



Geographical Biodiversity of Orchids in Different Municipalities of Northern Samar, Phillipines

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Orchids are one of the largest and most diverse groups among the Philippine flowering plants, harboring over 1200 species, varieties and forms. Thus, this study was conducted to identify the orchid species in nine (9) sampling sites, as well the anthropogenic activities and economic uses. Purposive sampling technique was applied in this study, which is form of sampling technique in which the selection of sample is based on the researcher's own judgment that will fit in the criteria of the study. A total of seventy-four (74) varieties of orchids, belonging to eighteen genera (18) were identified in nine sampling areas which implied that Northern Samar are rich in varieties of orchid species, although anthropogenic activities need to be minimized to protect these orchid species.

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1. INTRODUCTION

“The biodiversity of Northern Samar has long been underrepresented in the scientific literature, due to lack of published studies on biodiversity in the region” [1]. “The present study augments this gap and highlights the substantial level of biodiversity. The largest and the most threatened and diverse family of angiosperm plants globally. Orchids are widely used in traditional medicine as remedies for severe diseases” [2].

There are about 141 genera of orchids representing about 1,100 orchid species, 900 of which are described as endemic to the Philippines [3], with more new species and genera being discovered and recorded yearly [4,5,6,7,8,9] (Tandang et al. 2020). “Around 25 genera and 104 species are of commercial value. Many of the endemic species have contributed significant roles in the orchid hybridization work in various countries. Among them are *Vanda sanderana* or “waling-waling”, *V. merrillii*, *V. lamellata*, *V. luzonica*, *Aeredis pulcherimma*, *A. jarchiana*, *Phalaenopsis amabilis*, *P. lueddemanniana*, *P. pulchra*, *Renanthera storei*, *R. philippinensis*, *Dendrobium taurinum* among many others” (Valmayor, 1984).

“Habitat destruction and unsustainable harvesting are the major global threats to orchids” [10,11]. Habitat fragmentation negatively impacts species richness of orchids [12] (Parra Sánchez et al. 2016), the need of highly specialized habitat takes orchids more vulnerable to global environmental changes [10]. “Orchids are also highly traded mainly for horticulture, medicine and food” [13]. “Despite being regulated under the Convention on International Trade in Endangered Species, many of the species are still being collected and traded unofficially that is negatively affecting wild populations around the world” [14]. The National List of Threatened Philippine Plants of Fernando et al. [15] “stated that there are 19 species categorized as critically endangered, 35 endangered species, and 3 vulnerable species in the Orchidaceae family”.

The present study helps us in understanding of orchid diversity and ecology and will address the breach in our knowledge and distribution of Philippine orchids. The result of this study will be helpful not only in elucidating the level of biodiversity in Northern Samar but also in

inferring patterns of plant diversity and biogeography in the Philippines.

2. METHODOLOGY

“Northern Samar was subdivided into three areas, namely: Balicuatro Area, Central Area and the Pacific Region. The province lies in the northeast portion of the island of Samar, Philippines with longitudes 12° 15' – 12° 45' and latitudes of 124° 15' – 125° 30'. It is one of the six provinces comprising Region VIII. The province consists of twenty-four (24) municipalities. Catarman is the capital town” (Galenzoga, Quiñones, 2014).

2.1 Plant Survey

Extensive survey of Orchid species was carried out using purposive sampling technique. Municipality's identification was based on geographic location (distribution) and accessibility.

2.2 Plant Collection

Actual survey and collection of healthy orchid plants was done by the researcher with the help of some informants and forest guide. Samples healthy orchid plants and properly documented using a field notebook with the following information: date and place of collection, local name, economic importance and anthropogenic activity.

All orchid species encountered were photographed in situ whenever possible, and no voucher specimens were collected to ensure conservation. Most orchid species observed were represented by only one or a few individuals, and many are already being harvested for ornamental purposes. Species identification was carried out using photographic guides [3], (Pelser et al. 2011 onwards), expert consultations (such as the Co's Digital Flora of the Philippines online plant identification platform; Barcelona et al. [16], and relevant taxonomic literature [17,18]).

2.3 Determination of the Anthropogenic Activities

Data and information about the anthropogenic activities in the study area was determined

through the use of an interview guide distributed to the respondents living in the area.

2.4 Determination of the Economic Uses of Orchids

Data and information about the economic uses of orchids in the study area was gathered through the use of a researcher- made interview guide. In every study site (10) individuals, commonly a farmer and permanent residents living in the area served as the respondents of this study.

3. RESULTS AND DISCUSSION

3.1 Distribution of Orchid Species in Selected Municipalities of Northern Samar

Table 1 show the initial list of identified species of orchids in selected municipalities of Northern Samar. The list showed seventy-four (74)

species of orchids in nine (9) sampling sites. These were represented by eighteen (18) genera, namely, Acampe, Arachnis, Aranda, Bulbophyllum, Cattleya, Cymbidium, Dendrobium, Epidendrum, Guarianthe, Leptotes, Oeceoclades, Oncidium, Papilionanthe, Phalaenopsis, Rhynchostylis, Vanda, Vappodes and *X. mokara*.

As shown in the Table 1, there are nine municipalities which serve as the sampling sites, namely, Biri, Catarman, Laoang, Lavesarez, Palapag, San Isidro, San Roque, Silvino Lobos, and Rosario. Of the nine municipalities, Lavesarez (35), Catarman (34) and Biri (30) to have the most number of orchids. Whereas, San Roque (25), Rosario (25) and Silvino Lobos (24) has the least number of orchids.

Result implies that the nine sampling sites are rich in varieties of orchid species. Among the nine (9) municipalities, Lavezares and Catarman are the most orchid inhabited places.

Table 1. Orchid species in Selected Municipalities of Northern Samar

Sl. No	Species Name (Common Name)	Biri	Catarman	Laoang	Lavesarez	Palapag	Rosario	San Isidro	San Roque	Silvino Lobos
1	<i>Acampe pachyglossa</i>	/	x	x	x	x	x	x	x	/
2	<i>Arachnis flos-aeris</i> (spider orchid)	/	x	x	x	/	x	x	x	/
3	<i>Aranda broga</i>	x	x	x	x	/	x	x	x	/
4	<i>Bulbophyllum longifolium</i>	/	x	/	x	x	/	/	/	x
5	<i>Cattleya mendelii</i> (Columbian orchid)	x	x	x	/	x	x	x	x	/
6	<i>Cattleya labiata</i> (Crimson or Ruby-lipped cattleya)	x	/	/	x	/	x	/	/	x
7	<i>Cattleya pumila</i> (Dwarf sophronitis)	x	x	x	/	x	/	x	x	x
8	<i>Cattleya violecia var superba</i>	x	/	x	x	x	x	x	x	/
9	<i>Cymbidium aloifolium</i> (Aloe-leafed cymbidium)	/	x	/	/	/	x	/	/	x
10	<i>Cymbidium finlaysonianum</i>	/	x	x	x	x	x	x	x	x
11	<i>Dendrobium affine</i> (White butterfly orchid)	x	/	x	/	x	/	x	/	x
12	<i>Dendrobium 'airy peach'</i>	x	x	/	x	x	x	x	x	x
13	<i>Dendrobium anosmum</i> (Purple rain orchid)	/	/	/	/	/	/	/	/	/
14	<i>Dendrobium austrocaledonium</i> (Tea three orchid)	x	x	x	/	x	x	x	x	x
15	<i>Dendrobium bigibbum</i> (Cooktown orchid)	x	/	/	/	/	/	/	/	x
16	<i>Dendrobium bigibbum var. phalaenopsis</i>	/	x	x	/	x	/	x	x	x

Sl. No	Species Name (Common Name)	Biri	Catarman	Laoang	Lavesarez	Palapag	Rosario	San Isidro	San Roque	Silvino Lobos
17	(Cooktown orchid) <i>Dendrobium burana</i> 'Diamond'	x	/	/	/	x	/	x	x	/
18	<i>Dendrobium burana</i> 'green jade'	x	x	/	x	x	x	x	/	x
19	<i>Dendrobium burana</i> 'charming white'	x	x	/	x	/	x	x	x	x
20	<i>Dendrobium crumenatum</i> (Dove orchid)	/	/	/	x	x	/	/	/	/
21	<i>Dendrobium dearie</i> (Deares dendrobium)	x	x	x	/	x	x	x	x	x
22	<i>Dendrobium delicatum</i>	/	/	x	x	/	/	x	x	/
23	<i>Dendrobium</i> 'Emma White	x	x	x	/	x	x	x	x	x
24	<i>Dendrobium fractiflexum</i>	/	x	x	x	x	x	x	x	x
25	<i>Dendrobium lasianthera</i>	x	/	x	/	/	/	x	x	x
26	<i>Dendrobium nobile</i> (Noble dendrobium)	/	/	/	/	/	x	/	/	/
27	<i>Dendrobium kingianum</i> (Charming white orchid)	x	/	x	/	x	x	x	/	/
28	<i>Dendrobium phalaenopsis</i> (Mauve butterfly)	/	/	x	x	/	/	/	x	/
29	<i>Dendrobium phalaenopsis</i> 'hybrid'	x	/	x	x	x	x	x	x	x
30	<i>Dendrobium phalaenopsis</i> var. <i>hololeucum</i>	x	/	x	x	x	x	/	x	x
31	<i>Dendrobium petticoat</i>	x	/	/	/	/	/	x	x	x
32	<i>Dendrobium sonia</i> (Pink dendrobium)	/	/	x	/	/	/	/	/	x
33	<i>Dendrobium</i> 'pink veined or stripe'	x	/	x	x	x	/	x	x	x
34	<i>Dendrobium</i> 'sugar pink' (Pink lorco)	x	/	x	/	/	x	x	x	x
35	<i>Dendrobium pangasinanense</i> (Pangasinan orchid)	x	x	x		x	/	x	x	x
36	<i>Dendrobium schulleri</i>			/	/	x	x	x	x	/
37	<i>Dendrobium taurinum</i> (Bull orchid)	/	/		/	/	/	/	/	/
38	<i>Dendrobium uraiwan</i> (Uranaiwan orchid)	x	x	/	x	/	x	x	/	x
39	<i>Dendrobium victoriae-reginae</i> (Queen Victoria dendrobium)	/	x		/	x	x	x	/	x
40	<i>Epidendrum ciliare</i>	x	x	x	x	x	/	/	x	x
41	<i>Epidendrum ibaguense</i>	x	x	x	x	x	x	/	x	x
42	<i>Epidendrum radicans</i> (fire-star orchid)	/	/	x	x	x	x	/	/	/
43	<i>Epidendrum rigidum</i>	x	x	x	x	x	x	/	x	/
44	<i>Guarjantheskinneri</i> (Purple Guarja)	/	/	x	/	/	/	/	x	x
45	<i>Leptotes bicolor</i> (Bicolor orchid)	x	x	/	x	x	x	x	x	x

Sl. No	Species Name (Common Name)	Biri	Catarman	Laoang	Lavesarez	Palapag	Rosario	San Isidro	San Roque	Silvino Lobos
46	<i>Oeceoclades maculata</i> (Monk orchid)	x	x	x	/	x	x	x	x	x
47	<i>Oncidium altissimum</i>	x	x	x	x	x	/	/	x	x
48	<i>Oncidium varicosum</i> (Dancing lady)	/	/	/	/	/	/	/	/	/
49	<i>Papilionanthe teres</i> (Cylindrical vanda)	x	x	/	/	x	x	/	/	x
50	<i>Papilionanthe vandarum</i>	/	x	x	x	x	x	x	x	x
51	<i>Phalaenopsis amabilis</i> (Moth orchid)	/	/	/	x	x	x	/	/	x
52	<i>Phalaenopsis aphrodite</i>	x	/	/	x	/	/	x	x	/
53	<i>Phalaenopsis equestris</i>	/	x	/	x	x	x	/	x	x
54	<i>Phalaenopsis fasciata</i> (Striped flower phalaenopsis)	x	x	x	/	x	x	x	x	x
55	<i>Phalaenopsis fuller</i>	x	x	x	x	/	x	x	x	x
56	<i>Phalaenopsis lindenii</i> (Pumpkin beth orchid)	x	x	x	/	/	x	x	x	/
57	<i>Phalaenopsis lueddemanniana</i>	/	x	x	/	x	x	x	x	x
58	<i>Phalaenopsis schilleriana</i> (Moth orchid)	/	x	x	x	/	x	x	/	x
59	<i>Phalaenopsis singuliflora</i>	/	x	x	x	x	x	/	x	x
60	<i>Rhynchostylis retusa</i> (Foxtail orchid)	x	x	/	/	x	x	x	x	x
61	<i>Spathoglottis plicata</i> (Rose Pink ground orchid)	/	/	/	/	/	x	x	X	/
62	<i>Spathoglottis plicata</i> (Purple ground orchid)	/	/	/	/	/	/	x	/	/
63	<i>Spathoglottis plicata</i> (White ground orchid)	/	/	/	/	/	/	/	/	/
64	<i>Vanda charles goodfellow x tessellate alba</i> (Yellow orchid)	x	/	x	x	x	x	x	x	x
65	<i>Vanda coerulescens</i> (Orange color)	/	/	x	/	/	x	/	x	/
66	<i>Vanda coerulescens</i> (Pink color color)	/	x	x	x	x	x	/	/	x
67	<i>Vanda denisoniana</i> (Lady Denison Londesborough's Vanda)	x	/	/	x	x	x	x	/	x
68	<i>Vanda josephine</i> Brero (Vanda JBV hybrid)	x	/	x	x	x	/	x	/	/
69	<i>Vanda 'miss joaquim'</i> (Cylindrical vanda)	x	/	x	x	x	x	x	x	X
70	<i>Vanda scadens</i>	x	x	x	x	/	x	x	x	x
71	<i>Vanda usha</i>	/	/	/	/	/	/	/	/	/
72	<i>Vappodes phalaenopsis</i> (Cooktown orchid)	x	/	x	x	/	x	x	x	X
73	<i>X - mokara</i> (Mokara orchid)	x	x	/	/	x	/	/	x	X
74	TOTAL	30	34	26	35	27	25	27	24	25

Legend: /=present; x=absent

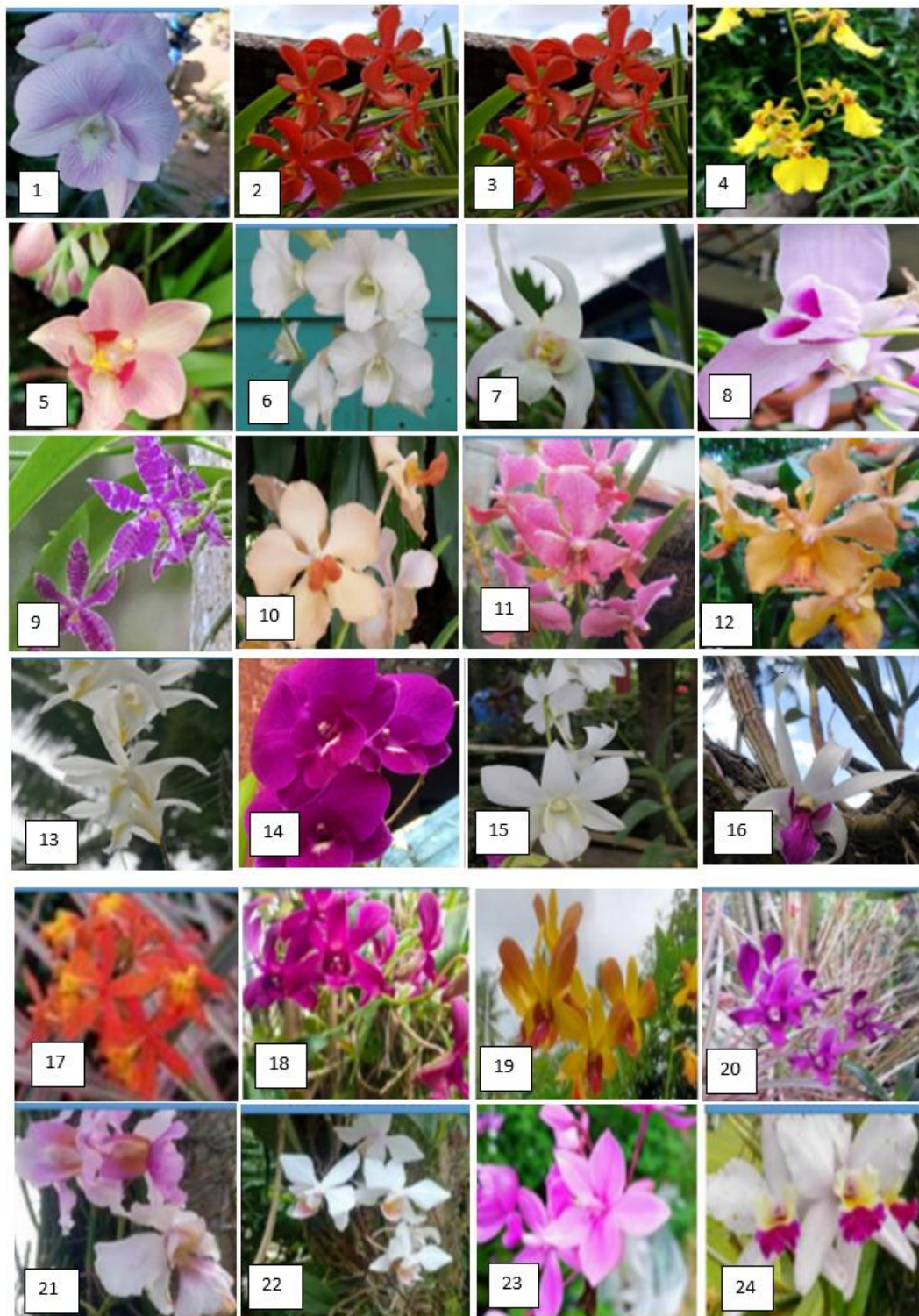


Fig. 1. The photographic representation of selected Orchid species found in the natural habitats of Northern Samar

1. *Vappodes phalaenopsis* 2. *Aranda broga* 3. *Arachnisflos-aeris* 4. *Oncidium varicosum* 5. *Phalaenopsis fuller*
6. *Dendrobium bigibbum* 7. *D. warawan* 8. *D. anosmum* 9. *P. luedemanniana* 10. *Vanda usha* 11. *V. JBV*
12. *V. courulescens* 13. *Dendrobium crumenatum* 14. *D. schulleri* 15. *D. sonia* 16. *Leptotes bicolor*
17. *Epidendrum radicans* 18. *Guarianthe skinneri* 19. *Dendrobium uraiwan* 20. *D. taurinium*
21. *Papilionathe teres* 22. *Phalaenopsis lindinii* 23. *Spathoglottis plicata* 24. *Cattleya pumila*

3.2 Anthropogenic Activities

As human population is expanding, increased pressure is being placed on natural area, including areas with numerous threatened orchid species. Based on observation and actual interview held in nine (9) sampling areas, three anthropogenic activities are identified by the researcher that are commonly affecting the distribution of orchid species in Northern Samar. Local collections have been observed in nine (9) sampling areas for ornamental purposes. Upon interviewing the local residents, some locals confirmed that they trade with outside plant hobbyist and collectors.

In the process of land clearing, numerous individual plants and animals are killed or die soon after. However, climate change, especially global warming that brings about frequent extreme events could negatively impact orchid's adaptation and aggravate the species extinction. Therefore, many species are subject to decline and threatening by potential challenges of climate change. Habitat degradation and climate changes are exacerbated by the poaching and harvesting of orchid species, which remain a global threat to orchid population.

In this matter, the researcher suggests to implement an immediate restriction in collecting orchid species to maximize its number in their natural habitat. Official of each municipality should take action in protecting the species from being poached legally and exposed in other threats.

3.3 Economic Uses

Economic importance of orchid species was identified through actual interview conducted by researcher in all sampling areas. Local residents identified and acknowledging that the seventy-one (71) species are economically important terms of horticulture and florist. They confirmed that they trade to outside hobbyist and collectors as they are interested in these plant species as plant stock.

It implies that, orchid species in the sampling area were known only for its ornamental uses and locals are unaware of other potential economic importance of orchids especially in medicine and food uses.

4. CONCLUSION

The seventy-four (74) species of orchids implied that the area has a vast diversity of orchid

species, and anthropogenic activities need to be minimized to protect these orchid species.

5. SUMMARY

There were seventy-four (74) orchid species that were found in nine (9) municipalities of Northern Samar. These represented nineteen (19) genera. Based on the interview conducted in the sampling areas, anthropogenic activities in area affecting the distribution of orchids were identified as illegal poaching, land clearing and climate change or calamities.

6. RECOMMENDATION

Restriction for collection of orchids should be implemented to local residents by municipal officials to conserve and enhance the number of these species.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

I hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscripts.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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