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Biodiversity of angiosperms at Kalagonoy, Gingoog City, Philippines

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Key words: Barangay Kalagonoy, Gingoog City, Biodiversity, Angiosperms

Abstract

Angiosperms serve a very vital role in our ecology. Considered to be the ultimate source of food for birds and mammals, including humans, these flowering plants are the most economically important group of green plants, serving as a source of pharmaceuticals, fibre products, timber, ornamentals, and other commercial products. This largest and most diverse group within kingdom Plantae, represents approximately 80 percent of all the known green plants now living. The objectives of this study were to determine the level of biodiversity of angiosperms found at the study area. It attempted to identify the endemic floral species and consequently identify floral species of medicinal importance. The study area was at Barangay Kalagonoy, Gingoog City, Misamis Oriental. Kalagonoy is estimated at 1,148.9 meters or 3,769.3 feet above sea level where 10.71 percent of the plants found are *Cerastostylis cf latipetala,* with six (6) individual species being recorded. Applying Shannon- Wiener Diversity Index (H), 21 individual species were found and considered endemic namely: *Calamus* sp., *Pinanga philippinensis, Rhododendron nortaniae, Rhododendron javanicum* (Blume) Benn. In, *Medinilla banahensis* Elmer*, Medinilla cfclementis, Medinilla cumingii* Naudin, *Medinilla quadrifolia* Blume, *Nepenthes cf mirabilis* (Lour.) Druce, *Appendicula* sp. *Bulbophyllum* sp., *Cerastostylis cflatipetala, Dendrobium* sp., *Dendrochilum* sp., *cf Octarrhena* sp., *cf Discopermum* sp., *Psychotria banahaensis, Urophyllum memecyloides, Smilax* sp., *Gomphandra flavirpa* and *Zingiber* sp. Out of the 21 individual endemic species, one (1) considered near threatened, one (1) considered critically endangered and six (6) were considered endangered. Also found were 10 plant species with medicinal values.

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Introduction

The Philippine archipelago is considered as one of the megadiverse countries in the world (Conservation International, 2012) and recognized as one of the eight "hottest hotspots" in terms of biodiversity (Myers *et al.*, 2000). The country is inhabited by 15,000 species of plants of which more than 8000 species are angiosperms (Madulid, 2005). It has also been characterized that, in tropical places, species distribution varies from one location to another because of biogeography, disturbance, and habitat (Whitmore 1984). These biological resources also provide many different goods and services not only to other organisms but most especially to humans (Nakashizuka 2004).

It has been known that the angiosperms or flowering plants—comprise an estimated 260,000 (Takhtajan 1997) 400,000 (Raven in Jarvis 2007) extant species and occupy nearly all habitats on Earth except the coldest arctic and Polar Regions and the deepest oceans. In Asia, the rate of biodiversity loss is higher and becoming serious (Nakashizuka 2004), including in the Philippines, due to environmental destruction (PCSD-IEMSDP 1998). Through time a lot of local communities in Mindanao, Philippines specifically Gingoog City, Misamis Oriental has done its step-in taking measures to preserve and conserve natural resources and an example of this is in Barangay Kalagonoy, Gingoog City.

Barangay Kalagonoy is considered by the City Environmental and Natural Resources as Protected Area. In this study, biodiversity of angiosperms at Kalagonoy, a barangay of Gingoog City, province of Misamis Oriental, Mindanao, Philippines was determined. Specifically, it aimed to determine the level of biodiversity of angiosperms found at the study area, identify the endemic floral species and consequently its medicinal importance.

Materials and methods

Research design and methods

A letter asking permission to conduct the study was given to the City Enviromental and Natural Resources (CENRO)since the area was a protected one. Taking all proper protocol from barangay level and assurance of safetyness from military detachment , there was orientation and consultative meeting to obtain smooth procedure in the conduct of the study. Establishment of plots was done using a line transect method. Five quadrants of 10 m x 10 m dimension were located in site

Plants inside each quadrant were identified and then counted accordingly. Each plant was tagged, counted and photographed for further identification. Species identification was determined using the field guide and taxonomic keys of Primavera (2010); Barcelona *et al.* (1996); Amorsolo *et al.* (1990); Sheeba (1996). Data analysis was done by applying Shannon- Wiener Index (H′) for species richness and assistance of plant experts was employed for the identification of species.

Data Analysis

Classification scheme of Shannon-Wiener Diversity Index (Fernando *et al.*, 1998) was employed. It is a measure of the average degree of "uncertainty" in predicting to what species an individual chosen at random from a collection of S species and N individuals will belong (Magurran, 1988).

$H' = -\sum[(n\ N)\ln(n\ N)]$ Classification scheme of Shannon-Wiener Diversity Index (Fernando *et al.*, 1998)

Shannon- Wiener Diversity Index (H)	Relative Value
3.50 and above	Very high
3.00 – 3.49	High
2.50 – 2.99	Moderate
2.00 – 2.49	Low
1.99 and below	Very Low

Results and discussions

Species Composition

Table 1 presents 10.71% of plant species found in Barangay Kalagonoy, Gingoog City belongs to *Cerastostylis cf latipetala,* with (6) six individual species recorded coming from Orchidaceae family and is considered endemic. A total of 29 species with 56 individual belonging to 14 different plant families is also indicated. The 21 individual species which are considered endemic are: *Calamus* sp.,

Pinanga philippinensis, Rhododendron nortaniae, Rhododendron javanicum (Blume) Benn. In, *Medinilla banahensis* Elmer, *Medinilla cf clementis, Medinilla cumingii* Naudin, *Medinilla quadrifolia* Blume, *Nepenthes cf mirabilis* (Lour.) *Druce, Appendicula* sp. *Bulbophyllum* sp., *Cerastostylis cf latipetala, Dendrobium* sp., *Dendrochilum* sp., *cf Octarrhena* sp., *cf Discopermum* sp., *Psychotria banahaensis, Urophyllum mem ecyloides, Smilax* sp., *Gomphandra flavirpa* and *Zingiber* sp.

From the 21 individual endemic species one (1) is considered near threatened which is *Calamus* sp., One (1) considered critically endangered is *cf Discopermum sp.* and *six (6) are considered endangered namely Rhododendron javanicum* (Blume) Benn. In, *Medinilla banahensis* Elmer, *Medinilla cfclementis, Medinilla cumingii* Naudin, *Medinilla quadrifolia* Blume, and *Psychotria banahaensis.*

From Table 1, Ten (10) plants namely *Calamus* sp., *Impatient platypetala* Lindl., *Sarcandra glabra* (Thunb.) Nakai, *Hellenia speciose* (J. Koenig) Govaerts, *Medinilla cumingii* Naudin, *Nepenthes cf mirabilis* (Lour.) Druce, *Freycinetia* sp., *Freycinetiacf multiflora, Piper* sp., *Smilax* sp., present its medicinal value commonly exhibited in their leaf parts of the plants.

Table 1. Species composition of plants at Barangay Kalagonoy, Gingoog City, Misamis Oriental.

Family	Scientific Name	Native/ Endemic	Frequency	Percentage	Conservation Status	Medicinal values
Arecaceae	*Calamus* sp.	Endemic	1	1.79%	Near threatened	Shoot: headache
	Pinanga philippinensis	Endemic	1	1.79%	-	-
Balsaminaceae	*Impatient platypetala* Lindl.	Native	2	3.57%	-	Flower: Asthma
Chloranthaceae	*Sarcandra glabra* (Thunb.) Nakai	-	3	5.36%	-	Leaves: anti-inflammatory, good antioxidant and for kidney diseases
Costaceae	*Hellenia speciose* (J.Koenig) Govaerts	-	2	3.57%	-	Leaves & roots: Diabetes, goiter, migraine, ear congestion, cough, lung nodule, urination difficulty and kidney problem.
Ericaceae	*Rhododendron nortaniae*	Endemic	1	1.79%	-	-
	Rhododendron javanicum (Blume) Benn. In	Endemic	1	1.79%	Endangered	-
Melastomaceae	*Medinilla banahensis* Elmer	Endemic	2	3.57%	Endangered	-
	Medinilla cf clementis	Endemic	2	3.57%	Endangered	-
	Medinilla cumingii Naudin	Endemic	2	3.57%	Endangered	Leaves: cough and fever
	Medinilla quadrifolia Blume	Endemic	3	5.36%	Endangered	-
Nepenthaceae	*Nepenthes cf mirabilis* (Lour.) Druce	Endemic	2	3.57%	-	Leaves: anti-bacterial
Orchidaceae	*Appendicula* sp.	Endemic	2	3.57%	-	-
	Agrostophyllum sp.	-	1	1.79%	-	-
	Bulbophyllum sp.	Endemic	1	1.79%	-	-
	Cerastostylis cf latipetala	Endemic	6	10.71%	-	-
	Dendrobium sp.	Endemic	1	1.79%	-	-
	Dendrochilum sp.	Endemic	2	3.57%	-	-
	Octarrhena sp.	Endemic	1	1.79%	-	-
Pandanaceae	*Freycinetia* sp.	-	3	5.36%	-	Roots: toothache and

Family	Scientific Name	Native/ Endemic	Frequency	Percentage	Conservation Status	Medicinal values
	Freycinetia cf multiflora	-	4	7.14%	-	hypertension Leaves: muscle pain and gas pain
Piperaceae	*Piper* sp.	-	1	1.79%	-	Leaves: Dyspepsia, ulcer, asthma, rheumatism, fracture and dislocation
Rubiaceae	*Lasianthus cf clementis*	-	2	3.57%	-	-
	Discopermum sp.	Endemic	1	1.79%	Critically endangered	-
	Psychotria banahaensis	Endemic	3	5.36%	Endangered	-
	Urophyllum meme cyloides	Endemic	2	3.57%	-	-
Smilacaceae	*Smilax* sp.	Endemic	1	1.79%	-	Anti-rheumatic
Stemonuraceae	*Gomphandra flavirpa*	Endemic	2	3.57%	-	-
Zingiberaceae	*Zingiber* sp.	Endemic	1	1.79%	-	-
		TOTAL:	56			

Species relative density and diversity.

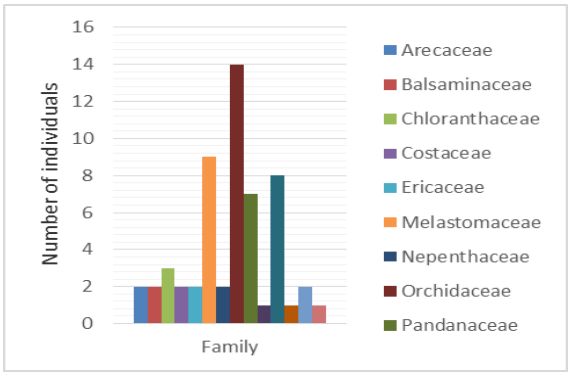

Fig. 1. The species distribution of plants in Barangay Kalagonoy, Gingoog City.

Fig. 1 shows the species distribution of the plants, in terms of their family name, present in Barangay Kalagonoy, Gingoog City, Misamis Oriental. The figure illustrates that Orchidaceae is the most relatively dense, followed by Melastomaceae, Rubiaceae, Pandaceae and Chloranthaceae. Plants families like Arecaceae, Balsaminaceae, Costaceae, Ericaceae, Nepenthaceae, Stemonuraceae, Piperaceae, Smilacaceae and Zingiberaceae are sparse in the area. In addition, the calculated Shannon-Wienner Diversity Index (H') is 3.23, which is according to Fernando Biodiveristy Scale (1998), the value is categorized as high diverse area.

Conclusions and recommendations

The level of biodiversity at Barangay Kalagonoy is categorized as high diverse area.

It is recommended that the local government unit preserve and protect the area from plant poacher and other external and internal factors. The City Environment and Natural Resources (CENRO) strongly sustain the Bantay Lasang Project which serve as a big help in the protection of plant species present in the area. Full cooperation of the local government and the community may be strengthen to sustain the high level of biodiversity of the , species found to this date until the test of time.

Acknowledgement

"We do not know what GOD had planned for us, but we continue to trust HIM because we know that HIS plan NEVER fails."

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Remarks


ENDEMIC SPECIES
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NEARLY THREATENED
Calamus sp.
CRITICALLY ENDANGERED
ENDANGERED
ENDANGERED
Medinilla cumingii
ENDANGERED