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REDISCOVERY OF *DENDROBIUM ALOIFOLIUM* (BLUME) RCHB.F. (ORCHIDACEAE) IN SINGAPORE

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INTRODUCTION

This paper documents the rediscovery, distribution, and status of *Dendrobium aloifolium* (Blume) Rchb.f. in Singapore (Fig. 1). The genus *Dendrobium* belongs to the family Orchidaceae, and is one of the largest genera within the family, consisting of about 1,100 species distributed from Japan to Tahiti to New Zealand and Australia to India and China, throughout Malesia to New Guinea (Wood, 2006). It is a significant orchid genus in the horticulture trade, with at least 300 species (Wood, 2006), and 10,000 cultivated hybrids (The Royal Horticultural Society, 1960 onwards).

In Peninsular Malaysia, *Dendrobium* is divided into 15 sections (Seidenfaden & Wood, 1992). *Dendrobium aloifolium* belongs to the section *Aporum*, which is characterised by fleshy, laterally flattened leaves that overlap each other at the base, arranged in two neat rows on both sides of thin, flattened stems, and the absence of a conical wart beneath the apex of the floral lip (Seidenfaden & Wood, 1992). *Dendrobium aloifolium* was first described by Carl Blume as *Macrostomium aloefolium* in 1825 and was later transferred to the genus *Dendrobium* by Professor Heinrich G. Reichenbach in 1861 (Cootes, 2001). The specific epithet referes to the aloe-like leaves of this species.

Fig. 1. A clump of *Dendrobium aloifolium* on a fallen branch in Nee Soon Swamp Forest, Singapore's largest fragment of freshwater swamp forest. (Photograph by: Ang Wee Foong).

PAST AND PRESENT RECORDS

Of the 32 *Dendrobium* species known to be native to Singapore, 27 are presumed to be locally extinct (Tan et al., 2008; Chong et al., 2009). Of the five extant species, *Dendrobium crumenatum* is the most widespread species, occurring on trees in forests, urban parks, and roadsides in Singapore. The remaining four are listed as nationally critically endangered, of which *Dendrobium lobbii* was only rediscovered in 2008 (Lok et al., 2008).

Dendrobium aloifolium was last collected by J. W. Anderson in 1911, and is known to occur in the coastal forests of Changi and Kranji, inland forests such as Serangoon and Teban (Keng et al., 2008) (Table 1) and freshwater swamp forest of Jurong (Corner, 1978). Ridley (1924) also noted that this species was common in the forests of Singapore.

Table 1. Singapore collections of *Dendrobium aloifolium* (Blume) Rchb.f. deposited in the Herbarium, Singapore Botanic Gardens (SING).

S/No.	Bar Code No.	Collector	Collector's No.	Date Collected	Locality
1.	0010663	H.N. Ridley	s.n.	1889	Changi
2.	0010666	J.S. Goodenough	s.n.	7 Jan.1889	Kranji
3.	0010714	H.N. Ridley	s.n.	26 Feb.1889	Kranji
4.	0010662	H.N. Ridley	s.n.	1891	Serangoon
5.	0072289	H.N. Ridley	s.n.	1891	Sg. Murai
6.	0010664	H.N. Ridley	s.n.	1892	Teban
7.	0010665	H.N. Ridley	s.n.	1894	Jurong
8.	0010668	J.W. Anderson	184	3 Sep.1911	Pasir Panjang
9.	0010667	Anonymous	s.n.	–	–

DETAILS OF THE REDISCOVERY

Dendrobium aloifolium is a widespread epiphytic orchid found throughout Southeast Asia, from Thailand, Peninsular Malaysia, Borneo, Indonesia to the Philippines, often in the wet bright areas of lowland forests, from sea level up to 500 m and is probably the commonest *Dendrobium* species in its section (Comber, 1990; Seidenfaden & Wood, 1992; Comber, 2001; Cootes, 2001; Go & Hamzah, 2008). The stems are flattened, 40–60 cm long, and pendulous when mature. The basal part, 15–20 cm long, bears flattened leaves that are 25 mm long and 7 mm in diameter, oblique, acute and overlapping each other. The apical portion of the stem, about 15 cm long, is covered only by sheathing leaves, and usually bears the flowers (Fig. 2). Flowers are about 4 mm long and wide (Fig. 3). Its dorsal sepal is less than 2 mm long and 1 mm wide. Petals are smaller than the sepals, with both white in colour and reflexed backwards soon after opening. The lip is about 3.5–5.4 mm long, straight, with sides upcurved, and ending abruptly. The midlobe is deeply bilobed, about 1 mm wide, with the lobules round and overlapping one another (Fig. 4).

On 9 Sep.2010, in a survey carried out along the pipeline between the Upper Peirce and Upper Seletar Reservoirs, two clumps of *Dendrobium aloifolium* were discovered on the swampy forest floor, among thick leaf litter, under dense canopy cover. Two clumps appeared to be mature plants, with many long stems forming from a single point. They were probably dislodged from the swamp forest trees in the vicinity by foraging arboreal mammals such as the long-tailed macaques (*Macaca fascicularis*), or banded leaf monkey (*Presbytis femoralis*). Most stems of the two clumps appeared to be rotting or have died out, owing probably to shading out by leaf litter and the wet forest floor. The two clumps appeared to be performing badly on the leaf litter, thus they were rescued and brought back to Plant Systematics Lab, Department of Biological Sciences (DBS), National University of Singapore (NUS) for nursing back to health and further propagation.

As more than 95% of Singapore's original vegetation cover have been lost over the past two centuries (Corlett, 1992), many native plant species have been extirpated from the city state (Turner et al., 1994). The situation for epiphytic species such as *Dendrobium aloifolium* is further exacerbated by the loss of large, old trees that act as hosts and also changes in the microclimate for growth owing to forest fragmentation (Turner et al., 1994). However, the high relative humidity of the Nee Soon Swamp Forest probably helps buffer against the effects of forest fragmentation. The swamp forest also retains a core, pristine primary forest patch that harbours many rare plant species. Hence, the conservation

Fig. 2. A clump of *Dendrobium aloifolium*. (Photograph by: Peter O'Bryne).

Fig. 3. Flowers of *Dendrobium aloifolium* are small, about 4 mm in length and width. Scale bar = 1 mm. (Photography by: Alvin Francis Lok Siew Loon).

Fig. 4. Close-up of the flowers showing the bilobed lip. Scale bar = 1 mm. (Photograph by: Peter O'Bryne).

value of Nee Soon Swamp Forest lies in that it is one of the few remaining pristine refuges, and stronghold for many rare indigenous flora and fauna species left in a highly urbanised city state (Ng & Lim, 1992).

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LITERATURE CITED

Chong, K. Y., H. T. W. Tan & R. T. Corlett, 2009. *A checklist of the total vascular plant flora of Singapore: native, naturalised and cultivated species*. Raffles Museum of Biodiversity Research, National University of Singapore, Singapore. 273 pp. Uploaded 12 November 2009. http://rmbr.nus.edu.sg/raffles_museum_pub/flora_of_singapore_tc.pdf. (Accessed 17 Sep.2010).

Comber, J. B., 1990. *Orchids of Java.* Royal Botanic Gardens, Kew, England. 407 pp.

Comber, J. B., 2001. *Orchids of Sumatra.* Natural History Publication, Borneo. 1,026 pp.

Cootes, J., 2001. Orchids of the Philippines. Times Editions, Singapore. 231 pp.

Corlett, R. T., 1992. The ecological transformation of Singapore, 1819−1990. *Journal of Biogeography* **19**(4): 411–420.

Corner, E. J. H., 1978. The freshwater swamp-forest of South Johore and Singapore. *Gardens' Bulletin, Singapore*, Supplement **1**: 1–266 pp.

Go, R. & K. A. Hamzah, 2008. *Orchids of Peat Swamp Forests in Peninsular Malaysia.* Peat Swamp Forest Project, UNDP/ GEF Funded (MAL/99/G31), Ministry of Natural Resources and Environment, Malaysia. 136 pp.

Keng, H., S. C. Chin & H. T. W. Tan, 1998. *The Concise Flora of Singapore. Volume II: Monocotyledons.* Singapore University Press, Singapore. 215 pp.

Lok, A. F. S. L., K-x. Tan & H. T. W. Tan, 2008. Rediscovery of *Dendrobium lobbii* Teijsm. & Binnend. (Orchidaceae) in Singapore. *Nature in Singapore* **1**: 35–39.

Ng, P. K. L. & K. K. P. Lim, 1992. The conservation status of the Nee Soon freshwater swamp forest of Singapore. *Aquatic Conservation: Marine and Freshwater Ecosystems*, **2**(3): 255–266.

Ridley, H. N., 1924. *The Flora of the Malay Peninsula. Volume IV.* L. Reeve & Co., Ltd, London. 383 pp.

Seidenfaden, G. & J. J. Wood, 1992. *The Orchids of Peninsular Malaysia and Singapore.* Olsen & Olsen, Fredensborg. 779 pp.

Tan, H. T. W., B. C. Tan, K.-x. Tan, Ali bin Ibrahim, P. T. Chew, K. S. Chua, H. Duistermaat, S.K. Ganesan, M. W. K. Goh, A. T. Gwee, R. Kiew, S. M. L. Lee, P. Leong, J. Lim, A. F. S. L. Lok, A. H. B. Loo, S. K. Y. Lum, T. Morgany, Saifuddin bin Suran, S. Sim, Haji Samsuri bin Haji Ahmad, Y. C. Wee, K. F. Yap, C. K. Yeo & J. W. H. Yong, 2008. Checklists of threatened species: Seed plants. In: Davison, G. W. H., P. K. L. Ng & H. C. Ho (eds.), *The Singapore Red Data Book: Threatened Plants and Animals of Singapore. 2nd edition.* Nature Society (Singapore), Singapore. Pp. 213–245.

The Royal Horticultural Society, 1960 onwards. *The International Orchid Register.* http://apps.rhs.org.uk/horticulturaldatabase/orchidregister/orchidregister.asp. (Accessed 17 Sep.2010).

Turner, I. M., H. T. W. Tan, Y. C. Wee, Ali Bin Ibrahim, P. T. Chew & R. T. Corlett, 1994. A Study of Plant Species Extinction in Singapore: Lessons for the Conservation of Tropical Biodiversity. *Conservation Biology*, **8**(3): 705–712.

Wood, H. P., 2006. *The Dendrobiums*. A. R. G. Ganter Verlag, Ruggell, Liechtenstein. 847 pp.