

***Pentasacme wallichii* Wight. (Family: APOCYNACEAE): A First Record to Bhutan**Kezang Tobgay¹, Nima Gyeltshen¹, Sangay Dema¹, Tandin Wangchuk², and Choki Gyeltshen^{1,*}**Abstract**

In Bhutan, the genus *Pentasacme* Wall. ex Wight. had been represented by only one species, *Pentasacme pulcherrima* Grierson & Long, which is mainly distributed in shaded steep banks and gully walls in subtropical rainforest at 250-550 m above sea level. During the ongoing 100 Trees species seed conservation project in Bhutan with Millennium Seedbank, Kew, specimens of *Pentasacme* Wall. ex Wight. were collected from warm broadleaved forest slopes of Zhemgang and Mongar districts at elevation of 680-705 m. These specimens were later identified as *Pentasacme wallichii* Wight., which is a new record to Bhutan. A description, key to species, and other information of the species are provided to simplify its identification.

Keywords: Bhutan, eastern Himalaya, *Pentasacme wallichii***Introduction**

Bhutan is situated between China in the north and India in the south with elevation ranging from 97 m to 7570 m above sea level. The country is located in one of the global biodiversity hotspots, the Eastern Himalaya, which is bestowed with diverse flora and fauna. However, there are limited taxonomic studies (Gyeltshen *et al.*, 2018) in the country.

Pentasacme Wall. ex Wight. is a unique Asiatic genus of family *Apocynaceae* consisting of four species (Rahman and Wilcock, 1991), and is sparingly distributed in the western and east-

ern Himalaya region including Nepal, Bhutan, Khasia Hills of India, Bangladesh, Myanmar, southern China, Vietnam, Malaysia, Thailand and Singapore (Rahman and Wilcock, 1990, 1991; Airy, 1973). Not much information on *Pentasacme* is available in Bhutan other than what is available in the Flora of Bhutan, 1999. The country had so far been represented by only one species, *Pentasacme pulcherrima* Grierson and Long, which is found in the south-eastern Bhutan (Grierson and Long, 1999). Thus, with the reporting of *Pentasacme wallichii* Wight., the country is represented by two *Pentasacme* species. *P. wallichii* is distributed in Bangladesh, India, Nepal, and now in Bhutan.

Materials and Method

Herbarium specimens of *Pentasacme wallichii* were collected from the slopes of Ngangla in Zhemgang district at an elevation of 680 to 705 m and Medan in Mongar district. Zhemgang is dominated by warm broad-leaved forests. The

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average annual temperature is 22°C and average annual rainfall is 254 mm (National Statistics Bureau, 2011).

Pentasacme wallichii is currently recorded only in the Zhemgang and Mongar districts by the authors. Attempts were made to locate more populations of *P. wallichii* in similar habitats and elevations. However, no other populations could be located elsewhere. The species

was determined using descriptions provided by Rahman and Wilcook (1991) and Grierson and Long (1999). Herbarium specimens were compared with herbarium materials available in the National Herbarium (THIM), under the National Biodiversity Centre, Bhutan Biodiversity Portal (www.biodiversity.bt), and other literatures accessible to the authors. The specimens are deposited at THIM.

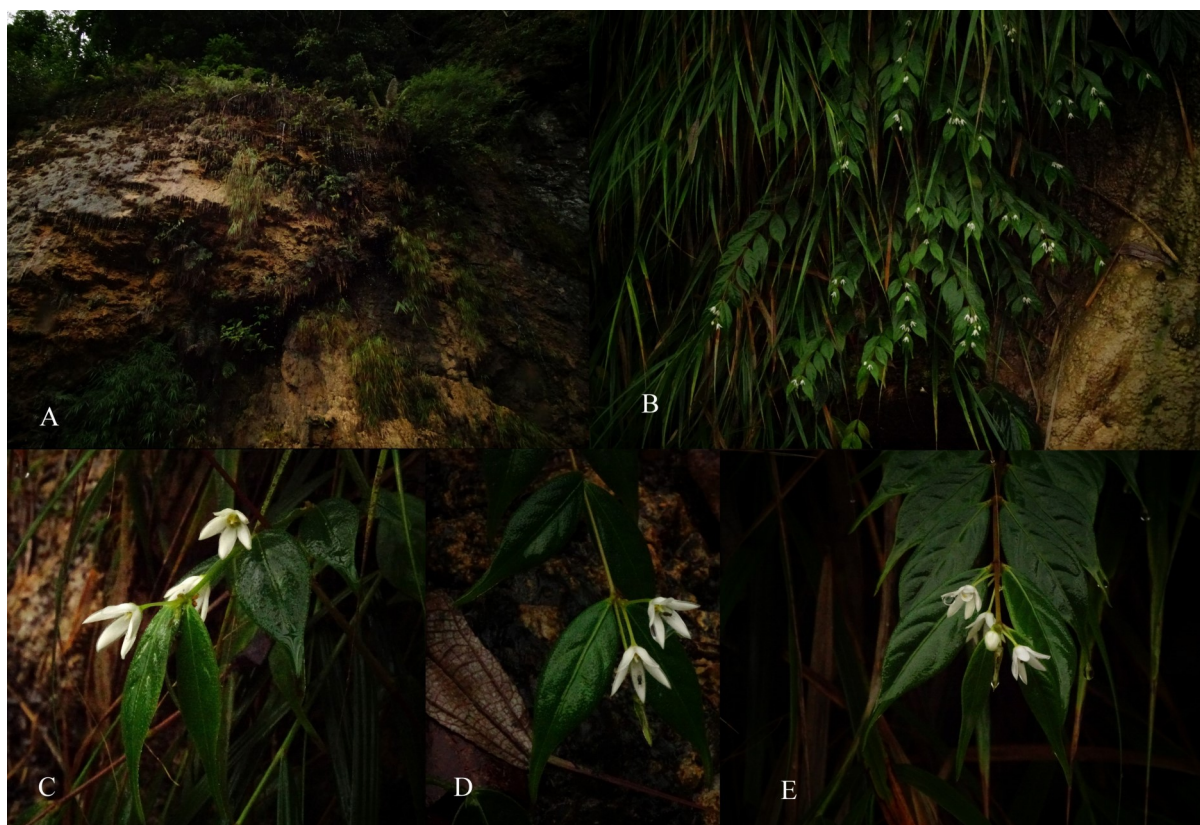


Figure 1: *Pentasacme wallichii* Wight.; A. habitat; B. habit; C., D., and E. flowers

Results and Discussion

Taxonomic accounts

Pentasacme Wall. ex Wight. is an erect or sometime pendulous, rheophytic, and tufted perennial herb with numerous arching stems from the base. Leaves are opposite, linear-lanceolate or ovate-elliptic, acuminate, membranous, sub-sessile, and cuneate with glands present at the junction of petiole and lamina. Cymes are raceme like or umbel-like, solitary at the nodes, on alternate side of the axis. Peduncles are very short; pedicel thread-like, and

bracts glabrous. Flowers white, small or large. Calyx lobes ovate, acuminate, lanceolate, with basal glands. Corolla rotate or campanulate; tube short; lobes ovate-acuminate or oblong-lanceolate, tip obtuse, glabrous, twisted to right. Corona cup-shaped, inserted on corolla tube. Staminal column very short, anthers large, apex membranous; stigma sessile, and are conical concealed by anthers. Pollinia beaked, erect, solitary in each anther locus, ovoid. Follicles cylindric-lanceolate, smooth. Seed with tuft of hairs at one end.

Pentasacme wallichii Wight, Contr. Bot. India (1834) 60; Decne. in DC., Prodr. 8 (1844)

627; Delessert. Icon. Select. Plant. 5 (1846) t. 87; Hook, f., Fl. Brit. India 4 (1883) 28; Wallich N., CAT. 8235 India; 12. Hara, Enum Fir. Pl. Nepal 3 (1982) 87; Rahman, J. Asiatic Soc. Bangladesh 14, 2 (1988) 97. Type: Bangladesh, Sylhet, Wallich Asclep. no. 74 (E).

Materials examined

Bhutan, Zhemgang, Panbang to Ngangla road, (Elevation: 705 m; 26°53'59.3" N, 91°02'79.1" E). Herbarium specimens were collected on November 5, 2016 by K. Tobgay, N. Gyeltshen, and T. Wangchuk. Bhutan, Mongar, Medan, (Elevation: 978 m; 27°03'32.03" N, 91°11'47.4" E). Herbarium specimens were also

collected on November 15, 2016 by K. Tobgay, N. Gyeltshen, and T. Wangchuk. The specimens are deposited at the National Herbarium (THIM) under NBC, Bhutan; Tobgay et al. 208-209 (THIM) (Figure 2).

Description: *Pentasacme wallichii* Wight. is a small erect or pendulous, rheophytic herb, 40-60 cm long. Stems and branches slightly stout, glabrous. Petioles 2-4 mm long. Leaves ovate-elliptic, acuminate, tip subacute, lamina 5-8 x 1.5-2.5 cm, midrib and nerves pubescent beneath. Cymes few-flowered; pedicels 1-1.5 cm long; bracts 2 x 1 mm, linear-lanceolate, tips acute. Calyx lobes ovate-lanceolate, 2.5 x 2 mm. Corolla deeply lobed; lobes oblong-lanceolate, 10-13 x 2-3 mm. Coronal scales adnate to the corolla tube between the lobes, small, never exceeding the staminal column, tip acute. Anthers ovate-acumin

ate. Pollinia ovate-lanceolate. Corpusculum narrow, longer than translator arms. Staminal column about 2 mm long. Stigma exerted above anthers. Follicles spindle shaped, c. 5.2 cm long, tapering at both ends, slightly stout, smooth.

Ecology: In clumps, growing on limestone rocks or cliff ledges by running water. Flowering and fruiting: May-August (November). New to Bhutan (Figure 3).

Distribution: India, Nepal, and Bangladesh and Bhutan (Figure 4).

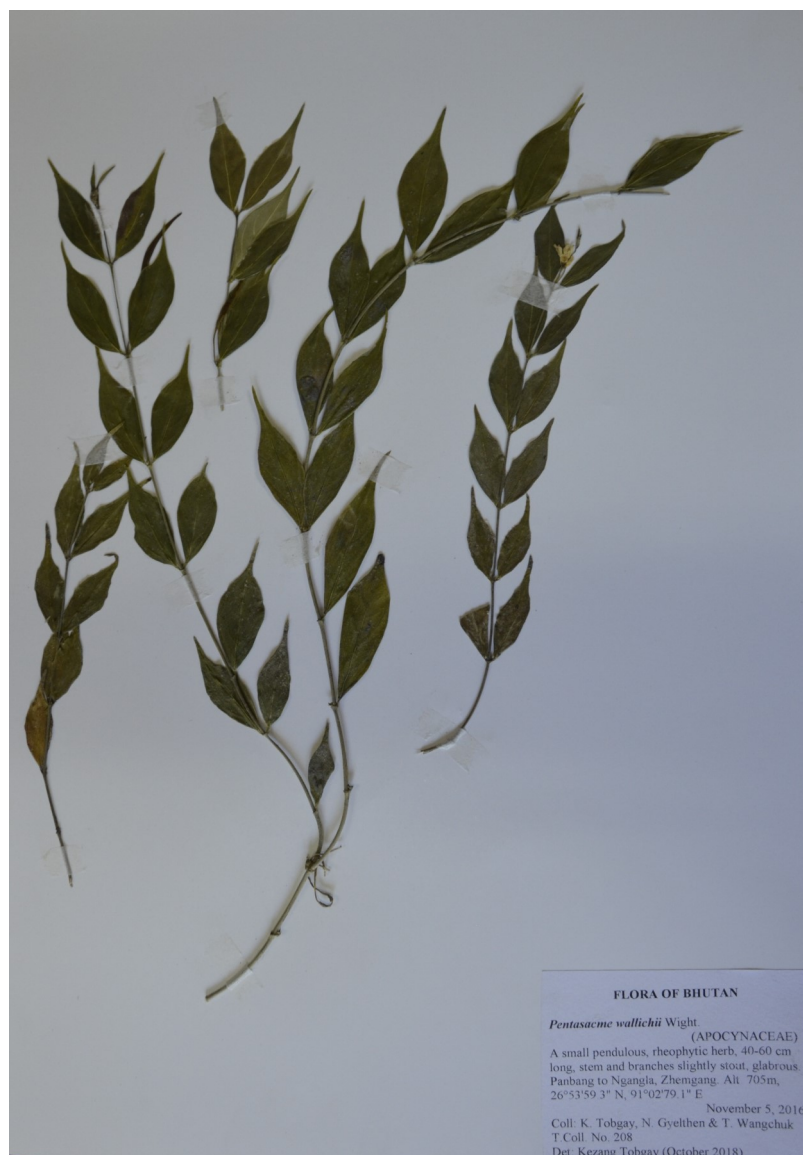


Figure 2: Herbarium specimen of *Pentasacme wallichii* deposited at National Herbarium (THIM) in the National Biodiversity Centre, Bhutan

Representative specimens

BANGLADESH. Sylhet, locality not attached, Wallich Asclep. no. 74 (E, holo; K, iso), Wallich Cat. no. 8235 (CGE, E, K, K-W); Sylhet, Wallich s.n. (K); E Bengal, locality not attached, Griffith 3774 (K). -INDIA. Western Himalaya, Kumaun: Sarju Valley, alt. 4000-5000 ft., 14.8.84, Duthie 3147 (E), Inayet (Duthie's collector) 24687 (CAL, K); near *Garrua*, Reid s.n. (E); Khar Bazar, Bilkasar 2319 (E); W Kapkot, alt. 3500 ft., Strachey & Winter-Bottom s.n. (K); locality not attached, Stewart 21342 (E), Strachey & Winter-Bottom 239 (CAL).

-NEPAL. W Nepal, Bim Khola, east of Kutharpekot, 27.4.1954, Stainton et al. 272 (BM, E); Jaldi Gad, Bheri Valley, alt. 6500 ft., 28.6.1966, Stainton 5476 (E); Barpak, 16.10.88, Stainton 8463 (E).

Taxonomic notes

Pentasacme wallichii Wight., belonging to the order Gentianales, family Apocynaceae, under the genus *Pentasacme* Wall. ex Wight. was described from Bangladesh by Sylhet, Wallich Asclep. no.74 (E, holo; K, iso), Wallich Cat. No. 8235 (CGE, E, K-W). This species is so far known only from Asia, and is endemic to the Himalaya.

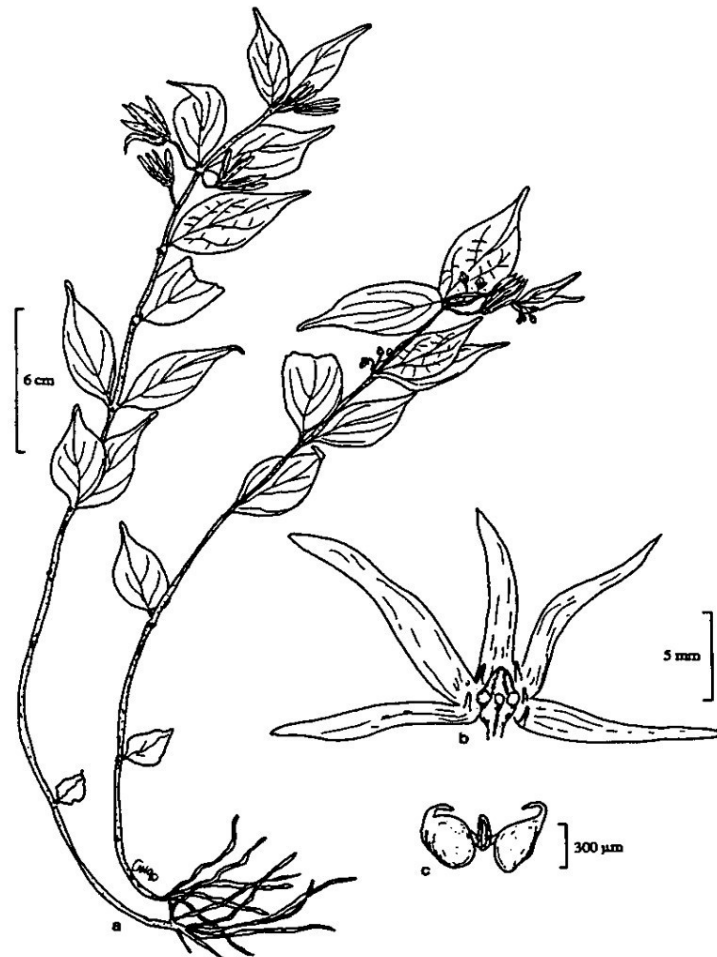


Figure 3: *Pentasacme wallichii* Wight. a. Habit; b. corolla cut open to reveal coronal scales and gynostegium; c. pollinarium (Stainton 5476, E), (Rahman & Wilcook, 1991)

Table 1: Key characteristics of *Pentasacme wallichii* and *P. pulcherrima*

Key features	<i>P. wallichii</i>	<i>P. pulcherrima</i>
Stem	Stem and branches slightly stout, glabrous	Stem little-branched and pubescent
Leaf	Ovate-elliptic, acuminate, tip sub-acute, lamina 5-8 x 1.5-2.5 cm, midrib and nerves pubescent beneath	Ovate to ovate-lanceolate lamina 6-13 x 1.6-4cm, apex acuminate to narrowly acute, base cuneate
Inflorescence	Corolla deeply lobed, 10-13 x 2-3 mm long, lobes oblong-lanceolate with acute tips	Corolla tube oblong-lanceolate, 20-30 x 2.5-3.5 mm long, lobes lanceolate with obtuse tips
Petioles	Petiole 2-4 mm long	Petiole 2-7 mm long



Figure 4: Asia map showing existing and new localities of *Pentasacme wallichii* Wight.

Conclusion

With the record of *Pentasacme wallichii*, Bhutan now has two species under the genus *Pentasacme*: *P. wallichii* and *P. pulcherrima*. *P. wallichii* was not recorded before in the Flora of Bhutan and with such new records being reported, there is a need to update flora documentation

in Bhutan. *P. wallichii* is reported for the first time from the two districts of Bhutan namely, Zhemgang and Mongar from an elevation of 680 to 705 m in warm broadleaved forests. We expect to find this species in few other locations in the country since there are areas which are difficult to access. The species has not been assessed by IUCN.

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