

## **HOYA CAUDATA HOOK. F. (APOCYNACEAE), A NEW RECORD FOR SINGAPORE, AND KEYS TO THE HOYA SPECIES OF SINGAPORE**

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**ABSTRACT.** — *Hoya caudata* Hook. f. is recently discovered as a new record to the native flora of Singapore in Nee Soon Swamp Forest. The total number of *Hoya* species now stands at 11. Two dichotomous keys (vegetative and reproductive) to the *Hoya* species of Singapore are also provided.

**KEY WORDS.** — Apocynaceae, *Hoya*, *Hoya caudata*, Nee Soon Swamp Forest, new record

### INTRODUCTION

This paper documents the new record and status of *Hoya caudata* Hook. f. (Figs. 1–4) in Singapore. *Hoya* has not been recently revised (Meve, 2002) and its number of species is difficult to evaluate. A very conservative estimate of ca. 200 species was suggested by Kleijn & van Donkelaar (2001). Their distribution area includes peninsular India, mainland Asia, Malesia, New Guinea, Solomon Islands, Melanesia, New Caledonia, and Australia (Forster et al., 1998; Hoffman et al., 2002). Southeast Asia is likely the centre of diversity for *Hoya*, with many species recorded and still being discovered till date. In the most recent regional revision for Peninsular Malaysia, Rintz (1978) recorded 25 species occurring in the region. Since then, two more species and two varieties have been described (Kiew, 1989, 1995; Veldkamp & Hansen, 1996; Rodda & Simonsson Juhonewe, 2012). In Singapore, 10 species were recorded initially (Ridley, 1900, 1925; Keng, 1990) (Table 1). *Hoya scortechinii* King & Gamble was added to the list after its discovery in 2006 on a sawn-off tree stump at a reservoir park (Yap, 2011). *Hoya caudata* is the twelfth and latest species of *Hoya* to be added to the Singapore flora. A key to the vegetative and reproductive state of native *Hoya* species is also presented here (Appendix A).

The genus *Hoya* was named in honour of Thomas Hoy (c. 1750–1822), the 18<sup>th</sup> century head gardener to the Duke of Northumberland at Syon House, Isleworth, by the river Thames opposite the Royal Botanic Gardens, Kew (Gledhill, 2008). The specific epithet *caudata* means “having a tail, or caudate”, referring to the long pointed anther appendages that stick out from the centre of the corona.

Table 1. List of *Hoya* species recorded in Singapore and their national conservation status.

S/No.	Species Name	National Conservation Status	Remarks
1.	<i>Hoya campanulata</i> Blume	Extinct	—
2.	<i>Hoya caudata</i> Hook. f.	Critically Endangered	New record
3.	<i>Hoya coriacea</i> Blume	Extinct	—
4.	<i>Hoya coronaria</i> Blume	Critically Endangered	Rediscovered (Yap, 2006)
5.	<i>Hoya diversifolia</i> Blume	Critically Endangered	—
6.	<i>Hoya finlaysonii</i> Wight	Extinct	—
7.	<i>Hoya lacunosa</i> Blume	Endangered	—
8.	<i>Hoya latifolia</i> G. Don	Endangered	—
9.	<i>Hoya obtusifolia</i> Wight	Extinct	—
10.	<i>Hoya revoluta</i> Wight ex Hook. f.	Extinct	—
11.	<i>Hoya scortechinii</i> King & Gamble	Critically Endangered	New record (Yap, 2011)
12.	<i>Hoya verticillata</i> (Vahl) G. Don	Common	—

*Hoya caudata* is an epiphytic climber with thin wiry stems, about 0.3 cm thick (Fig. 1) (Ridley, 1925; Rintz, 1978). The plant usually climbs up trees or on rocks including limestone and needs exposed locations to flower. Adventitious roots are freely produced along the stem to help anchor the plant securely to the substrate. The leaves are pendulous, thick and hard, sparsely distributed along the stems. They are borne opposite to each other but often only one leaf per node



Fig. 1. *Hoya caudata* scrambling among leaf litter on the forest floor at Nee Soon Swamp Forest. (Photograph by: Ang Wee Foong).

reaches maturity and often not all nodes bear leaves. The shortly stalked leaves have leaf blades that are ovate, with a narrowed tip and slight heart-shaped base, green turning red in full sun, with prominent silver mottling, and are 2.5–7 by 4–15 cm (Fig. 2). The leaf blade margins are strongly corrugated. Young leaves are thin and hairy, gradually becoming leathery and nearly glabrous upon maturity. The flowering peduncles are persistent and the flowers are borne on rigid, curved pedicels forming a concave umbel of 8–15 flowers. Each flower is composed of a corolla 1.3 cm across with white and pubescent lobes, bearing long marginal hairs and a fleshy, five-lobed, staminal corona, raised above the corolla by the filament tube, deep red in colour, with 4–5 mm long hyaline anther appendages arising from its anthers, above the stigma head. The flowers open for one to two days.

*Hoya caudata* occurs from south Thailand and Peninsular Malaysia to Sumatra and Borneo, growing epiphytically on trees in lowland forests and limestone hills (Ridley, 1925; Rintz, 1978), where it is known to be common, but not in abundance.

### **HOYA CAUDATA IN SINGAPORE**

*Hoya caudata* was first encountered by MLR and Andrew Tay in Nov. 2011 in Nee Soon Swamp Forest (NSSF). A few specimens were observed in a patch of constantly flooded primary forest in the centre of NSSF, growing in deep shade on a fallen tree trunk covered in moss and at the moss-covered base of a neighbouring tree (Fig. 3). A few plants were also climbing on thin branches (Fig. 4). Another individual was later discovered in a separate location by WFA at the edge of the NSSF outside Nee Soon Range I, in seasonally flooded swamp, weakly scrambling amongst leaf litter on the forest floor and climbing up surrounding saplings. In both specimens, no flowers were encountered. However, the characteristic rigid and mottled mature leaves were diagnostic enough to identify the plants to species level. The discovery of *Hoya caudata* in Singapore does not come as a surprise as it is within its distribution range from southern Thailand and throughout Peninsular Malaysia. In fact, it is highly likely that other species of *Hoya* found in the neighbouring Peninsular Malaysia may have occurred or may still occur in Singapore forests. Previously, in 2006, *Hoya scortechinii* was also newly discovered in the forests of Singapore (Yap, 2011). However, the rapid urbanisation of Singapore in the past two centuries has seen a staggering 95% loss of our natural forests (Corlett, 1992). Hence, it is very possible that we could have lost many species of *Hoya* even before we could discover and record them here.

The new discovery of two species of *Hoya* in the last five years in Singapore may offer signs of hope for our local biodiversity, but it should never make us complacent about our conservation efforts. Currently about 10 plants are used as mother plants at Singapore Botanic Gardens (SBG Acc. No. 20113492) to propagate sufficient stock for re-introduction trial plantings in suitable locations in the nature reserves and nature parks in order to increase the genetically indigenous population of *Hoya caudata* in Singapore.



Fig. 2. Mature leaf of *Hoya caudata* growing in deep shade. (Photograph by: Ang Wee Foong).

#### ACKNOWLEDGEMENTS

We thank the National Parks Board Singapore and the National University of Singapore for funding our research, the Ministry of Defence (MINDEF) for granting us access to restricted areas within the Central Catchment Nature Reserve, and Andrew Tay for his help during fieldwork.

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Fig. 3. *Hoya caudata* in its natural habitat in Nee Soon Swamp Forest. (Photograph by: Michele Luigi Rodda).



Fig. 4. The stem of *Hoya caudata* in Singapore, bearing a single leaf per node. (Photograph by: Michele Luigi Rodda).

APPENDIX A

Key to the *Hoya* Species of Singapore Based on Vegetative Characters

1. Leaf base acute or attenuate ..... 2
- Leaf base cordate or truncate ..... 8
2. Leaves thin, coriaceous, rapidly wilting when cut ..... 3
- Leaves fleshy ..... 4
3. Vigorous epiphytic climber ..... *Hoya coriacea*
- Delicate epiphytic shrub with a few twining stems ..... *Hoya campanulata*
4. Venation prominent ..... 5
- Venation obscure, at least on the upper surface ..... 6
5. Leaves up to 20 cm long, very stiff ..... *Hoya finlaysonii*
- Leaves smaller, usually 3–5 cm long ..... *Hoya lacunosa*
6. Leaf tip obtuse, leaves flexible ..... *Hoya diversifolia*
- Leaf tip acute ..... 7
7. Leaf base long attenuate, with visibly raised leaf margins ..... *Hoya revoluta*
- Leaf base cuneate ..... *Hoya verticillata*
8. Generally terrestrial climber, entire plant pubescent ..... *Hoya coronaria*
- Generally epiphytic, glabrous or sparsely pubescent ..... 9
9. Leaves ovate, thickly fleshy, large, up to 30 × 20 cm, trinerved ..... *Hoya latifolia*
- Leaves smaller, penninerved ..... 10
10. Leaves shiny, stems very stout ..... *Hoya obtusifolia*
- Leaves dull, stems thin and wiry ..... 11
11. Venation prominent, at least if growing in strong light, leaves at least three times as long as wide, margins undulate ..... *Hoya scortechinii*
- Venation obscure, leaves about two times as long as wide, margins corrugated, occasionally with white blotches on upper leaf surface ..... *Hoya caudata*

Key to the *Hoya* Species of Singapore Based on Reproductive Characters

1. Inflorescence concave umbel ..... 2
- Inflorescence convex umbel ..... 4
2. Corolla flat when fully opened, white with long white hairs; corona red ..... *Hoya caudata*
- Corolla revolute when fully opened ..... 3
3. Corona lobes upcurved, inner process yellowish, outer process white, corolla white and hairy ..... *Hoya lacunosa*
- Corona lobes bilobed, inner process red, outer process white, corolla pale pink and hairy ..... *Hoya revoluta*
4. Corolla spreading when fully opened ..... 5
- Corolla reflexed when fully opened ..... 9
5. Corolla campanulate, without distinct lobes; corolla and corona white to pale yellow ..... *Hoya campanulata*
- Corolla not as above; with distinct corolla lobes ..... 6
6. Peduncles clustered, flowers small, about 8 mm in diameter, yellow or pink; corona white ..... *Hoya latifolia*
- Peduncles solitary ..... 7
7. Corolla densely pubescent inside, glabrous outside, pink; corona pink ..... *Hoya diversifolia*
- Corolla glabrous inside ..... 8
8. Corolla puberulous outside, white or yellow turning purple; corona yellow ..... *Hoya coronaria*
- Corolla glabrous outside, yellow or white; corona yellow ..... *Hoya obtusifolia*
9. Corolla densely pubescent inside, yellow; corona white ..... *Hoya coriacea*
- Corolla glabrous or puberulent ..... 10
10. Corona lobe outer process obtuse, pale yellow or white, upper lobes red; corolla glabrous, pale yellow to pink ..... *Hoya scortechinii*
- Corona lobe outer process acute ..... 11
11. Corolla white or pink; corona lobes white with deep pink inner process ..... *Hoya verticillata*
- Corolla lobes yellowish with deep red tips; corona white ..... *Hoya finlaysonii*