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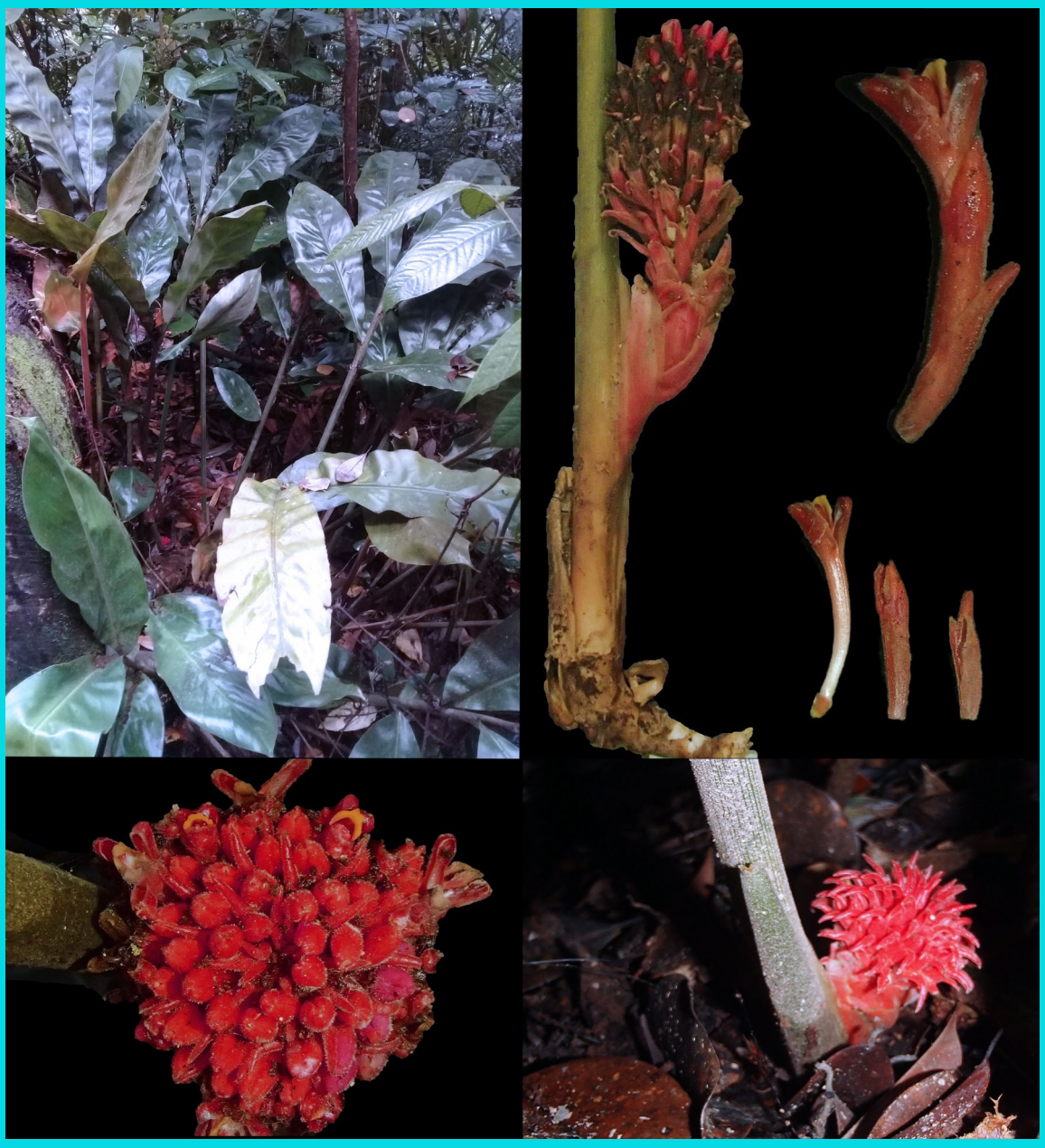

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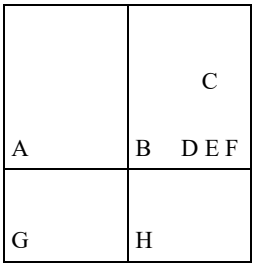

Cover images: *Plagiostachys strobilifera* var. *conica* Salasiah & Meekiong. A. Habit. B. Inflorescence, lateral view. C. Whole flower, lateral view. D. Flower with calyx removed. E. Calyx. F. Bracteole. G. Inflorescence, aerial view. H. Young inflorescence. A–G. *Salasiah 0003*; *H. Salasiah et al. 0014*. Photos by Salasiah Mohamad.

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THE NANTU *PLATYCERIUM GRANDE* (POLYPODIACEAE), A NEW GENERIC RECORD OF *PLATYCERIUM* IN SULAWESI, INDONESIA

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ABSTRACT
DARNAEDI, D. & CLAYTON, L. 2020. The Nantu *Platycerium grande* (Polypodiaceae), a new generic record of *Platycerium* in Sulawesi, Indonesia. *Reinwardtia* 19(2): 81–85. — *Platycerium grande* (Fée) Kunze was discovered for the first time in Indonesia at the Nantu Forest, Gorontalo Province, Sulawesi. In this paper we document this discovery by providing a description and illustration of this species, as well as some brief ecological notes. Furthermore this is a new generic record of *Platycerium* in Sulawesi, Indonesia.

Key words: Ecology, Nantu forest, new record, *Platycerium grande* (Fée) Kunze, Polypodiaceae, Sulawesi, taxonomy.

ABSTRAK
DARNAEDI, D. & CLAYTON, L. 2020. *Platycerium grande* (Polypodiaceae), dari Nantu, sebuah rekaman baru marga *Platycerium* di Sulawesi, Indonesia. *Reinwardtia* 19(2): 81–85. — *Platycerium grande* (Fée) Kunze untuk pertama kali ditemukan di hutan Nantu, Provinsi Gorontalo, Sulawesi. Dalam tulisan ini disajikan pertelaan dan gambar beserta catatan lengkap ekologi lapangan dari *P. grande*. Temuan ini juga merupakan rekaman baru marga *Platycerium* untuk Sulawesi, Indonesia.

Kata kunci: Ekologi, hutan Nantu, *Platycerium grande* (Fée) Kunze, Polypodiaceae, rekaman baru, Sulawesi, taksonomi.

INTRODUCTION

Platycerium is one of the few pantropical epiphytic fern genera belonging to Polypodiaceae. Hennipman & Roos (1982) in their Monograph described 15 species of *Platycerium* worldwide, six of which are confined to the Asian-Malesian region. These are *Platycerium bifurcatum* (T.Moore) Hennipman & M.C.Roos, *P. coronarium* (D.Koenig ex O.F.Müll.) Desv., *P. ridleyi* Christ, *P. holtumii* de Jonch. & Hennipman, *P. wandae* Racib. and *P. grande* (Fée) Kunze, with the last species distributed only in the Philippines. *Platycerium grande* is generally understood to be connected with the well-known Australian name, *viz*. *P. superbum* de Jonch. & Hennipman, but the name is nomenclaturally linked to material from the Philippines (De Joncheere & Hennipman, 1970). The two species are different but the Philippines specimens present in large herbaria are of very poor quality. The type specimen of *P. grande* deposited in BM comprises only one complete fertile leaf, without sterile leaves or habitat information. Two young plants from a local nursery in Cebu, reportedly collected from the wild in Davao, were sent to Kew and Leiden in 1975. Hennipman *et al.* (1979) discussed the systematic position of this species based on a living collection in Leiden Botanic Gardens.

MATERIALS AND METHODS

Material for this study was collected during botanical explorations in the Nantu forest, Gorontalo, at 00°47’00” – 00°56’00”N and 122°08’00” – 122°37’00”E, with *Herbarium Bogoriense* (BO) – LIPI staffs and Universitas Nasional Jakarta students in 2014, 2015 and 2019. The morphology and growth characters were described based on field data as well as living collections cultivated in Bogor Botanic Gardens, Purwodadi Botanic Garden and a private Bogor garden. Habitat notes were recorded during observation in three different sites, two populations in the Nantu Wildlife Sanctuary and one population in the adjacent East Nantu Production Forest.

RESULTS AND DISCUSSION

Taxonomy

Platycerium grande (Fée) Kunze, Linnaea 23: 474 (1850); [J. Sm., J. Bot. (Hook.) 3: 402 (1841), nom. nud.]; C. Presl, Epim. Bot. 154 (1851); Hook, Gard. Chron. (1858) 764; Spec. Fil. 5 (1864) 284; J. Sm., Ferns Brit. & For. 121 (1866); Baker, Syn. Fil. (1868) 425; Benth, Fl. Austral. 7 (1878) 781; F. M. Bailey. Fernw. Austral. (1881) 74; Syn. Queensl. Fl. (1883) 724; Bedd. Suppl. Ferns Brit. India 445 (1892); F. M. Bailey. Queensl. Fl. 6 (1881) 1995; Racib. Pterid. Buitenzorg 57 (1898); Copel. Polypod. Philipp. 138 (1905); Aldrev., Malayan Ferns 708 (1908); Copel. Leafl. Philipp. Bot. 3: 850 (1910); Domin, Bibl. Bot. 85: 198 (1915); Ridl. J. Malay Br. Roy. As. Soc. 109 (1926); Tardieu & C. Chr. In Fl. Indo-Chine 446 (1941); Copel. Fern Fl. Philipp. 458 (1960); Tindale, Contr. N. S. W. Nat. Herb. Flora Ser. 208-21 (1961) 28; Joe, Baileya 12: 91 (1964); De Jonch. & Hennipman, Brit. Fern Gaz. 10: 113, pl. 9 (1970); Joe Hoshizaki, Amer. Fern J. 60: pl. 18: 5, 8, pl. 19: 28 (1970); Joe Hoshizaki, Biotropica 4 (2): 95, pl. 2: 15, pl. 4: 14, pl. 6:19, pl. 7: 15, pl. 8: 15 (1972); Hennipman *et. al.* Fern Gaz. 12: 47, f. 1, 2 (1979); Hennipman & Roos, Monogr. *Platycerium* 99, f. 24, 25, pl. 7a, 8a (1982); Zamora & Co, Guide Philipp. Flora & Fauna II, 1: 156 (1986); Joe Hoshizaki & Price, Amer. Fern J. 80: 65 (1990); Hennipman & Roos, *Platycerium.* Fl. Malesiana II (3): 139 (1998);

----- *Neuroplatyceros grandis* Fée, Mem. Foug. 2. Acrost. 103 (1845);
----- *Alcicornium grande* Underw., Bull. Torrey Bot. Club 32: 594 (1905);
----- *Platycerium grande* Kunze var. *normale*, Domin Bibl. Bot. 85: 200 (1915);
----- Type: *Cuming* 157, Philippines, Luzon, Mt. San Cristobal (BM).

Rhizome: short but massive, densely covered by scales. *Rhizome scales* basifixed, 12.5–25 by 2–5.0 mm, index 3.5-8, widest near the base, margin with hairs up to 1 mm long, apex acute, midrib absent. *Fronds:* base fronds sessile, green, recurring when old, 80–110 by 90–180 cm, lower part with sinuous margin, upper part spreading, 3-5 × forked equally, basal fringe conspicuous, forming a huge basket. Foliage fronds maturing in pairs, symmetrical, 50–230 cm long, with 2 equally-long main lobes, each with a wide, horizontal soral patch and two lateral, pendulous, 3-7 forked lobes. Hairs with 8-13 rays up to 0.25 mm long. *Soral patch* semicircular 7–55 by 2–40 cm, upward in the end, mature earlier, gradually getting brownish in colour and dry. Sporangia with (15-) 17-22 (-24) indurated annulus cells. Spore 64 per sporangium.

Specimens examined. Cultivated in Bogor Botanic Gardens, from material collected in the wild (Nantu Wildlife Sanctuary, Gorontalo Province, Sulawesi, Indonesia), 6 December 2014, *Darnaedi, Clayton and Ardiyani Dar. 2014-392* (BO); cultivated in Purwodadi Botanic Garden; cultivated in a Bogor private garden, December 2015, *Darnaedi Dar. 2015-400*.

Distribution. Philippines: Mindanao, Ticao ?, Luzon, Mt San Cristobal. Indonesia: Sulawesi, Gorontalo, Nantu Wildlife Sanctuary and East Nantu Production Forest, at 300–400 m alt.

Ecology. Previous ecological and habitat information of this species is extremely scarce. The first description by De Joncheere & Hennipman (1970) noted only that the plant was epiphytic and solitarily in crowns of trees (Hennipman & Roos, 1982 & 1998). In our first botanical exploration at the Nantu forest (2014) we observed *P. grande* plants growing epiphytically and solitarily, pendulously hanging at the first and second branches of the crown of huge trees, about 20–30 m above the forest floor. This was growing well on the ridge of a rather exposed humid forest on a small hill, and also on a huge bayur tree (*Pterospermum* sp.) in a valley of deep pristine forest (Fig. 1). During our three explorations a total of more than 10 individuals were observed in three different populations, two populations discovered in protected forest at the Nantu Wildlife Sanctuary, and another population in pristine forest currently classified as Production Forest.

Conservation Status. Reported to be extinct in Luzon, Mt. San Cristobal by Zamora & Co (Hoshizaki & Price, 1990; Hennipman & Roos, 1998). In Indonesia, Sulawesi: One local person had collected a specimen from the forest as an ornamental plant. Not available in any nursery or local market. Currently it is only found in Nantu Wildlife Sanctuary with population size <50. We propose the conservation status according to IUCN as Critically Endangered D.

NOTES AND RECOMMENDATION

The plants collected in the Nantu Wildlife Sanctuary forest are the impressive giant staghorn fern *Platycerium grande* closely related to *P. holtumii* in Thailand-Indochina, *P. wandae* in Papua New Guinea and *P. superbum* in Australia. These four species grow scattered at different locations and are never sympatric, thus our collection is a new discovery from the Nantu forest, Gorontalo, Sulawesi. It is also a new record of the fern genus *Platycerium* in Sulawesi (Fig. 2).

Fig. 1. *Platycerium grande* (Fée) Kunze, hanging on the crown of a huge tree on a hilly ridge hill in deep pristine forest in the Nantu forest, Gorontalo, Sulawesi, Indonesia. Photos by D. Darnaedi.

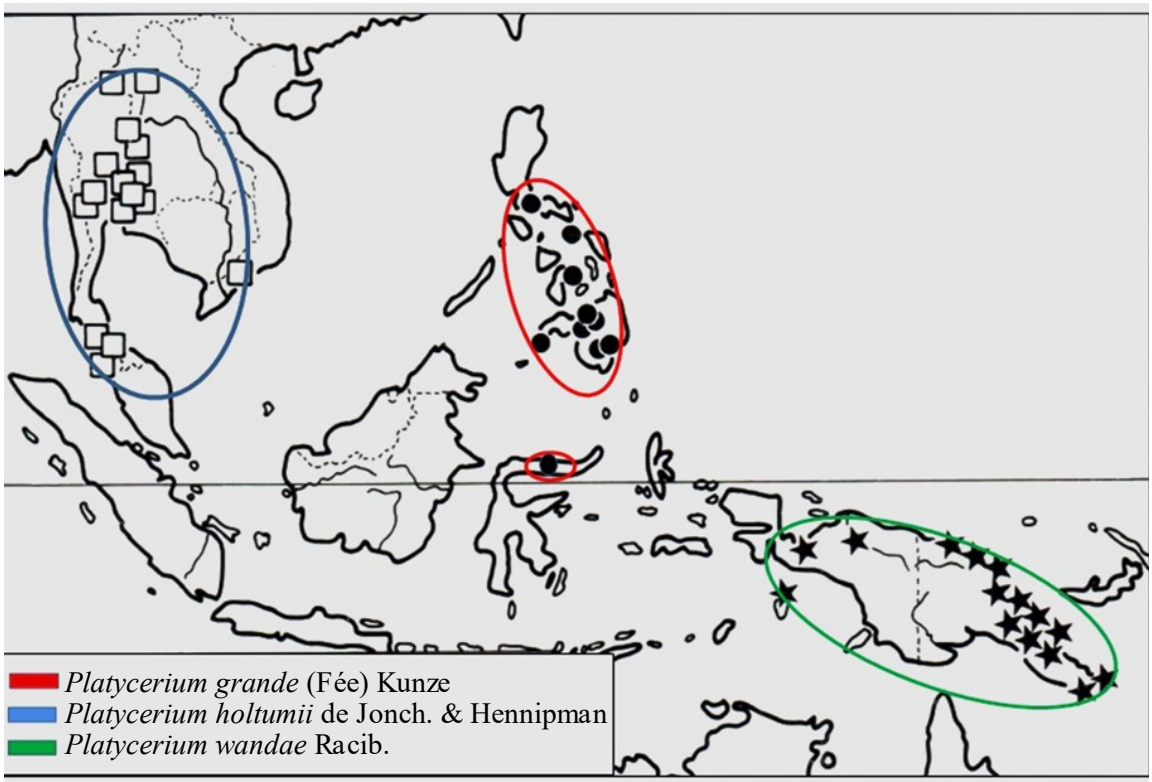

Fig. 2. Distribution of three important species of *Platycerium* spp. in Asian-Malesian region, including *Platycerium grande* (Fée) Kunze, a new record from the Nantu Forest, Gorontalo, Sulawesi, Indonesia.

Phylogenetic relationship based on intensive morphological characters, and interpreted following cladistics analysis showed the four species were in one clade, *Platycerium grande* group (Hennipman & Roos, 1982). By using DNA sequence data, Kreier & Schneider (2006) reported that *P. grande* is the sister to *P. holtumii* occuring in Thailand-Indochina. However, the relationships within this clade are still not fully discovered. Molecular analysis of Asia-Malesian *Platycerium* species is currently in progress.

The shape of the foliage frond, soral patches and huge base frond of *P. grande* make it is easily distinguishable from any other species of *Platycerium*. Our cultivated plants are similar in shape to the type specimen *Cuming 157* (at BM), as well as to the cultivated plant in Leiden described by Hennipman & De Joncheere (1979). However, the Nantu specimen is much larger, with foliage fronds 230 cm long, almost double the length of those cultivated in Leiden Botanic Garden. The plant growing on a tree trunk of jambu air (*Syzygium aqueum*) in a Bogor private garden, has three foliage fronds. Once the oldest foliage frond becomes old and brownish in color the second one then become mature, subsequently followed by 3rd frond (Fig. 3). Spore germination of this species to evaluate their taxonomical value as well for ornamental purposes is in progress in Bogor Botanic Gardens.

Platycerium is a beautiful fern genus which botanists and gardeners would likely find exciting to collect. However, no specimens have previously been deposited in Herbarium Bogoriense (BO) as well as no living collection in the Botanic Gardens of LIPI. Only one person in a village close to the Nantu forest had planted it, using coconut fiber as a media, hanging in his garden. This shows that botanical exploration in various corners in Sulawesi is still very rarely conducted, and information on plant diversity in general and fern in particular is far from complete (Ardiyani *et al*., 2020). Therefore, more extensive botanical explorations in Sulawesi are strongly recommended. Due to the increase of deforestation around the Nantu forest and the great importance of conserving the rare *Platycerium grande* and many other plants species there, we have proposed changing the status of the East Nantu Production Forest to Protection Forest (Darnaedi *et al*., 2019). This proposal has been strongly supported by Indonesian Institute of Sciences (LIPI) and the Local Authority of Gorontalo Regency. This change is now in the process of gaining official legal status from the Ministry of Environment and Forestry by 2021.

Fig. 3. *Platycerium grande* (Fée) Kunze, *Dar. 2014-390*, cultivated on tree trunk of *Syzygium aquaeum,* in Bogor garden. A. 1st old foliage frond, brownish in color, 230 cm long, 2nd foliage frond three months old, 190 cm long, 35 cm wide. B. 3rd foliage frond two weeks old, 40 cm long with young soral patch growing upward. Photos by D. Darnaedi.

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