



A new species of *Strobilanthes* (Acanthaceae) from the Western Ghats, India

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ABSTRACT: *Strobilanthes scopulicola*, a new species from the collections of the high altitude montane grasslands of Nilgiri Biosphere Reserve in Western Ghats of India is described and illustrated. Photographs, details of phenology, distribution, pollen morphology and similarity with related species were also provided.

KEY WORDS: Acanthaceae, India, pollen, *Strobilanthes lanata*, *S. lawsonii*, taxonomy, Wayanad, Western Ghats.

INTRODUCTION

The genus *Strobilanthes* Blume consists of ca. 450 species (Mabberley, 2017) confined to the south and southeast of Asia and Melanesia (Carine and Scotland, 1998; Carine and Scotland, 2002). In India, the genus includes ca. 150 species (Karthikeyan *et al.*, 2009), of which more than 60 occur in south India alone (Carine and Scotland, 2002; Venu, 2006), however, recent findings suggest the unexplored diversity of *Strobilanthes* in south India (Scotland, 1998; Santhosh Kumar *et al.*, 2002; Carine *et al.*, 2004; Gopalan and Chithra, 2008; Mascarenhas and Janarthanan, 2013; Sasidharan *et al.*, 2016; Josekutty *et al.*, 2016, 2018; Augustine *et al.*, 2017; Biju *et al.*, 2017; Thomas *et al.*, 2018, 2019a, 2019b, 2019c, 2020). During the systematic study of *Strobilanthes* from south India for the past twelve years, the authors collected specimen of *Strobilanthes* which grew along the open rocky cliffs in the high altitude montane grasslands of Nilgiri Biosphere Reserve. The plant possessed features such as ovate to lanceolate-ovate leaves, much elongated and uninterrupted to interrupted spikes with tawny indumentum, large, campanulate and deep blue corollas and apically pubescent ovaries. Closer examination of the specimen revealed similarity to *S. lawsonii* Gamble and *S. lanata* Nees. Furthermore, comparison of the specimens with herbarium specimens in India and abroad and critical study of relevant literature revealed that it did not match with any of the known species of *Strobilanthes* including *S. lawsonii* and *S. lanata* (Carine *et al.*, 2004; Venu 2006). Therefore, we describe it as a new species.

TAXONOMIC TREATMENT

Strobilanthes scopulicola A.K. Pradeep, Sinj. Thomas, B. Mani & Britto, *sp. nov.* **Fig. 1**

Type: INDIA. Nilgiri Biosphere Reserve, Kerala, Wayanad, Meppadi, 1750 m a.s.l., 11°29'17" N, 76°06'49" E, 15 December 2014, Pradeep A. K. & Bince Mani 68241 (holotype, RHT!).

Diagnosis: *Strobilanthes scopulicola* is allied to *S. lawsonii* and *S. lanata*, but differs by ovate to lanceolate-ovate leaves (not ovate or elliptic), pubescence on adaxial leaf surface (not glabrous), bracts with acute apex (not acuminate) and adaxial pubescence (not glabrous), widely elliptic corolla lobes (neither ovate nor triangular or orbicular), stamens with villous filaments (not sparse hairy), glabrous stigma (not pubescent) and subprolate pollen grains with two ribs completely encircling the grain (neither prolate nor all the ribs fused at poles).

Description: Erect, isophyllous, semelparous shrubs, up to 2.5 m high; stem terete, lenticellate, profusely branched, covered with dense tawny hairs. Leaves opposite, slightly asymmetrical; petiole 10–35 mm long, slightly canaliculate, brown tomentose; lamina ovate to lance-ovate, 70–155 × 22–63 mm, coriaceous, base shortly decurrent, apex long acuminate, up to 50 mm long, margin entire, dense tawny woolly beneath, pubescent on veins above; lateral veins 8–13 pairs, impressed above, raised beneath. Inflorescences axillary or terminal, 65–110 × 4–5 mm, narrow uninterrupted to interrupted compound spikes; peduncle terete, branched, covered with dense tawny indumentum; bracts ovate, ca. 7 × 4 mm, shorter than calyx at anthesis, base rounded, apex acute, margin entire, abaxial surface and margin with tawny woolly indumentum, adaxial surface pubescent; bracteoles ca. 6 × 1 mm, linear, brown woolly outside. Calyx 6–9 mm long, 5-lobed, tube 3–5 mm long, lobes ca. 3 × 1 mm, narrowly acute, unequal with two lobes shorter than the rest, woolly outside and pubescent inside, glandular pubescent in infructescence. Corolla blue, 27–32 mm long, slightly curved and widening from

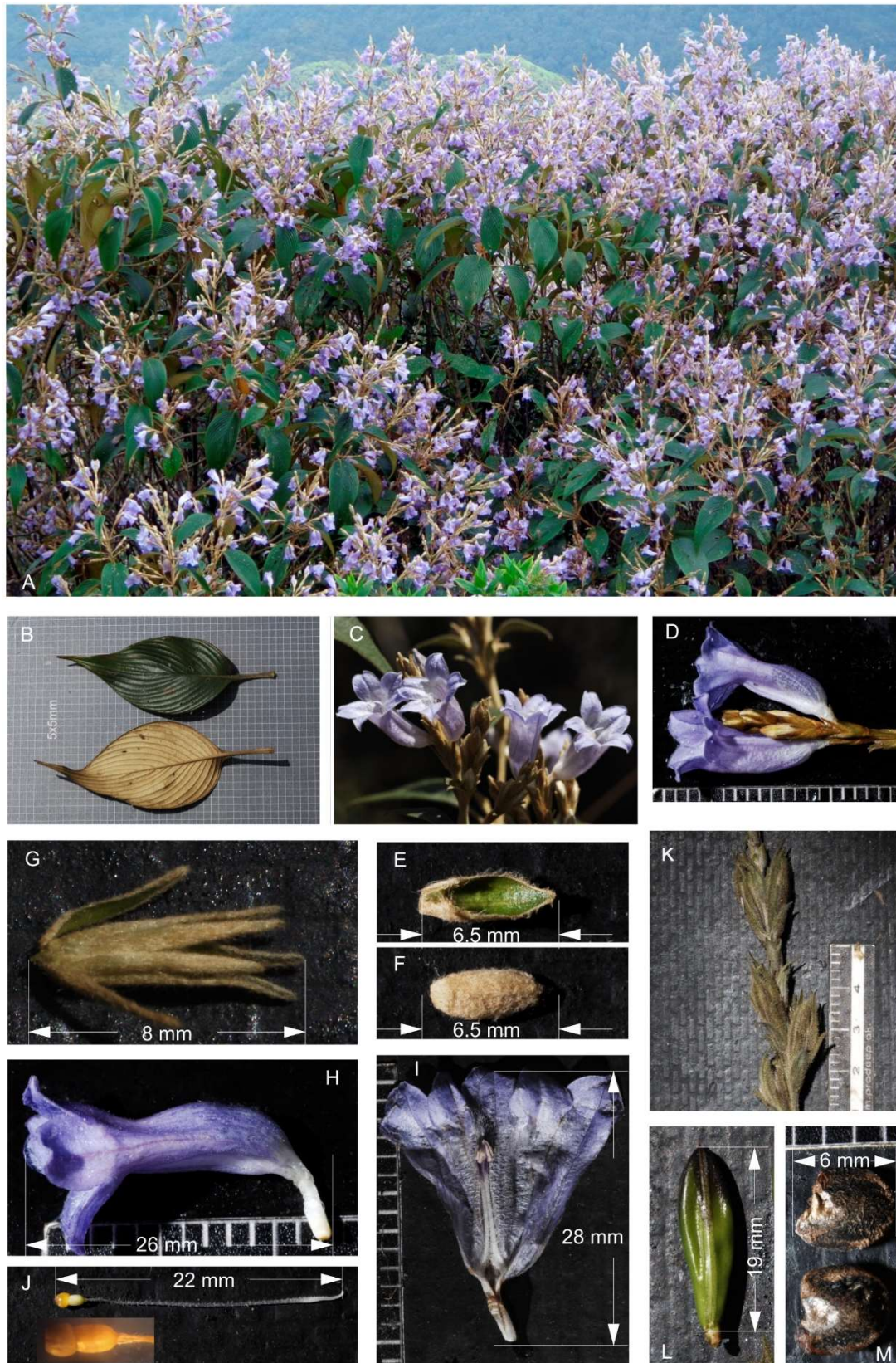


Fig. 1: *Strobilanthes scopulicola*. **A.** Habit; **B.** Leaves: adaxial and abaxial view; **C–D.** Inflorescence; **E.** Bract: adaxial surface; **F.** Bract: abaxial surface; **G.** Bracteole and calyx; **H.** Corolla; **I.** Corolla split open showing the included stamens; **J.** Pistil (inset: ovary with apical pubescence); **K.** Infructescence; **L.** Young fruit; **M.** Seeds.

**Table 1.** Comparison of pollen characteristics of *Strobilanthes scopulicola*, *S. lawsonii* and *S. lanata*.

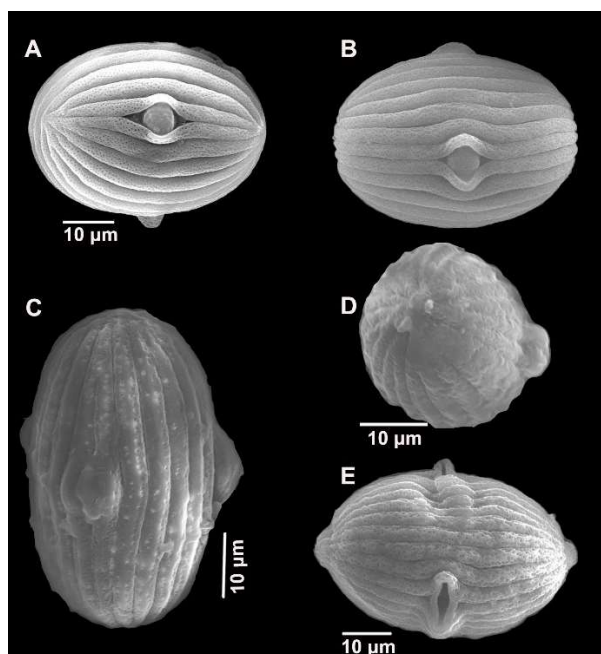
Species	Pollen type†	Equatorial view	P (μm)	E (μm)	P:E ratio	Ribs (nos.)
<i>S. scopulicola</i>	2	subprolate	43–45	34–36	1.25	21–23
<i>S. lawsonii</i> †	1	prolate	54–61	40–47	1.30	21–27
<i>S. lanata</i> †	1	prolate	72–76	43–50	1.70	24–28

†Type 1: all ribs fuse at the poles; type 2: two or three ribs completely encircle the poles (Carine and Scotland, 1998).

Table 2. Diagnostic characters of *Strobilanthes scopulicola* and allied taxa.

Characters	<i>S. scopulicola</i>	<i>S. lawsonii</i> †	<i>S. lanata</i> †
Adaxial leaf indumentum	pubescent	glabrous	glabrous
Spikes at anthesis	uninterrupted to interrupted	interrupted	uninterrupted
Bract apex	acute	acuminate	acuminate
Calyx	6.0–8.5 mm long	5.6–6.5 mm long	7.1–13.0 mm long
Corolla lobes shape	widely elliptic	ovate to broadly triangular	ovate to sub-orbicular
Filament pubescence	dense villous throughout	sparse white hairs for 0.7–0.8 of length	pubescent below for more than half the length
Pubescence on ovary apex	long hairy pubescent	glabrous	sparsely pubescent
Pubescence of style	pubescent throughout	sparsely pubescent	sparsely pubescent
Pubescence of stigma	glabrous	pubescent	pubescent

†Carine *et al.* (2004).

**Fig. 2:** SEM micrographs of pollen grain of *Strobilanthes scopulicola* (A–B), *S. lawsonii* (C–D) and *S. lanata* (E).

basal tube, 5-lobed; tube 6–7 mm long, glabrous, white; throat campanulate, 16–18 mm long, deep blue, with dense short pubescence on outer surface and long white hairs on inner surface; lobes equal, 5–7 × 6–7 mm, widely elliptic, deep blue, apex rounded to obtuse, with dense pubescence on outer surface. Stamens 2, included, basally attached to corolla; filaments 10–11 mm long, villous throughout; anthers ca. 2 × 1 mm, bithecate. Ovary ca. 2 × 1 mm, apex pubescent, 2-locular with two ovules per locule; style 18–20 mm long, filiform, pubescent throughout; stigma linear, ca. 2 mm long, simple, glabrous. Infructescence 100–200 × 10–20 mm, densely glandular hairy; capsule 20–23 × 7–8 mm, elliptic, glabrous. Seeds 2, 5.0–6.5 × 5.0 mm, tawny lanate.

Etymology: The specific epithet “scopulicola” refers to the habitat rock cliffs of high altitude montane grasslands where the new species is exclusively found.

Phenology: Flowering November–January; seed dispersal from mid-April onwards.

Habitat and distribution: *Strobilanthes scopulicola* grows along rocky cliffs in grasslands at an elevation of 1600–2050 m a.s.l. in the northern part of the Nilgiri Biosphere Reserve.

Pollen Morphology: Pollen grains are ellipsoid (Fig. 2A–B), tricolporate and contain pseudocolpi. The pollen is subprolate in outline and exine divided into longitudinal ribs which are close, straight, tectate and two of them completely encircle the pollen. Other pollen features are also given for descriptive purposes (Table 1).

Notes: The new species is closely related to *S. lawsonii* by similarities such as tawny indumentum on leaf, stem and inflorescence, leaves with acuminate apex, narrow uninterrupted or interrupted spikes, bracts being shorter than calyx, campanulate corolla and included stamens. The new taxon also shows relationships with *S. lanata* in characters such as entire leaves with dense tawny woolly abaxial indumentum, campanulate corolla and included stamens. However, the new species could easily be set apart from both taxa by several vegetative and floral features (Fig. 3; Table 2).

The variability of pollen morphology in *Strobilanthes* is a potentially useful character to delimit taxa in this group (Carine and Scotland 1998, Deng *et al.* 2006). The close allies of the new taxon, such as *S. lawsonii* and *S. lanata* belong to pollen type 1 (Carine and Scotland 1998) in which the ribs fuse at the poles and none of them completely encircle the pollen. The pollen of *S. scopulicola* belongs to type 2 in which some of the ribs completely encircle the poles. A comparison of pollen characteristics with the related taxa, *S. lawsonii* and *S. lanata*, is presented (Fig. 2 C–E, Table 1).



Fig. 3. Flowering branch of *Strobilanthes scopulicola* (A) and *S. lanata* (C) and image of the type specimen of *S. lawsonii* (© the Board of Trustees of the Royal Botanic Gardens, Kew) (B)

Specimens examined: *Strobilanthes scopulicola*: INDIA. Nilgiri Biosphere Reserve, Kerala, Wayanad, Meppadi, 20 February 2015, Pradeep A. K. 68242 (RHT! TAI!); 25 April 2015, Pradeep A. K. 68414 (RHT!). *Strobilanthes lawsonii*: INDIA. Tamilnadu, Nilgiri Distr., Sispara Ghat, November 1883, Gamble 13387 (K! lectotype); Sispara, June 1884, Gamble 14252 (K!); 19 November 1890, Anonymous s. n. (MH!); Coonoor, Sims Park, 16 April 1900, Bourne s. n. (K!). *Strobilanthes lanata*: India. Tamilnadu, Nilgiri Distr., Sispara, 25 April 1870, Beddome 119 (K!); Sispara Ghat, Anonymous s. n. (MH!); Botanic Garden Ooty, 15 April 1950, Curator s. n. (MH!).

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