

Floristic Composition of the Mangroves in Siargao Island

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Abstract - Mangroves are ecologically important as nurseries of many species of fishes and as bird sanctuaries. Surveys were carried out to monitor the floristic composition of mangrove stands in Siargao Island. A total of 23 major or true mangrove taxa under 15 genera in 14 families were recorded in Del Carmen, Pilar, San Isidro, and General Luna in Siargao Island, Surigao del Norte, Philippines. All the plants are vascular belonging to division *Magnoliophyta* and *Pterophyta*. The species identified at the four municipalities were found to vary. The major constituent species in this study was *Rhizophora apiculata* which was the most abundant and identified at the four study sites. *Nypa fruticans*, *Rhizophora mucronata*, *Bruguiera gymnorrhiza* and *Xylocarpus granatum* were less common but found in all sites. All the other species were occasionally or rarely seen in the study areas. Del Carmen has sixteen mangrove plant species, seven species were recorded in San Isidro, seven species in Pilar, and nine mangrove plant species in General Luna.

Keywords – mangrove flora, taxa, mangroves, ecology.

I. INTRODUCTION

The mangrove ecosystem is one of the most diverse ecosystems in the coastal area. It is of great ecological value as habitat for a wide variety of plants, animals and microorganisms, as bird sanctuaries, and as nurseries for many species of fishes. Mangrove plants are important components of the ecosystem which are intertidal shrubs and trees capable of thriving in transition zones where fluctuating salinity is due to the rise and fall of the tides and the oxygen content of the soil is low. There are three commonly recognized mangrove groups: the major mangrove species or true mangroves, the minor mangrove species, and the mangrove associates. The true mangroves, also known as “strict mangroves”, occur almost exclusively or exclusively in intertidal habitats [13]. Globally, there are some 50-60 species of mangroves belonging to 16 families, with 35 species in the Philippines alone [7].

An estimated 256,000 – 263,000 hectares of mangroves in the Philippines are in existence. This decline from 400,000- 500,000 ha at the turn of the century [7] is due to overexploitation, conversion of mangroves into culture ponds, industry and settlements. Increasing demands for fisheries products caused majority of the destruction of the mangroves. Currently, some government agencies and non-government organizations are exerting considerable efforts for the conservation and rehabilitation of the mangroves which may hopefully reverse the decline of the mangrove population.

This study was conducted in the mangroves of Siargao Island, Surigao del Norte which was declared as the Siargao Island Protected Landscape and Seascape [11]. It was chosen as a priority protected area, primarily due to the important bio-physical features such as the extensive

expanse of mangrove forest, fringing coral reefs, and numerous lagoons which are important for the propagation of many wildlife species including endemic species of birds, mammals, and flowering plants in the terrestrial ecosystem. One important feature is the extensive expanse of mangrove forest covering 8,692 ha, considered as the most extensive mangrove forest in Mindanao. An assessment of mangrove vegetation, which was one of the bases for the declaration of SIPLAS reported 19 species of mangrove plants [11].

Studies of mangrove plant species in other areas of the Philippines were reported: [4], [3], [1], and [8]. Reference [12] extensively reviewed mangrove vegetation literature in the entire Philippines, including studies conducted in Luzon, Visayas and Mindanao. More recently outside the Philippines, species diversity and distribution of mangroves in Adaman and Nicobar Islands, India reported 25 true mangrove species [9].

The conduct of a survey on floristic composition of the mangroves is essential to monitor and update the condition of the mangrove ecosystem in Siargao Island. This paper aimed to identify, classify and describe the mangrove plant species and compare the plant species identified from the four municipalities.

II. METHODOLOGY

Three study areas were selected from each of the four municipalities, namely: Del Carmen, San Isidro, Pilar and General Luna in Siargao Island, Surigao del Norte, Philippines. A 10 X 10 meter plot was established in the sampling area. The mangrove plant species were identified using the field guide to the identification of some mangrove plant species in the Philippines [2] and the field guide to Philippine mangroves [6]. The frequency of occurrence of all species found in the study areas were recorded. The variability of the mangrove plant species collected from the four municipalities was determined using G-test [5].

Scope and Limitation

The study was conducted to identify, classify and describe the mangrove plant species from four municipalities and the species recorded from the four sites were compared. The study used frequency of occurrence only to describe the mangroves.

III. RESULTS AND DISCUSSION

Part I. Identification, Classification and Description of Mangrove Plant Species

A total of twenty-three (23) true mangrove taxa under 15 genera in 14 families were recorded from Del Carmen, Pilar, San Isidro, and General Luna, Siargao Island,

Surigao del Norte, Philippines. Table 1 shows the list of species of the mangrove plants identified and classified from the different study areas, with the common names of each species. All the plants were vascular belonging to division *Magnoliophyta* and *Pterophyta*. The family *Rhizophoraceae* had the most number of representatives with 4 taxa from 2 genera. The extensive root system (knee roots or stilt roots) of the members of *Rhizophoraceae* contributed a lot to its adaptability in an otherwise very stressful habitat [12].

Twenty-one (21) of the plants had been identified and classified up to the species level, out of the 23 species found in the study areas. All of the 21 species which were identified and classified in this study were mentioned and included in the updated list of taxa of the true or major mangrove vegetation in the Philippines by [12]. An extensive review of literature on mangrove plant species was conducted to update the total number of true mangroves in the country. A total of 39 major or true mangrove taxa under 19 genera in 16 families were recorded for the entire Philippine Islands. The 23 mangrove plant species in this study is an interesting information, considering the total of 39 species for the entire Philippines already, with the expanse of mangroves in Siargao Island, there might be more species waiting to be identified. In the field guide to the identification of some mangrove plant species in the Philippines of [2], 28 true mangrove taxa were described. Another field guide to Philippine mangroves by [6] also included 36 true mangrove species.

Table 1. List of the mangrove plant species identified and classified from Siargao Island.

Scientific Name	Family Name
<i>Acanthus ilicifolius</i> L.	<i>Acanthaceae</i>
<i>Acrostichum aureum</i> L.	<i>Pteridaceae</i>
<i>Acrostichum speciosum</i> Willdenow	<i>Pteridaceae</i>
<i>Aegiceras corniculatum</i> (L.) Blanco	<i>Myrsinaceae</i>
<i>Aegiceras floridum</i> Roem.and Schult	<i>Myrsinaceae</i>
<i>Avicennia marina</i> (Forsk.) Vierh.	<i>Avicenniaceae</i> (<i>Verbenaceae</i>)
<i>Avicennia officinalis</i> L.	<i>Avicenniaceae</i> (<i>Verbenaceae</i>)
<i>Bruguiera gymnorrhiza</i> (L.) Lam.	<i>Rhizophoraceae</i>
<i>Bruguiera parviflora</i> Wight and Arn.ex Griff.	<i>Rhizophoraceae</i>
<i>Camptostemon philippinensis</i> (Vidal) Becc.	<i>Bombacaceae</i>
<i>Excoecaria agallocha</i> L.	<i>Euphorbiaceae</i>
<i>Lumnitzera racemosa</i> Willd.	<i>Combretaceae</i>
<i>Nypa fruticans</i> (Thunb.) Wurmb.	<i>Arecaeae</i> (<i>Palmae</i>)
<i>Osbornia octodonta</i> F. Muell.	<i>Myrtaceae</i>
<i>Pemphis acidula</i> J.R.Forst. and G.Forst.	<i>Lythraceae</i>
<i>Rhizophora apiculata</i> Blume	<i>Rhizophoraceae</i>
<i>Rhizophora mucronata</i> Lam.	<i>Rhizophoraceae</i>
<i>Scyphiphora hydrophyllacea</i> Gaertn.	<i>Rubiaceae</i>
<i>Sonneratia alba</i> J. Smith	<i>Sonneratiaceae</i>
<i>Xylocarpus granatum</i> Koen.	<i>Meliaceae</i>
<i>Xylocarpus moluccensis</i> (Lam.) M.Roem.	<i>Meliaceae</i>
Unknown 1	
Unknown 2	

Two of the unknown plants are not found in the field guide to the identification of some mangrove plant species in the Philippines of [2] and [6]. The two unknown species could not be assigned also to any family or genus due to the absence of flowers and the other characteristics such as morphology of the leaves and stem are not enough to classify them to any major group. Further documentation of some important parts are necessary to assign the species to any group.

The occurrence of the individual species within the mangrove forest is reliant on environmental factors such as nutrient availability, salinity and oxygen level in the soil. The interactions of many factors may govern the existence of the plant species in the mangrove ecosystem.

Description of Mangrove Plant Species

Acanthus ilicifolius L. belongs to family *Acanthaceae*. The common names are lagiwliw, ragoyroy, or Diliuariu. This plant is a shrub, typically robust with spiny stems and leaves. The corolla of the flower is in part light blue or violet, rarely white.

Acrostichum aureum L. belongs to family *Pteridaceae* of Division *Pterophyta*. The common names are lagolo and palaypay. The tips of leaves are blunt; generally taller, up to 2 m or more.

Acrostichum speciosum Willdenow belongs to family *Pteridaceae* of Division *Pterophyta*. The common names are lagolo and palaypay. The tips of leaves are elongate-pointed, clumps shorter, less than 2 m.

Aegiceras corniculatum (L.) Blanco belongs to family *Myrsinaceae*. The common name is saging-saging. It is a small, multi-branched, flower with fragrant smell, erect shrub with a miniature banana shaped fruits, tip of leaves are rounded with a notched, 10 cm x 6 cm leaves.

Aegiceras floridum Roem.and Schult belongs to family *Myrsinaceae*. The common name is tinduk-tindukan. It is a small, multi-branched shrub, sour smelling flower, fruit slightly curved like a miniature sharp pointed banana up to 3 cm in length, 6 cm x 3 cm leaves.

Avicennia marina (Forsk.) Vierh. belongs to family *Avicenniaceae* (*Verbenaceae*). The common name is bungalon. A tree that grows up to 12 m, leaves opposite 8cm x3.5 cm, flower is orange yellow or pale yellow 3-4 mm diameter, inflorescence capitate, fruit is heart-shaped.

Avicennia officinalis L. belongs to family *Avicenniaceae* (*Verbenaceae*), common name is Api-api. A tree that grows up to 30m, leaves opposite 10cm x 5cm, flower is orange yellow or lemon yellow 6-10mm diameter, fruit is heart-shaped, abruptly narrowed to a short beak 2.5cm.

Bruguiera gymnorrhiza (L.) Lam. belongs to family *Rhizophoraceae*, common name is Busain. A tree that grows up to 30m, leaves opposite 15cm x 5cm, reddish flower, stipules and midrib, undersurface, fruit is cigar-shaped 25cm x 1-2cm diameter ribbed, blunt apically.

Bruguiera parviflora Wight and Arn.ex Griff. belongs to family *Rhizophoraceae*, common name is Langarai. A tall slender tree that grows up to 20m, yellowish green, upper shiny underleaf dull leaves, opposite 10cm x 6cm, flower yellowish, green smooth fruit 15cm x 5mm.

muddy. When compared to other less common species such as *Rhizophora mucronata* and *Xylocarpus granatum*, the site characteristic wherein they are known to thrive are specific, such as with salinity, the species prefers brackish site and with substrate, it prefers muddy site [7].

Del Carmen has the most diverse mangrove community with sixteen mangrove plant species recorded, seven mangrove plant species in San Isidro, seven species in Pilar, and nine mangrove plant species in General Luna. The thickest mangrove cover in Siargao Island is located in Del Carmen which could be attributed for the presence of a more diverse mangrove plant community. The abundance and diversity of the mangrove ecosystem may differ from each study area due to the interplay of many factors. According to [7], mangrove plant species distribution is influenced by tidal elevation and flooding regime, salinity pattern, substrate and other factors. Species may be distributed both vertically according to low, mid, and high tidal level, and horizontally from downstream, intermediate and upstream. Environmental factors of hydrology, salinity, substrate, rainfall and freshwater supply also affect mangrove growth.

IV. CONCLUSION

The mangroves in Del Carmen, San Isidro, Pilar and General Luna in Siargao Island, Surigao del Norte support a diverse plant community. Twenty-three mangrove plant species under 15 genera in 14 families were recorded in the four study sites, 21 of which were identified and classified in this study, and 2 are unknown. The major constituent species in this study was *Rhizophora apiculata* which was the most abundant and identified at the four study sites. *Nypa fruticans*, *Rhizophora mucronata*, *Bruguiera gymnorrhiza* and *Xylocarpus granatum* were less common but found in all sites. All the other species were occasionally or rarely seen in the study areas. All the plants were vascular belonging to division Magnoliophyta and Pterophyta. Mangrove plant species recorded at the four study sites were found to vary. Del Carmen has the most diverse mangrove plant community with sixteen species, seven species were recorded in San Isidro, seven species in Pilar, and nine species in General Luna.

V. RECOMMENDATIONS

Extensive studies on the existing mangrove plant species and its ecology is needed for the mangroves in Siargao Island. Sufficient time must be set aside for the extensive study so that a complete list of true mangrove plant species in Siargao Island will provide a baseline data. And more time is needed to gather data on the importance values (sum of relative abundance, frequency and dominance), species richness, Simpson's indices, tree height, tree density and canopy area so that complete information on the ecology of the mangroves in Siargao Island will be made available.

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