CONVOLVULACEAE Genus indeterminate				W
CONVOLVULACEAE Genus indeterminate		vehemalia		W
CONVOLVULACEAE Hewittia sublobata (L.f.) Kuntze	V	pukafifta		IDC10742
CONVOLVULACEAE Ipomoea aquatica Forssk.	V			IDC10781
CONVOLVULACEAE Ipomoea cairica (L.) Sweet	V			IDC10765,10889
CONVOLVULACEAE Ipomoea macrantha Roem. & Schult.	V			W
CONVOLVULACEAE Ipomoea obscura (L.) Ker Gawl.	V			W
CONVOLVULACEAE Ipomoea pes-caprae (L.) R.Br. subsp. brasiliensis (L.) Ooststr.	V	tahi ilailahu		W,IDC_SR
CONVOLVULACEAE Ipomoea pes-tigridis L.	V			IDC_SR
CONVOLVULACEAE Ipomoea sp.	V			IDC10737
CONVOLVULACEAE Ipomoea triloba L.	V			IDC_SR
CONVOLVULACEAE Merremia gemella (Burm.f.) Hallier f.	V	iratarutaruasa		IDC10787
CONVOLVULACEAE Polymeria ambigua R.Br.	V			IDC_SR
CONVOLVULACEAE Xenostegia tridentata (L.) Austin & Staples	V			IDC10653
CRASSULACEAE Bryophyllum pinnatum (Lam.) Kurz	H	pipivale kerikeri		W
CUCURBITACEAE Diplocyclos palmatus (L.) C.Jeffrey	V	papusavonu		IDC10658
CUCURBITACEAE Genus indeterminate	V			IDC2_3_06
CUCURBITACEAE Genus indeterminate		papusaron hoto		W
CUCURBITACEAE Luffa cylindrica (Lour.) M.Roem.	V			IDC10752
CUCURBITACEAE Neoalsomitra schefferiana (Cogn.) Hutch. ssp. podagrica (Steenis) W.J.de Wilde & Duyfjes	V			IDC10895
CYCADACEAE Cycas rumphii Miq.	T			IDC_SR
CYPERACEAE Baumea rubiginosa (Spreng.) Boeck.	H	Kau	B51	IDC10810
CYPERACEAE Cladium mariscus (L.) Pohle	H			IDC10806;10881
CYPERACEAE Cyperus javanicus Houtt.	H			IDC_SR
CYPERACEAE Cyperus sp.	H			IDC11082
CYPERACEAE Cyperus sp.	H			IDC10949
CYPERACEAE Cyperus stoloniferus Retz.	H	mumur, kalakalaho		W
CYPERACEAE Cyperus unioloides R.Br.	H			IDC10820
CYPERACEAE Eleocharis dulcis (Burm.f.) Trin. ex Hensch.	H	ututu'u,Utut	B47	IDC10777
CYPERACEAE Eleocharis geniculata (L.) Roem. & Schult.	H			IDC10811
CYPERACEAE Fimbristylis complanata (Retz.) Link	H	foekala-kalahu		IDC10778
CYPERACEAE Fimbristylis sp.	H			IDC10918
CYPERACEAE Fimbristylis sp.	H			IDC10952
CYPERACEAE Fimbristylis tristachya R.Br.	H			IDC10809
CYPERACEAE Rhynchospora corymbosa (L.) Britton	H			IDC10882
CYPERACEAE Rhynchospora sp.	H			IDC10917
CYPERACEAE Schoenoplectus mucronatus (L.) Palla ex J.Kern	H	ira lulus irasikire		IDC10797
CYPERACEAE Schoenus falcatus R.Br.	H			IDC10807
CYPERACEAE Scleria lithosperma (L.) Sw. var. lithosperma	H	loloso		IDC_SN
CYPERACEAE Scleria polycarpa Boeck.	H	lulusu		W
CYPERACEAE Scleria scrobiculata Nees & Mey. ex Nees	H	lulus haate		IDC10775,10819
CYPERACEAE Scleria terrestris (L.) Fasset	H			IDC10909
DATISCACEAE Tetrameles nudiflora R.Br.	T			IDC25_2_06
DAVALLIACEAE Nephrolepis sp.	F			IDC11038
DENNSTAEDTIACEAE Microlepia speluncae (L.) T.Moore	F			IDC10709
DICHAPETALACEAE Dichapetalum timoriense (DC.) Boerl.	F			IDC_SN
DILLENIACEAE Dillenia pentagyna Roxb.	T		221	IDC_SN2_3_06
DIOSCOREACEAE Dioscorea affin transversa R.Br.	V	alan noko		IDC_SR
DIOSCOREACEAE Dioscorea bulbifera L.	V	licoros, bitter yam		W
DRYOPTERIDACEAE Tectaria siifolia (Willd.) Copel.	F			IDC10912
EBENACEAE Diospyros maritima Blume	T	kauloko		IDC10965
EBENACEAE Diospyros sp.	T	kapuao'okelesu		W
ELAEAGNACEAE Elaeagnus triflora Roxb. var. triflora	V			IDC11062

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ELAEOCARPACEAE Genus indeterminate		akilesu		W
EUPHORBIACEAE Alchornea rugosa (Lour.) Muell.Arg.	S			IDC10891
EUPHORBIACEAE Antidesma ghaesembilla Gaertn.	S			IDC_SR
EUPHORBIACEAE Antidesma montanum Blume	S			IDC10688;10976
EUPHORBIACEAE Breynia cernua (Poir.) Mull.Arg.	S	Pua Pua Ete, Silari	68	IDC10723
EUPHORBIACEAE Breynia sp.				IDC11009
EUPHORBIACEAE Breynia sp.		puapua		W
EUPHORBIACEAE Bridelia sp				IDC_SN
EUPHORBIACEAE Bridelia tomentosa Blume	T	Sik Ete	105	IDC11099
EUPHORBIACEAE Briedeila sp.				IDC11109
EUPHORBIACEAE Chamaesyce cf. chamissonis	H			W
EUPHORBIACEAE Chamaesyce prostrata	H			W
EUPHORBIACEAE Chamaesyce sp.	H			W
EUPHORBIACEAE Codiaeum variegatum (L.) A.Juss. var. moluccanum (Decne.) Mull.Arg.	S	acurete (achurete?);ula ulacau (F)	2	IDC10872;10900
EUPHORBIACEAE Croton sp.				IDC11097
EUPHORBIACEAE Croton sp.				W
EUPHORBIACEAE Drypetes sp.		cila ete		W
EUPHORBIACEAE Euphorbia antiquorum	T	latupoukalaru		IDC10825
EUPHORBIACEAE Euphorbia heterophylla L.	H	mucucapapano		IDC_SR,W
EUPHORBIACEAE Euphorbia hirta L.	H			IDC_SR,W
EUPHORBIACEAE Excoecaria agallocha L.	T			W,IDC_SR
EUPHORBIACEAE Genus indeterminate	S			IDC11057
EUPHORBIACEAE Genus indeterminate	S			IDC10945
EUPHORBIACEAE Genus indeterminate	S			IDC10802
EUPHORBIACEAE Genus indeterminate	S			IDC11071
EUPHORBIACEAE Genus indeterminate	S			IDC10971
EUPHORBIACEAE Genus indeterminate		kaisala eteete		W
EUPHORBIACEAE Genus indeterminate		suka ete		IDC_SN
EUPHORBIACEAE Glochidion sumatranum Miq.	T			IDC_SR
EUPHORBIACEAE Glochidion xerocarpum (O.Schwarz) Airy Shaw	T			IDC10853;10902
EUPHORBIACEAE Jatropha curcas L.	S			IDC_SR
EUPHORBIACEAE Jatropha gossypifolia L.	S			IDC_SR
EUPHORBIACEAE Macaranga tanarius (L.) Mull.Arg.	T	Wenurapi,Venu	72,B55	IDC10746
EUPHORBIACEAE Mallotus mollissimus (Geisler) Airy Shaw	T	Wenurapi,venu,Hai Oto	51,B43	IDC10697
EUPHORBIACEAE Mallotus philippensis (Lam.) Mull.Arg.	T	isa isanete;isa isano		SN;IDC10933
EUPHORBIACEAE Mallotus sp.				IDC11014
EUPHORBIACEAE Melanolepis multiglandulosa (Reinw. ex Blume) Reichb.f. & Zoll.	T	Ula-Ulacau	82	IDC10682
EUPHORBIACEAE Phyllanthus amarus K.Schum. & Thonn.	H			W
EUPHORBIACEAE Phyllanthus cf. tenellus	H			W
EUPHORBIACEAE Phyllanthus reticulatus Poir.	V	silari	B10,44	IDC10760
EUPHORBIACEAE Phyllanthus sp.	H			IDC10956
EUPHORBIACEAE Phyllanthus sp.	H			IDC10956
EUPHORBIACEAE Phyllanthus sp.	H			IDC10942
EUPHORBIACEAE Phyllanthus sp.	H			IDC10951
EUPHORBIACEAE Phyllanthus urinaria L.	H			IDC10951
EUPHORBIACEAE Phyllanthus virgatus G.Forst.	H			W
EUPHORBIACEAE Ricinus communis L.	S			IDC_SR
EUPHORBIACEAE Suregada glomerulata (Blume) Baill.	S	larinika???,pailolos,Walitoto Takuru; vitotakuru(T), paiakelelele?	23	IDC10703,10847;10964
FABACEAE Abrus precatorius L.	V			IDC10656
FABACEAE Canavalia papuana Merr. & L.M.Perry	V			IDC10774
FABACEAE Canavalia rosea (Sw.) DC.	V	lerelere		W
FABACEAE Dalbergia pinnata (Lour.) Prain.	T			IDC11098
FABACEAE Dalbergia timorensis		helu		W
FABACEAE Dendrolobium umbellatum (L.) Benth.	H			W
FABACEAE Derris scandens (Roxb.) Benth.	V	cha piti		IDC10838;10959
FABACEAE Derris trifoliata Lour.	V			IDC10989

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FABACEAE Desmodium sp.	H			IDC10932
FABACEAE Desmodium sp.	S			IDC10966
FABACEAE Desmodium triflorum (L.) DC.	H	afati		W,IDC_SR
FABACEAE Erythrina variegata L. var. orientalis (L.) Merr.	T	Ciri Ete	123, 223	W,IDC_SR
FABACEAE Flemingia strobilifera (L.) R.Br. ex W.T.Aiton	S			IDC10700
FABACEAE Inocarpus fagifer (Parkinson) Fosberg	T			IDC10670
FABACEAE Millettia pinnata (L.) Panigrahi	T			IDC10997
FABACEAE Millettia xylocarpa Miq.	T			IDC10856
FABACEAE Mucuna pruriens (L.) DC. var. utilis (Wight) Burck	V	kavaha vaha		IDC10738
FABACEAE Pterocarpus indicus Willd.	T	ai na		W
FABACEAE Pycnospora lutescens (Poir.) Schindl.	H			IDC10916
FABACEAE Sesbania formosa (F.Muell.) N.T.Burb.a	T			IDC_SN
FABACEAE Smithia sensitiva Ait.	H			IDC10808
FABACEAE Sophora tomentosa L.	S			W
FABACEAE Strongylodon lucidus (G.Forst.) Seem.	V			IDC11076
FABACEAE Uraria lagopodioides (L.) Desv. ex DC.	H	posiaku		IDC10904
FABACEAE Vigna marina (Burm.) Merr.	V			W
Fern Genus indeterminate	F			IDC11006
Fern Genus indeterminate	F			IDC11021
Fern Genus indeterminate	F			IDC11022
Fern Genus indeterminate	F			IDC11024
Fern Genus indeterminate	F			IDC11077
Fern Genus indeterminate	F			IDC11058
Fern Genus indeterminate	F			IDC11050
Fern Genus indeterminate	F			IDC11041
Fern Genus indeterminate	F			IDC11039
Fern Genus indeterminate	F			IDC11065
Fern Genus indeterminate	F	Leuleu		IDC_SR
FLACOURTIACEAE Flacourtia indica (Burm.f.) Merrill	T	ukulau;Uku Lau Lau	B63	IDC10763
FLACOURTIACEAE Flacourtia sp. large leaves (F. rukam)	T	parako?		IDC_SN
FLACOURTIACEAE Flueggea sp.		parako		W
FLACOURTIACEAE Genus indeterminate		koicila ataatarana		W
FLACOURTIACEAE Muntingia calabura L.	T			IDC_SR
FLAGELLARIACEAE Flagellaria indica L.	V	severu	B21	IDC_SR
GLEICHENIACEAE Dicranopteris linearis (Burm.f.) J.Underw.	F			IDC11112
GNETACEAE Gnetum gnemon L.		Kusalu; molingu(I)	35	IDC11064
GOODENIACEAE Scaevola taccada (Gaertn.) Roxb.	S	kokour		IDC10958
HERNANDIACEAE Gyrocarpus americanus Jacq.	T	ai mutin (T); vovoru(F)	22	IDC_SRP
HERNANDIACEAE Hernandia nymphaeifolia (C.Presl) Kubitzki	T			IDC10992
HYDROCHARITACEAE Blyxa sp.	A	ikaferehuitiana		IDC_SN
HYDROCHARITACEAE Ottelia alismoides (L.) Pers.	A	ikakahuiitinana		IDC10773
Indeterminate	T			IDC_SN29_2_06
Indeterminate	S			IDC_SN2_3_06
Indeterminate	T			IDC_SN29_2_06
Indeterminate	H			IDC11048
Indeterminate	H			IDC11008
Indeterminate				IDC10941
Indeterminate				IDC11086
Indeterminate	S			IDC11044
Indeterminate	S			IDC10969
Indeterminate				IDC10930
Indeterminate	H			IDC11061
Indeterminate		achur ete		IDC_SN
Indeterminate	V	akalu		IDC_SR
Indeterminate	T	balu ete		IDC_SR
Indeterminate	T	beleki se		IDC_SN
Indeterminate		biahara		IDC_SR
Indeterminate	T	chilla		IDC_SR
Indeterminate		ete piti		IDC_SR

Scientific name	LifeForm	Bahasa Fatuluku	CT No	Source/Voucher
Indeterminate	T	haiforoku		IDC_SR
Indeterminate		hamu		IDC_SR
Indeterminate	T	Hara ana	32	IDC10963
Indeterminate		homolu		IDC_SR
Indeterminate	T	ikana		IDC_SR
Indeterminate		ipsa ete;ili ete		IDC_SR
Indeterminate		ira akeraununu		IDC_SR
Indeterminate		kai teharia		IDC_SR
Indeterminate	T	lari nika		IDC_SR
Indeterminate		lua ete		IDC_SR
Indeterminate	V	Luwara (Dragons tooth)		IDC_SN
Indeterminate		malahu lakuwaru		IDC_SR
Indeterminate		matar ete		IDC_SR
Indeterminate	T	mataria		IDC_SN
Indeterminate		mulici		IDC_SR
Indeterminate		Poria	75	IDC_SR
Indeterminate		Putun Ete	78	IDC_SR
Indeterminate	T	rauka piti		IDC_SN
Indeterminate		tauloko		IDC_SR
Indeterminate		tchele tchele		IDC_SR
Indeterminate	T	una puti		IDC_SN
Indeterminate	T	valur ete		IDC_SR
Indeterminate	T	vaya hara;vaia hara		IDC_SR
Indeterminate		wehemamaln asa		IDC_SR
LAMIACEAE Basilicum polystachyon (L.) Moench	H			IDC10814
LAMIACEAE Genus indeterminate				IDC11016
LAMIACEAE Hyptis capitata Jacq.	H			IDC10893
LAMIACEAE Hyptis suaveolens (L.) Poit.	H	canoto		IDC_SR
LAMIACEAE Leucas decemdentata	H			W
LAMIACEAE Leucas sp.				W
LAMIACEAE Ocimum basilicum (L.) Back	H	chan mukia, sweet basil		W
LAMIACEAE Ocimum tenuiflorum L. var. anisodorum (F.Muell.) Domin	H	chan oto, holy basil		IDC10864
LAMIACEAE Plectranthus scutellarioides (L.) R.Br.	H			IDC10735
LAMIACEAE Teucrium viscidum Blume		irasisiku irasikur		IDC10790
LAURACEAE Cassytha filiformis L.	V	tarayapalinu;tali		IDC10759
LAURACEAE Cryptocarya sp.	T	araporu ete	115	IDC10694,SN
LAURACEAE Cryptocarya sp.	T	lilir ete		W
LAURACEAE Crypyocarya sp.	T	achakaranu		IDC10826
LAURACEAE Endiandra sp	T			IDC10710
LAURACEAE Endiandra sp.	T	amololo		IDC10829
LAURACEAE Genus indeterminate	T	tulan		IDC_SN
LAURACEAE Litsea glutinosa (Lour.) C.B.Rob.	T	tulan		IDC_SN
LAURACEAE Litsea sp.	T			IDC11108
LAURACEAE Litsea sp.	T	inakoe		IDC10727
LECYTHIDACEAE Barringtonia asiatica (L.) Kurz	T			IDC_SR
LECYTHIDACEAE Barringtonia racemosa (L.) Spreng.	T	Ira ete	B8	IDC10805
LECYTHIDACEAE Barringtonia sp.	T	korikorinu; kouru		W
LECYTHIDACEAE Planchonia sp.	T	iparo upulu		IDC25_2_06
LECYTHIDACEAE Planchonia sp.	T	Iric Ete	113	IDC_SN3/10/05
LECYTHIDACEAE Planchonia timorensis Blume	T			IDC10671
LEEACEAE Leea indica (Burm.f.) Merr.	S	motiar; mokiro	18,B29	IDC10708
LEMNACEAE Lemna aequinoctialis Welw.	A	ira kemu kemur		IDC10800
LILIACEAE Genus indeterminate	H	cici		W
LILIACEAE Gloriosa superba L.	H	curailailahu		IDC10946
LILIACEAE Hypoxis aurea Lour.	H			IDC10905
LILIACEAE Proiphys amboinensis (L.) Herbert	H			IDC_SR
LOGANIACEAE Strychnos minor Dennst.	V			IDC10732
LOMARIOPSIDACEAE Elaphoglossum sp.	F			IDC11073

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LORANTHACEAE Amyena artensis sp.	E	lakisoruaku		W
LORANTHACEAE Decaisnina sumbawensis (Tiegh.) Barlow	E	lakisoru aku		IDC10750
LORANTHACEAE Dendrophthoe curvata (Blume) Miq.	E			IDC10764
LYGODIACEAE Lygodium sp.	F			IDC11110
LYGODIACEAE Lygodium sp.	F			IDC11081
LYTHRACEAE Pemphis acidula J.R.Forst. & G.Forst.	S	kaitemuru		IDC10681
MALPIGIACEAE Hiptage benghalensis (L.) Kurz	V	paipor taru		IDC10757
MALPIGIACEAE Hiptage benghalensis (L.) Kurz	V	paipuru		IDC_SN ck id
MALPIGIACEAE Ryssopterys timoriensis (DC.) Juss.	V			IDC10962;10990
MALVACEAE Abelmoschus manihot (L.) Medik.	S			IDC10788
MALVACEAE Abutilon auritum (Wall. ex Link) Sweet	S			IDC10886
MALVACEAE Abutilon indicum (L.) Sweet subsp. albescens (Miq.) Boiss.	S			IDC10943
MALVACEAE Abutilon sp.		nau		W
MALVACEAE Genus indeterminate				W
MALVACEAE Hibiscus hirtus L.	S			IDC10835
MALVACEAE Hibiscus tiliaceus L.	T	varu, waru	40,B15	IDC10780
MALVACEAE Hibiscus vitifolius L.	S			IDC10868
MALVACEAE Sida acuta Burm.f.	H			W,IDC_SR
MALVACEAE Sida pusilla Cav.	H			W
MALVACEAE Sida rhombifolia L.	H			IDC10865
MALVACEAE Thespesia lampas (Cav.) Dalz. & Gibbs var. lampas	S			IDC10664
MALVACEAE Thespesia populnea	T	onovaru		W
MALVACEAE Urena lobata L.	H	sisiku; duut karau toi(T); falla(L)		W,IDC_SR
MELASTOMACEAE Memecylon sp.	S	rufarufa?, rufa?		W
MELIACEAE Aglaia argentea Blume	T	ulupiate		IDC10689
MELIACEAE Aphanamixis polystachya (Wall.) R.N.Parker	T	Pua mimiraka	12	IDC10668
MELIACEAE bipinnate lves, ft eaten by pidgeons	T			IDC_SN
MELIACEAE Dysoxylum acutangulum Miq. subsp. foveolatum (Radlk.) Mabb. (opp lvs)	T	luafula fula;Pai Lolosu	91	IDC10885
MELIACEAE Dysoxylum gaudichaudianum (A.Juss.) Miq.	T	pua mimiraka		IDC10695,10837;11079
MELIACEAE Dysoxylum parasiticum (Osb.) Kosterm.	T	Cecele	45	IDC10720
MELIACEAE Dysoxylum setosum (Span.) Miq.	T	pua mimiraka		IDC10830;ck11047
MELIACEAE Genus indeterminate	T	unapoti		W
MENISPERMACEAE Anamirta cocculus (L.) Wight & Arn.	V	sururu	112	IDC10842
MENISPERMACEAE Pachygone ovata (Poir.) Hook.f. ex Thomson	V			IDC10878
MENISPERMACEAE Pycnarrhena longifolia (Decne ex Miq.) Becc.	V			IDC_SN
MENISPERMACEAE Stephania japonica (Thunb.) Miers	V			IDC11066
MENYANTHACEAE Nymphoides indica (L.) Kuntze	A	ra rau rau		IDC10769
MIMOSACEAE Acacia leucophloea (Roxb.) Willd.	T			IDC10883;11101
MIMOSACEAE Acacia sp.	T			IDC11090
MIMOSACEAE Acacia sp.	T	rusano		W
MIMOSACEAE Adenanthera pavonina L.	T	Laihere	60, 227	IDC_SR
MIMOSACEAE Albizia lebbeck (L.) Benth.	T	pai mani [piemarni]	120	IDC10840
MIMOSACEAE Cathormion umbellatum (Vahl) Kosterm. subsp. moniliforme (DC.) Brummitt	T			IDC_SR
MIMOSACEAE Dichrostachys cinerea (L.) Wight & Arn. subsp. malesiana Brenan & Brummitt	T			IDC10699
MIMOSACEAE Entada phaseoloides (L.) Merr.	V	sae;sai		IDC_SN
MIMOSACEAE Pararchidendron pruinosum (Benth.) I.C.Nielsen	T	Molisu,molliso	B40	IDC_SN
MIMOSACEAE Prosopis pallida (Humb. & Bonpl. ex Willd.) Kunth	T			IDC10884
MOLLUGINACEAE Glinus lotoides L.	H			IDC10817
MOLLUGINACEAE Mollugo pentaphylla L.	H			IDC11084
MORACEAE Antiaris toxicaria Lesch. var. macrophylla (R.Br.) Corner	T	para		IDC10823
MORACEAE Fatoua pilosa Gaudich.	H			IDC10654,10873
MORACEAE Ficus cf. tinctoria		pulivare		W

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MORACEAE Ficus drupacea Thunb.	T		107	IDC10663
MORACEAE Ficus fulva Reinw. ex Blume	T			IDC10674
MORACEAE Ficus gul Lauterb. & K.Schum.	T	ali po		IDC10698,10751,10679
MORACEAE Ficus hispida L.f.	T	Wata wata	43,52,B41	IDC10666
MORACEAE Ficus microcarpa L.f.	T	Hama susu	B9	IDC10673
MORACEAE Ficus racemosa L. var. racemosa	T	Hama Po'o		IDC10824
MORACEAE Ficus sagittata J.Konig ex Val	T	Lohiri	B36	IDC10755
MORACEAE Ficus septica Burm.f.	T	kaipupu	17	IDC10696,10675
MORACEAE Ficus sp.				IDC10672
MORACEAE Ficus sp.		alipu		W
MORACEAE Ficus sp.		hali mutin		W
MORACEAE Ficus sp.		kara		W
MORACEAE Ficus sp.		nunu		W
MORACEAE Ficus sp.		susu		W
MORACEAE Ficus sp.		suvule		IDC10874
MORACEAE Ficus sp.		vacaru		W
MORACEAE Ficus superba (Miq.) Miq.	T	kara roko		IDC10821
MORACEAE Ficus variegata Blume	T	Tatiru imimiraka		IDC10725
MORACEAE Ficus variegata Blume	T	Tatiru ipiti		IDC10729
MORACEAE Ficus virens Aiton var. virens	T	hama piti; halimutin (T)	33	IDC10841,10650
MORACEAE Ficus virgata Reinw. ex Blume	T			IDC10676
MORACEAE Ficus wassa Roxb.	T	Ho Holu	B11	IDC10677
MORACEAE Genus indeterminate		luavarinu		W
MORACEAE Maclura cochinchinensis (Lour.) Corner	V			IDC_SR
MORACEAE Streblus affin taxoides (Heyne ex Roth) Corner	S	matarufa uku	225	IDC10894
MORACEAE Trophis scandens (Lour.) Hook. & Arn.	V	uku-cumu		SN;IDC11105
MYRISTICACEAE Horsfieldia sp.	T			IDC11025
MYRISTICACEAE Horsfieldia sp.	T			IDC10925
MYRISTICACEAE Myristica lancifolia Poir.	T	upuku ete		IDC10913
MYRISTICACEAE Myristica lancifolia Poir. subsp. montana (Roxb.) de Wilde	T	Imakoil	28	IDC10693
MYRISTICACEAE Myristica rumphii (Bl.) Kosterm var. rumphii	T	Lari lawak	26	IDC10691
MYRSINACEAE Aegiceras corniculatum (L.) Blanco	S			IDC10987
MYRSINACEAE Ardisia sp.	S			IDC10716;10801,11018
MYRSINACEAE Embelia sp.	V			IDC10719,11069,10719
MYRSINACEAE Embelia sp.	V			IDC10968
MYRSINACEAE Maesa junghuhniana Scheff.	S			IDC10705,10734;10922
MYRSINACEAE Maesa sp.	S	Folokua tuatua	53	IDC10702
MYRTACEAE Rhodamnia cinerea Jack	S	Inamoru	84	IDC11072
MYRTACEAE Syzygium nervosum DC.	T	akam;Uhak fuik(T)	B18	IDC10903
MYRTACEAE Syzygium sp.	T		13	IDC10733
MYRTACEAE Syzygium sp. affin S. microcymum	T	ulu moru		IDC11011
MYRTACEAE Syzygium sp. affin S. samarangense	T	Wahuru,vaharu	6,B31	IDC_SN
NYCTAGINACEAE Boerhavia dominii Meikle & Hewson	H			GAB6956
NYCTAGINACEAE Boerhavia glabrata Blume	H	merek asa		W
NYCTAGINACEAE Pisonia aculeata L.	V	rufa hotu		IDC10812
NYCTAGINACEAE Pisonia umbellifera (J.R.Forst. & G.Forst.) Seem	T	Bobo Ete	37	IDC10799;10685
OLACACEAE Olax imbricata Roxb.	V			IDC10877
OLACACEAE Ximenia americana L.	V	lukumore		IDC10981
OLEACEAE Jasminum didymum G.Forst.	V			IDC_SN
OLEACEAE Jasminum sp.	V	tarupitinu		IDC_SN
ONAGRACEAE Ludwigia perennis L.	H			IDC_SR
OPHIOGLOSSACEAE Helminthostachys zeylanica (L.) Kaulf.	F			IDC10783
OPILIACEAE Cansjera leptostachya Benth.	V	akusepin		IDC10747,10846
OPILIACEAE Opilia amentacea Roxb.	V	taro piti		IDC10974
ORCHIDACEAE Dendrobium sp.	E			IDC10848
ORCHIDACEAE Dendrobium sp.	E			IDC11042
ORCHIDACEAE Dendrobium sp.	E			IDC_SR

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ORCHIDACEAE Genus indet		malahara cipicipi		IDC10793
ORCHIDACEAE Genus indeterminate				IDC11056
ORCHIDACEAE Genus indeterminate				IDC11053
ORCHIDACEAE Genus indeterminate		anggrek		W
ORCHIDACEAE Geodorum sp.	H			IDC11054
ORCHIDACEAE Malaxis sp.	H			IDC11013
ORCHIDACEAE Nervilia sp.	H			IDC11055
ORCHIDACEAE Vanda sp.	E			IDC_SR
PANDANACEAE Freycinetia ?angustifolia Blume	V			IDC2_3_06
PANDANACEAE Pandanus sp. 1	T			IDC_SR
PANDANACEAE Pandanus sp. 2	T	Cenu	B17	IDC_SR
PANDANACEAE Pandanus tectorius Parkinson	T	ceenu, screwpine		W
PASSIFLORACEAE Passiflora foetida L.	V	chala chala		W,IDC_SR
PEDALIACEAE Genus indeterminate	H			IDC10944
PEDALIACEAE Josephinia imperatricis Vent.	H			IDC10977
PIPERACEAE Genus indeterminate	H			IDC11051
PIPERACEAE Peperomia pellucida (L.) Kunth	H			IDC11052
PIPERACEAE Piper betle L.	V	Malu Hoko	B34	IDC10728
PIPERACEAE Piper sp affin P.subpeltatum	V			IDC11031
PIPERACEAE Piper sp.	V			IDC11078
PIPERACEAE Piper sp. (veins at base, ft pedicelled)	V			IDC10715
PIPERACEAE Piper sp. affin P.retrofractum Vahl (veins above middle)	V	tarukukurisa, serihutan (I)		IDC_SN
PIPERACEAE Pothomorphe subpeltata (Willd.) Miq.		tarako colisa		IDC_SN
PITTOSPORACEAE Pittosporum moluccanum (Lam.) Miq.	T	cilia ete		IDC10870
PLUMBAGINACEAE Plumbago zeylanica L.	H			IDC_SR
POACEAE Bambusa vulgaris Schrad. ex Wendl.	H	afa tula, bamboo		W,IDC_SR
POACEAE Bothriochloa bladhii (Retz.) S.T.Blake	H			IDC10920
POACEAE Brachiaria cf. paspaloides	H			W
POACEAE Capillipedium parviflorum (R.Br.) Stapf	H			IDC10919
POACEAE Chrysopogon aciculatus	H			W,IDC_SR
POACEAE Chrysopogon sp.	H			IDC_SR
POACEAE Dactyloctenium aegyptium (L.) Willd.	H			W
POACEAE Digitaria sp.	H			W
POACEAE Digitaria sp.	H	uchaucha lamano		W
POACEAE Eleusine indica (L.) Gaertn.	H			W,IDC_SR
POACEAE Enneapogon pallidus (R.Br.) P.Beauv.	H			IDC11092
POACEAE Eragrostis sp.	H			IDC10931
POACEAE Genus indeterminate	H			IDC11005
POACEAE Genus indeterminate	H			IDC10954
POACEAE Heteropogon contortus (L.) P.Beauv. ex Roem. & Schult.	H			W,IDC_SR
POACEAE Heteropogon triticeus (R.Br.) Stapf	H			IDC10661
POACEAE Hyparrhennia sp.	H	kucasusunu		W
POACEAE Imperata cylindrica (L.) Reausch.	H	verasa;Werupanatu	B52	IDC_SR
POACEAE Isachne sp.	H			IDC11003
POACEAE Ischaemum sp.	H			IDC11001
POACEAE Ischaemum sp.	H			IDC10953
POACEAE Ischaemum sp.	H			W
POACEAE Leersia hexandra Sw.	H			IDC_SR
POACEAE Lepturus repens (G.Forst.) R.Br.	H			W
POACEAE Mnesithea rottboellioides (R.Br.) de Koning & Sosef	H			IDC_SR
POACEAE Paspalum	H			IDC11002
POACEAE Paspalum	H			IDC11074
POACEAE Paspalum orbiculare	H			W
POACEAE Phragmites vallatoria (Pluk. ex L.) Veldkamp	H	moto kete;Motto	B26	IDC_SN
POACEAE Saccharum spontaneum L.	H	uchaucha susunu, wild sugar cane		W,IDC_SR
POACEAE Setaria sp.	H			IDC10970
POACEAE Sorghum timorense (Kunth) Buse in de Vriese	H			IDC10921

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POACEAE Spinifex littoreus (Burm.f.) Merr.	H	tahi ukuuku, tahi karahu		W,IDC_SR
POACEAE Spinifex longifolius R.Br.	H			IDC_SR
POACEAE Thuarea involuta	H	afaafatula		W
POACEAE Zoyzia sp.	H			W
PODOCARPACEAE Sundacarpus amara (Blume) C.N.Page	T			IDC10753
POLYGALACEAE Polygala longifolia Poir.	H			IDC10915
POLYGONACEAE Persicaria attenuata (R.Br.) Sojak	H			IDC10791
POLYGONACEAE Persicaria barbata (L.) H.Hara	H	lotonu asa		IDC10789
POLYPODIACEAE Drynaria quercifolia (L.) J.J.Sm.	F			IDC_SN
POLYPODIACEAE Drynaria sp	F	sa'apu		W
POLYPODIACEAE Drynaria sp.	F			IDC11087
POLYPODIACEAE Microsorum sp.	F			IDC11035
POLYPODIACEAE Microsorum sp.	F			IDC10923
POLYPODIACEAE Pyrrosia aff dielsii	F			IDC11068
POLYPODIACEAE Pyrrosia lanceolata (L.) Farwell	F	Aca Olo-Olo	B37	IDC10701
PORTULACACEAE Portulaca australis Endl.	H	ilailahu		W
POTAMOGETONACAE Potamogeton distinctus A.Benn.	A			IDC10776
PSILOTACEAE Psilotum nudum (L.) Griseb.	F			IDC10850
PTERIDACEAE Pteris affin ensiformis	F			IDC10684
PTERIDACEAE Pteris affin pacifica	F			IDC11023
PTERIDACEAE Pteris ensiformis	F			IDC11075
PTERIDACEAE Pteris ensiformis	F			IDC10910
PTERIDACEAE Pteris vittata L.	F			IDC10861
RHAMNACEAE Colubrina asiatica (L.) Brongn.	V			IDC10980
RHAMNACEAE Genus indeterminate				W
RHAMNACEAE Genus indeterminate		tulano		W
RHAMNACEAE Gouania javanica Miq.	V	wapapaka ete		IDC10740,10890
RHAMNACEAE Ziziphus celtidifolia DC.	T	tara		IDC_SN
RHAMNACEAE Ziziphus timoriensis DC.	T	ai lok fuik?		IDC_SN29_2_06
RHIZOPHORACEAE Carallia brachiata (Lour.) Merr.	T	Oi	16, B23	SN;IDC11007
RHIZOPHORACEAE Rhizophora stylosa Griff.	T	ai tasi		W
RUBIACEAE Aidia racemosa (Cav.) Tirveng.	T	memehara		W
RUBIACEAE Dentella repens (L.) J.R.Forst. & G.Forst.	H			IDC10792
RUBIACEAE Genus indeterminate				W
RUBIACEAE Genus indeterminate	S			IDC11045
RUBIACEAE Genus indeterminate	V			IDC10994
RUBIACEAE Genus indeterminate	S			IDC_SN2_3_06
RUBIACEAE Genus indeterminate	S			IDC11063
RUBIACEAE Genus indeterminate		hoholu	57	W
RUBIACEAE Genus indeterminate		lalamu		W
RUBIACEAE Geophila repens (L.) I.M.Johnston	H			IDC11027
RUBIACEAE Guettarda speciosa L.	T	lorovahu		IDC10996
RUBIACEAE Ixora longifolia	S			IDC11010
RUBIACEAE Ixora sp.				W
RUBIACEAE Ixora timorensis Decne.	S	none		IDC10831;10955
RUBIACEAE Lasianthus strigosus Wight	S			IDC11015
RUBIACEAE Morinda citrifolia L.	T	Nenuka	39, B7	IDC10762
RUBIACEAE Myrmecodia tuberosa Jack.	E			IDC10888
RUBIACEAE Nauclea orientalis (L.) L.	T	Sawele	41, B6	IDC_SR
RUBIACEAE Oldenlandia corymbosa L.	H			W
RUBIACEAE Psychotria sp.	S			W
RUBIACEAE Psychotria sp.	S			IDC10822
RUBIACEAE Psychotria sp.	S			IDC10683
RUBIACEAE Psydrax sp.	S			IDC_SN
RUBIACEAE Psydrax sp.	S	pai keli keli		IDC_SN
RUBIACEAE Randia sp.		makarolik		W
RUBIACEAE Saprosma sp.	S			IDC10704
RUBIACEAE Saprosma sp.	S		?=11019	IDC10754
RUBIACEAE Saprosma sp.	S			IDC11019

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RUBIACEAE Saprosma sp.	S	isusu		IDC10857
RUBIACEAE Spermacoce remota Lam.	H			IDC10950
RUBIACEAE Tarenna sp.	T			IDC10730
RUBIACEAE Timonius timon (Spreng.) Merr.	T	Lalamu	42,. B4	IDC10741
RUTACEAE Aegele marmelos L.Correa ex Roxb.	T	Koi Cila	B48	IDC10758
RUTACEAE Affin Acronychia trifoliata Zoll.	T	chele		IDC10849
RUTACEAE Affin Pleiospermium dubium (Blume) Swingle	T	mochow uku		IDC10845
RUTACEAE Citrus hystrix	T	irasikir curuk		IDC10796
RUTACEAE Genus indeterminate	T			IDC11033
RUTACEAE Genus indeterminate	T			IDC11046
RUTACEAE Genus indeterminate		jurur hoto		W
RUTACEAE Genus indeterminate	T	musakau		IDC_SR
RUTACEAE Glycosmis sp.				IDC10887
RUTACEAE Luvunga monophylla (DC.) Mabb.	V	uku		IDC10836
RUTACEAE Micromelum minutum (G.Forst.) Wight & Arn.	T	mamecerai		IDC10669;11070
SANTALACEAE Exocarpos latifolius R.Br.	T	seria		W,IDC_SR
SANTALACEAE Santalum album L	T	ete mukiaru; ariku(T?)		IDC_SR
SAPINDACEAE Allophyllus cobbe (L.) Raeusch.	S	tahi vahuru?		IDC10929;10985;10986
SAPINDACEAE Atalaya salicifolia (DC.) Blume	T			IDC_SN
SAPINDACEAE Cardiospermum halicacabum L.	H	kaka painu		IDC10839
SAPINDACEAE Dimocarpus longan Lour. subsp. malesianus Leenh.	T	Aja Loloru	27	IDC10749
SAPINDACEAE Dodonaea viscosa Jacq.	S			IDC10982
SAPINDACEAE Elattostachys sp.	T	ai me tan		W
SAPINDACEAE Elattostachys verrucosa (Blume) Radlk.	T			IDC10832
SAPINDACEAE Genus indeterminate		tahi chuchu		W
SAPINDACEAE Harpullia arborea (Blanco) Radlk	T			IDC11017
SAPINDACEAE Lepisanthes rubiginosa (Roxb.) Leenh.	S	Aglaia?		IDC10745,10851
SAPINDACEAE Pometia pinnata J.R. & G. Forst.	T	Malahu	21	IDC_SN
SAPINDACEAE Schleichera oleosa (Lour.) Oken	T	Kaicawa,ai dak	58, B5	IDC_SR
SAPOTACEAE Mimusops elengi L.	T	paiparunu, paiparuna?		IDC10967
SAPOTACEAE Pouteria nitida (Blume) S.P.Teo	T	Amacu	1	IDC10712
SAPOTACEAE Pouteria obovata (R.Br.) Baehni	T	warirasa	11,B25	IDC10867;10988
SAPOTACEAE Pouteria obovoidea (H.J.Lam.) Baehni	T			IDC11028
SAPOTACEAE Pouteria sp. sericeous	T			IDC_SN2_3_06
SCHIZAEACEAE Lygodium circinnatum (Burm.) Sw.	F			IDC10862
SCROPHULARIACEAE Bacopa sp.	H			IDC10939
SCROPHULARIACEAE Genus indeterminate	H			W
SCROPHULARIACEAE Limnophila sp.	H			W
SELAGINELLACEAE Selaginella sp.	F			W,IDC_SR
SIMAROUBACEAE Brucea javanica (L.) Merr.	T			IDC10871
SIMAROUBACEAE Harrisonia brownii A.Juss.	S			IDC10901
SMILACACEAE Smilax australis R.Br.	V	Or affin		IDC10975
SMILACACEAE Smilax blumei A.DC.	V	faripluha;Fari Rua	B58	IDC10748
SOLANACEAE Solanum mauritianum				W
SOLANACEAE Solanum sp.		Akumusa	73	IDC10680
SOLANACEAE Solanum sp.		kauloko(L)		IDC10940
STEMONACEAE Stemona sp.	V	ututu		IDC_SR
STERCULIACEAE Abroma mollis DC.	S			IDC10957
STERCULIACEAE Helicteres isora L.	S	folokuatuatua		IDC10869;10947
STERCULIACEAE Heritiera littoralis Dryand.	T			IDC10998
STERCULIACEAE Kleinhovia hospita L.	T	savatu,Sawatu	67	IDC_SN
STERCULIACEAE Melhania javanica Adelb.	H			IDC11093
STERCULIACEAE Melochia umbellata (Hout.) Stapf	T	Walaka,Walalaka	71,B57	IDC10739
STERCULIACEAE Pterospermum diversifolia Blume	T	Pokuru	8	IDC10934
STERCULIACEAE Sterculia affin quadrifida R.Br.	T	Komil Ete, komilu	87	IDC10736
STERCULIACEAE Sterculia foetida L.	T	ai nitas		W,IDC_SR
STERCULIACEAE Waltheria indica L.	H			IDC11091
SURIANACEAE Suriana maritima L.	S	kaitemuru?		W

Scientific name	LifeForm	Bahasa Fatuluku	CT No	Source/Voucher
TACCACEAE Tacca palmata Blume	H	luicorocoro		SN;IDC10911
THELYPTERIDACEAE Amphineuron terminans (Hook.) Holttum	F			IDC10803
THELYPTERIDACEAE Christella subpubescens	F			IDC11026
THELYPTERIDACEAE Cyclosorus interruptus (Willd.) H.Ito	F			IDC10880
THELYPTERIDACEAE Pronephrium asperum	F			IDC11029
THYMELAEACEAE Phalaria sp.		Upur Ete	99	IDC_SR
THYMELAEACEAE Phaleria octandra (L.) Baill.	S			IDC10690
THYMELAEACEAE Thecanthes concreta (F.Muell.) Rye	H			IDC11094
TILIACEAE Genus indeterminate		nokeku		W
TILIACEAE Grewia breviflora Benth.	T			IDC11102;11100
TILIACEAE Grewia oxyphylla Burret	T			IDC10657;11103
TILIACEAE Triumfetta pilosa Roth	S			IDC10782
TYPHACEAE Typha domingensis Pers.	H			IDC10879
ULMACEAE Celtis philippensis Blanco	T	cila ete		IDC_SN
ULMACEAE Celtis sp.		tara		IDC_SR
ULMACEAE Celtis sp.		tarapiti		W
ULMACEAE Trema tomentosa (Roxb.) H.Hara	S	nelu nelu		IDC10660
URTICACEAE Boehmeria sp.		chalaparu		W
URTICACEAE Dendrocnide moroides (Wedd.) Chew.	S			IDC11060
URTICACEAE Genus indeterminate				IDC11020
URTICACEAE Genus indeterminate				IDC10973
URTICACEAE Genus indeterminate		ata oloolo		W
URTICACEAE Pipturus argenteus (J.R.Forst.) Wedd.	T	Apuluka	38,B50	IDC10707
URTICACEAE Pouzolzia hirta (Blume) Hassk.	H			IDC10784;11104
VERBENACEAE Callicarpa candicans (Burm.f.) Hocker.	S	payapaya		W,IDC_SR
VERBENACEAE Clerodendrum buchanani (Roxb.) Walp.	S			IDC10714
VERBENACEAE Clerodendrum floribundum R.Br.	T	Wanikua ete	222;122	IDC10767
VERBENACEAE Clerodendrum inerme (L.) Gaertn.	V			W
VERBENACEAE Clerodendrum japonicum (Thunb.) Sweet	S			IDC10713
VERBENACEAE Lantana camara L.	V	lantana		W,IDC_SR
VERBENACEAE Phyla nodiflora (L.) Greene	H	lippia		IDC10779
VERBENACEAE Premna serratifolia L.	S			IDC10960
VERBENACEAE Premna sp.				IDC11096
VERBENACEAE Stachytarpheta jamaicensis (L.) Vahl	H			IDC10863
VERBENACEAE Tectona grandis	T	tek		IDC_SR
VERBENACEAE Vitex pubescens	T	paharu pitini		W,IDC_SR
VERBENACEAE Vitex rotundifolia L.f.	S	pulapula		W
VERBENACEAE Vitex sp.	T	luri pahar		IDC_SN
VERBENACEAE Vitex trifolia L.	S	pula pula;tahi ete		IDC10854
VIOLACEAE Genus indeterminate				W
VITACEAE Cayratia geniculata (Blume) Gagn.	V	lak taru		IDC10785
VITACEAE Cayratia japonica (Thunb.) Gagn.	V	laku		IDC10692
VITACEAE Cayratia sp.	V			IDC_SN
VITACEAE Cayratia trifolia L.	V	laku		IDC10979
VITACEAE Cissus reniformis Domin	V			IDC_SR
VITACEAE Cissus sp.	V	uvas fuik(T)		IDC10906
VITACEAE Tetrastigma sp	V			IDC2_3_06
VITACEAE Tetrastigma sp. or affin	V			IDC10756
VITACEAE Tetrastigma sp.	V	laku		W
VITTARIACEAE Antrophyum plantagineum (Cav.) Kaulf.	F			IDC11043
VITTARIACEAE Vittaria ensiformis Sw.	F			IDC11049
ZINGIBERACEAE Alpinia sp.	H			IDC10908;10926
ZINGIBERACEAE Alpinia sp.	H			IDC10722
ZINGIBERACEAE Costus speciosa (Koen.) Sm.	H			IDC11004
ZINGIBERACEAE Genus indeterminate	H	luapanapanarika		W
ZINGIBERACEAE Zingiber zerumbet (L.) Sm.	H	mupoko		IDC10936
ZYGOPHYLLACEAE Tribulus cistoides L.	H	paituku		W

APPENDIX 2. Bahasa Fataluku Names of Vascular Plants Recorded from the Proposed Jaco-Tutuala-Lore National Park

The list is ordered by Bahasa Fataluku name, with Tetun names indicated by (T), Lore names by (L) and English common names by (E). Life form (**t**ree, **s**hrub, **h**erb, **v**ine, **f**ern) and scientific name are indicated where known. Names used in this list should be treated with caution. While every care and has been taken in the indentification of specimens, many have yet to be checked by specialists and against accurately determined herbarium specimens. In addition, many specimens from the second field trip are yet to be identified. Thus, many names will change in time. Bahasa Fataluku names were provided by Fernando Santana, Almaieda Xavier, John dos Santos and others. Voucher numbers or source of each record are indicated in the "CT No" (Colin Trainor collections) and "Source/Voucher" columns (W = from Whistler 2001, usually a sight record; IDC with number = herbarium voucher collection; IDC_SR = this study, sight record; IDC_SN or SN = sterile unnumbered collection for checking purposes).

Bahasa Fatuluku	Scientific name	LifeForm	CT No	Source/Voucher
Aca Olo-Olo	POLYPODIACEAE Pyrrosia lanceolata (L.) Farwell	F	B37	IDC10701
acha oloolo, bird's-nest fern(E)	ASPLENIACEAE Asplenium nidus L.	F	48	IDC_SR
achakaranu	LAURACEAE Crypyocarya sp.	T		IDC10826
achur ete	Indeterminate			IDC_SN
acurete (achurete?);ula ulacau(F)	EUPHORBIACEAE Codiaeum variegatum (L.) A.Juss. var. moluccanum (Decne.) Mull.Arg.	S	2	IDC10872;10900
afa tula, bamboo(E)	POACEAE Bambusa vulgaris Schrad. ex Wendl.	H		W,IDC_SR
afaafatula	POACEAE Thuarea involuta	H		W
afati	FABACEAE Desmodium triflorum (L.) DC.	H		W,IDC_SR
Aglaia?	SAPINDACEAE Lepisanthes rubiginosa (Roxb.) Leenh.	S		IDC10745,10851
ai lok fuik?	RHAMNACEAE Ziziphus timoriensis DC.	T		IDC_SN29_2_06
ai me tan	SAPINDACEAE Elattostachys sp.	T		W
ai mutin (T); vovoru(F)	HERNANDIACEAE Gyrocarpus americanus Jacq.	T	22	IDC_SRP
ai na	FABACEAE Pterocarpus indicus Willd.	T		W
ai nitas	STERCULIACEAE Sterculia foetida L.	T		W,IDC_SR
ai tasi	RHIZOPHORACEAE Rhizophora stylosa Griff.	T		W
aidila, papaya(E)	CARICACEAE Carica papaya	T		W
Aja Loloru	SAPINDACEAE Dimocarpus longan Lour. subsp. malesianus Leenh.	T	27	IDC10749
akadiru (I), kalala	ARECACEAE Genus indeterminate	T		W
akalu	Indeterminate	V		IDC_SR
akam;Uhak fuik(T)	MYRTACEAE Syzygium nervosum DC.	T	B18	IDC10903
akar	ARECACEAE Metroxylon sp.	T		W
akilesu	ELAEOCARPACEAE Genus indeterminate			W
Akilisu Ete	COMBRETACEAE Terminalia sp.	T	102	IDC_SR
Akilisu Ete	COMBRETACEAE Terminalia soembawana Sloot.	T		IDC_SN
Akumusa	SOLANACEAE Solanum sp.		73	IDC10680
akusepin	OPILIACEAE Cansjera leptostachya Benth.	V		IDC10747,10846
alan noko	DIOSCOREACEAE Dioscorea affin transversa R.Br.	V		IDC_SR
ali po	MORACEAE Ficus gul Lauterb. & K.Schum.	T		IDC10698,10751,10679
alipu	MORACEAE Ficus sp.			W
Amacu	SAPOTACEAE Pouteria nitida (Blume) S.P.Teo	T	1	IDC10712
amiwaya	APOCYNACEAE Cerbera manghas L.	T	7,B33	IDC10726;10983
amololo	LAURACEAE Endiandra sp.	T		IDC10829
anggrek	ORCHIDACEAE Genus indeterminate			W
api ete asa	ASCLEPIADACEAE Tylophora sp.	V		W
Apuluka	URTICACEAE Pipturus argenteus (J.R.Forst.) Wedd.	T	38,B50	IDC10707
araporu ete	LAURACEAE Cryptocarya sp.	T	115	IDC10694,SN
arapuru	CLUSIACEAE Mammea sp.	T		W
Arik	ANACARDIACEAE Rhus taitensis Guill.	T	114	IDC_SR
aruda	ASTERACEAE Genus indeterminate			W
ata oloolo	URTICACEAE Genus indeterminate			W
Baiminik	ARALIACEAE Delarbrea collina Vieill.	S	34	IDC10876
balu ete	Indeterminate	T		IDC_SR
beleki se	Indeterminate	T		IDC_SN

Bahasa Fatuluku	Scientific name	LifeForm	CT No	Source/Voucher
biahara	Indeterminate			IDC_SR
Bobo Ete	NYCTAGINACEAE Pisonia umbellifera (J.R.Forst. & G.Forst.) Seem	T	37	IDC10799;10685
canoto	LAMIACEAE Hyptis suaveolens (L.) Poit.	H		IDC_SR
Cecele	MELIACEAE Dysoxylum parasiticum (Osb.) Kosterm.	T	45	IDC10720
ceenu, screwpine	PANDANACEAE Pandanus tectorius Parkinson	T		W
Cenu	PANDANACEAE Pandanus sp. 2	T	B17	IDC_SR
cenupeleku	AGAVACEAE Cordyline sp.	S		IDC_SN
cha piti	FABACEAE Derris scandens (Roxb.) Benth.	V		IDC10838;10959
chala chala	PASSIFLORACEAE Passiflora foetida L.	V		W,IDC_SR
chalaparu	URTICACEAE Boehmeria sp.			W
chan mukia, sweet basil(E)	LAMIACEAE Ocimum basilicum (L.) Back	H		W
chan oto, holy basil	LAMIACEAE Ocimum tenuiflorum L. var. anisodorum (F.Muell.) Domin	H		IDC10864
chele	RUTACEAE Affin Acronychia trifoliata Zoll.	T		IDC10849
chilachila	COMMELINACEAE Commelina diffusa	H		W
chilla	Indeterminate	T		IDC_SR
cici	LILIACEAE Genus indeterminate	H		W
cila ete	EUPHORBIACEAE Drypetes sp.			W
cila ete	ULMACEAE Celtis philippensis Blanco	T		IDC_SN
cilia ete	PITTOSPORACEAE Pittosporum moluccanum (Lam.) Miq.	T		IDC10870
cipileku	ASCLEPIADACEAE Calotropis gigantea (L.) W.T.Aiton	S		W,IDC_SR
Ciri Ete	FABACEAE Erythrina variegata L. var. orientalis (L.) Merr.	T	123, 223	W,IDC_SR
Coconut(E)	ARECACEAE Cocos nucifera L.	T		W
curailailahu	LILIACEAE Gloriosa superba L.	H		IDC10946
Erua	BURSERACEAE Garuga floribunda Decne.	T	79	IDC10659;11089
ete mukiaru; ariku(T?)	SANTALACEAE Santalum album L	T		IDC_SR
ete piti	Indeterminate			IDC_SR
fara	CAESALPINIACEAE Intsia bijuga (Colebr.) Kuntze		24	IDC10927
faripluha;Fari Rua	SMILACACEAE Smilax blumei A.DC.	V	B58	IDC10748
foekala-kalahu	CYPERACEAE Fimbristylis complanata (Retz.) Link	H		IDC10778
Folokua tuatua	MYRSINACEAE Maesa sp.	S	53	IDC10702
folokuatuatua	STERCULIACEAE Helicteres isora L.	S		IDC10869;10947
fuik, has fuik, mangas, mango(E)	ANACARDIACEAE Mangifera indica L.	T		IDC_SR
haiforoku	Indeterminate	T		IDC_SR
hali mutin	MORACEAE Ficus sp.			W
hama piti; halimutin (T)	MORACEAE Ficus virens Aiton var. virens	T	33	IDC10841,10650
Hama Po'o	MORACEAE Ficus racemosa L. var. racemosa	T		IDC10824
Hama susu	MORACEAE Ficus microcarpa L.f.	T	B9	IDC10673
hamu	Indeterminate			IDC_SR
Hara ana	Indeterminate	T	32	IDC10963
helu	FABACEAE Dalbergia timorensis			W
Ho Holu	MORACEAE Ficus wassa Roxb.	T	B11	IDC10677
hoholu	RUBIACEAE Genus indeterminate		57	W
homolu	Indeterminate			IDC_SR
iha iha rala	CAESALPINIACEAE Senna surattensis (Burm.f.) H.S.Irwin & Barneby	S		IDC10743
ikaferehuitiana	HYDROCHARITACEAE Blyxa sp.	A		IDC_SN
ikakahuiitinana	HYDROCHARITACEAE Ottelia alismoides (L.) Pers.	A		IDC10773
ikana	Indeterminate	T		IDC_SR
ilailahu	PORTULACACEAE Portulaca australis Endl.	H		W
Imakoil	MYRISTICACEAE Myristica lancifolia Poir. subsp. montana (Roxb.) de Wilde	T	28	IDC10693
inakoe	LAURACEAE Litsea sp.	T		IDC10727
Inamoru	MYRTACEAE Rhodamnia cinerea Jack	S	84	IDC11072
iparakulayhu	CAESALPINIACEAE Cassia fistula L.			IDC10768
iparo upulu	LECYTHIDACEAE Planchonia sp.	T		IDC25_2_06
ipsa ete;ili ete	Indeterminate			IDC_SR
ira akeraunununu	Indeterminate			IDC_SR
ira eipi eipi mimireke	ASCLEPIADACEAE Asclepias curassavica L.	H		IDC10772
Ira ete	LECYTHIDACEAE Barringtonia racemosa (L.) Spreng.	T	B8	IDC10805
ira kemu kemur	LEMNACEAE Lemna aequinoctialis Welw.	A		IDC10800

Bahasa Fatuluku	Scientific name	LifeForm	CT No	Source/Voucher
ira lulus irasikire	CYPERACEAE Schoenoplectus mucronatus (L.) Palla ex J.Kern	H		IDC10797
ira sikir kemukemur	CERATOPHYLLACEAE Ceratophyllum demersum L.	A		IDC10798
irasikir curuk	RUTACEAE Citrus hystrix	T		IDC10796
irasisiku irasikur	LAMIACEAE Teucrium viscidum Blume			IDC10790
iratarutaruasa	CONVOLVULACEAE Merremia gemella (Burm.f.) Hallier f.	V		IDC10787
Iric Ete	LECYTHIDACEAE Planchonia sp.	T	113	IDC_SN3/10/05
isa isanete;isa isano	EUPHORBIACEAE Mallotus philippensis (Lam.) Mull.Arg.	T		SN;IDC10933
isusu	RUBIACEAE Saprosma sp.	S		IDC10857
jave	BORAGINACEAE Cordia subcordata Lam.	S		IDC10995
jurur hoto	RUTACEAE Genus indeterminate			W
kai teharia	Indeterminate			IDC_SR
Kaicawa,ai dak	SAPINDACEAE Schleichera oleosa (Lour.) Oken	T	58, B5	IDC_SR
Kailemu,sukaer	CAESALPINIACEAE Tamarindus indica L.	T	62	IDC_SR
kaipupu	MORACEAE Ficus septica Burm.f.	T	17	IDC10696,10675
kaisala eteete	EUPHORBIACEAE Genus indeterminate			W
kaitemuru	LYTHRACEAE Pemphis acidula J.R.Forst. & G.Forst.	S		IDC10681
kaitemuru?	SURIANACEAE Suriana maritima L.	S		W
kajakaja	CAPPARACEAE Capparis cordifolia			W
kaka painu	SAPINDACEAE Cardiospermum halicacabum L.	H		IDC10839
kalakalahu	ARACEAE Aglaonema marantifolia Blume	H		IDC10686
kalau	CAPPARACEAE Cleome sp.	H		W
Kali Ete	COMBRETACEAE Terminalia sp.	T	106	IDC_SR
kapuao'okelesu	EBENACEAE Diospyros sp.	T		W
kara	MORACEAE Ficus sp.			W
kara roko	MORACEAE Ficus superba (Miq.) Miq.	T		IDC10821
katapa	COMBRETACEAE Terminalia catappa L.	T		W,IDC_SR
Kau	CYPERACEAE Baumea rubiginosa (Spreng.) Boeck.	H	B51	IDC10810
kauloko	EBENACEAE Diospyros maritima Blume	T		IDC10965
kauloko(L)	SOLANACEAE Solanum sp.			IDC10940
kavaha vaha	FABACEAE Mucuna pruriens (L.) DC. var. utilis (Wight) Burck	V		IDC10738
kemari, aikakeiu (T)	CASUARINACEAE Casuarina equisetifolia J.R.Forst. & G.Forst.	T		W,IDC_SR
kiaru	BURSERACEAE Canarium vulgare Leenh.	T		IDC10914
koanano	ANNONACEAE Annona glabra L.	T		IDC_SR
Koi Cila	RUTACEAE Aegele marmelos L.Correa ex Roxb.	T	B48	IDC10758
koicila ataatarana	FLACOURTIACEAE Genus indeterminate			W
koikoiferehu	AGAVACEAE Pleomele angustifolia (Medik.) N.E.Br.	S		IDC10852
kokour	GOODENIACEAE Scaevola taccada (Gaertn.) Roxb.	S		IDC10958
Komil Ete, komilu	STERCULIACEAE Sterculia affin quadrifida R.Br.	T	87	IDC10736
konokasa	AMARANTHACEAE Alternanthera sessilis (L.) R.Br.	H		IDC10771
korikorinu; kouru	LECYTHIDACEAE Barringtonia sp.	T		W
kucasusunu	POACEAE Hyparrhennia sp.	H		W
Kusalu;; molingu(I)	GNETACEAE Gnetum gnemon L.		35	IDC11064
la la	ANNONACEAE Uvaria rufa Blume	V		SN;IDC11106
Laihere	MIMOSACEAE Adenanthera pavonina L.	T	60, 227	IDC_SR
lak taru	VITACEAE Cayratia geniculata (Blume) Gagn.	V		IDC10785
lakisoru aku	LORANTHACEAE Decaisnina sumbawensis (Tiegh.) Barlow	E		IDC10750
lakisoruaku	LORANTHACEAE Amyena artensis sp.	E		W
laku	VITACEAE Cayratia japonica (Thunb.) Gagn.	V		IDC10692
laku	VITACEAE Cayratia trifolia L.	V		IDC10979
laku	VITACEAE Tetrastigma sp.	V		W
lalahoto	ANNONACEAE Genus indeterminate			W
lalamu	RUBIACEAE Genus indeterminate			W
Lalamu	RUBIACEAE Timonius timon (Spreng.) Merr.	T	42,. B4	IDC10741
lantana	VERBENACEAE Lantana camara L.	V		W,IDC_SR
Lari lawak	MYRISTICACEAE Myristica rumphii (Bl.) Kosterm var. rumphii	T	26	IDC10691
lari nika	Indeterminate	T		IDC_SR
larinika???,pailolos,Walitoto Takuru; vitotakuru(T), paiakelelele?	EUPHORBIACEAE Suregada glomerulata (Blume) Baill.	S	23	IDC10703,10847;10964
latupoukalaru	EUPHORBIACEAE Euphorbia antiquorum	T		IDC10825
lawalawano	ASCLEPIADACEAE Dischidia major (Vahl) Merr.	V		IDC10794
lerelere	FABACEAE Canavalia rosea (Sw.) DC.	V		W
Leuleu	Fern Genus indeterminate	F		IDC_SR

Bahasa Fatuluku	Scientific name	LifeForm	CT No	Source/Voucher
licoros, bitter yam	DIOSCOREACEAE Dioscorea bulbifera L.	V		W
lilir ete	LAURACEAE Cryptocarya sp.	T		W
lippia	VERBENACEAE Phyla nodiflora (L.) Greene	H		IDC10779
Lohiri	MORACEAE Ficus sagittata J.Konig ex Val	T	B36	IDC10755
loloso	CYPERACEAE Scleria lithosperma (L.) Sw. var. lithosperma	H		IDC_SN
lorovahu	RUBIACEAE Guettarda speciosa L.	T		IDC10996
lorovahu?	BORAGINACEAE Tournefortia argentea			W
lotonu asa	POLYGONACEAE Persicaria barbata (L.) H.Hara	H		IDC10789
lua ete	Indeterminate			IDC_SR
luafula fula;Pai Lolosu	MELIACEAE Dysoxylum acutangulum Miq. subsp. foveolatum (Radlk.) Mabb. (opp lvs)	T	91	IDC10885
lualolonia	CAESALPINIACEAE Bauhinia sp.			W
luapanapanarika	ZINGIBERACEAE Genus indeterminate	H		W
luapayahu	ANACARDIACEAE Buchanania arborescens (Blume) Blume	T		IDC10721
luavarinu	MORACEAE Genus indeterminate			W
luicorocoro	TACCACEAE Tacca palmata Blume	H		SN;IDC10911
lukumore	OLACACEAE Ximenia americana L.	V		IDC10981
lulus haate	CYPERACEAE Scleria scrobiculata Nees & Mey. ex Nees	H		IDC10775,10819
lulusu	CYPERACEAE Scleria polycarpa Boeck.	H		W
luri pahar	VERBENACEAE Vitex sp.	T		IDC_SN
Luwara (Dragons tooth)	Indeterminate	V		IDC_SN
luwaru, luara	ARECACEAE Caryota rumphiana Mart.	T	B20	99;IDC2_3_06
maca uku nainailu	CAESALPINIACEAE Caesalpinia furfuracea (Prain) Hattink	V		IDC10766
macha macha	ASTERACEAE Tridax procumbens L.	H		W,IDC_SR
maek	ARACEAE Amorphophallus paeoniifolius (Dennst.) Nicolson	H		IDC10937
makarolik	RUBIACEAE Randia sp.			W
malahara cipicipi	ORCHIDACEAE Genus indet			IDC10793
Malahu	SAPINDACEAE Pometia pinnata J.R. & G. Forst.	T	21	IDC_SN
malahu lakuwaru	Indeterminate			IDC_SR
Malu Hoko	PIPERACEAE Piper betle L.	V	B34	IDC10728
mamecerai	RUTACEAE Micromelum minutum (G.Forst.) Wight & Arn.	T		IDC10669;11070
matar ete	Indeterminate			IDC_SR
mataria	Indeterminate	T		IDC_SN
matarufa uku	MORACEAE Streblus affin taxoides (Heyne ex Roth) Corner	S	225	IDC10894
memehara	RUBIACEAE Aidia racemosa (Cav.) Tirveng.	T		W
merek asa	NYCTAGINACEAE Boerhavia glabrata Blume	H		W
mochow uku	RUTACEAE Affin Pleiospermium dubium (Blume) Swingle	T		IDC10845
Molisu,molliso	MIMOSACEAE Pararchidendron pruinosum (Benth.) I.C.Nielsen	T	B40	IDC_SN
moro	CAESALPINIACEAE Peltophorum pterocarpum (DC.) Backer ex K.Heyne	T	109	W,IDC_SR
moro	CAESALPINIACEAE Senna timorensis (DC.) H.S.Irwin & Barneby	S		IDC10731
motiar; mokiro	LEEACEAE Leea indica (Burm.f.) Merr.	S	18,B29	IDC10708
moto kete;Motto	POACEAE Phragmites vallatoria (Pluk. ex L.) Veldkamp	H	B26	IDC_SN
Muamica Pauhu	ANACARDIACEAE Mangifera timorensis Blume	T	47	IDC10667,10924
mucucapapano	EUPHORBIACEAE Euphorbia heterophylla L.	H		IDC_SR,W
mulici	Indeterminate			IDC_SR
mumur, kalakalaho	CYPERACEAE Cyperus stoloniferus Retz.	H		W
mupoko	ZINGIBERACEAE Zingiber zerumbet (L.) Sm.	H		IDC10936
musakau	RUTACEAE Genus indeterminate	T		IDC_SR
mutu mutu	ARALIACEAE Gastonia sp.	T		IDC_SN
muyapayahu	ANACARDIACEAE Genus indeterminate			W
naenae ru	ARACEAE Epipremnum pinnata (L.F.) Schott	V		W,IDC_SR
naenae ru	ARACEAE Pothos sp.	V		IDC_SN
naenae ru	ARACEAE Raphidophora sp.	V	B28	IDC_SR
nau	MALVACEAE Abutilon sp.			W
nelu nelu	ULMACEAE Trema tomentosa (Roxb.) H.Hara	S		IDC10660
Nenuka	RUBIACEAE Morinda citrifolia L.	T	39, B7	IDC10762
netiku	CAESALPINIACEAE Senna tora (L.) Roxb.	S		W,IDC_SR
nokeku	TILIACEAE Genus indeterminate			W
none	RUBIACEAE Ixora timorensis Decne.	S		IDC10831;10955
nunu	MORACEAE Ficus sp.			W
Oi	RHIZOPHORACEAE Carallia brachiata (Lour.) Merr.	T	16, B23	SN;IDC11007

Bahasa Fatuluku	Scientific name	LifeForm	CT No	Source/Voucher
onovaru	MALVACEAE Thespesia populnea	T		W
Or affin	SMILACACEAE Smilax australis R.Br.	V		IDC10975
ote ote	CAPPARACEAE Cleome viscosa L.	H		IDC_SR
oteote	CAESALPINIACEAE Senna sophora (L.) Roxb.			W
paharu pitini	VERBENACEAE Vitex pubescens	T		W,IDC_SR
pai keli keli	RUBIACEAE Psydrax sp.	S		IDC_SN
pai mani [piemarni]	MIMOSACEAE Albizia lebbeck (L.) Benth.	T	120	IDC10840
paiparuntaru	ANNONACEAE Uvaria sp.	V		IDC10724
paiparunu, paiparuna?	SAPOTACEAE Mimusops elengi L.	T		IDC10967
paipor taru	MALPIGIACEAE Hiptage benghalensis (L.) Kurz	V		IDC10757
paipuru	MALPIGIACEAE Hiptage benghalensis (L.) Kurz	V		IDC_SN ck id
paituku	ZYGOPHYLLACEAE Tribulus cistoides L.	H		W
papusaron hoto	CUCURBITACEAE Genus indeterminate			W
papusavonu	CUCURBITACEAE Diplocyclos palmatus (L.) C.Jeffrey	V		IDC10658
para	MORACEAE Antiaris toxicaria Lesch. var. macrophylla (R.Br.) Corner	T		IDC10823
parako	FLACOURTIACEAE Flueggea sp.			W
parako?	FLACOURTIACEAE Flacourtia sp. large leaves (F. rukam)	T		IDC_SN
payapaya	VERBENACEAE Callicarpa candicans (Burm.f.) Hocker.	S		W,IDC_SR
pia pia	BORAGINACEAE Cordia monoica Roxb. subsp. subpubescens (Decne.) Reidl	T		IDC10761;10855
Piamusul Ete	BORAGINACEAE Cordia sp.		104	IDC_SR
pipivale kerikeri	CRASSULACEAE Bryophyllum pinnatum (Lam.) Kurz	H		W
Pokuru	STERCULIACEAE Pterospermum diversifolia Blume	T	8	IDC10934
Poria	Indeterminate		75	IDC_SR
posiaku	FABACEAE Uraria lagopodioides (L.) Desv. ex DC.	H		IDC10904
pua hoto	ARECACEAE Genus indeterminate	T		W
pua kaikai	ARECACEAE Calamus sp.1	V	B12	IDC_SR
Pua mimiraka	MELIACEAE Aphanamixis polystachya (Wall.) R.N.Parker	T	12	IDC10668
pua mimiraka	MELIACEAE Dysoxylum gaudichaudianum (A.Juss.) Miq.	T		IDC10695,10837;11079
pua mimiraka	MELIACEAE Dysoxylum setosum (Span.) Miq.	T		IDC10830;ck11047
Pua Pua Ete, Silari	EUPHORBIACEAE Breynia cernua (Poir.) Mull.Arg.	S	68	IDC10723
Puapasuna	CLUSIACEAE Calophyllum soulattri Burm.f.	T	59;B3	IDC_SR
puapua	EUPHORBIACEAE Breynia sp.			W
pukafifta	CONVOLVULACEAE Hewittia sublobata (L.f.) Kuntze	V		IDC10742
pula pula;tahi ete	VERBENACEAE Vitex trifolia L.	S		IDC10854
pulapula	VERBENACEAE Vitex rotundifolia L.f.	S		W
pulivare	MORACEAE Ficus cf. tinctoria			W
Putun Ete	Indeterminate		78	IDC_SR
ra rau rau	MENYANTHACEAE Nymphoides indica (L.) Kuntze	A		IDC10769
rauka piti	Indeterminate	T		IDC_SN
rufa hotu	NYCTAGINACEAE Pisonia aculeata L.	V		IDC10812
rufarufa?, rufa?	MELASTOMACEAE Memecylon sp.	S		W
rusano	MIMOSACEAE Acacia sp.	T		W
sa'apu	POLYPODIACEAE Drynaria sp	F		W
sae;sai	MIMOSACEAE Entada phaseoloides (L.) Merr.	V		IDC_SN
savatu,Sawatu	STERCULIACEAE Kleinhovia hospita L.	T	67	IDC_SN
Sawele	RUBIACEAE Nauclea orientalis (L.) L.	T	41, B6	IDC_SR
seria	SANTALACEAE Exocarpos latifolius R.Br.	T		W,IDC_SR
severu	FLAGELLARIACEAE Flagellaria indica L.	V	B21	IDC_SR
seweru	ARECACEAE Calamus sp.3	V		IDC_SR
Sik Ete	EUPHORBIACEAE Bridelia tomentosa Blume	T	105	IDC11099
silari	EUPHORBIACEAE Phyllanthus reticulatus Poir.	V	B10,44	IDC10760
sisiku; duut karau toi(T); falla(L)	MALVACEAE Urena lobata L.	H		W,IDC_SR
sisil	AGAVACEAE Agave sisalana	H		W
suka ete	EUPHORBIACEAE Genus indeterminate			IDC_SN
Suka piti	ACANTHACEAE Genus indeterminate			IDC_SN
sukapiti	ASTERACEAE Chromolaena odorata (L.) R.M.King & H.Rob.	V	B64	IDC_SR
sukapiti?	ASTERACEAE Melanthera biflora (L.) Willd.	H		IDC10961
sururu	MENISPERMACEAE Anamirta cocculus (L.) Wight & Arn.	V	112	IDC10842
susu	MORACEAE Ficus sp.			W
suvule	MORACEAE Ficus sp.			IDC10874

Bahasa Fatuluku	Scientific name	LifeForm	CT No	Source/Voucher
tahi chuchu	SAPINDACEAE Genus indeterminate			W
tahi ilailahu	CONVOLVULACEAE Ipomoea pes-caprae (L.) R.Br. subsp. brasiliensis (L.) Ooststr.	V		W,IDC_SR
tahi ukuuku, tahi karahu	POACEAE Spinifex littoreus (Burm.f.) Merr.	H		W,IDC_SR
tahi vahuru?	SAPINDACEAE Allophyllus cobbe (L.) Raeusch.	S		IDC10929;10985;10986
tali	ARECACEAE Genus indeterminate	T		W
tara	RHAMNACEAE Ziziphus celtidifolia DC.	T		IDC_SN
tara	ULMACEAE Celtis sp.			IDC_SR
tarako colisa	PIPERACEAE Pothomorphe subpeltata (Willd.) Miq.			IDC_SN
tarapiti	ULMACEAE Celtis sp.			W
tarayapalinu;tali	LAURACEAE Cassytha filiformis L.	V		IDC10759
taro piti	OPILIACEAE Opilia amentacea Roxb.	V		IDC10974
tarukukurisa, serihutan (I)	PIPERACEAE Piper sp. affin P.retrofractum Vahl (veins above middle)	V		IDC_SN
tarulakuwara;lalahoto	ANNONACEAE Cyathostemma glabrum (Span.) Jessup	V		IDC10907;10827
tarupitinu	OLEACEAE Jasminum sp.	V		IDC_SN
tatafu	BOMBACACEAE Ceiba pentandra	T		W,IDC_SR
tatafu hotu	BOMBACACEAE Bombax ceiba L.	T		IDC_SR
Tatiru imimiraka	MORACEAE Ficus variegata Blume	T		IDC10725
Tatiru ipiti	MORACEAE Ficus variegata Blume	T		IDC10729
tauloko	Indeterminate			IDC_SR
tchele tchele	Indeterminate			IDC_SR
tek	VERBENACEAE Tectona grandis	T		IDC_SR
tua marau	ARECACEAE Arenga pinnata Merr.	T		W,IDC_SR
tufu tu	ARALIACEAE Schefflera elliptica (Bl.) Harms.	V	B62	IDC10818
tulan	LAURACEAE Genus indeterminate	T		IDC_SN
tulan	LAURACEAE Litsea glutinosa (Lour.) C.B.Rob.	T		IDC_SN
tulano	RHAMNACEAE Genus indeterminate			W
uchaucha lamano	POACEAE Digitaria sp.	H		W
uchaucha susunu, wild sugar cane(E)	POACEAE Saccharum spontaneum L.	H		W,IDC_SR
uku	RUTACEAE Luvunga monophylla (DC.) Mabb.	V		IDC10836
uku-cumu	MORACEAE Trophis scandens (Lour.) Hook. & Arn.	V		SN;IDC11105
ukulau;Uku Lau Lau	FLACOURTIACEAE Flacourtia indica (Burm.f.) Merrill	T	B63	IDC10763
ukuleku	CAESALPINIACEAE Caesalpinia bonduc (L.) Roxb.	V		W
ukuleku	CAPPARACEAE Capparis sepiaria L.	V		IDC10655
Ula-Ulacau	EUPHORBIACEAE Melanolepis multiglandulosa (Reinw. ex Blume) Reichb.f. & Zoll.	T	82	IDC10682
Ulu meru	ANACARDIACEAE Pleiogynium timoriense (DC.) Leenh.	T	20	IDC_SR
ulu moru	MYRTACEAE Syzygium sp. affin S. microcymum	T		IDC11011
ulupiate	MELIACEAE Aglaia argentea Blume	T		IDC10689
una puti	Indeterminate	T		IDC_SN
unapoti	MELIACEAE Genus indeterminate	T		W
upuku ete	MYRISTICACEAE Myristica lancifolia Poir.	T		IDC10913
Upur Ete	THYMELAEACEAE Phalaria sp.		99	IDC_SR
upur ete (F); ailalar	APOCYNACEAE Wrightia javanica A.DC	T		IDC11107
ututu	STEMONACEAE Stemona sp.	V		IDC_SR
ututu'u,Utut	CYPERACEAE Eleocharis dulcis (Burm.f.) Trin. ex Hensch.	H	B47	IDC10777
uvas fuik(T)	VITACEAE Cissus sp.	V		IDC10906
vacaru	MORACEAE Ficus sp.			W
valur ete	Indeterminate	T		IDC_SR
varu, waru	MALVACEAE Hibiscus tiliaceus L.	T	40,B15	IDC10780
Vatu Fuan	BURSERACEAE Haplolobus floribundus (K.Schum.) H.J.Lam.	T	9,B32	IDC_SR
vaya hara;vaia hara	Indeterminate	T		IDC_SR
vehemalia	CONVOLVULACEAE Genus indeterminate			W
velavise	ANNONACEAE Meiogyne sp.	T		IDC_SN
verasa;Werupanatu	POACEAE Imperata cylindrica (L.) Reausch.	H	B52	IDC_SR
vihivihi lu	BORAGINACEAE Cordia dichotoma G.Forst.	T		IDC10948
wacasu	ARACEAE Colocasia gigantea(Blume) Hook.f.	H		IDC_SR
Wahuru,vaharu	MYRTACEAE Syzygium sp. affin S. samarangense	T	6,B31	IDC_SN
Waja hara	APOCYNACEAE Alstonia scholaris (L.) R.Br.	T	54	IDC_SR
Walaka,Walalaka	STERCULIACEAE Melochia umbellata (Hout.) Stapf	T	71,B57	IDC10739
Wanikua ete	VERBENACEAE Clerodendrum floribundum R.Br.	T	222;122	IDC10767

Bahasa Fatuluku	Scientific name	LifeForm	CT No	Source/Voucher
wapapaka ete	RHAMNACEAE Gouania javanica Miq.	V		IDC10740,10890
warirasa	SAPOTACEAE Pouteria obovata (R.Br.) Baehni	T	11,B25	IDC10867;10988
Wata wata	APOCYNACEAE Tabernaemontana pandacaqui Lam.	S		IDC10687
Wata wata	MORACEAE Ficus hispida L.f.	T	43,52,B41	IDC10666
wayaharhoto	APOCYNACEAE Alstonia actinophylla (A.Cunn.) K.Schum.	T		IDC10875,10843
wehemamaln asa	Indeterminate			IDC_SR
Wenurapi,Venu	EUPHORBIACEAE Macaranga tanarius (L.) Mull.Arg.	T	72,B55	IDC10746
Wenurapi,venu,Hai Oto	EUPHORBIACEAE Mallotus mollissimus (Geisler) Airy Shaw	T	51,B43	IDC10697

APPENDIX 3. SITE BY SPECIES DATA

To be inserted once identifications are complete.

APPENDIX 4. REFERENCE COLLECTION CD OF PHOTOS OF PLANT SPECIES

See attached.