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Diversity of the genus *Hoya* R. Brown (Apocynaceae : Asclepiadoideae) in Tuensang and Zunheboto district of Nagaland, India

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Abstract

The present communication deals with the occurrence of six species of viz., *Hoya arnottiana* Wight, *H. linearis* Wallich *ex* D. Don, *H. longifolia* Wallich, *H. multiflora* Blume, *H. polynuera* Hooker *f*. and *H. vaccinioides* Hooker *f*. in Tuensang and Zunheboto districts of Nagaland, India with taxonomic treatment, description and photographs.

Key words: Diversity, *Hoya*, Tuensang and Zunheboto district, Nagaland.

INTRODUCTION

The genus *Hoya* R. Brown which belongs to sub-family Asclepiadoidae of Apocynaceae commonly known as "wax plants" because of its waxy appearance consist of about 200 species (Wanntorp *et al*. 2006). It is native to South Asia (India and China), Australia and Polynesia and is distributed throughout the moister parts of the Eastern tropics from Nepal and Sri Lanka to Southern China, Northern Australia and in the Pacific regions. Jagtap & Singh (1999) reported in India the genus is represented by 29 species. The present paper deals with the morpho-taxonomic characteristics of six species of *Hoya*, viz., *H. arnottiana* Wight, *H. linearis* Wallich *ex* D. Don, *H. longifolia* Wallich, *H. multiflora* Blume, *H. polynuera* Hooker *f*. and *H. vaccinioides* Hooker *f*. from the Tuensang and Zunheboto district of Nagaland, India.

The Indian state of Nagaland is lies between 25° 6' to 27° 4' N latitudes and 93° 2' to 95° 15' E longitudes covering an area of 16,575 sq km. It combines boundaries with Mayanmar in the East, Arunachal Pradesh in the North, Manipur in the South and Assam in the West. The district Tuensang lies between 26º 19' 207" N latitudes and 94º 33'.054" E longitudes and the altitude of the district is 1673 m. The district Zunheboto lies between 24º 52'30" N latitudes and 94º 35'58" E longitudes and the altitude of the district is 1874.22 m.

MATERIALS AND METHODS

The plants were collected from the natural vegetations from various localities of Tuensang and Zunheboto districts of Nagaland during different seasons in their flowering and fruiting stages and processed following Jain & Rao (1977). The voucher specimens are deposited in the Herbarium of the Department of Botany, Nagaland University, Lumami.

Collected specimens were determined to species level using the keys provided by Hooker (1883), Kanjilal & Bor (1939), Hajra, *et al*. (1996), Grierson & Long (1999), and Jagtap &

Singh (1999). Finally, their identity were verified by matching and CAL and ASSAM. Also, through the consultation with Dr. David Middleton of Royal Botanic Garden Edinburgh.

ENUMERATION

Hoya R. Brown [Apocynaceae : Asclepiadoideae)

Twining, pendulous or rambling and rooting shrubs, occasionally epiphytic, rarely erect. Leaves opposite, thick and fleshy or thickly coriaceous. Flowers in axillary, terminal or lateral umbelliform cymes. Calyx small, inconspicuous, 5-partite. Corolla tube widely campanulate to flattened or reflexed; lobes 5, fleshy or waxy, spreading to reflex; gynostegium large and showy; corona of 5 fleshy membranous or horny processes fused to the stamina column, stellately spreading or ascending, often concave on the upper surface; staminal column short. Follicles 1 or 2, slender.

1a. Inflorescence terminal, or terminal and axillary — — — — — — 2

1b. inflorescence axillary umbels — — — — — — — — — — 4

2a. Leaves terete — — — — — — — — — — *H. linearis*

2b. Leaves flat — — — — — — — — — — — — 3

3a. Lamina rhombic-ovate to rhombic-lanceolate; petiole < 0.4 cm — *H. polyneura*

3b. Lamina oblong, oblanceolate; petiole more than 1 cm — — *H. multiflora*

4a. Leaves very small, rarely up to 2.5 cm long — — — — *H. vaccinioides*

4b. Leaves very narrow, more than 2.5 cm long — — — — — — 5

5a. Leaves narrowly oblanceolate; nerves hardly visible — — *H. longifolia*

5b. Leaves elliptic or lanceolate; nerves distinct — — — — *H. arnottiana*

Hoya arnottiana Wight, Contr. Bot. India 37. 1834; Hooker *f*., Fl. Brit. Ind. 4: 60. 1883; Kanjilal *et al*., Fl. As. 3: 306. 1939; Watson in Grierson & Long, Fl. Bhutan. 2.2: 719-720. 1999; Jagtap & Singh, Fasc. Fl. Ind. 24: 96. 1999; Giri *et al*., Mater. Fl. Aruna. Pradesh. 2: 167. 2008.

Lofty climbing, glabrous shrubs. Leaves elliptic or lanceolate, 8-14 x 3.8-6.5 cm, thick, coriaceous, apex acute or acuminate, base rounded, nerves distinct; petiole up to 2 cm long. Flowers creamy in umbels, axillary; peduncle long or short stout, pedicles long. Coronal process white, large exceeding the tube. Follicles slender paired, 15-16 cm long, apex blunt.

Flowers & Fruits: May – December. **Exsiccatae**: Suruhoto (Zunheboto), M0942.

Habitat: On moist rocky slopes in shady places in tropical semi-evergreen deciduous forest.

Distribution: Nepal, India [Upper Assam, Arunachal Pradesh, Sikkim and Nagaland]. Endemic to Eastern Himalaya.

Hoya linearis Wallich *ex* D. Don, Prodr. Fl. Nepal. 130. 1825; Hooker *f*., Fl. Brit. Ind. 4: 53. 1883; Watson in Grierson & Long, Fl. Bhutan. 2.2: 716. 1999; Jagtap & Singh, Fasc. Fl. Ind. 24: 104. 1999; Giri *et al*., Mater. Fl. Aruna. Pradesh. 2: 168. 2008.

Epiphytic undershrubs. Stem pendulous, branches pubescent. Leaves straight, terete, 3-4.8 x 0.2-0.3 cm, apex acute, base rounded or truncate. Flowers white in umbels, terminal, short

PLATE - I: Diversity of *Hoya* species recorded from Tuensang and Zunheboto district of Nagaland. **Fig. A.** *H. arnottiana* Wight; **Fig. B.** *H. linearis* Wallich *ex* D. Don; **Fig. C.** *H. longifolia* Wallich; **Fig. D.** *H. multiflora* Blume (in fruit); **Fig. E**. *H. polyneura* Hooker f.; **Fig. F.** *H. vaccinioides* Hooker f.

peduncle. Coronal process white. Follicles single, slender, straight, linear-lanceolate, 5-7 cm long, glabrous.

Flowers & Fruits: August – December. **Exsiccatae**: VK (Zunheboto), M0223.

Habitat: Grows on big tree branches in tropical deciduous forest.

Distribution: Nepal, India [Arunachal Pradesh, Sikkim and Nagaland]. North Myanmar.

Hoya longifolia Wallich *ex* Wight, Contr. Bot. India 36. 1834; Hooker *f*., Fl. Brit. Ind. 4: 56 – 57. 1883; Kanjilal *et al*., Fl. As. 3: 304. 1939; Watson in Grierson & Long, Fl. Bhutan. 2.2: 716 – 717. 1999; Jagtap & Singh, Fasc. Fl. Ind. 24: 107. 1999; Giri *et al*., Mater. Fl. Aruna. Pradesh. 2: 168. 2008.

Epiphytic creeping shrub. Branches glabrous, long, pendulous. Leaves narrowly oblanceolate, 3.5-12 x 1.2-2.4 cm, apex acuminate, base acute, fleshy, glabrous; petiole stout, up to1.5 cm long. Flowers whitish in umbels, axillary, long peduncle. Coronal process stellate, spreading. Follicles single, slender, 7.5-8 cm long, linear, glabrous.

Flowers & Fruits: May – December. **Exsiccatae:** Mishilimi (Zunheboto) M0620

Habitat: Grows on big tree trunks at the base in tropical semi-evergreen forest.

Distribution: Himalayas; India [Arunachal Pradesh, Sikkim, Meghalaya (Khsai Hills) and Nagaland], Thailand.

Hoya multiflora Blume, Catalogus 49. 1823; Hooker *f*., Fl. Brit. Ind. 4: 52 – 53. 1883; Kanjilal *et al*., Fl. As. 3: 302 – 303. 1939; Jagtap & Singh, Fasc. Fl. Ind. 24: 108. 1999.

Epiphytic crect shrub. Stem glabrous, pale gray, yellowish when dry. Leaves oblong, oblanceolate, 5-18 x 2.1-5.2 cm, apex broadly acuminate, base cuneate, fleshy, glabrous, pale yellowsish when dry; petiole stout, 0.5-2.3 cm long. Flowers in many flowered terminal or axillary umbellate cymes. Coronal process hairy. Follicles linear, lanceolate, glabrous, slightly curved**,** 5.3 – 13.2 cm long.

Flowers & Fruits: April – November. **Exsiccatae**: Chare old village (Tuensang district), SDNU287

Habitat: Found growing epiphytic on *Lithocarpus* sp.at an altitude about 1270m from msl in Subtropical evergreen forest near road side. **GPS location:** N 26º 17´ 06.2" E 94 º 36´ 56.2"

Distribution: India. Endemic to Nagaland.

Hoya polyneura Hooker *f*. in Hooker *f*., Fl. Brit. Ind. 4: 54. 1883; Watson in Grierson & Long, Fl. Bhutan. 2.2: 717 – 718. 1999; Jagtap & Singh, Fasc. Fl. Ind. 24:117. 1999; Giri *et al*., Mater. Fl. Aruna. Pradesh. 2: 170. 2008.

Epiphytic undershrubs, glabrous, branches long. Leaves sub-sessile, rhomboid-ovate or lanceolate, 5.4-6.5 x 2.4-3.5 cm, apex acuminate, base obtusely rounded, very fleshy; numerous obliquely parallel lateral nerves arise from midrib; petioles 0.2-0.3 cm long. Flowers reddish purple in umbels, axillary, very shortly peduncle. Coronal processes red-purple. Follicle single, slender, about 10 cm long, falcate, smooth.

Flowers & Fruits: April – October. **Exsiccatae**: Suruhoto (Zunheboto), M0892.

Habitat: Grows creeping on tree trunks in tropical semi-evergreen deciduous forest

Distribution: India [Arunachal Pradesh, Sikkim Himalaya and Nagaland], Bhutam. Endemic to Eastern Himalaya.

Hoya vaccinioides Hooker *f*. in Hooker *f*., Fl. Brit. Ind. 4: 56. 1883; Kanjilal *et al*., Fl. As. 3: 304. 1939; Jagtap & Singh, Fasc. Fl. Ind. 24: 121. 1999.

Epiphytic undershrubs, quite glabrous, branches long, slender pendulous. Leaves elliptic-lanceolate, 1.5-2.5 x 0.4-0.6 cm long, apex sub-acute, base rounded or truncate, fleshy, nerves obscure. Flowers creamy white in umbels, terminal, short peduncle. Coronal process pink-red. Follicles long, slender, about 7.5 cm long, straight.

Flowers & Fruits: August-December. **Exsiccatae**: Naltoqa. (Zunheboto), M0202.

Habitat: Grows creeping on big tree branches in tropical evergreen and semi evergreen forest.

Distribution: India: Upper Assam, Arunachal Pradesh (Mishmi Hills) and Nagaland. Endemic to North-East India.

DISCUSSION

Out of the recorded six species, two [*H. arnottiana* & *H. polynura*] are endemic to the Eastern Himalaya, *H. vaccinioides* is endemic to the North-Eastern region of India ad *H. multiflora* is endemic to Nagaland. This expresses the restricted distribution of different species of *Hoya*. The two other species [*H. linearis* & *H. longifolia*] are only little more distributed outside the Himalayan territory. It is observed that except *Hoya linearis* all the other five species *Hoya arnottiana*, *H. longifolia*, *H. multiflora*, *H. polynuera* and *H. vaccinioides* are rare in occurrence with a single population only of each of the species in their natural forested habitat of the study area. Due to unregulated activities such as logging, Jhuming practice and road constructions the natural trees in the forest which are the habitats for these obligate *Hoya* species are destroyed resulting in decrease in their population in the wild. Conservation of unchanged natural vegetation in the forest is strongly recommended for the survival and protection of these beautiful *Hoya* species as well as for other epiphytes.

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