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Checklist of Endemic Species in Mt. Malindang Range Natural Park, Philippines – A Review

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Abstract

Mt. Malindang Range Natural Park (MMRNP) is a protected area in the Philippines. The present study aimed to enumerate, update, document, and verify the endemic species of flora and fauna in MMRNP. Data were gathered from available literature, online published articles, and printed books on different explorations and research studies in MMRNP from 1900 up to 2024. The record showed that MMRNP has a total of 60 endemic species consisting of eight species of flora and fifty-two species of fauna. Recorded endemic species were mostly named after Mt. Malindang by various authors and scientists. It is recommended that unified efforts and involvement among stakeholders in protecting and conserving MMRNP endemic species a top priority, and safeguard mountain ranges of MMRNP.

Keywords: Asean Heritage Park, conservation, fauna, flora, protected area

Introduction

The Philippines is considered one of the most megadiverse countries in the world (Lillo *et al*., 2020; Malayang, 2021; Tobias *et al.*, 2021; Abijay *et al*., 2023). It is an archipelagic country composed of islands, islets, rugged terrain, and mountain ranges, contributing to its high endemism (Flantua *et al*., 2020; de la Cruz, *et al*., 2024). It hosts over a thousand species of plants and animals (Daipan, 2021). However, despite its contribution to the economy, its importance and species richness faced multifaceted challenges that included man-made or anthropogenic and natural calamities. The Philippines' strong commitment to the Convention on Biological Diversity (CBD) to address these exacerbating issues to conserve and protect this wildlife species, thus, a total of 109 protected areas in various categories were established, declared, and managed by the Department of Environment and Natural Resources and multiple stakeholders (Republic Act 11038) including Mt. Malindang Range Natural Park (MMRNP) through Republic Act 9304.

MMRNP is one of the key biodiversity areas in the Philippines (Pito *et al*., 2020; Alaman, 2020; Coritico & Amoroso, 2020; Villantes *et al.*, 2024). Another significant distinction of MMRNP is that it recognizes important bird areas (IBA), conservation priority areas, and the Alliance of Zero Extinction Sites (DENR, 2022). Due to its rich biodiversity in 2011, it was declared as the 29th ASEAN Heritage Park (AHP) and 5th AHP in the Philippines, joining Mt. Apo Natural Park, Mt. Iglit Baco Natural Park, Mt. Kitanglad Range Natural Park and Tubataha Reef Natural Park by the ASEAN Centre for Biodiversity (Pito *et al*., 2020; Coritico & Amoroso, 2020).

The present study was conducted through an online search and research of the available literature, printed articles, and books published from different explorations and studies conducted in MMRNP from 1900 up to 2024. The enumeration of endemic fauna and flora species in MMRNP aims to update the stakeholders, PAMB, park manager, LGUs, NGOs, and academe on the presence and value of this iconic, unique, rare,

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endemic, and threatened species in Mt. Malindang. Stakeholders must work together to protect and safeguard this unique floral and faunal site species so that it continues to exist in the wild and maintains its integrity as an AHP.

Materials and Methods

Local of the Study

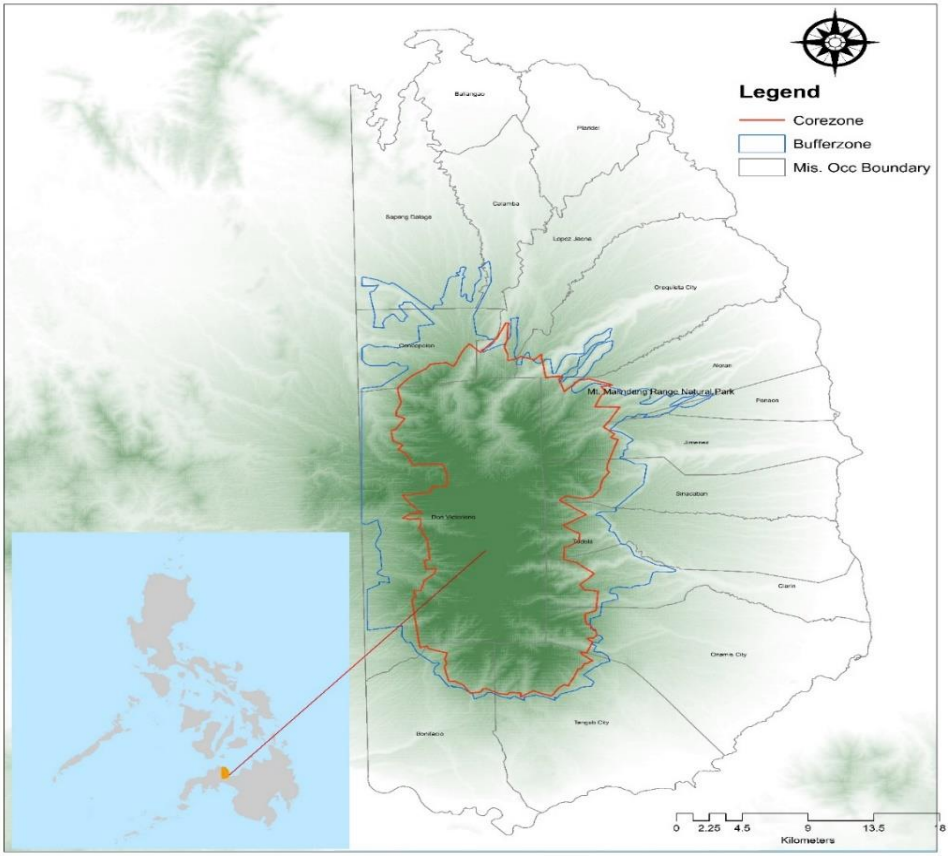

Figure 1. Map of Mt Malindang Range Natural Park, Misamis Occidental

MMRNP is located in the province of Misamis Occidental, Philippines and has a total area of 53,268 ha (Figure 1). The strict protection zone covers an area of 34,694 ha. and the buffer zone is 18,334 ha. The park covers most of the areas above 800 m in the MMRNP range of eastern Mindanao, which rises to 2,404 m, the Mt. Malindang peak. The terrain is steep, rugged, and forested. Its rivers run radially out from the mountains, and a high proportion of the water in many of the major catchments in the region comes from the Park. The park covers the municipalities of Don Victoriano, Bonifacio, Tudela, Clarin, Sinacaban, Jimenez, Aloran, Panaon, Lopez Jaena, Calamba, and Concepcion, and the Cities of Tangub, Ozamiz, and Oroquieta, all in the province of Misamis Occidental.

Methods

This study employed a comprehensive approach to gathering information over a century of exploration and research conducted in MMRNP, Philippines. The methodology involved an extensive online review of the available on literature, covering published articles, expedition reports, taxonomic reviews, field guides, handbooks, printed books and field assessment. The search covers studies from 1900 to 2024. The inclusiveness of this period ensures a thorough examination of the evolution of knowledge about MMRNP. Furthermore, the literature review was done at the national and international publications. The diversity of sources, authored by individuals and institutions at local, national, and international levels, enhances the comprehensiveness and reliability of the gathered information. By synthesizing data from various sources, this study aims to provide a holistic understanding of the ecological and biological aspects of MMRNP, offering insights that reflect the collective efforts of researchers over the past century.

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Results and Discussion

The Philippines hosts about 10,145 species of flora, with almost 4,874 Philippine endemic species (Pelser *et al.,* 2011 onwards). Notably, Philippine endemic fauna has almost 1,994 species distributed to 57 mammals, 683 birds, 355 reptiles, 115 amphibians, and 784 invertebrates, using the threatened categories (Gonzales, *et al.,* 2018; Agduma *et al.,* 2023).In MMRNP, a comprehensive faunal and floral exploration in Mt. Malindang conducted by various researchers, including Mearns (1909); Mearns and Hutchkin (1909); Rand and Rabor (1960), Kenedy *et al*. (1957), Tabaranza *et al*. (2001); While faunal study conducted by Ballentes *et al*., (2006), Nuneza *et al*. (2010), Aspe and James, (2015), Batucan, *et al.*, (2016), Mohagan *et al*., (2018). Another Floristic studies conducted by Amoroso *et al*. (2006), Arances *et al.* (2004), and Roxas *et al*. (2005) recorded a total of 1,284 Species, 472 genera, and 187 families. The study of Alaman *et al*. (2020) and Pito et al. 2020 in the southern part of MMRNP disclosed a new record of Philippine endemic species found on MMRNP: *F. balete* and *F. pseudopalma*. Recent studies undertaken in the southern areas of MMRNP have shown that there are 46 species of trees, and 21 species are endemic to the Philippines (Pito *et al*., 2020). The study of Labajo-Villantes *et al.,* 2024 recorded 114 different species of orchids from 49 different genera were discovered throughout the study on MMRNP and its environs. Moreover, this present study in MMRNP listed 60 site endemic species of flora and fauna.

1. Endemic Species of flora in MMRNP

Of the 60 MMRNP endemic species listed, eight (8) species were endemic species of flora. This constitutes about 13.33% of the endemic species found in MMRNP. These represent seven (7) families namely, Begoniaceae, Ericaceae, Euphorbiaceae, Gesneriaceae, Melastomataceae, Orchidaceae,and Nepenthaceae. The 8 Genera comprise of

A*eschynanthus , Agrostopyllum Appeddicula, Begonia, Glochoidon, Medinilla, Nepenthes and Rhododendron* as shown in Table 1.

2. Endemic Species of fauna in MMRNP

Meanwhile, the MMRNP endemic species of fauna has a total of 52 species. This denotes 83.67% of the endemic found in MMRNP, representing 22 families and 38 genera as shown in Table 1. Out of 52 faunal endemic species, one (1) mammal, twelve (12) avian species, and thirty nine (39) invertebrates, as shown in Table 1. The most abundant faunal endemic belonged to the family Megascolecidae comprised of 1 genus, *Pheretima*, and 18 species(Aspe and James, 2015)

3. Assessment of conservation status

The conservation status of each species was noted and recorded based on the most recent recommendations, these include DENR DAO (2017-01; 2019-09), Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and listing of threatened species of the IUCN. Results showed that out 60 site endemic species, 3 are listed in CITES and all are under appendix II. Species listed in Appendix II are not necessarily in danger of extinction but must follow controlled trades (Labajo-Villantes et al., 2024). Following the list of DAO 2017-11 and DAO 2019-09 marked 1 CR, while IUCN Redlist included 1 DD, 1 VU.

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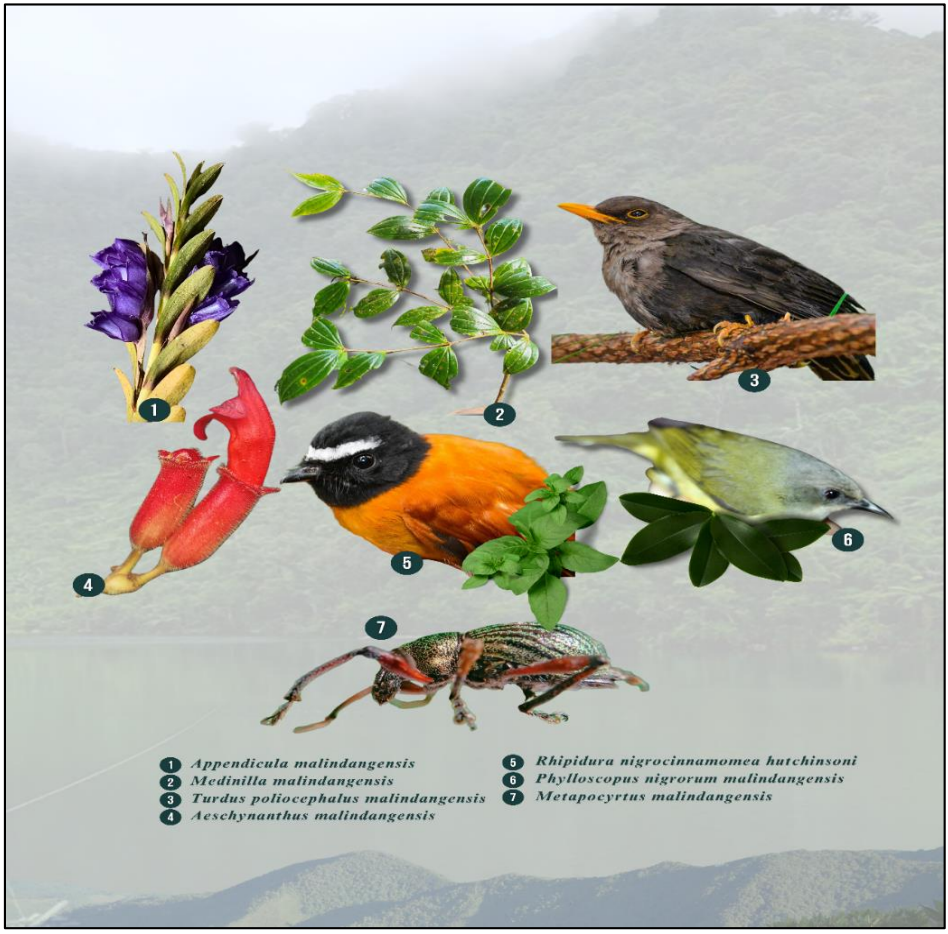
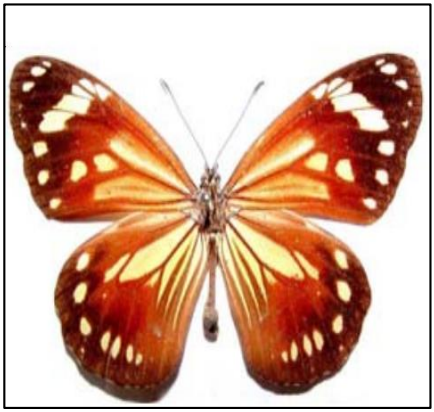


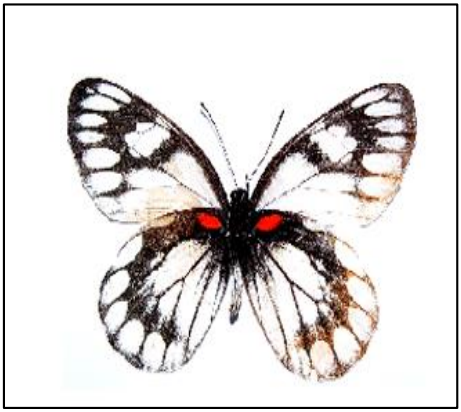
Figure 2. Photo showing the MMRNP site endemic species of flora and fauna (Photo by Mark Anthony M. Manapsal, Ms. Hanira B. Abubacar, and Ms. Emmarie F. Mapiot)

Sparsorythus buntawensis (Photo from Batucan et al 2016)

Itara Mindanao (Photofrom Tan et. al., 2024)



Paranatica danati malindangensis Schroeder & Treadway (Ballentes et al., 2006)



Delias diaphna basilisae Schroeder & Treadway*(Ballentes et al., 2006*)

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		SPECIES	AUTHOR AND YEAR	MMRNP DISTRIBUTION	CONSERVATION STATUS		
					DAO 2017-11 /DAO 2019-09	CITES (cites.org)	IUCN
FLORA							
1	Begoniaceae	*Begonia malindangensis* Merr.	Merr., (1911)	Barangay Lake Duminagat, Don Victoriano, Misamis Occidental			Not Listed
2	Ericaceae	*Rhododendron malindangense* Merr	Mearn 1908	Barangay Lake Duminagat, Don Victoriano, Misamis Occidental			Not Listed
3	Euphorbiaceae	*Glochidion malindangensis* Merr.	Mearn 1905				Not Listed
4	Gesneraceae	*Aeschynanthus malindangensis* Merr	Mansibang and Pelser, 2021	Barangay Lake Duminagat, Don Victoriano, Misamis Occidental			Not Listed

5	Melastomaceae	*Medinilla malindangensis* Merr.	Merrilli, 1905	North Peak, Barangay Lake Duminagat, Don Victoriano, Misamis Occ			Not Listed
6	Nepentheceae	*Nepenthes kurata* Jebb & Cheek	Cheek, M. and Jebb, M., 2013.	Barangay Lake Duminagat, Don Victoriano, Misamis Occ	CR		Not Listed
7	Orchidaceae	*Agrostopyllum malindangense ames philip* Merr	Ames, (1911)	Barangay Lake Duminagat, Don Victoriano, Misamis Occidental			Not Listed
8	Orchidaceae	*Appendicula malindangensis* (Ames) Schltr., 1912	Govaerts, R. (2003).	North Peak ,Barangay Lake Duminagat, Don Victoriano, Misamis Occidental		II	Not Listed
FAUNA							
9	Soricidae	*Crocidura grandis* Miller	Brown, W.C. and Alcala, A.C., 1970.				Data Deficient

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10	Campephagidae	*Coracina mcgregori mcgregori* Mearns	Mearns and Co, 1905-1907	Vulnerable
11	Dicaeidae	*Dicaeum kampalili masawan* Rand, AL; Rabor, DS 1957	Salomonsen, F., 1960..	Not Listed
12	Dicaeidae	*Dicaeum hypoleucum mindanense* Tweeddale,A 1877	Alexander, E.,	Not Listed
13	Locustellidae	*Locustella caudata malindangensis* (Mearns, EA 1909)	Mearns, E.A., 1909.	Not Listed
14	Muscicapidae	*Brachypteryx poliogyna malindangensis* Mearns, EA 1909	Mearns, E.A., 1909.	Not Listed
15	Muscicapidae	*Ficedula luzoniensis malindangensis* Rand, AL; Rabor, DS 1957	Kennedy *et al* (1997) .	Not Listed
16	Nectariniidae	*Aethopyga boltoni malindangensis* Rand, AL; Rabor, DS 1957	Kennedy, R.S., Gonzales, P.C. and Miranda Jr, H.C., 1997.	Not Listed

17	Psittacidae	*Prioniturus waterstradti malindangensis* Mearns, EA 1909	Mearns, E.A., 1909.		II	Not Listed
18	Psittaculidae	*Trichoglossus johnstoniae pistra* Rand & Rabor	Rand and Rabor,1957.		II	Not Listed
19	Phylloscopidae	*Phylloscopus nigrorum malindangensis* Mearns, EA 1909	Mearns, E.A., 1909.			Not Listed
20	Turdidae	*Turdus nigrorum malindangensis* (Mearns, EA 1907)	Peterson, A.T., 2007.			Not Listed
21	Zosteropidae	*Heleia goodfellowi malindangensis* (Mearns, EA 1909)	Mearn, 1909	Nueva Vista (Mansawan), Mt. Malindang		Not Listed
22	Camaenidae	*Amphidromus maculiferus malindangensis* Bartsch 1917	Bartsch 1917			Not Listed
23	Curculionidae	*Metapocyrtus malindangensis*	Cabras et al. 2021	Barangay Nueva Vista, Don Victoriano, Misamis Occidental		Not Listed
24	Elateridae	*Priopus malindangensis* Platia, 2020	Platia, 2020			Not Listed

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25	Heptageniidae	*Afronurus albentis* Batucan, Nuñeza, & Lin, 2016	Batucan, L.S., Nuñeza, O.M., Villanueva, R.J.T. and Lin, C.P., (2016)	Layawan river, Oroquieta City	Not Listed
26	Heptageniidae	*Afronurus ayayti* Batucan, Nuñeza, & Lin, 2016	Batucan, L.S., Nuñeza, O.M., Villanueva, R.J.T. and Lin, C.P., (2016)	Layawan river, Oroquieta City	Not Listed
27	Heptageniidae	*Afronurus butawensis* Batucan, Nuñeza, & Lin, 2016	Batucan, L.S., Nuñeza, O.M., Villanueva, R.J.T. and Lin, C.P., (2016)	Layawan river, Oroquieta City	Not Listed

28	Heptageniidae	*Afronurus pisay* Batucan, Nuñeza, & Lin, 2016	Batucan, L.S., Nuñeza, O.M., Villanueva, R.J.T. and Lin, C.P., (2016)	Layawan river, Oroquieta City	Not Listed
29	Heptageniidae	*Afronurus striatafemoris* Batucan, Nuñeza, & Lin, 2016	Batucan, L.S., Nuñeza, O.M., Villanueva, R.J.T. and Lin, C.P., (2016)	Layawan river, Oroquieta City	Not Listed
30	Heptageniidae	*Afronurus subanen* Batucan, Nuñeza, & Lin, 2016	Batucan, L.S., Nuñeza, O.M., Villanueva, R.J.T. and Lin, C.P., (2016)	Layawan river, Oroquieta City	Not Listed
31	Gryllidae	*Itara (Phormincter) Mindanao* Tan, Grumo, Gono & Bahoy, 2024	Tan et al 2024,	Barangay Lake Duminagat, Don Victoriano, Misamis Occidental	Not Listed
32	Megascolecidae	*Pheretima boniaoi* Aspe & James 2014	Aspe, N.M. and James,	Small Potongan, Concepcion,	Not Listed

			S.W., 2014. New species of	Misamis Occidental	
33	Megascolecidae	*Pheretima concepcionnensis* Aspe & James 2014	Aspe, N.M. and James, S.W., 2014.	Small Potongan, Concepcion, Misamis Occidental	Not Listed
34	Megascolecidae	*Pheretima edavai* Aspe & James 2014	Aspe, N.M. and James, S.W., 2014.	Small Potongan, Concepcion, Misamis Occidental	Not Listed
35	Megascolecidae	*Pheretima immanis* Aspe & James 2014	Aspe, N.M. and James, S.W., 2014.	Lake Duminagat, Don Victoriano, Misamis Occidental	Not Listed
36	Megascolecidae	*Pheretima lago* Aspe & James 2014	Aspe, N.M. and James, S.W., 2014. Zootaxa	Lake Duminagat,, Don Victoriano, Misamis Occidental	Not Listed
37	Megascolecidae	*Pheretima lluchi* Aspe & James 2014	Aspe, N.M. and James, S.W., 2014. *Zootaxa*,	Sebucal, Oroquieta City	Not Listed

38	Megascolecidae	*Pheretima longigula* Aspe & James 2014	Aspe, N.M. and James, S.W., 2014.. *Zootaxa*,	Lake Duminagat,Don Victoriano, Misamis Occidental	Not Listed
39	Megascolecidae	*Pheretima longiprostata* Aspe & James 2014	Aspe, N.M. and James, S.W., 2014. *Zootaxa*, *3881*(5), pp.401-439.	Small Potongan, Concepcion, Misamis Occidental	Not Listed
40	Megascolecidae	*Pheretima maculodorsalis* Aspe & James 2014	Aspe, N.M. and James, S.W., 2014. *Zootaxa*	Barangay Lake Duminagat,Don Victoriano, Misamis Occidental	Not Listed
41	Megascolecidae	*Pheretima malindangensis* Aspe & James 2014	Aspe, N.M. and James, S.W., 2014. *Zootaxa*, *3881*(5), pp.401-439.	Sebucal, Oroquieta City	Not Listed
42	Megascolecidae	*Pheretima misamisensis* Aspe & James 2014	Aspe, N.M. and James, S.W., 2014.	Sebucal, Oroquieta City	Not Listed

			Zootaxa, *3881*(5), pp.401-439.		
43	Megascolecidae	*Pheretima montanan* Aspe & James 2014	Aspe, N.M. and James, S.W., 2014. N. *Zootaxa*, *3881*(5), pp.401-439.	Lake Duminagat,Don Victoriano, Misamis Occidental	Not Listed
44	Megascolecidae	*Pheretima nolamin* Aspe & James 2014	Aspe, N.M. and James, S.W., 2014. *Zootaxa*, *3881*(5), pp.401-439.	Lake Duminagat,Don Victoriano, Misamis Occidental	Not Listed
45	Megascolecidae	*Pheretima nunezae* Aspe & James 2014	Aspe, N.M. and James, S.W., 2014.. *Zootaxa*, *3881*(5), pp.401-439.	Sebucal, Oroquieta City	Not Listed
46	Megascolecidae	*Pheretima potonganensis* Aspe & James 2014	Aspe, N.M. and James, S.W., 2014.. *Zootaxa*,	Small Potongan, Concepcion, Misamis Occidental	Not Listed

			3881(5), pp.401-439.		
47	Megascolecidae	*Pheretima subanensis* Aspe & James 2014	Aspe, N.M. and James, S.W., 2014. *Zootaxa*, *3881*(5), pp.401-439.	Sebucal, Oroquieta City	Not Listed
48	Megascolecidae	*Pheretima tigris* Aspe & James 2014	Aspe, N.M. and James, S.W., 2014. *Zootaxa*, *3881*(5), pp.401-439.	Lake Duminagat, Don Victoriano, Misamis Occidental	Not Listed
49	Megascolecidae	*Pheretima wati* Aspe & James 2014	Aspe, N.M. and James, S.W., 2014.. *Zootaxa*, *3881*(5), pp.401-439.	Sebucal, Oroquieta City,	Not Listed
50	Nymphaladae	*Parantica dannatti malindangensis* Yamamoto and Takei 1980	A Yamamoto, S Takei - Lepidoptera Science, (1980)	Mt. Guinlajan, Mt. Ulohan sa Dapitan, Malindang	Not Listed

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51	Nymphaladae	*Mycalesis ita imeldae* Aoki and Vemura,1982	Aoki and Vemura,1982	North Peak, Mt. Ulohan sa Dapitan, Old Liboron, Mt. Capole, Gandawan, Lake Duminagat, Sebucal	Not Listed
52	Pieridae	*Appias indra threadawayi* Schruder *1975*	Wolfgand and Settele,1995		Not Listed
53	Pieridae	*Appias phoebe mindana* subsp. nov.Yamamoto and Takei 1980	A Yamamoto, S Takei - Lepidoptera Science, (1980)		Not Listed
54	Pieridae	*Delias diaphana basilisae* Schuder and Threadaway 1983	Wolfgand and Settele. (1995)		Not Listed
55	Pieridae	*Delias schoenigi malindangeana* Nakanoand Yagshita 1993	Wolfgand and Settele, (1995)		Not Listed
56	Plecoptera	*Phanoperla constanspina* Dela Cruz, Nuñeza & Lin, 2016	Cruz, I.N.B.D., Nuñeza, O.M. and Lin, C.P., (2016)	Layawan River, Mt. Malindang	Not Listed

57	Riodinidae	*Dodona deodata malindangensis* Schruder and Threadawy 1988	Schruder and Threadawy, (1988)		Not Listed
58	Rhynchoribatidae	*Eurhynchoribates (Eurhynchoribates) misamisensis*	Miko, L., Ermilov, S.G. and Corpuz-Raros, L., 2017..		Not Listed
59	Scarabaeidae	*Holotrichia malindangensis* Matsumuto	Matsumoto Takeshi 2010.		Not Listed
60	Tricorythidae	*Sparsorythus buntawensis* Batucan Jr., Nuñeza, Villanueva & Lin, 2016	Batucan, L.S., Nuñeza, O.M., Villanueva, R.J.T. and Lin, C.P., (2016)	Layawan River, Buntawan , Oroquieta City	Not Listed

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Conclusion

MMRNP has recorded 60 endemic flora and fauna species at Mt. Malindang since 1900 up to 2024. These significant findings contribute to the park's rich biodiversity and conservation. However, their habitats are threatened by anthropogenic activities, climate change, and natural catastrophes. Hence, a call to action should be made among the PAMB, LGUs, and DENR to strengthen protection and law enforcement activities. It is recommended that further studies of the remaining unstudied mountain ranges be conducted to determine more site endemic flora and fauna species of the park. Finally, LGUs must adopt endemic species as a flagship species pursuant to RA 9147.

Acknowledgements

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