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Short Communication: Inventory of native orchids in Makki Sub-District, Lanny Jaya, Papua, Indonesia

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Abstract. *Agustini V, Zebua L, Wenda N. 2016. Inventory of native orchids in Makki Sub-District, Lanny Jaya, Papua, Indonesia. Biodiversitas 17: 301-305.* Orchids have been over exploitation since years ago. Some of orchids species are becoming threatened, endangered or even vanished that which may have not been found or discovered. Lanny Jaya, Papua, Indonesia is a new district located at latitude 03°57'08" S and longitude 138°25'05.02" E, covers an area of 2.248 km^2. The establishment of this new district gives impact to the plant habitat including orchids. The study was done in Makki Sub-District, Lanny Jaya, Papua, Indonesia. The present study is an inventory orchid species in Lanny Jaya by explorative method. There were 22 species (17 genera) consist of epiphytic, terrestrial and lithophytic orchids. Among them *Dendrobium subclausum* is the most abundance species in this area. With the combination of bright orange and yellow colors in sepal it can be seen throughout the year.

Keywords: Inventory, Lanny Jaya, orchids, Papua

INTRODUCTION

The Orchidaceae is one of the largest and most diverse families of flowering plants, consists 20,000-35,000 species which together occupy almost every kind of habitat on land New Guinea. Many orchids are terrestrials but most species are epiphytes that perch on, or hang suspended from, the trunks, branches and twigs of trees, mostly in tropical rainforests (Dressler 1981, 1993). Many epiphytes also grow on rocks while some plants grow in exclusively on them namely lithophytes or epilith. More than 70% of all orchid species are epiphytic (Gravendeel et al. 2004).

Papua occupies the western half of the island of New Guinea. It is divided administratively between the country of Papua New Guinea and the Indonesian Province of Papua. Papua New Guinea is a wonderful for orchids since it has many variations in climate and habitats from dry savanna and grasslands to high mist and moss forests, from lush wet coast to small orchid-covered islands encircled by reefs. Each distinct area has own types of orchids (Millar 1978). New Guinea is one of the richest places for orchids with up to 3500 species in 120-130 genera (O'Byrne 1994).

Lanny Jaya is a new district since 2008, formerly it is part of Jayawijaya district. This 2.248 km^2 area with around 1500-3000 m altitude, temperature 14-24^{0}C with rainfall 1900-2000 mm and also great variation of habitat like rainforest and tropical savanna woodlands is a suitable place for orchids. Lanny Jaya is divided into ten districts. Makki Sub-District is the biggest one which covers 150 km^2 areas. In wild most orchids live as epiphytes in the forest trees. A new administrative area, like Makki Sub-District has to build many public facilities such as road, government building and economic issues. These human activities will destroy the forest; the host plants of epiphyte orchids will be lost fast. The establishment for sure gives adverse impact to the orchids.

Study in some places like Pegunungan Bintang and Jayawijaya regencies shown that orchids population becoming extinct due to the rapid destruction of the remaining forest. Information about the orchids of Papua including this area is currently scattered in a small number of publications, and rather difficult to obtain in Indonesia especially in Papua (Lugrayasa 2004; Ungirwalu 2007; Agustini et al. 2012; Agustini et al. 2013; Agustini et al. 2015). The aim of this work is to inventory orchid's species in Makki Sub-District, Lanny Jaya, Papua, Indonesia through field exploration. This research intend to provide a basic tools to residents of the district to assist them recognizing and identifying the local orchids in the wild. And also make local people aware of the treasures that are still living in their forest so it will stimulate them in trying to preserve this forest.

MATERIALS AND METHODS

Study site

Lanny Jaya is a new district located at latitude 03^{0}57' 08''S and longitude 138 ^{0} 25'05,02'' E, which covers an area of 2.248 km^2. The study was conducted in Kemiri Kampong (150 km^2) Makki Sub-District, Papua, Indonesia which covers around 6,7% of total area of Lanny Jaya (Figures 1 and 2). The Kampong is the biggest one among the others nine. The study was done from April to September 2014. Some species which not identified were collected and grown in the green house for further identification.

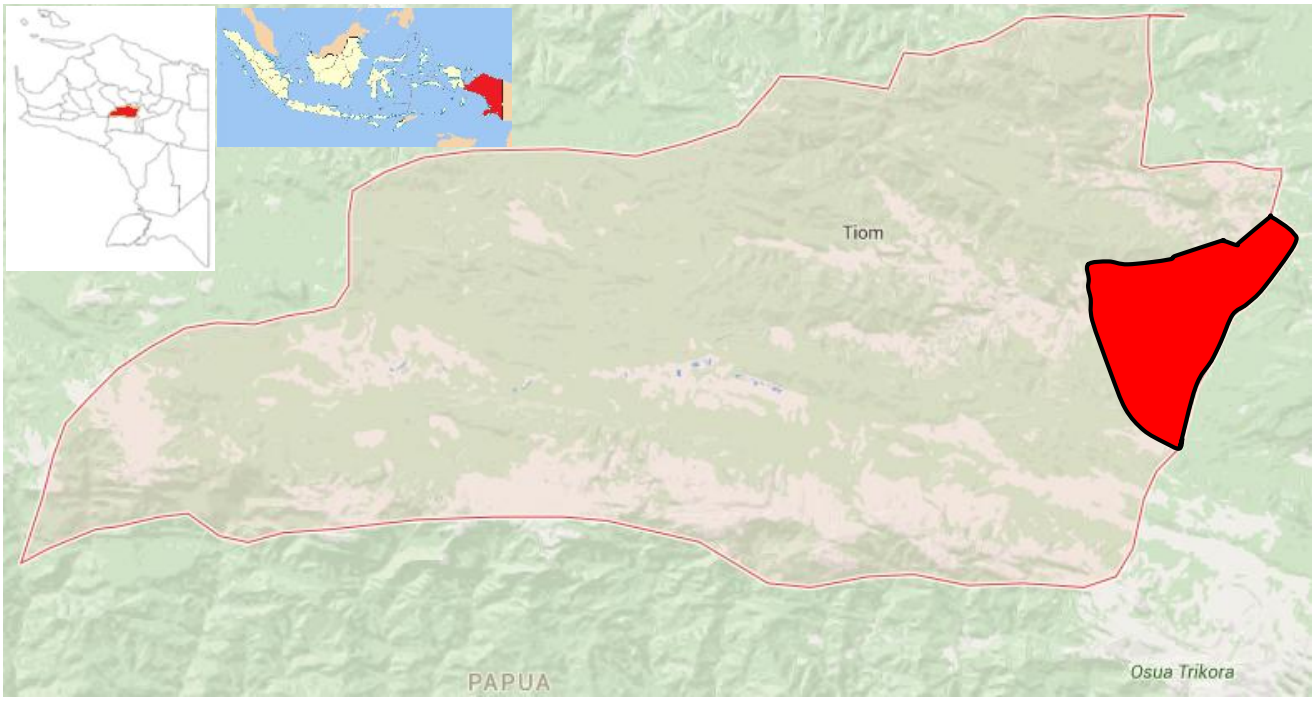

Figure 1. Location of Makki Sub-District, Lanny Jaya District, Papua, Indonesia

Figure 2. In the Makki forest where orchids can be found everywhere along aside the creek.

Procedures and data analysis

In order to assess the orchid flora, a good number of field explorations were made throughout the Makki Sub-District. If a species could not be immediately identified, either a photo was taken or a specimen was collected to facilitate later identification. For herbarium specimens one or two portions of the live plants were collected. For each species encountered, field notes were taken along with the voucher specimen following the standard technique (Jain and Rao 1977). The samples collections have been critically studied after their flowering. Live collections of different species also were grown and maintained in the net house of Biology Department, Faculty of Mathematics and Natural Sciences, Cenderawasih University, Jayapura, Papua, Indonesia for future molecular work.

Identification of the orchids was using literatures from Millar (1978), O'Byrne (1994), Schuiteman (1995), and Schuiteman and de Vogel (2002-2010).

RESULTS AND DISCUSSION

Results

The district is characterized by highly humid atmosphere around 80%, and abound rains with excessive wetness, and low temperature 14^{o}C minimum and 27^{o}C maximum which is responsible for the development of tropical rain forest. There are 22 taxa of orchids belonging to 22 species in 17 genera in Kemiri Kampong, Makki Sub-District. Of these 18 species are epiphytic, 3 species terrestrial, and 1 species lithophytic. (Table 1, Figure 3). Among those, *Dendrobium* is still the richest genus followed by *Bulbophyllum*. *Dendrobium* also found dominant in other parts of lowland and highland of Papua (Agustini et al. 2013; 2015) and New Guinea in general (Millar 1978).


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Figure 3. Some flowers orchids of Makki Sub-District, Lanny Jaya District: A. *Arachnis flos-aeris* (L) Rchb.f.., B. *Bulbophyllum alticola* Schltr., C. *Calanthe rhodochylla* Schltr., D. *Bulbophyllum brachypetala* J.J.Sm. E. *Dendrobium subclausum* Rolfe., F. *D. brassii* T.M.Reeve & P.Woods., G. *D. erosum* (Blume) Lindl., H. *Mediocalcar bifolium* J.J.Sm., I. *Phaius tankervilleae* (Banks ex L'Herit) BL, J. *Diplocaulobium tipula* (J.J.Sm) Krzl., K. *Liparis* sp., L. *Epiblastus basalis* Schltr.

Table 1. List of species of Makki Sub-District, Lanny Jaya District, Papua, Indonesia

Genus	Species	Habit
Agrosthophyllum	*Agrosthophyllum* sp.	Epiphyte
Arachnis	*Arachnis flos-aeris* (L) Rchb.f.	Epiphyte
Bulbolphyllum	*Bulbolphyllum brachypetala* J.J.Sm.	Epiphyte
	Bulbophyllum alticola Schltr	Epiphyte
Calanthe	*Calanthe rhodochylla* Schltr	Terrestrial
Coelogyne	*Coelogyne asperata* Lindl	Epiphyte
Dendrobium	*Dendrobium finisterrae* Schltr	Epiphyte
	Dendrobium subclausum Rolfe	Epiphyte
	Dendrobium erosum (Blume) Lindl.	Epiphyte
	Dendrobium brassii T.M.Reeve & P.Wood	Epiphyte
Dendrochilum	*Dendrochilum longifolium* Rchb.f.	Epiphyte
Diplocaulobium	*Diplocaulobium tipula* (J.J.Sm) Krzl.	Epiphyte
Dockrillia	*Dockrillia* sp.	Epiphyte
Epiblastus	*Epiblastus basalis* Schltr	Terrestrial
Eria	*Eria* sp.	Epiphyte
Glomera	*Glomera compressa* J.J.Sm.	Epiphyte
Liparis	*Liparis* sp.	Lithophyte
Mediocalcar	*Mediocalcar bifolium* J.J.Sm.	Epiphyte
	Mediocalcar arfakense J.J.Sm.	Epiphyte
Oberonia	*Oberonia* sp.	Epiphyte
Phaius	*Phaius tankervilleae* (Banks ex L'Herit) Bl	Terrestrial
Robiquetia	*Robiquetia mooreana* (Rolfe) J.J.Sm.	Epiphyte

Discussion

It is now well known that biodiversity is being lost globally at a rate that is faster than at any previous time in history (Heywood and Watson 1995). In general Papua region is in a bit better position than most other places in Indonesia, large scale logging and agriculture including palm oil cultivation started relatively late, and so Papua still has vast amounts of untouched forest. It is good for orchids in wild, but no doubt that the situation will be changed soon since the development many new regencies last decade and still continue up to now. The situation is much worse for orchid species partly because most of them only survive in certain habitats Therefore, most orchid species are now considered to be at risk of extinction as a result, directly and indirectly, of human activities, and almost all of them are included in conservation lists.

These days numerous orchids species in Papua are being rare in wild land threatened with extinction because of degradation or even total destruction of their habitats. Its happened also in Cycloops Nature Reserve on terrestrial orchids status (Lugrayasa 2004; Agustini et al. 2008). The problem is particularly acute in region with a high orchids diversity like Papua, especially when pressure from collectors aggravates the problems.

In the case of the highland area of Papua, the establishment of new regencies and districts was done so fast which even worse that might faced by diversity of orchid species. More over, reducing some of the important tree species in the "reserve" forest which served as ideal habitat of orchids also happened now days, namely *Pandanus, Casuarina*, willo, kote and gii (local names).

Some genera are not to everybody's taste but these are important for the ecology and the botanic point of view. These species must have caused quite a stir among orchid botanist but the fact is that they all perished fairly quickly. So the laboratory in Biology Department, Cenderawasih University is focusing on developing the protocol for propagation of orchid species. This technique will help in conserving the rare species which are at the outmost threat for survivality.

In this investigation 17 genera and 22 orchid species were collected from Makki Sub-District, Lanny Jaya District in 6 months. Among them, which species and genera are becoming scarce and require special protections are difficult to tell. *Dendrobium*, 32 species, and *Bulbophyllum*, 10 species, are the two bigger species found in the study site. Some genera possess no horticultural value; some are high sough after by dealers and collectors but may be equally at risk because of exacting habitat requirements.

Some of the orchids can easily be found throughout Papua New Guinea island either high or low land. Furthermore, others can only be seen in high montane at an elevation 1200 m above sea level (asl.) and more. One species namely *Dendrobium subclausum* Rolfe is the most abundance species, not only in this study area but also in Habema, Jayawijaya at an elevation 3000 m asl. Although it can be locally abundant, if the habitat severely fragmented, it is undergoing a population decline for sure. There are no *D. subclausum* Rolfe in lowland areas. (Agustini et al. 2013; Panal et al. 2015).

Other species such as *Coelogyne asperata* Lindl, *Phaius tankervilleae* (Banks ex L'Herit) Bl. and others *Dendrobium* found in lowland area of Papua (Agustini et al. 2013). Among them *C. asperata* can be seen growing in almost all area in Indonesia (GBIF 2011), but become rare especially in Java and Sumatra due to forest fragmentation. *Robiquetia mooreana* (Rofle) J.J.Sm. is a species which distributed in Papua, Papua New Guinea and Solomon Islands. Study in population dynamics of some orchids *Dendrobium sinense* Tang & F.T. Wang (Hu et al. 2015), *Paphiopedilum appletonianum* (Gower) Rolfe (Chen et al. 2009) and *Phalaenopsis pulcherrima* (Lindl) J.J.Sm. (Hu et al. 2015) indicated that population of wild orchids were experiencing a rapid decline.

According to the list compiled by the International Union for Conservation of Nature (IUCN), loss of habitats

like forest clearance for palm oil, farmland, cites, roads was the main cause of the rise of declining wild species including epiphytic orchids (Vrbek and Fiedler 1998; Riofrío et al. 2007; Yoder et al. 2010; de Moraes et al. 2015) and terrestrial (Yoder et al. 2010). The changing of size, shape, geographic isolation, and habitat condition may influence both structure and population of orchids in certain area. Furthermore fragmentation also threatens epiphytic orchids due to loss of pollinators, increased risk of desiccation and fire, and plants invasion.

There are still numerous undiscovered and unexplained patterns in the distribution of wild orchids in Lanny Jaya. The number of recorded species will almost certainly increase, with additional research and the opening up of many still inaccessible locations (Agustini et al. 2013). Recently, more work in orchids identification was done by molecular technique (Hidayat et al. 2013; Mytnik-Ejsmont et al. 2015; Deng et al. 2015; Ponert et al. 2016). The technique will help taxonomist to overcome the limitation of classical identification and to unsolved taxonomic problem both at species and genus levels such as genus *Hederorkis* (Mytnik-Ejsmont et al. 2015), *Polystachya* (Peraza-Flores et al. 2011), or genus into the subtribes (Ponert et al. 2016).

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