



## RESEARCH PAPER

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## Floral assessment in Kayam Forest in Brgy. Pagatpatan, Butuan City, Agusan del Norte, Philippines

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### Abstract

The Philippines is considered as one of the megadiverse countries in the world. The country is one of the World biologically richest but has the most threatened ecosystems. For decades, environmentalists and nature enthusiasts go hand-in-hand in conducting studies that would assess and formulate projects which will encourage environmental conservation and preservation, most especially those threatened ecosystems. Local communities have already started their initiatives in monitoring and maintaining the protection of the important ecosystem near them. Barangay Pagatpatan in Butuan City is an example. This study was conducted to determine the species richness and assessment of vascular plants in the “Kayam Forest” Barangay Pagatpatan, Butuan City, Agusan del Norte, Philippines. The study utilized descriptive research design to assess the local area. Transect plot technique/quadrat sampling was employed to assess the floral communities. The forest is dominated by *Inocarpus fagifer* and habitat of 20 other species belonging to 13 different plant families. The low diversity index of the area suggests that it is noteworthy for protection and conservation, for these Kayam trees are striving only in this area in Butuan City making it very unique ecosystem and therefore the local government and the community efforts for sustaining the area is very vital.

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## Introduction

The Philippines is considered as one of the megadiverse countries in the world. Considering 7,107 islands and islets, the Philippines has many endemic species of plants. Moreover, the country is regarded as one of the biodiversity hotspots in the world. This means that the country is one of the world's biologically richest but has the most threatened ecosystems. For the past decades, natural and anthropogenic causes have cost the country considerable number of species (Lubos *et al.*, 2016).

For decades, environmentalists and nature enthusiasts go hand-in-hand in conducting studies that would assess and formulate projects which will encourage environmental conservation and preservation, most especially those threatened ecosystems. Local communities have already started their initiatives in monitoring and maintaining the protection of the important ecosystem near them. Barangay Pagatpatan in Butuan City is an example.

There is an area in this barangay where Tahitian/Polynesian Chestnut or the locals call it "Kayam" grew exclusively. The city government and the locals, due to the area's uniqueness, exert effort to protect the so called "Kayam Forest". This study was conducted to determine the species richness and assessment of vascular plants in the "Kayam Forest" Barangay Pagatpatan, Butuan City, Agusan del Norte, Philippines. Specifically, it aimed to identify the species composition in the sampling site and determine species richness, relative density and diversity.

## Materials and methods

### Research design and methods

The study utilized descriptive research design to assess the local area. Prior to the study, a letter asking permission to conduct the study was given to the barangay captain of the community. The researchers personally visited and explained to the captains and officers the objectives of the study. The sampling area is located at Barangay Pagatpatan, Butuan City, Agusan del Norte, Philippines. That is 8°59'18"N, 125°31'36"E and it is 6.9m above sea level. The area is

with very few household around it. A total of six 10m x 10m transect plot were established of the sampling stations for the study. Transect plot technique/quadrat sampling was employed to assess the floral communities. Parameters measured in the community structure of plants include species composition. In terms of stand structure, 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); Amoroso *et al.* (1990); Sheeba (1996). Assistance from plant experts was also employed for the identification of the species.

### Data analysis

Shannon-Wiener Index ( $H'$ ). 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

### Species Composition

The sampling area is dominated by *Inocarpus fagifer* or Kayam, as the locals call it, almost they cover the area but there were some plant species documented. Table one (1) presents the plant species found in the area. The table depicts that 46.3% of the plants there are Kayam, with 50 individual species recorded and because the area is located near the river and most part of it are submerged in water, so there were also mangrove species (and associates) documented, namely: *Sonneratia alba*, *Acrostichum speciosum*, *Acrostichum aureum*, *Nypa fruticans*, *Acanthus ebracteatus*, and *Terminalia catappa*. There were also epiphytic plants observed: *Hoya* sp., *Trichoglottis*

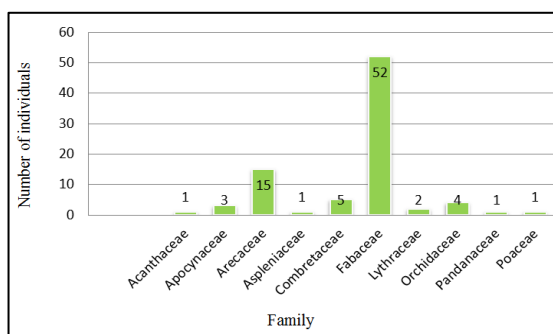
*apoensis*, *Pteroceras* sp., and *Drynaria quercifolia*. Tress, like *Acacia confuse*, *Erythrina variegata*, *Ficus hauili* and *Ficus* sp., were also documented. And some other plant species: *Cocos nucifera*, *Corypha taliera*,

*Pandanus amaryllifolius*, and *Thysanolaena maxima* were also observed to be striving in the area, a total of 21 species with 108 counted individuals belonging to 13 different plant families.

**Table 1.** Species composition of plants in Kayam Forest, Pagatpatan, Butuan City.

Family	Scientific name	Common name	Frequency	Percentage
Acanthaceae	<i>Acanthus ebracteatus</i>	Acanthus	1	0.93
Apocynaceae	<i>Voacanga grandifolia</i>	Vaocanga	2	1.85
	<i>Hoya</i> sp.	Hoya	1	0.93
Arecaceae	<i>Nypa fruticans</i>	Nipa	13	12.04
	<i>Cocos nucifera</i>	Coconut	1	0.93
	<i>Corypha taliera</i>	Buli	1	0.93
Aspleniaceae	<i>Asplenium antiquum</i>	Asplenium	1	0.93
Combretaceae	<i>Terminalia catappa</i>	Talisay	5	4.63
Fabaceae	<i>Inocarpus fagifer</i>	Kayam	50	46.30
	<i>Acacia confuse</i>	Acacia	1	0.93
	<i>Erythrina variegata</i>	Dapdap	1	0.93
Lythraceae	<i>Sonneratia alba</i>	Pagatpat	2	1.85
Moraceae	<i>Ficus hauili</i>	Hauili	5	4.63
	<i>Ficus</i> sp.	Ficus	1	0.93
Orchidaceae	<i>Trichoglottis apoensis</i>	Wild orchid (1)	2	1.85
	<i>Pteroceras</i> sp.	Wild orchid (2)	2	1.85
Pandanaceae	<i>Pandanus amaryllifolius</i>	Pandan	1	0.93
Poaceae	<i>Thysanolaena maxima</i>	Tiger grass	1	0.93
Polypodiaceae	<i>Drynaria quercifolia</i>	Oackleaf Fern	2	1.85
Pteridaceae	<i>Acrostichum speciosum</i>	Palaypay	8	7.41
	<i>Acrostichum aureum</i>	Mangrove Fern	7	6.48
		Total	108	

Species Relative Density and Diversity.



**Fig. 1.** The species distribution of plants in Pagatpatan, Butuan City.

Fig. one (1) shows the species distribution of the plants, in terms of their family name, present inside the “Kayam Forest” in Pagatpatan, Butuan City. The Fig. depicts that Fabaceae is the most relatively dense, followed by Pteridaceae, Arecaceae, Combretaceae, Orchidaceae and Apocynaceae family, and plant families like Polypodiaceae, Acanthaceae, Aspleniaceae, Lythraceae, Pandanaceae, and Poaceae are sparse in the area. In addition, the calculated Shannon-Wiener Diversity Index ( $H'$ ) is 2.07, which

according to Fernando Biodiversity Scale (1998), the value is categorized as low diverse area. This result is quiet expected because *Inocarpus fagifer* (Kayam), belonging to Fabaceaea family, is dominating the area, with 46.3% species richness. *Inocarpus fagifer* (Kayam) is thriving in the area because these plants, according to the locals, are valued because of their historical, ecotourism and economic value hence protection initiatives for the Kayams are adapted by the local government unit (LGU).

According to a Butuan City Environment & Natural Officer, the LGU, Department of Environment and Natural Resources, and Caraga State University are in the process of making the “Kayam Forest” a Local Conservation Area (LCA).

Kayam plants are very adaptive to strive in different environmental conditions: it can succeeds in a wide range of soils that include highly calcareous and saline soils and poorly drained seasonal to permanently waterlogged valleys, swamps, and marshes, it can

flourish in soils with medium to very low fertility rating and it can grow in mildly acidic to very alkaline coastal soils (Parkenson, 2012), just like the conditions of the area where these plants are thriving.

### Conclusion

Kayam Forest in Pagatpatan, Butuan City is dominated by *Inocarpus fagifer* and habitat of 20 other species belonging to 13 different plant families. The low diversity index of the area suggests that it is noteworthy for protection and conservation, for these Kayam trees are striving only in this area in Butuan City making it very unique ecosystem and therefore the local government and the community efforts for sustaining the area is very vital.

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