



Inventory of orchids in the Mount Hamiguitan Range Wildlife Sanctuary, Davao Oriental, Philippines

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(Published by Research Trend, Website: www.biobulletin.com)

(Received 09 March 2018; Accepted 22 April 2018)

ABSTRACT: The orchid family is the most threatened group of plants in the Philippines, and remains to be poorly known and studied. A thorough survey was done from the base to the peak of the mountain Mount Hamiguitan Range Wildlife Sanctuary (MHRWS) to record and identify the orchid species. MHRWS harbors 45 species of orchids, 23 of them are Philippine endemic, a few may be undescribed. About 53% are epiphytes and 47% are terrestrial. The remarkable richness of orchids found in the present study highlights the importance for conservation of flora in MHRWS and other mountains and forests reserves in Mindanao.

Keywords: Davao Oriental, Orchidaceae, Mindanao, Mount Hamiguitan, Philippines

How to cite this article: Dizon, S.A., Ocenar, A.P. and Naive, M.A.K. (2018). Inventory of orchids in the Mount Hamiguitan Range Wildlife Sanctuary, Davao Oriental, Philippines. *Bio Bulletin*, 4(1): 37-42.

INTRODUCTION

Orchidaceae, the orchid family, is one of the richest families of seed plants. It is composed of five subfamilies, 880 genera and more than 25,000 species worldwide (Cribb *et al.*, 2003). It elicits enthusiastic interest from botanists, but is also one of the most endangered plant taxa (Kreutz, 2009; Zhang *et al.*, 2015). Orchid species requires unique habitat and microhabitat, so they are confined to particular elevations and forest types (Jalal, 2013), which makes them excellent indicators of ecosystem changes (Jacquemyn *et al.*, 2005; Yulia, 2011; Nadkami, 1994). Furthermore, due to their great economic importance to floral and pharmaceutical industries, many species have been over-collected and poached, and are becoming endangered (Naive *et al.*, 2017a).

Harbouring more than 1,200 species with approximately 85% endemism, Philippines is one of the orchid richest countries in the world (Cootes, 2011).

The number is increasing as new species and varieties continued to be found (*e.g.* Calaramo *et al.*, 2017; Cootes *et al.*, 2016, 2017; De Leon *et al.*, 2017; Naive, 2017; Naive *et al.*, 2016, 2017a&b). Many more species await scientific description, but given the increasing pace of forest destruction, many species may not be known and fully explored. Such threat has direct impact on the orchid flora considering that it has the highest number of threatened species (Fernando *et al.*, 2008). The assessment of orchid diversity and distribution is further limited by potential problems in nomenclature that are difficult to resolve because of the lack of access to reference specimens, digital imagery, and detailed collection particularly in Mindanao (Buenavista, 2017).

Mt. Hamiguitan Range Wildlife Sanctuary (MHRWS) is situated in the Province of Davao Oriental. This area is a center for endemism and a home to an astonishing diversity of species. It is also a protected area and was designated as a World Heritage site by UNESCO (Caparas, 2012). MHRWS harbors 957 species of plants belonging to 427 genera and 166 families, 723 of which are Angiosperms (UNESCO, 2013), and 19 orchids (Buenavista, 2017). Here we ground-truth the previous assessment. Rare species could have been missed previously. Most orchid species are identified by their flowers, and few species flower throughout the year.

MATERIAL AND METHODS

Extensive survey was carried out from July 2016--October 2017 in MHRWS situated at the southern end of the Eastern Mindanao Biodiversity Corridor (EMBC) La Union, San Isidro, Davao Oriental (Fig. 1). MHRWS covers a 6834 hectare located between 6°40'01" to 6°46'60" N and 126°09'02" to 126°31'01" E in the southeastern part of the Davao Oriental Province (Amoroso & Aspiras, 2010). The reserve has an elevation range of 75 [map seems to show reserve going to the shore line = 0 m] to 1,637 meters above sea level and is characterized by five vegetation types: agro-ecosystem, dipterocarp forest, montane forest, typical mossy forest and mossy-pygmy (UNESCO, 2013).

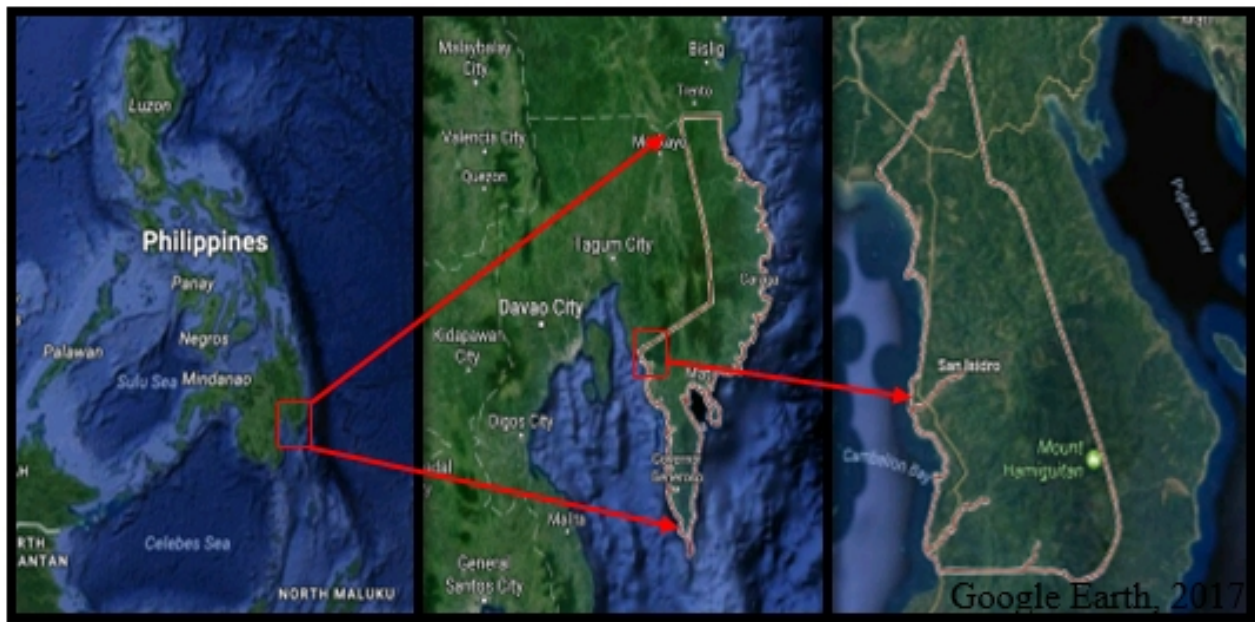


Fig. 1. Map showing the area where the study was conducted in Mt. Hamiguitan Range Wildlife Sanctuary, La Union, San Isidro, Davao Oriental, Philippines. (Google Earth, 2017).

Following the established mountain trail, a transect walk (5 m both sides) and opportunistic sampling was done starting from the base to the peak of the mountain. The species that could be field-identified were photographed to provide records. Those species that could not be identified in the field were collected. Identification was mainly based on Valmayor (1984), Cootes (2001, 2011) and Cootes & Tiong (2015). The assessment of the species was based on DENR Administrative Order No. 2017-11.

RESULTS AND DISCUSSION

A total of 45 taxa of identifiable Orchidaceae species with 23 endemic species were recorded,

which belongs to 24 genera in three subfamilies and nine tribes (Table 1). The subfamily Epidendroideae has the highest number of species (38) followed by Orchidoideae (5) and Cypripedioideae (2). Out of the 45 taxa recorded, 38 of them are identified to species level. Some of the unidentified species were not in flower, which prevented identification to species level. Epiphytes (53%) and terrestrials (47%) were represented about equally (Table 2).

Epiphytic orchid species are influenced by various environmental factors, such as light availability. Their nature in growing to their host plant is one way of adapting to get sunlight (Tirta, 2014).

Table 1: Systematics of Orchidaceae species found in MHRWS, Davao Oriental Philippines.

Subfamilies	Tribe	Genus		
Cypripedioideae		<i>Paphiopedilum</i>		
Orchidoideae	Cranichideae	<i>Goodyera</i>		
		<i>Macodes</i>		
		<i>Myrmechis</i>		
		<i>Rhomboda</i>		
	Diurideae	<i>Corybas</i>		
		<i>Cryptostylis</i>		
		Epidendroideae	Arethuseae	<i>Coelogyne</i>
				<i>Dendrochilum</i>
		Malaxideae	Cymbidieae	<i>Crepidium</i>
				<i>Denia</i>
<i>Liparis</i>				
<i>Cymbidium</i>				
Collabieae	Podochileae		<i>Dipodium</i>	
			<i>Cephalantheropsis</i>	
			<i>Plocoglottis</i>	
			<i>Spathoglottis</i>	
Vandaeae	Dendrobieae	<i>Appendicula</i>		
		<i>Ceratostylis</i>		
		<i>Podochilus</i>		
		<i>Trichotosia</i>		
		<i>Pomatocalpa</i>		
		<i>Staurochilus</i>		
		<i>Trichoglottis</i>		
		<i>Bulbophyllum</i>		
		<i>Dendrobium</i>		
		<i>Epigeneium</i>		

Other factors mentioned by Dressler (1993) favorable to epiphytes are greater seed dispersal, better exposure to pollinators, and avoidance of predators. This study harbors 24 epiphytic orchid species, showing that the study area provides suitable conditions for the survival of epiphytic orchids. The genus *Dendrobium* has the highest number of species compared to the other genera with seven identified species, it was followed by *Bulbophyllum* and *Dendrochilum* with five and four species respectively. Most of the *Dendrobium* species recorded in this inventory were not found by Buenavista (2017) namely *D. guereroi*, *D. microphyton*, *D. orbilobulatum*, *D. philippinense* & *D. sanderae*. Out of the 45 species found here, only 11 were included in Buenavista (2017). Among the 45 recorded Orchidaceae species, five are listed as threatened Philippine plants (DENR

Administrative Order No. 2017-11). *Paphiopedilum ciliolare* and *P. adductum* are listed as critically endangered (CR) and both are Philippine endemics. *Bulbophyllum loherianum* (a Philippine endemic species) and *Cymbidium ensifolium* are categorized as Endangered (EN). *Dendronium sanderae* is listed as Vulnerable (VU).

At present, numerous orchid species in the Philippines are becoming rare in the wild and are threatened with extinction because of degradation or even a total destruction of their habitats. There are still numerous undiscovered and unexplained patterns in the distribution of wild orchids in MHRWS. The number of recorded species will almost certainly increase, with additional research and the opening up of many inaccessible locations.

Table 2: Orchidaceae species present in MHRWS, Davao Oriental, Philippines.

Species name	Habit	Endemicity	Present study	Buenavista, 2017
1. <i>Appendicula tembuyukenensis</i> J.J. Wood	Terrestrial	Native		
2. <i>Bulbophyllum colubrimodum</i> Ames	Epiphytic	Endemic		-
3. <i>Bulbophyllum cummingii</i> (Lindl.) Rchb.f	Epiphytic	Native		-
4. <i>B. loherianum</i> (Kraenzl.) Ames	Epiphytic	Endemic		-
5. <i>B. tortuosum</i> (Blume) Lindley	Epiphytic	Native		-
6. <i>Bulbophyllum</i> sp.	Epiphytic	-		-
7. <i>Cephalantheropsis halconensis</i> (Ames) S.S.Ying	Terrestrial	Native		-
8. <i>C. obcordata</i> (Lindl.) Ormerod	Terrestrial	Native	-	
9. <i>Ceratostylis latipetala</i> Ames	Epiphytic	Endemic	-	
10. <i>Coelogyne marmorata</i> Reichenbach f.	Epiphytic	Endemic		-
11. <i>Corybas</i> sp.	Terrestrial	-		-
12. <i>Crepidium</i> sp. 1	Terrestrial	-		-
13. <i>Crepidium</i> sp. 2	Terrestrial	-		-
14. <i>Crepidium</i> sp. 3	Terrestrial	-		-
15. <i>Cryptostylis arachnites</i> (Blume) Hassk	Terrestrial	Native		
16. <i>Cymbidium ensifolium</i> (L.) Sw.	Terrestrial	Native		-
17. <i>Dendrobium auriculatum</i> Ames and Quisumbing	Epiphytic	Endemic		
18. <i>Db. guereroi</i> Ames & Quisumbing	Epiphytic	Endemic		-
19. <i>Db. microphyton</i> L.O. Williams	Epiphytic	Endemic		-
20. <i>Db. orbilobulatum</i> Fessel & Lückel	Epiphytic	Endemic		-
21. <i>Db. philippinense</i> Ames	Epiphytic	Endemic		-
22. <i>Db. sanderae</i> Rolfe	Epiphytic	Endemic		-
23. <i>Db. uniflorum</i> Griff.	Epiphytic	Native		
24. <i>Dendrochilum coccineum</i> H. E. Pedersen and B. Gravendeel	Epiphytic	Endemic		
25. <i>Ddc. kopfii</i> Lückel	Terrestrial	Endemic		
26. <i>Dendrochilum</i> sp. 1	Epiphytic	-		-
27. <i>Dendrochilum</i> sp. 2	Epiphytic	-		-
28. <i>Ddc. tenellum</i> (Nees & Meyen) Ames	Epiphytic	Endemic	-	
29. <i>Dienia ophrydis</i> (J.Koenig) Seidenf.	Terrestrial	Native		-
30. <i>Dipodium fevrellii</i> subsp. <i>deleonii</i> O'Byrne	Epiphytic	Native		-
31. <i>Epigeneium stella-silvae</i> (Loher & Kraenzl.) Summerh	Epiphytic	Endemic		-
32. <i>Goodyera viridiflora</i> (Blume) Blume	Terrestrial	Endemic	-	
33. <i>Liparis</i> sp.	Terrestrial	-		-
34. <i>Macodes petola</i> (Blume) Lindl.	Terrestrial	Native		-
35. <i>Myrmechis philippinensis</i> Ames	Terrestrial	Endemic		-
36. <i>Paphiopedilum adductum</i> Asher	Terrestrial	Endemic		
37. <i>P. ciliolare</i> (Rchb.f) Stein	Terrestrial	Endemic		
38. <i>Plocoglottis plicata</i> (Roxb.) Ormerod	Terrestrial	Native		-
39. <i>Podochilus lucescens</i> Blume	Epiphytic	Native		-
40. <i>P. strictus</i> Ames	Epiphytic	Endemic		-
41. <i>Pomatocalpa fuscum</i> (Lindl.) J.J.Sm.	Epiphytic	Endemic		-
42. <i>Rhomboda</i> sp.	Terrestrial	-		-
43. <i>Spathoglottis kimballiana</i> var. <i>antiquensis</i> T. Green	Terrestrial	Endemic		
44. <i>S. plicata</i> Blume	Terrestrial	Native		
45. <i>S. tomentosa</i> Lindl.	Terrestrial	Native		
46. <i>Staurochilus agussanensis</i> (Ames & Quisumbing) Fessel & Lückel	Epiphytic	Endemic		-
47. <i>S. guibertii</i> (Linden & Rchb.f) Christenson	Epiphytic	Endemic		-
48. <i>Trichoglottis geminata</i> J.J.Sm.	Epiphytic	Native		-
49. <i>T. latisejala</i> Ames	Epiphytic	Endemic		-
50. <i>Trichotosia ramosii</i> (Leavitt) Kraenzl	Epiphytic	Endemic	-	

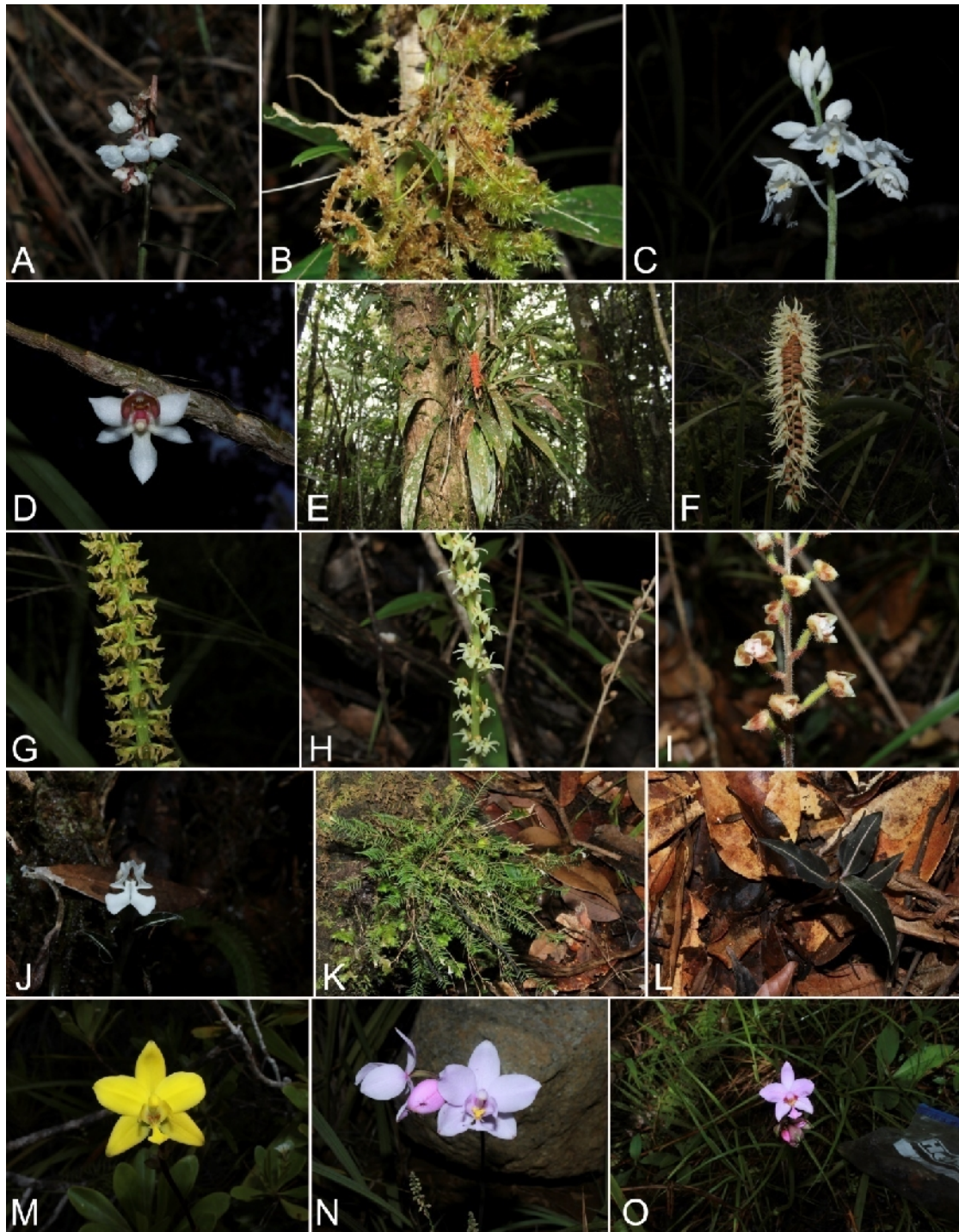


Fig. 2. Selected orchid species found in MHRWS A. *Appendicula tembuyukenensis* B. *Bulbophyllum colubrimodum* C. *Cephalantheropsis halconensis* D. *Dendrobium orbilobulatum* E. *Dendrochilum coccineum* F. *Ddc. kopfii* G. *Dienia ophrydis* H. *Liparis* sp. I. *Macodes petola* J. *Myrmechis philippinensis* K. *Podochilus lucescens* L. *Rhomboda* sp. M. *Spathoglottis kimballiana* var. *antiquensis* N. *S. tomentosa* O. *S. plicata* Photos by: MAK Naive.

CONCLUSION

The field survey conducted in MHRWS recorded a total of 45 species in 24 genera excluding the species recorded by Buenavista (2017). The record includes 23 endemic species and five threatened taxa namely, *Bulbophyllum loherianum*, (EN), *Cymbidium ensifolium* (EN), *Dendrobium sanderae* (VU), *Paphiopedilum adductum* (CR), *P. ciliolare* (CR). This benchmark data presented can be utilized for future monitoring of orchid populations and conservation initiatives of threatened species in MHRWS.

ACKNOWLEDGEMENTS

Dr. Daniel Geiger, Tristan Senarillos are acknowledge for their help in completing this manuscript. Jim Cootes provided taxonomic help and advice. The local guides, Tatay Pidoy, Kuya Al-Al, Kuya Jerry, Kuya Archer, and Kuya MD assisted during the study. DENR granted us Gratuitous Permit. The first author would like to acknowledge her friends and family for the unending support and encouragement during the conduct of this study.

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