



Hoya fauziana ssp. *angulata* (Apocynaceae, Asclepiadoideae), a new subspecies from Borneo and Sumatra

M. Rodda¹, A.L. Lamb², L. Gokusing³, S. Rahayu⁴

Key words

Asclepiadaceae
epiphyte
Hill Dipterocarp Forest
Indonesia
Kalabakan
Kalimantan
Malaysia
Sabah
Southeast Asia

Abstract A new *Hoya* subspecies from Borneo and Sumatra, *Hoya fauziana* ssp. *angulata* is described and illustrated. Both subspecies of *Hoya fauziana* have long lanceolate leaves, pubescent corollas and prominent ovoid corona lobes. They can be separated by the orientation of the pedicels (straight in *H. fauziana* ssp. *fauziana* and angled in *H. fauziana* ssp. *angulata*) and the type and position of pubescence of the corolla (tube and lobes pubescent with evident sericeous hairs in *H. fauziana* ssp. *fauziana* vs only tube finely pubescent in *H. fauziana* ssp. *angulata*).

Published on 26 September 2018

INTRODUCTION

Hoya R.Br. (Apocynaceae, Asclepiadoideae, Marsdenieae) is a large genus of 350–450 mostly epiphytic climbers (Rodda 2015) with Indomalayan-Australasian distribution, with a few species extending all the way to southern India/Sri Lanka, the Himalayan foothills, southern China and Japan (Forster et al. 1998). The island of Borneo is particularly species rich. In recent years numerous papers on Bornean *Hoya* have been published (Lamb & Rodda 2016, Rahayu & Rodda 2017, Rodda 2017) bringing the count of species to 73. For the island of Sumatra Rahayu & Wanntorp (2012) published a checklist and a key including 27 *Hoya* species.

Lamb et al. (2014) described eight new taxa based on live materials from Sabah that bloomed in cultivation at Kipandi Park (Kampung Kipandi, Moyog, Sabah). More collections have since been made by the authors and one accession collected by LG in Mixed Hill Dipterocarp Forest in the Kalabakan area of Sabah has been identified as a new taxon. It was also collected in Sumatra (Riau) in 2004 by SR, and in West Kalimantan (Sanggau) in 2016 by Maskuran. The new subspecies, *Hoya fauziana* ssp. *angulata* Rodda, A.L.Lamb, Gokusing & S.Rahayu is here described and illustrated.

Hoya fauziana* ssp. *angulata Rodda, A.L.Lamb, Gokusing & S.Rahayu, *subsp. nov.* — Fig. 1, 2

Distinguished from *H. fauziana* ssp. *fauziana* by the orientation of the flowers, all facing the same direction (vs perpendicular to the pedicel axis in *H. fauziana* ssp. *fauziana*) and by the fine pubescence of the corolla tube (vs long sericeous trichomes on the corolla tube and lobe in *H. fauziana* ssp. *fauziana*). — Type: L. Gokusing LG56/2017 (holo SAN), Malaysia, Sabah, Tawau, Kalabakan area, Mixed Hill Dipterocarp Forest, 16 May 2017.

Etymology. The specific epithet '*angulata*' refers to the orientation of the flowers, held at an angle of 90–180° to the pedicels.

Epiphytic climber with white latex in all vegetative parts, glabrous. *Stems* slender, to c. 1.5 m long, internodes 10–20(–30) cm by 1.5–3 mm, brown; *root* adventitious sparsely produced along the stem. *Leaves* petiolate; petiole terete, 2–6 by 1–2 mm diam, dark green to maroon; lamina lanceolate, 8–16 by 2–5 cm, base cuneate to obtuse, apex acuminate; venation pinnate, secondary veins hardly visible in live material, 5–12 pairs, diverging at 45–60° from the main vein, anastomosing near lamina edge, tertiary venation reticulate; dark green above with numerous grey spots, below lighter green. *Collecters* at lamina base 2, ovoid, 500–700 by 350–450 µm. *Inflorescence* positively geotropic, pseudo-umbellate, convex, 8–10(–20)-flowered; peduncle 9–10 cm long by c. 1.5 mm diam, glabrous. *Pedicel* 2.5–3 cm by 0.7–0.8 mm diam, reddish-maroon, very finely papillose, sharply angled just below the calyx. *Calyx* 3.5–4 mm diam, lobes ovate, spatulate, 1.5–2 by 0.7–1 mm wide, apex round, inside glabrous, outside very sparsely pubescent; *basal collecters* one in each calyx lobe sinus, ovate with a round tip, 0.23–0.35 mm long. *Corolla* reflexed, turban shaped, c. 13 mm diam, 18–20 mm when flattened; tube 3–4 mm long, finely pubescent inside, trichomes 130–170 µm long, glabrous outside, corolla lobes revolute, broadly ovate, 5–7 by 6–7 mm, dark orange-red, glabrous, apex acute. *Corona* staminal, violet red, 8–10 mm diam, 3–4 mm high; *corona lobes* ovoid, 4–5 by c. 2.5 mm, ridged above, below sulcate with revolute margins, outer process round raised, inner process oblong, covering anther appendages. *Anthers* triangular, 1 by 1 mm, with apical round membranaceous appendage exceeding the style-head apex. *Pollinia* oblong, 700–750 by 230–270 µm, narrowing towards the base, apex obliquely truncate, sterile edge continuous along the outer side of each pollinium; *corpusculum* rhomboid, 400–450 by 200–250 µm; *caudicles* curved, hyaline, 150–200 by 80–100 µm at the widest. *Style-head* 5-angled in cross section, with 5 lobes alternating with the stamens, style-head apex flat to slightly convex, c. 2 mm broad. *Ovaries* oblong with a round tip, 1.4–1.7 by 1–1.2 mm wide at the base, glabrous. *Fruit* and *seed* not seen.

¹ The Herbarium, Singapore Botanic Gardens, National Parks Board, 1 Cluny Road, 259569 Singapore;

corresponding author e-mail: rodda.michele@gmail.com.

² P.O. Box 10960, 88810 Kota Kinabalu, Sabah, Malaysia.

³ Kipandi Park, P.O. Box 12785, 88831 Kota Kinabalu, Sabah, Malaysia.

⁴ Bogor Botanic Gardens, Indonesian Institute of Sciences, Bogor, Indonesia.

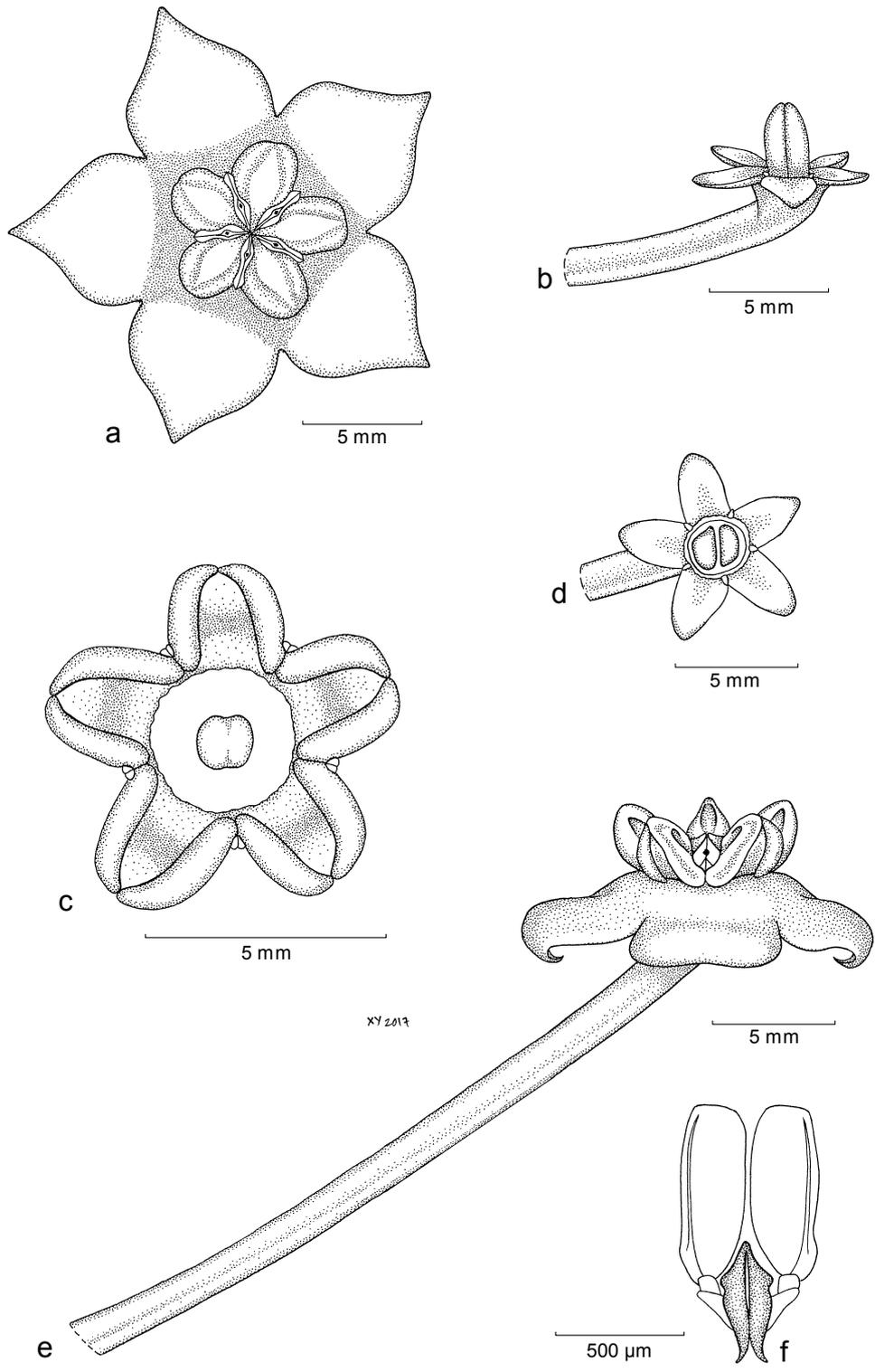


Fig. 1 *Hoya fauziana* ssp. *angulata* Rodda, A.L.Lamb, Gokusing & S.Rahayu. a. Corolla, top view; b. pedicel and calyx, side view; c. corona, from underneath; d. pedicel and calyx, top view; e. flower and pedicel, side view; f. pollinarium (Gokusing LG56/2017 (SAN)). — Drawn by Xiang Yun Loh.

Distribution & Ecology — *Hoya fauziana* ssp. *angulata* has been collected in one locality in Sumatra, Riau, Bukit Tiga Puluh area (*Maskuran s.n.* (BO)) and in two localities in Borneo, Sabah, Malaysia, Kalabakan area (*Gokusing LG56/2017* (SAN)) and Kalimantan, Sanggau, Jangkang area (*Maskuran s.n.* (BO)). In Sumatra as well as Sabah the species was collected in Mixed Hill Dipterocarp Forest, while in Kalimantan it was found in lowland mixed Dipterocarp and Heath Forest. All plants observed were epiphytic climbers.

Conservation status — Data Deficient (DD, IUCN Standards and Petitions Subcommittee 2017). Using GeoCAT (Bachman et al. 2011) we calculated the EOO for *H. fauziana* ssp.

angulata to be > 145 000 km² and the AOO > 12 000 km². The taxon should therefore be assessed as Least Concern. Only three populations are known and therefore it might belong to a threatened category. Only one collection is within a conservation area (Sumatra, Bukit Tiga Puluh) while the other two localities are not within conservation areas and may in the future be converted to agriculture. However, we do not have information on the population size, number of mature individuals and habitat loss to make an accurate conservation assessment and therefore assess *H. fauziana* ssp. *angulata* as Data Deficient. *Ex situ* collections are present at Kipandi Park and at Bogor Botanic Garden (Acc No. BBG- B 200409390).



Fig. 2 *Hoya fauziana* ssp. *angulata* Rodda, A.L.Lamb, Gokusing & S.Rahayu. Living plant flowering in cultivation at Kipandi Park, Sabah, Malaysia. — Photo by Steven Bosuang.

Specimens examined.

Hoya fauziana ssp. *fauziana*: MALAYSIA, Sabah, Tenom District, Ulu Tomani, 1200 m, cultivated at Kipandi Park, 30 Oct. 2013, A. Lamb 2462/2013 (SAN, SING).

Hoya fauziana ssp. *angulata*: INDONESIA, Kalimantan, Sanggau, Jangkang area, mixed Dipterocarp and Heath Forest, lowland, 14 Sept. 2016, Maskuran s.n. (BO); Sumatra, Riau, Bukit Tiga Puluh, Bukit Tiga Puluh area, Mixed Hill Dipterocarp Forest, lowland, 26 Aug. 2004, S. Rahayu JQ328/2004 (BO).

Notes — The new taxon is here classified as a subspecies of *Hoya fauziana* (Rodda et al. 2015) because they both have long lanceolate leaves, and their corolla and corona are of very similar shape. The more striking difference between the two taxa that warrants the separation of a new subspecies lies in the orientation of the flowers that are held perpendicular at 90° to the pedicels in *H. fauziana* ssp. *fauziana* but face the same

direction in *H. fauziana* ssp. *angulata* at angles of 90–180° to the pedicel. The species also differ in type and placement of the pubescence on the corolla: *H. fauziana* ssp. *fauziana* has sericeous hairs 250–350 µm long that are sparse on the inside of the corolla tube and dense on the inside of the corolla lobes while *H. fauziana* ssp. *angulata* has thin hairs 130–170 µm long only present on the inside of the corolla tube. Lastly the pollinium and corpusculum are larger in *H. fauziana* ssp. *angulata* (pollinium: 700–750 by 230–270 µm, corpusculum: 400–450 by 200–250 µm) compared to *H. fauziana* ssp. *fauziana* (pollinium: 650–700 by 300–350 µm, corpusculum: 350–400 by 200–220 µm).

Acknowledgements This study is part of an ongoing research project on the systematics of *Hoya*. This research received support from the National Parks Board (Singapore) that sponsored field expeditions to Borneo and herbarium visits in Asia and Europe. The visit to Riau (Sumatra) was supported by Bogor Botanic Gardens – LIPI's Flora expedition, while the sample from West Kalimantan was provided by Mr. Maskuran. We would like to thank the curators of BM, BO, BRUN, FI, K, KEP, L, LAE, P, SAN, SAR, SNP, and SING herbaria for allowing access and/or for providing high quality images of herbarium specimens, Xiang Yun Loh for preparing the line drawing, Steven Bosuang for providing pictures of the live plant and two anonymous reviewers for their valuable comments on the manuscript.

REFERENCES

- Bachman S, Moat J, Hill AW, et al. 2011. Supporting Red List threat assessments with GeoCAT: geospatial conservation assessment tool. In: Smith V, Penev L (eds), e-Infrastructures for data publishing in biodiversity science. ZooKeys 150: 117–126, and GeoCAT. Geospatial Conservation Assessment Tool. [On line.] <http://geocat.kew.org/> (accessed 10 Jan. 2018).
- Forster PI, Liddle DJ, Liddle IM. 1998. Diversity in the genus *Hoya* (Asclepiadaceae – Marsdenieae). *Aloe* 35: 44–48.
- IUCN Standards and Petitions Subcommittee. 2017. Guidelines for using IUCN Red List Categories and Criteria. Version 13. Prepared by the Standards and Petitions Subcommittee. Downloadable from <http://www.iucnredlist.org/documents/RedListGuidelines.pdf>.
- Lamb AL, Rodda M. 2016. A guide to Hoyas of Borneo. Natural History Publications Borneo, Kota Kinabalu.
- Lamb A, Gavrus A, Emoi B, et al. 2014. The Hoyas of Sabah, a commentary with seven new species and a new subspecies. *Sandakania* 19: 1–89.
- Rahayu S, Rodda M. 2017. *Hoya narcissiflora* (Apocynaceae, Asclepiadoideae), a new species from Borneo. *Reinwardtia* 16: 5–10.
- Rahayu S, Wannrtorp L. 2012. Notes on the species diversity of *Hoya* (Apocynaceae-Asclepiadoideae) of Sumatra. *Asklepios* 113: 17–26.
- Rodda M. 2015. Two new species of *Hoya* R.Br. (Apocynaceae, Asclepiadoideae) from Borneo. *PhytoKeys* 53: 83–93.
- Rodda M. 2017. Index of names and types of *Hoya* (Apocynaceae: Asclepiadoideae) of Borneo. *Gardens' Bulletin Singapore* 69: 33–65.
- Rodda M, Simonsson Juhonewe N, Lamb A. 2015. *Hoya fauziana* (Apocynaceae: Asclepiadoideae), a new species from Sabah, Malaysian Borneo. *Webbia* 70: 207–210. <https://doi.org/10.1080/00837792.2015.1043764>.