CHECKLIST OF WILD ORCHIDS ALONG MARAI PARAI TRAIL

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ABSTRACT

The term Marai Parai, in the Dusun language referring to a type of grass-like sedge known as *Tetraria pilisepala* (Steud.) Larridon. The area is located northwest of Mount Kinabalu in Sabah, Malaysia. This highland region has the potential to be developed as an eco-tourism location and as an alternative route to the summit of Mount Kinabalu. Several studies in this area have reported the discovery of an endemic species such as *Nepenthes rajah* Hook.f., *Drosera ultramafica* A.Fleischm., A.S.Rob. & S.McPherson. and *Dendrobium kinabaluensis* Ridl. Therefore, this study was conducted to survey the richness of orchid species that can be found along the way from Kiau Village to Marai Parai Plateau. The species were photographed, and their morphological characteristics were noted. A total of 51 species were recorded including one species that is new to sciences and in the process of description and verification. This data will be an additional checklist of orchid species from this alternative route. Results from this study is expected to serve as references and guidelines for future sustainable management plans for the Marai Parai route to the summit of Mount Kinabalu.

Keywords: *Endemic, Malaysia, Mount Kinabalu, Orchidaceae, Sabah,*

INTRODUCTION

The preliminary results of the orchid exploration at one of the most challenging routes of the Marai Parai are presented in this report. On October 7, 2023, Scientific Expedition of Marai-Parai-Gurkha Hut was carried out with the aim to collect scientific data in various fields to help build plans to develop a new climbing route to Mount Kinabalu. Marai Parai is a small plateau in the Northwest of Mount Kinabalu, and the first ascent of Mount Kinabalu through this route was recorded in 1983.

The area has been named 'Marai Parai' because of the resemblance of the common grass-like sedge (*Tetraria pilisepala*) that can be found in that area to the hill-paddy of the Dusun people called 'Parai'. While the term 'Marai Parai' refers to rice swaying in the breeze. The first visit to Marai Parai area was recorded in 1858 by Sir Hugh Low and Sir Spenser St. John. The current expedition is the six expeditions after 12 years from the last expedition in 2011 made by Antony van der Ent et al.

The sloping plateau of Marai Parai (1,652 m a.s.l) can be reached from Kiau Village (ca. 992 m a.s.l) and crosses several rivers; Sungai Tinokok, Sungai Tahubang and Sungai Kinotoki. The route will go through community farms, rubber tree plantation area, and GOMPITO forest reserved before reaching Sabah Park border to Marai Parai plateau. It will take one to two days to reached to the plateau.

Orchid is one of the fascinating species that resides in Mount Kinabalu range. The orchids exhibit incredible diversity in terms of size, colour and shape. Mount Kinabalu's diverse range of habitats, from lowland rainforests to alpine meadows, provides suitable conditions for many different orchid species to thrive. More interestingly, the Marai Parai area is categorized as an ultramafic habitat and housed many endemic species to Borneo. Thus, it is not surprising if there is always new species being discovered every time an exploration is conducted in an ultramafic area.

Ultramafic area supports unique and specialized flora, including orchids. More than 200 orchids species were found in ultramafic area and many of which are endemic to Sabah (Wood et al., 2011; van der Ent et al., 2014). These orchids have adapted to the high concentrations of heavy metals in the soil through a variety of mechanisms, such as developing specialized root systems or forming symbiotic relationships with fungi (McCormick et al., 2018). Their unique adaptation and remarkable adaptation in a challenging environment emphasize the importance of conserving orchid species in this type of habitat.

Therefore, the survey conducted for this study is to evaluate the diversity of orchid species in this area and the potential of the area for eco-tourism activities. With the data presented here, it is hoped to help management plan to ensure the sustainability of the area from losing biodiversity.

METHODOLOGY

The species annotated was made from the starting point at 992 m a.s.l to Marai Parai plateau at 1,652 m a.s.l. The annotated work begins on October 8th, 2023, and ended on September 13th, 2023. It was rainy seasons at the time of the expedition. Species were photographs and their morphological characters were noted in the fieldnote book for later identifications. Species identification was referred to the established species taxonomy key, published book or journal and confirmation was sought from expert advice. The accepted name was verified from Plant of the World Online (POWO) by Royal Botanic Gardens KEW. For new species identification, voucher specimens were prepared according to Md.-Isa et al. (2023) and deposited in Kinabalu Park Herbarium.

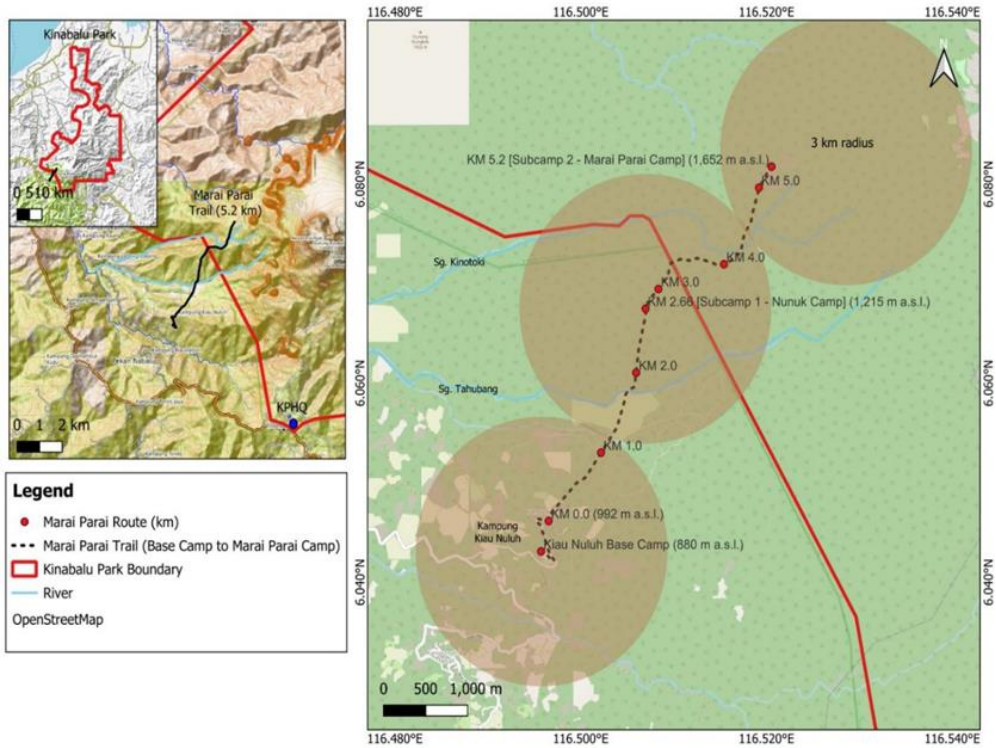

Figure 1. Map of Marai Parai Route

RESULTS

Table 1 shown list of 51 species that were recorded along the route to Marai Parai plateau area. One species is suspected to be new to science and in the process of description and verification (Plate 3). Plate 1 and Plate 2 shown some species that were flowering during the expedition. Identified species were categorized into their respective subfamilies; Apostasioideae, Cypripedioideae, Epidendroideae and Orchidoideae. No species from Vanilloideae were managed to be seen during the expedition. Orchids that could not be identified until their species level were label as sp.

Table 1. List of species along the trail starting from Kiau Nulu to Marai Parai Plateu.

Orchid Species (Kiau Nulu → Marai Parai Plateau)		
Subfamily	Genus	*Species*
Apostasioideae	*Apostasia*	*nuda*
Orchidoideae	*Anoectochilus*	sp.
	Corybus	*pictus*
	Cystorchis	*aphylla*
	Goodyera	*rostellata*
	Platanthera	*kinabaluensis*
	Platanthera	*stapfii*
	Peristylus	*hallieri*
	sp. nov. **	
Cypripedioideae	*Paphiopedilum*	*dayanum* *
Epidendroideae	*Aeridostachya*	*robusta*
	Agrostophyllum	sp.
	Aphyllorchis	sp.
	Appendicula	*anceps*
	Appendicula	sp.
	Arachnis	*calcarata*
	Arundina	*graminifolia*
	Bromheadia	*divaricata*
	Bulbophyllum	*unguiculatum*
	Bulbophyllum	*pocilum*
	Bulbophyllum	*mutabile*
	Calanthe	*lyroglossa*
	Coelogyne	*kinabaluensis*

	Coelogyne	*cuprea var planiscapa*
	Coelogyne	*rupicola*
	Crepidium	*kinabaluense*
	Crepidium	sp.
	Cymbidium	sp.
	Dendrobium	cf. *cymbulipes*
	Dendrobium	*tetrachromum*
	Dendrobium	*patentilobum*
	Dendrobium	*parthenium*
	Dendrobium	*lambii*
	Dendrobium	sp.
	Dendrochilum	*planiscapum*
	Dendrochilum	*corrugatum*
	Dendrochilum	*longifolium*
	Dipodium	sp.
	Dilochia	*cantleyi*
	Epigeneium	*kinabaluense*
	Liparis	*viridicallus*
	Liparis	*nervosa*
	Liparis	sp.
	Malaxis	sp.
	Pholidota	sp.
	Pinalia	sp.
	Podochilus	*microphyllus*
	Spathoglottis	*kimbiliana*
	Spathoglottis	*microchillina*
	Thrixspermum	sp.
	Trichotosia	*microphylla*

Note: * = Critically Endangered; ** = new species in the process of description and verification

DISCUSSION AND CONCLUSION

Marai Parai route promising a breathtaking journey with their magnificent and glorious species of orchid. The number of species recorded in this study is only a reflection of the overall undiscovered richness of orchid in this area. Due to the challenging terrain of route, unpredictable weather and limited

survey time, some areas could not be surveyed. From the short period of expedition, it is estimated that more new species can be found in this area.

Thirteen genus that could not be identified to their respective species were not flowering at the time of expedition. It is hard to recognized species of orchid that have similar vegetative structure in their entire genera such as *Bulbophyllum, Coelogyne, Dendrobium,* and *Thrixspermum* without their flower structure. A common practice by taxonomist or botanist is to plant an unidentified species in the greenhouse (with license) until flowering for identification process. However, during this study no living specimens were taken to prevent the species from dying when brought down from their natural habitat. The chances for the species to survive outside their natural habitat is considered low because the humid temperature differences can be one of the causes of the species not being able to survive. This can lead to loss of biodiversity if it is the only species or living specimens alive in that area.

Studying orchids in Marai Parai area which is known as one of ultramafic area in Sabah can contribute to a better understanding of the overall biodiversity of the region. Identifying and protecting orchid species in this type of environments may contribute to the overall conservation efforts within the Kinabalu Park. For conservation purposes, it is important to pay attention to the presence of the critically endangered species *Paphiopedilum dayanum*, even though the global extinction risk status of the majority of the species found in this study has not yet been determined. Their unique adaptation and ecological importance emphasize the importance of conserving these fragile ecosystems and the rich orchid diversity they harbour.

The opening of a new route through Marai Parai to the summit of Mount Kinabalu may threaten the orchid species on the route. However, with a sustainable management planning as a guideline could lower the impact to the biodiversity and at the same time conserve the ecosystems. Numbers of hikers who will use the route should be minimized at any given time. Strict regulations should be imposed to protect the species from illegal poaching and being taken out without a license. The path to be used by the hikers should be away from locations that have endemic or rare orchid species to avoid those species being trampled or collected illegally.

With a very short period of survey, we believe more endemic, rare, and new species can be found in this route and need to be recorded and protected before they vanish due to anthropogenic activities, natural disaster or climate change.

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APPENDIXES

Plate 1.

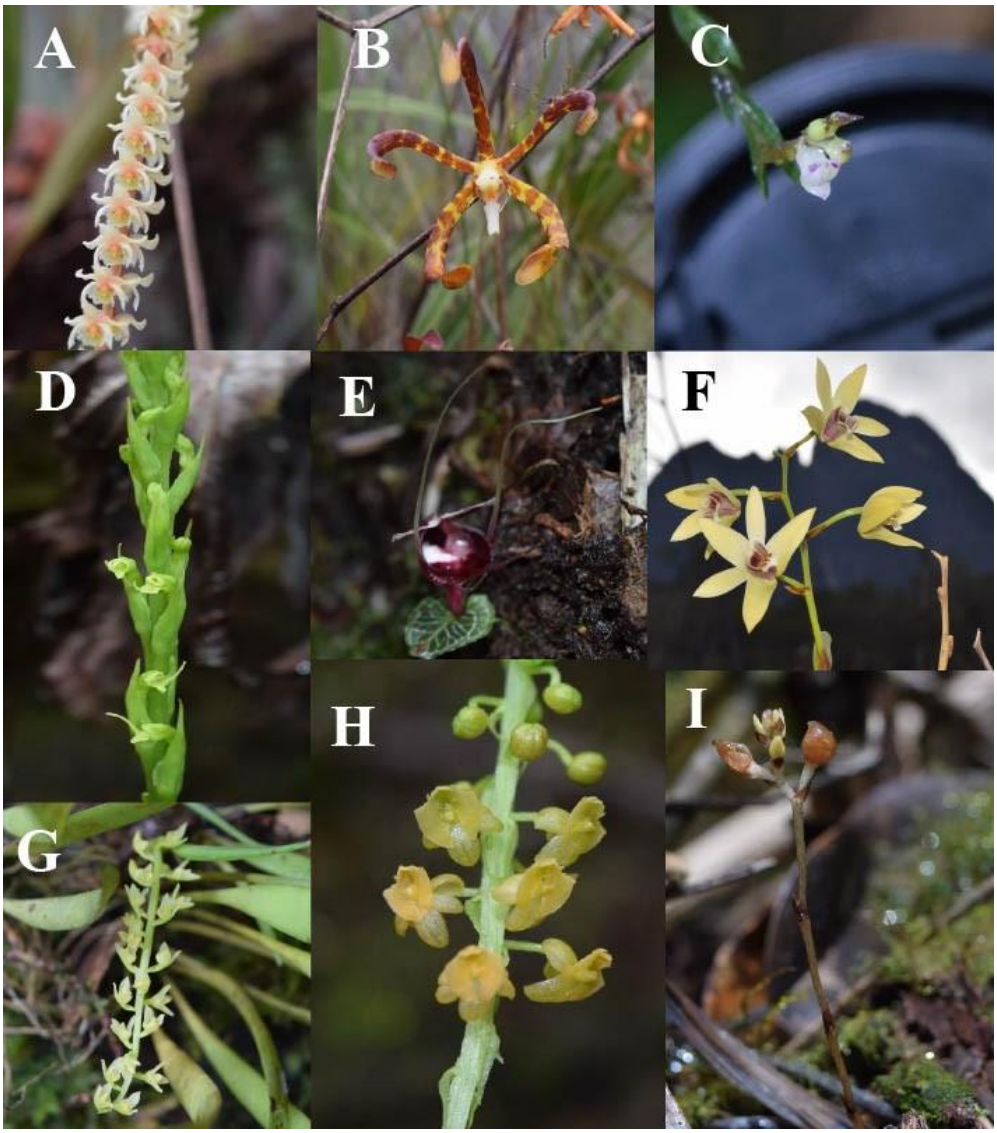

Plate 2.

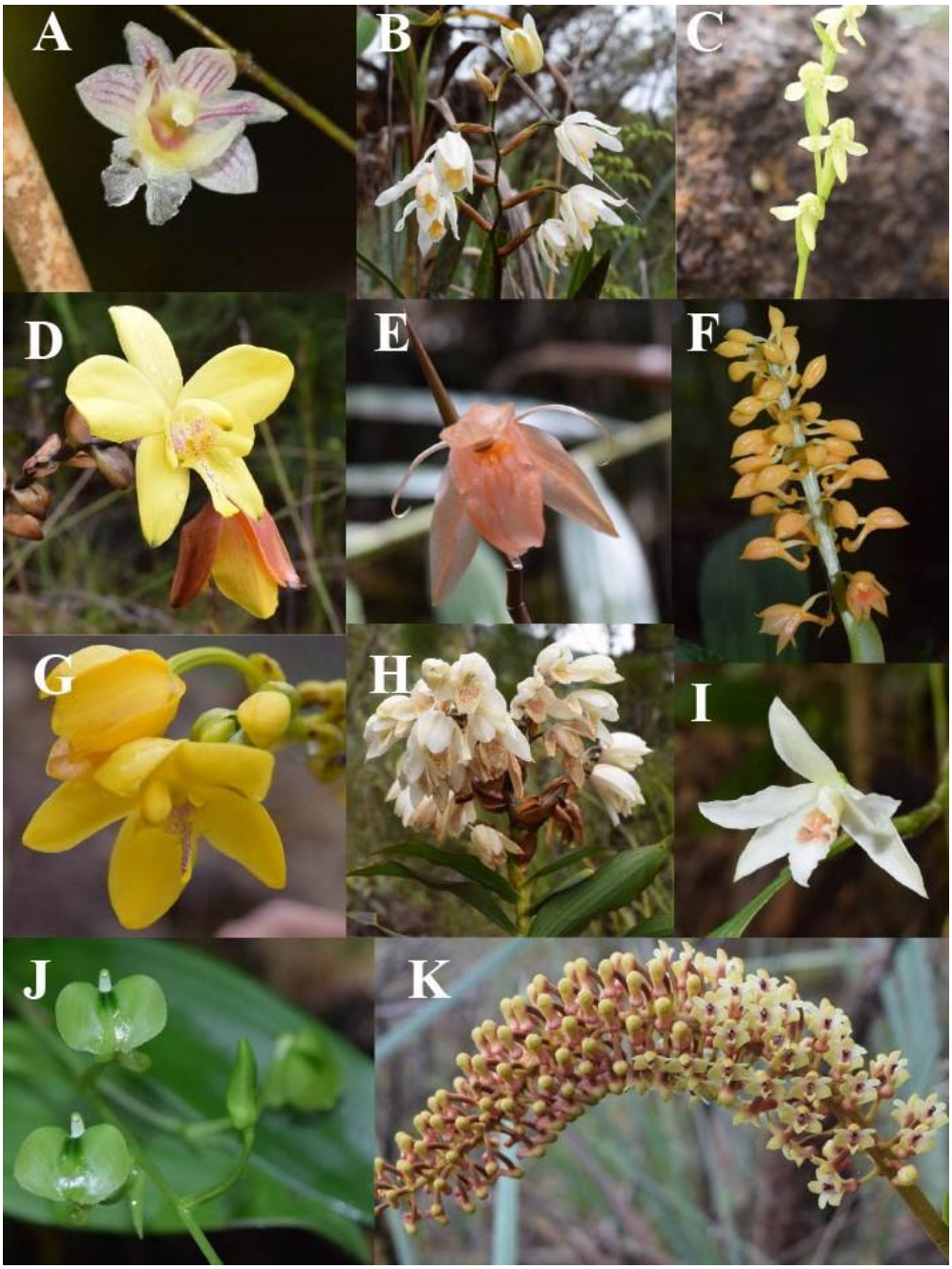

Plate 3.

New species in the process of description and verification.

List of Species:

Plate 1

A. *Dendrochilum corrugatum* (Ridl.) J.J.Sm.
B. *Arachnis calcarata* Holttum
C. *Podochilus microphyllus* Lindl.
D. *Peristylus hallieri* J.J.Sm.
E. *Corybas pictus* (Blume) Rchb. f.
F. *Dendrobium kinabaluense* Ridl.
G. *Bulbophyllum unguiculatum* Rchb.f.
H. *Crepidium kinabaluense* (Rolfe) Szlach

Plate 2

A. *Dendrobium patentilobum* Ames & C. Schweinf.
B. *Coelogyne rupicola* Carr.
C. *Platanthera stapfii* Kraenzl. ex Rolfe.
D. *Spathoglottis kimballiana* Hook. f.
E. *Coelogyne kinabaluensis*
F. *Calanthe lyroglossa* Rchb. f.
G. *Spathoglottis microchilina* Kraenzl.
H. *Dilochia cantleyi* (Hook.f.) Ridl.
I. *Dendrobium tetrachromum* Rchb.f.
J. *Liparis halconensis* (Ames) Ames
K. *Aeridostachya robusta* (Blume) Brieger