

An Enumeration of the Vascular Plants of Mount Tabunan, Cebu Island, Philippines

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ABSTRACT: Vascular plants in the north-eastern portion of Mount Tabunan, Cebu Island, The Philippines, were inventoried from ten plots. A total of 288 taxa were recorded, 213 have been identified at least to the family level and belong to 133 genera and 68 families.

KEY WORDS: floristic composition, tropical mountains, Cebu watershed, Tabunan forest.

INTRODUCTION

The Tabunan Forest is the only remaining large patch of natural virgin forest in the Metro Cebu Watershed. (Quimio, 2006). This forest has an area of at least 40 hectares according to the most recent forest cover map available (Quimio, 2006). This information reflects the fact that only about 0.3% of the original forest cover in Cebu island remains (SSC, 1988), which is mostly confined to rocky limestone cliffs. The forest is considered as the last hope for some of Cebu's few remaining unique wildlife treasures. It is one of the last sources of native seeds for reforestation programs in Cebu and the reserve of natural samples of plant generic resources in Metro Cebu Watersheds (Quimio, 2006). It is also the home of most of the threatened and endemic bird species in Cebu. These include the Cebu Flowerpecker (*Dicaeum quadricolor*), Black Shama (*Copsychus cebuensis*), Coppermith Barbet (*Megalaima haemacephala cebuensis*), Elegant Tit (*Parus elegans visayanus*), Streak-breasted Bulbul (*Hypsipetes siquijorensis monticola*)

and Everett's White-eye (*Zosterops everetti everetti*). Despite the fact that it is in a strict-protection zone, there is a continuous threat of exploitation by local residents. The forest exterior, for instance, is being claimed by the agricultural activities of local residents. There is also occasional cutting of trees and harvesting of rattan inside the forest.

It has been the focus of conservation actions in Cebu. In fact, it is selected as one of the seven conservation priority areas (CPAs) in Cebu island identified by the Philippine Biodiversity Conservation Priority-setting Program (PBCPP). It is given an extremely high critical (EHc) priority level (Ong *et al.*, 2002). The fact that it is part of Central Cebu, one of the biodiversity corridors, likewise identified by PBCPP, emphasizes further its significance. Despite this status, there is still no exhaustive inventory of plants. It is therefore urgent to catalogue them.

This paper aims to provide a checklist of vascular plants in the north-eastern portion of Mount Tabunan.

MATERIALS AND METHODS

Study Area

Mount Tabunan is located in the central part of Cebu, in barangay Tabunan, Cebu City, Philippines (Figure 1). It is part of the Central Cebu National Park (CCNP), a 11,893-hectare reserve area, and the Kotkot-Lusaran Watershed Forest Reserve.

Mount Tabunan belongs to the Type III climate according to Coronas Classification, *i.e.*, it is relatively dry from November to April and wet during the rest of the year.

The Tabunan Forest sits on a ridge with an elevation ranging from 500 to 880 m asl. The highest peak is located in the southwestern portion. The slopes are generally steep which makes the soil very susceptible to erosion. The area is overlain with limestone boulders. These patches of limestone, however, are shallow. They overlie the more dominant parent materials such as basalt, andesite and diorite which are acidic. Most trees, then, are anchored on acidic soils (Quimio, 2006).

Establishment of the Sampling Sites and Plant Inventory

Ten 20x20 m quadrats were established in the northeastern portion of Tabunan Forest. Generally, 20 meters is the longest distance that can be accurately surveyed in a dense forest (Dallmeier, 1992).

All woody plants with a stem diameter of at least 3 cm at breast height inside the quadrant were identified. A 2x5 m subplot was laid inside each 20x20 m quadrant for the inventory of herbs, vines and seedlings. The subplots were laid where the ground vegetation was dense. All the herbs and seedlings were identified.

Voucher specimens were collected from both identified and unidentified plants in the field. Each measured plant was given a code name. This code name was also used in tagging the corresponding vouchers identified and confirmed at the Botanical Herbarium (CAHUP) and Forestry Herbarium (LBC), Museum of Natural History, UP Los Baños, Laguna. The unidentified plants were identified by Mr. Leonardo Co of the Jose Vera Santos Herbarium (PUH), Institute of Biology, UP Diliman.

RESULTS AND DISCUSSION

A total of 288 taxa were recorded from the ten plots. Of these, 27.8% were identified to species level, 74% to genus level, and 80.9% to family level. All taxa that were identified to species level are listed in Table 1. The 213 taxa identified belonged to 133 genera and 68 families.

Angiosperms, accounting for 96.57% of all species, clearly dominated the study area. The pteridophytes represented 2.58% of the species and only 2 gymnosperm species were found, *Gnetum gnemon var. gnemon* and *Podocarpus sp.*

More than half (61.5%) of the recorded taxa were woody species (including seedlings), 34.7% were herbs, and the remaining 3.8% were vines. Most vines were found at higher elevations.

The most represented families were Moraceae (24 species), Meliaceae (22 species), and Araceae (18 species). The most represented genera were *Ficus* (18 species), *Aglaia* (9 species), and *Garcinia* (7 species).

The frequency of taxa was low. More than half (63.2%) of all taxa were recorded from only one of the ten plots.

Very few species showed high frequencies. Two species, *Mallotus cumingii*

and *Procris* sp. were found in all ten plots.

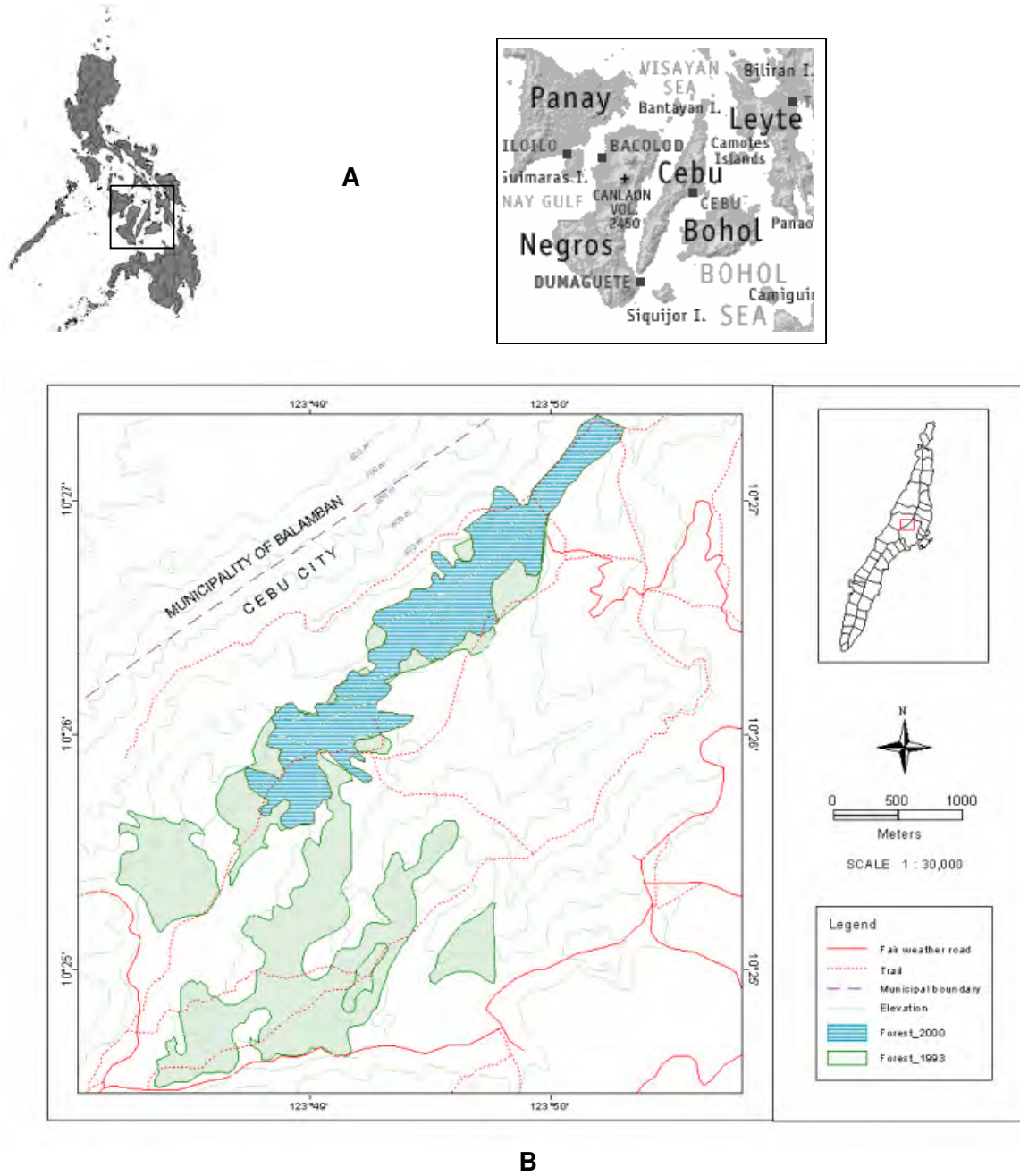


Figure 1. The study area. **A.** Location of Cebu Island in the Philippines. **B.** Location of Mount Tabunan in Central Cebu, showing the reduction of forest cover from 1993 (NAMRIA) to 2000 (DENR-Region VII).

Table 1. List of identified species of vascular plants found in the north-eastern portion of Mount Tabunan.

FAMILY / SPECIES

ACHARIACEAE

Hydnocarpus heterophylla Blume *ssp. philippinensis* Sleum.

ANACARDIACEAE

Dracontomelon edule (Blanco) Skeels

Mangifera altissima Blanco

ANNONACEAE

Goniothalamus elmeri Merr.

APOCYNACEAE

Alstonia macrophylla Wall. ex DC.

Alstonia scholaris (L.) R. Br.

ARACEAE

Alocasia heterophylla Merr.

Colocasia esculenta Linn.

Homalomena philippinensis Engl.

ARALIACEAE

Osmoxylon luzoniensis

BURSERACEAE

Canarium denticulatum Blume

CANNABACEAE

Celtis philippinensis Blanco

CONNARACEAE

Rourea minor (Gaertn.) Aubl.

DIPTEROCARPACEAE

Hopea philippinensis Dyer

Parashorea malaanonan (Blanco) Merr.

Shorea contorta Vidal

EBENACEAE

Diospyros blancoi A.DC

ERYTHROPALACEAE

Strombosia philippinensis (Baill.) Rolfe

EUPHORBIACEAE

Blumeodendron kurzii (Hook. f.) J.J. Sm. ex Koord. & Valetton

Macaranga bicolor Muell. -Arg.

Macaranga grandifolia (Blanco) Merr.

Table 1. Continued.

FAMILY / SPECIES

EUPHORBIACEAE continued

Macaranga hispida (Blume) Muell. -Arg.*Macaranga tanarius* (L.) Muell. -Arg.*Mallotus cumingii* Muell. -Arg*Melanolepis multiglandulosa* (Reinw. Ex. Blume) Rchb. F. & Zoll.

FLACOURTIACEAE

Pangium edule Reinw. ex. Blume

GNETACEAE

Gnetum gnemon L. var. *gnemon*

GRAMINAE

Centotheca lappacea (L.) Desv.

GUTTIFERAE

Calophyllum soulattri Burm. f.

LAMIACEAE

Viticipremna philippinensis (Turcz.) H.J. Lam.

LAURACEAE

Litsea quercoides Elmer*Endiandra coriacea* Merr.*Litsea tomentosa* Blume

LEGUMINOSAE

Archidendron clypearia (Jack) I. C. Nielsen ssp.*Cynometra copelandii* (Elmer) Elmer

MALVACEAE

Leptonychia banahaensis (Elmer) Merr.*Pterocymbium tinctorium* (Blanco) Merr.*Sterculia philippinensis* Merr.*Sterculia rubiginosa* Vent.

MARANTACEAE

Donax cannaeformis (Forster) Schum.

MELIACEAE

Aglaiia lawii (Wight) Saldanha & Ramamoorty*Chisocheton patens* Blume*Dysoxylum arborescens* (Blume) Miq.

MENISPERMACEAE

Arcangelisia flava (L) Merr*Pericampylus glaucus* (Lam.) Merr.

Table 1. Continued.

FAMILY / SPECIES

MORACEAE

Artocarpus blancoi (Elm.) Merr.
Artocarpus cf. odoratissima Blanco
Ficus ampelas Burm. f.
Ficus cf. odorata (Blanco) Merr.
Ficus linearifolia Elmer
Ficus minahassae (De Vriese & Teijsm.) Miq.
Ficus nota (Blanco) Merr.
Ficus pisifera Wall.
Ficus pseudopalma Blanco
Ficus septica Burm. f.
Ficus variegata Blume
Ficus villosa Blume

MUSACEAE

Musa textilis L. Née

MYRISTICACEAE

Gymnacranthera farquhariana (Wallich ex Hook. f. & Thomson) Warb. *ssp. paniculata* (A. DC.) R. Schouten
Myristica cf. agusanensis Elmer

NEPHROLEPIDACEAE

Nephrolepis cordifolia (L.) K. Presl

OPILIACEAE

Champereia manillana Blume

PHYLLANTHACEAE

Antidesma cf. pleuricum Tul.
Breynia cernua (Poir.) Muell.-Arg.

PTERIDACEAE

Pteris cf. armata

RUBIACEAE

Canthium monstrosum Vidal

RUTACEAE

Lunasia amara Blanco
Melicope triphylla (Lam.) Merr.

SAPINDACEAE

Dimocarpus longan Lour. *ssp. longan var. malesianus*
Elattostachys verrucosa (Blume) Radlk.
Lepisanthes fruticosa (Roxb.) Leenh.

Table 1. Continued.

| FAMILY / SPECIES |
|---|
| <i>Pometia pinnata</i> Forst. |
| SCHIZAEACEAE |
| <i>Lygodium circinnatum</i> (Burm.) Swartz |
| TACCACEAE |
| <i>Tacca integrifolia</i> Ker Gawler |
| <i>Tacca palmate</i> Blume |
| TECTARIACEAE |
| <i>Tectaria dissecta</i> (Forst.) Lellinger |
| URTICACEAE |
| <i>Boehmeria heterophylla</i> |
| <i>Leucosyke hispidissima</i> (Wedd.) Miq. |
| <i>Pipturus arborescens</i> (Link) C. B. Rob. |
| VIOLACEAE |
| <i>Rinorea bengalensis</i> (Wall.) Kuntze |

CONCLUSION

There is a need to examine the dynamics of this biodiversity for the future planning of appropriate forest management strategy in sustaining this most valuable resource.

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Diversity Study on Echinoderms in Mu Ko Man, Rayong Province, Eastern Coast of Thailand

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ABSTRACT: The echinoderms of Mu Ko Man, Rayong Province, located in the Eastern Coast of Thailand were intensively studied from specimens collected from sandy beaches, rocky beaches and coral reefs at 13 sites, namely: Ko Mannai (3 sites), Ko Manklang (3 sites), Ko Mannok (4 sites), Hin Toihoui (1 site) and Hin Farang (2 sites) from December 2006 to June 2008. The echinoderms found were classified into 5 classes, 12 orders, 19 families, 24 genera and 36 species. The most abundant Echinoderms in this area are: *Lamprometra palmate*, *Diadema setosum*, *Brissus latercarinatus*, *Holothuria (Metensiothuria) leucospilota*, and *Holothuria (Stauropora) fuscocinerea*. Only one species, namely *Holothuria (Metriatyla) scabra*, is important to Thais commercially.

KEY WORDS: Echinoderm, Mu Ko Man, Rayong Province, Eastern Coast of Thailand.

INTRODUCTION

The Phylum Echinodermata is widely distributed. They are common intertidally and also abundant at great depths. Almost all forms are benthic as adults (Morrissey & Sumich, 2008). Echinoderms include animals commonly known as feather stars and sealilies (Crinoidea); starfish or sea stars (Asteroidea); brittle and basket stars (Ophiuroidea); sea urchins, sand dollars and heart urchins (Echinoidea); and sea cucumbers (Holothuroidea). Their phylum contains about 7,000 living species and approximately 13,000 species are known from a rich fossil records dating back to the early Cambrian era (Brusca & Brusca, 2003). Mu Ko Man is a group of 3 offshore islets in Rayong Province, namely: Ko Man Nai, Ko Man Klang and Ko Man Nok, including Hin Farang and Hin Toi Houi. At present, Ko Man Nai is under the responsibility of the Eastern Marine and

Coastal Resources Research Centre (EMCOR), the Department of Marine and Coastal Resources for use as a sea turtle breeding and research station (Mucharin & Sukkasem, 2008).

Former literature reporting on the Echinoderms in the Eastern Coast of Thailand was first conducted in the reign of King Rama V by the Dane, Dr. Th. Mortensen. He surveyed and collected sea animals in the Gulf of Thailand and reported four new sea urchins in the Gulf of Siam, namely: *Chaetodiadema granulatum*, *Pleurechinus doderleini*, *Pleurechinus siamensis* and *Gymnechinus pulchellus* (Mortensen, 1904). Waiyanida (1984) took note of twelve species of starfish from Ao Pattaya and Mu Ko Phai, Chon Buri Province. Rodma (1996) reported fifty-nine echinoderms from Chon Buri and Rayong Provinces. Putchakarn (1998) provided information on fifty-six echinoderms from the eastern

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