

## REDISCOVERY OF *LIPARIS BARBATA* LINDL. (ORCHIDACEAE) IN SINGAPORE

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### INTRODUCTION

*Liparis* is a relatively large genus, with a cosmopolitan distribution and an estimated 350 species (Comber, 1990; Seidenfaden & Wood, 1992). Congeners can be terrestrial or epiphytic (Comber, 2001), but only terrestrial species with underground storage parts are able to survive in temperate countries (Comber, 1990). *Liparis* species have variedly shaped pseudobulbs and usually bear erect terminal inflorescences although pendulous forms occur in certain species (Comber, 1990, 2001). Leaves are more or less pleated, broad and thin, with or without joints at the base (Seidenfaden & Wood, 1992). The flowers are comparatively small, resupinate and have considerably narrower petals as compared to their sepals. The labellum (lip) is entire with a long, curved, and slightly winged column lacking a foot (Comber, 1990; Seidenfaden & Wood, 1992). The genus *Liparis* can further be divided into three sections; *Liparis*, *Distichae*, and *Coriifoliae* (Seidenfaden, 1976; Comber, 2001). The section *Liparis* is differentiated from the others by bearing leaves which that are not jointed and eventually withering on the plant, much like those in the genus *Malaxis*. The other two sections have jointed or articulated leaves that fall off the plant. In the section *Distichae*, the inflorescences have thick floral bracts and flowers arranged in two rows, and flowers emerging one or two at a time. In contrast, plants in the section *Coriifoliae* have inflorescences with thin floral bracts and flowers emerging in all directions and usually all opening at the same time.

*Liparis* is well-distributed throughout Southeast Asia and in the surrounding area. Thirty-one species occur in Thailand, 21 species in Peninsular Malaysia, 43 species in Sumatra, 31 species in Java, and 39 species in Borneo, although some of these species have extended ranges as far as Africa, China, India, and New Guinea (Comber, 2001). Of the five species recorded in Singapore, four are nationally extinct (Tan et al., 2008; Chong et al. 2009). Here, we present the rediscovery of *Liparis barbata* (Fig. 1) in Singapore.



Fig. 1. *Liparis barbata* growing in leaf litter in the Nee Soon Swamp Forest. (Plant height, including inflorescence = 24 cm). (Photograph by: Alvin Francis Lok Siew Loon).



Fig. 2. (a) Upper portion of the inflorescence. Scale bar = 1 mm. (Photograph by: Peter O'Byrne). (b) Close-up of seed pods. Scale bar = 5 mm. (Photograph by: Alvin Francis Lok Siew Loon).

#### PAST AND PRESENT RECORDS

*Liparis barbata* (Fig. 1) is one of five species of *Liparis* recorded from Singapore and was previously known by its synonym *Liparis wrayi*. Out of these five species, *Liparis elegans*, *Liparis gibbosa*, and *Liparis tricallosa* are epiphytic, while *Liparis barbata*, and *Liparis ferruginea* are the only two terrestrial members. Of these five species, all but one was previously considered nationally extinct (Tan et al., 2008; Chong et al., 2009). *Liparis ferruginea* which was



Table 1. Previous Singapore collections of *Liparis barbata* Lindl. deposited in the Herbarium, Singapore Botanic Gardens (SING).

S/No.	Bar Code No.	Collector	Collector's No.	Collection Date	Locality
1.	0010858	E. J. H. Corner	A729	4 May 1933	Bukit Mandai



Fig. 3. Close-up of the flowers. Scale bar = 5 mm. (Photograph by: Peter O'Byrne).

previously believed to be nationally extinct was rediscovered by staff members of the National Parks Board (Nparks) in 2004, in an open swampy field in the eastern part of Singapore, growing with *Eriocaulon* species., *Utricularia* species, *Fimbristylis dichotoma*, *Scleria sumatrensis*, *Xyris complanata*, *Stylosanthes hamata*, and *Lycopodiella cernua* (Yam et al., 2009).

According to herbarium records, the last and only collection of *Liparis barbata* was by E. J. H. Corner on 4 May 1933 at Bukit Mandai (Table 1) and no other collections and sighting records for this taxon has since been made till its recent

rediscovery. *Liparis barbata*, like *Liparis ferruginea*, was also considered nationally extinct, and has been recently rediscovered at the Nee Soon Freshwater Swamp Forest along the pipeline by WFA and KYC on 8 Aug. 2010. Although *Liparis barbata* was only collected at Bukit Mandai once by E. J. H. Corner, it was also recorded from freshwater swamp forest in Singapore (Corner, 1978; Seidenfaden & Wood, 1992; Keng et al. 1998).

Like most terrestrial *Liparis* species, *Liparis barbata* belongs to the section *Liparis* and has more or less terrete pseudobulbs that are 10–12 cm long with four to six leaves (Fig. 1). Leaves are elliptic, pleated, with wavy or undulating margins, 5–12 × 4–6.3 cm, and with a 3 cm-long petiole. Inflorescences are about 18–25 cm long, with a 7 cm peduncle and rachis with many well-spaced flowers (Fig. 2a). The resupinate flowers are pale olive-green and off-white (Fig. 2a & 3), about 9 mm wide, with 2–3 mm long floral bracts (Fig. 3). The dorsal sepal is narrowly oblong to obtuse, 8 × 2 mm wide. The lateral sepals are more egg-shaped and slightly shorter and broader. The petals are narrow and linear, 7 × 0.5 mm wide. The lip is somewhat rectangular, recurved, being broader and shallowly bilobed towards the apex, with toothed margins and a small thickening at the base. The column is slender and arching, to about 4.5 mm long. The capsules are 0.6–0.7 cm long and warty along the line of dehiscence (Fig. 2b). Arditti (1993) also reported that the mycorrhizal fungi associated with terrestrial *Liparis* species is *Rhizoctonia subtilis* that thrives in moist soils, hence possibly explaining the preferred habitat of this species.

*Liparis barbata* is quite widely distributed, ranging from India, Myanmar, Thailand, Peninsular Malaysia, Java, Borneo to New Guinea (Comber, 1990, 2001; Seidenfaden & Wood, 1992). It is found in montane habitats (Comber, 1990), and more commonly encountered in the lowlands, especially in freshwater swamp habitats (Keng et al. 1998; Seidenfaden & Wood, 1992).

## CONCLUSIONS

Many plant taxa thought to be nationally extinct have been rediscovered at the Nee Soon Freshwater Swamp Forest in the Central Catchment Nature Reserve. Amongst these rediscoveries were *Aeschynanthus albidus* (Lok & Tan, 2008), *Pinanga simplicifrons* (Ang et al., 2010), and *Polystachya concreta* (Lok et al., in press). Nee Soon Freshwater Swamp Forest is also possibly the most important habitat for native orchid species (with some species found nowhere else in the Republic), which seem to thrive on the humidity that this habitat affords them. Sadly today, the freshwater swamp forest at Nee Soon covers less than 5 km<sup>2</sup> (Ng & Lim, 1992), a huge reduction from the original estimated 27.2 km<sup>2</sup> (Corlett, 1991; Turner et al., 1994). Because of its importance to so many critically endangered plant and animal species, an in-depth study of the hydrology, fauna and flora of Nee Soon Swamp Forest should be carried out to ascertain if this habitat is sustainable and is in no danger of drying out, owing to changes in global climate patterns and development works in the surrounding areas. All rediscoveries should be viewed as an opportunity to resurrect these species from “the dead” by propagating them for reintroduction to more localities around Singapore and possibly the offshore islands such as Pulau Ubin and those under the administration of the Singapore Armed Forces (SAF) such as Pulau Biola, Pulau Pawai, Pulau Sudong, Pulau Senang, and Pulau Tekong, which are less likely to undergo major urban development in the near future, thus allowing protection and the preservation of our native heritage for a longer period.

## ACKNOWLEDGEMENTS

We would like to express our gratitude to the Chief Executive Officer and staff members of the National Parks Board (NParks) for allowing us access to collections of *Liparis barbata* at the Herbarium, Singapore Botanic Gardens (SING), as well as for granting us permission to access the Central Catchment Nature Reserve. Lastly we would also like to thank Peter O’Byrne for contributing his excellent photos of this beautiful taxon. This research was partially funded by the Ministry of National Development Research Fund for the Built Environment through the research grant for the project “Enhancing the Urban Native Biodiversity in Singapore” in collaboration with the NParks.

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