NATURE IN SINGAPORE 2009 **2:** 481–485
Date of Publication: 18 December 2009

THE STATUS AND DISTRIBUTION IN SINGAPORE OF *ACRIOPSIS LILIIFOLIA* (KOENIG) ORMEROD (ORCHIDACEAE)

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INTRODUCTION

Acriopsis is a very small genus of orchid with only six species known so far (Comber, 1990) and can be found in Sikkim, Myanmar, Thailand, Laos, Cambodia, Vietnam, Malaysia, throughout Indonesia, the Philippines, New Guinea, the Solomon Islands, and Northern Australia (Cootes, 2001). *Acriopsis liliifolia* belongs to the family Orchidaceae, subfamily Epidendroideae, and has the widest range of any congener, ranging over much of Southeast Asia, New Guinea, Australia, and even the Solomon Islands (Seidenfaden & Wood, 1992; Comber, 2001). This orchid is usually found from sea level up to 1,100 m (Comber, 1990, 2001), although it has been found to grow up to 1,600 m on exposed sites in the Philippines (Cootes, 2001). It demonstrates a wide ecological amplitude, being found growing in varied habitats such as white sand kerangas heath forests, adinandra belukar heath forests, beach forests, mangrove forest, closed-canopy primary rainforests as well as in plantations and roadside trees, growing either as an epiphyte or a lithophyte (Comber, 1990, 2001; Cootes, 2001; Millar, 1999). This species has also for the longest time been referred to as *Acriopsis javanica*, but has now been recognised as *Acriopsis liliifolia*, because J. Koenig was the first person to validly name the taxon (Comber, 2001). There are also three recognised varieties of *Acriopsis liliifolia*—var. *javanica*, var. *floribunda* (the Philippines), and var. *auriculata* (Vietnam, Peninsular Malaysia, Java, Borneo, and Southeast Sumatra. The name *Acriopsis* (Greek *akris*, locust; *opsis*, resemblance) refers to the flower's column which is shaped like a locust.

Acriopsis liliifolia (Koenig) Ormerod has ovoid and ridged pseudobulbs that are many-noded, growing closely together bearing two to three leaves at the tip. The leaves are thin with a rounded apex and gradually narrow to the base, although this varies with the growing conditions. Plants found growing in shady conditions usually possess long broad leaves while plants growing in exposed sites usually have short and narrow (almost terete) leaves (Fig. 1). Inflorescences grow from the rhizome and is borne on a long scape and typically branches a few times, bearing up to 200 blooms (Cootes, 2001). The flowers are sometimes pale green but more often spotted with purple (Fig. 2). The dorsal sepal is linear concave up to 5 mm long and 1.6 mm wide. The petals are oblong and up to 5 mm long and 2–2.2 mm wide. The lateral sepals are fused to form a synsepalum up to 4 mm long and 2 mm wide. The labellum is three-lobed, forming a tube with the base of the column.

In its microhabitat, *Acriopsis liliifolia* usually grows close to the ground and typically develops a mass of aerial or "catch roots"—like *Grammatophyllum speciosum*—that are used to catch falling debris for nutrition (Comber, 1990). This species is also almost always found associated with ants such as *Crematogaster* species although other ants such as *Camponotus* species (Fig. 3) are known to live in the root mass. The *Crematogaster* species usually builds nest in the aerial root ball of the orchid, swarming around the plant when it is touched or disturbed. In this animal-plant association, the orchid seems to provide the ants with a lattice-like framework for nest-building, while the ants in return provide protection as well as nutrients (waste material from the ants) to the plants. This orchid-ant association has not been reported including (Arditti, 1993). It would certainly be interesting to carry out experiments that compare the growth performance of ant-excluded versus ant-associated individuals.

PAST AND PRESENT RECORDS

Acriopsis liliifolia is the only species from the genus in Singapore and is usually found here as an epiphyte in freshwater swamp forest, mangrove forest, lowland evergreen rain forest as well as beach vegetation, and occasionally on roadside trees. It was first collected in Singapore by H. N. Ridley in 1889 at Tanglin, later in 1890 at Kranji and at Changi in 1892 (Table 1) (Ridley, 1924). This species was classified as nationally vulnerable in the 1st Edition of *The Singapore Red Data Book* (Turner et al., 1994) and its status has since been upgraded to nationally critically endangered in the 2nd Edition (Tan et al., 2008) owing to losses in habitat and fewer individuals found in the wild.

Fig. 1. *Acriopsis liliifolia* growing as an epiphyte in kerangas heath forest at Bako National Park, Sarawak, Malaysia. (Photograph by: Alvin Francis Lok Siew Loon).

Fig. 2. A close up of the flower (1.2 cm wide). (Photograph by: Eric Hunt).

Fig. 3. *Camponotus* ants nesting in the root mass of a rescued plant. (Photograph by: Ng Pei Xin).

Table 1. Previous Singapore collections of *Acriopsis lillifolium* (Koenig) Ormerod deposited in the Herbarium, Singapore Botanic Gardens (SING, with bar code no.) or Herbarium, Raffles Museum of Biodiversity Research, National University of Singapore (SINU, with accession no.).

S/No.	Accession or Bar Code No.	Herbarium	Collector	Collector's No.	Date	Locality
1.	0010442	SING	N. Cantley	s.n.	1982	–
2.	0010445	SING	J. S. Goodenough	s.n.	1892	Changi
3.	0010444	SING	H. N. Ridley	s.n.	8 Jan.1890	Kranji
4.	0010443	SING	H. N. Ridley	s.n.	Dec.1889	Tanglin
5.	2007016257	SINU	D. J.-S. Y. P. Tng	P5-1	2002	Lazarus Island

Presently, individuals of *Acriopsis liliifolia* have been observed at Bukit Timah Nature Reserve (BTNR), the Central Catchment Nature Reserve (CCNR), Heng Mui Keng Terrace, Lim Chu Kang Chinese Cemetery, Nee Soon Swamp Forest, Pulau Sakijang Pelepah (Lazarus Island), Pulau Tekong, and the Western Catchment Area. On Pulau Tekong, this species is fairly common, found growing on trees near the sea, especially on *Casuarina equisetifolia*, in abandoned plantations, adinandra belukar as well as on mangrove trees in the north of the island. In the Western Catchment Area it has been encountered on a tembusu (*Fagraea fragrans*) tree fall and was also found growing on a roadside tree in the Chinese Cemetery at Lim Chu Kang. Unfortunately, this specimen no longer remains as the tree it was growing on was removed owing to disease and it is unknown if the epiphyte was rescued. Up to 2003, the population growing on the two *Casuarina equisetifolia* trees at Lazarus Island still persisted, but we are uncertain if these still remain, as the island was undergoing development during that period. The latest collection of this species was from a tree fall from the Nee Soon Freshwater Swamp Forest on 28 Feb.2009 which was collected and cultivated in a nursery at the National University of Singapore (Fig. 4).

Fig. 4. The flowering plant collected from the tree fall at Nee Soon Freshwater Swamp forest. (Photograph by: Alvin Francis Lok Siew Loon).

CONCLUSIONS

Acriopsis liliifolia is an orchid species with wide ecological amplitude and is very common in all the neighbouring countries. However it has become critically endangered in Singapore (Tan et al., 2008) and this emphasizes the need and commitment for habitat conservation and protection by our policy makers. Fortunately, this species is still found in many of the Singapore Armed Forces (SAF) training areas which are awarded protection from the military which restricts public access. Since this species is highly tolerant to exposure, it is a good candidate for ex-situ conservation via tissue culture and for re-introduction to roadside trees in Singapore, along with *Dendrobium crumenatum* and *Grammatophyllum speciosum*.

ACKNOWLEDGEMENTS

We would like to express our gratitude to the Chief Executive Officer and staff members of the National Parks Board for allowing us access to collections of *Acriopsis liliifolia* at the Herbarium, Singapore Botanic Gardens (SING), as well as for granting us permission to make collections in the Central Catchment Nature Reserve, and to Chua Keng Soon from the Herbarium, National University of Singapore for the herbarium record on *Acriopsis liliifolia*.

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