

## Research article

# ***Sonerila longipedunculata* sp. nov., a new species of Melastomataceae from the southern Western Ghats, India, with additional notes and lectotypification of *Sonerila travancorica***

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**Abstract.** A new species of Melastomataceae, *Sonerila longipedunculata* Resmi & Nampy sp. nov., is described from the southern Western Ghats, India. It is morphologically close to *S. travancorica*, but differs by the tuberous root stock, fleshy stems, ovate to cordate lamina, longer, angular peduncles, 3-ribbed hypanthium, ovate-elliptic petals, acute anthers, and 3-ribbed capsules. Detailed description, distribution map, and photographic images are provided. The morphological differences with relevant species are discussed. The status of the new species is provisionally assessed here as ‘critically endangered’ according to IUCN Red List Categories and Criteria. The name *Sonerila travancorica* is lectotypified and its identity is discussed. The status of *Sonerila longipetiolata* is discussed and is synonymised under *S. travancorica*.

**Keywords.** Sonerileae, Kerala, *Sonerila longipetiolata*, tuberous, South Wayanad forest division.

Resmi S. & Nampy S. 2021. *Sonerila longipedunculata* sp. nov., a new species of Melastomataceae from the southern Western Ghats, India, with additional notes and lectotypification of *Sonerila travancorica*. *European Journal of Taxonomy* 733: 160–174. <https://doi.org/10.5852/ejt.2021.733.1231>

## Introduction

*Sonerila* Roxb. (Melastomataceae Juss., Sonerileae Triana) is a taxonomically complex genus with around 180 recognised taxa of terrestrial or low epiphytic herbs and sub-shrubs of shady habitats (Resmi & Nampy 2018). The genus is distributed in the tropical Indo-Pacific region (Cellinese 1997), and is easily recognisable by its generally trimerous flowers, mostly uniparous (scorpioid) cymes, and 3-locular, inferior ovary. Clarke (1879) recognised 43 species in the *Flora of British India*, ca 20 species of which are found within the present political boundaries of India. Currently, there are 62 species and two varieties reported in India, with the highest diversity (53 species and two varieties) in the Western Ghats, one of the major centres of diversity for the genus (Resmi *et al.* 2018).

During botanical explorations in 2017–2019, as part of a taxonomic revision of *Sonerila* in India, an unknown species was collected in the southern Western Ghats, from the Kattukunnu of Banasura hills, within the South Wayanad forest division, Kerala. Following a careful review of herbarium specimens and taxonomic literature, we conclude that this species is new to science. The new species, *Sonerila*

*longipedunculata* Resmi & Nampy sp. nov., is described and compared with *Sonerila travancorica* Bedd., a species described from the Travancore mountains by Beddome (1871). Further scrutiny revealed that, even though later researchers included the latter species in their studies (Triana 1871; Clarke 1879; Cogniaux 1891; Stapf 1892; Gamble 1919; Nair & Henry 1983; Mohanan & Henry 1994; Mohanan & Sivadasan 2002; Manickam *et al.* 2008), a type had not been designated, and hence we selected a lectotype according to the Shenzhen Code (Turland *et al.* 2018). We also came across the recently described species *S. longipetiolata* Josephine, Manickam, Murugan, Sundaresan & Jothi (Josephine *et al.* 2003), which was differentiated from *S. travancorica* based on size and shape of leaves, texture of indumentum, number of flowers, and apex shape of calyx and corolla. However, a detailed examination of the protologue, type, and live material from the type locality revealed that the vegetative and floral features used to delimit *S. longipetiolata* are variable and overlap with the circumscription of *S. travancorica*. Therefore, we reduce *S. longipetiolata* to a synonym of *S. travancorica*.

## Material and methods

All measurements and morphological character assessments were performed using living samples in the field and cultivated specimens at Calicut University Botanical Garden. Specimens were processed following Vogel (1987) and Forman & Bridson (1989). The study was based on specific literature (Triana 1871; Beddome 1871; Clarke 1879; Cogniaux 1891; Stapf 1892; Gamble 1919; Nair & Henry 1983; Mohanan & Henry 1994; Mohanan & Sivadasan 2002; Josephine *et al.* 2003; Manickam *et al.* 2008). All available Indian specimens of *Sonerila*, including types, were examined in the following herbaria: BM, CAL, CALI, K, MH, TBGT, XCH. Acronyms of herbaria follow Index Herbariorum (Thiers, continuously updated). Specimen images were retrieved from JSTOR Global Plants (<http://plants.jstor.org>). Nomenclature was checked in Tropicos (<http://www.tropicos.org>) and the International Plant Names Index (<http://www.ipni.org>). For the description of taxa, the terminology follows Stearn (1992). Photographs were taken with an EZ4 HD stereo microscope with a 3.0 megapixel digital camera (Leica, Switzerland) and a Stemi 508 stereo microscope (Carl Zeiss, Germany) with an attached AxioCam 105 colour camera. Ecological and geographic distribution data were collected from herbarium labels; the distribution map was created using QGIS ver. 3.12.2 (QGIS 2020). Provisional conservation status assessments were based on guidelines published by the IUCN Standards and Petitions Subcommittee (2019).

## Results

Order Myrtales Juss. ex Bercht. & J.Presl  
Family Melastomataceae Juss.  
Genus *Sonerila* Roxb.

***Sonerila longipedunculata*** Resmi & Nampy sp. nov.  
urn:lsid:ipni.org:names:77214918-1  
Figs 1–3, 4A1–G1

## Diagnosis

Morphologically similar to *S. travancorica* in having caulescent habit, densely pubescent, long petiolate leaves, densely glandular-pubescent hypanthium and abaxially glandular-hairy petals, but differs by its tuberous root stock (vs non-tuberous in *S. travancorica*), fleshy stems with whitish or claret coloured bristles (vs woody stems with long, dense white hairs), 2–4-cm-long internodes (vs 2.5–6.5-cm-long internodes), 5–9-cm-long petioles with dense bristles (vs 2–7-cm-long petioles with long, dense hairs), ovate to cordate lamina with serrate margins (vs ovate to elliptic lamina with serrulate margins), 10–16-cm-long, angular peduncles (vs 3–6-cm-long, terete peduncles), 3-ribbed hypanthium (vs 6-ribbed hypanthium), ovate-elliptic petals with acute to mucronate apex (vs ovate to broadly ovate

petals with mucronate or emarginate apex), acute anthers (vs acuminate to rostrate anthers) and 3-ribbed capsules (vs 6-ribbed capsules).

### Etymology

The epithet '*longipedunculata*' refers to the characteristically long peduncle of the inflorescence of the new species.

### Material examined

#### Type

INDIA • Kerala, Wayanad district, Banasura hills, Kattukunnu; ca 1000 m a.s.l.; growing under wet rocks in grassy slopes; 13 Aug. 2017; *Resmi S. & Santhosh Nampy 151222*; holotype: CALI!; isotype: MH!.

#### Additional material

INDIA • Kerala, Wayanad district, Banasura hills, Kattukunnu; ca 1000 m a.s.l.; on humus-covered soil and rock crevices; 8 Oct. 2017; *Resmi S., Dani Francis & Aswathy Ganga 151239*; CALI!.

### Description

Erect or procumbent perennial herbs, 10–30 cm tall. Root stocks tuberous; tubers globose, 1–1.5 cm in diameter, white to pale green, covered by tufts of roots. Stems sub-terete with shallow grooves arising from axils of each pair of leaves, 3–5 mm thick, fleshy, claret coloured, with 2 or 3 branches occasionally developing from distal nodes; internodes 2–4 cm long; nodes densely glandular- or eglandular-hairy. Leaves simple, decussate; petioles adaxially grooved or canaliculated,  $5\text{--}9 \times 0.1\text{--}0.2$  cm, claret coloured with dense glandular or eglandular bristles; laminae ovate, basal ones cordate to broadly ovate,  $3\text{--}6 \times 3\text{--}6$  cm, dark green adaxially, claret coloured abaxially, cordate or sub-rounded at base with non-overlapping or overlapping margins (basal ones), obtuse or rounded at apex, serrate at margins with each tooth ending in terminal eglandular trichome, bullate when mature, with eglandular bristles densely on adaxial surface and on midrib and lateral veins abaxially; veins pinnate, 1–2 pairs from base and 2–3 pairs from above, less branched, impressed adaxially, conspicuous abaxially. Cymes scorpioid of 6–14 flowers in two rows, terminal, unbranched; peduncles angular,  $10\text{--}16 \times 0.15\text{--}0.2$  cm, longer than petiole, densely glandular-pubescent; bracts caducous. Flowers  $1\text{--}1.6 \times 1\text{--}1.5$  cm; pedicels terete,  $4\text{--}5 \times 1\text{--}2$  mm, longer in fruit, claret coloured, densely glandular-pubescent. Hypanthium campanulate,  $5\text{--}6 \times 2\text{--}3$  mm, 3-lobed, 3-ribbed, claret coloured with greenish tinge distally, densely glandular-pubescent; lobes triangular,  $1\text{--}2 \times 1\text{--}2$  mm, acute at apex. Petals 3, ovate to elliptic,  $7\text{--}8 \times 4\text{--}5$  mm, pale pink with darker midrib, obtuse to rounded at base, acute to mucronate at apex, glabrous adaxially, with glandular trichomes on midrib abaxially. Stamens 3, alternate to petals; filaments 4–5 mm long, pale pink, glabrous, dilated and twisted downwards; anthers sagittate to deeply cordate at base, acute at apex, 4–5 mm long, yellow, dehiscing through apical pores. Ovary inferior,  $2\text{--}2.5 \times 2\text{--}3$  mm; style filiform, 8–9 mm long, pale pink, dark towards apex, longer than stamen; stigma capitate, pink, rugose, glabrous. Capsules urceolate,  $5\text{--}9 \times 3\text{--}3.5$  mm, claret coloured or green with claret tinge, 3-ribbed, with sparse bristly trichomes. Seeds many, obovoid, 0.5–0.6 mm long, pale brown; raphe prominent, excurrent; testa densely tuberculate throughout.

### Phenology

*Sonerila longipedunculata* sp. nov. was collected with flowers and fruits from September to October.

### Distribution and habitat

The new taxon is presently known only from a small area in the Kattukunnu of Banasura hills within the South Wayanad forest division (Fig. 1), where it has been growing under wet rocks on grassy slopes at an elevation of ca 1000 m. Although no detailed ecological studies have been undertaken, *S. longipedunculata* sp. nov. appears to be restricted to shaded rocky outcrops and is likely to occur in areas where a specific combination of light intensity and moisture prevails, such as vertical, moss-covered rocks or rock crevices, as is the case for many species of *Sonerila*. It is found in association with *S. raghavana* Ratheesh, Sunil, Nandakumar & Shaju, species of grass (Poaceae Barnhart), *Mitracarpus* Zucc. (Rubiaceae Juss.), *Selaginella* P.Beauv. (Selaginellaceae Willk.) and several mosses.

### Provisional conservation status

*Sonerila longipedunculata* sp. nov. is known from a single population in the type locality with about 60 mature individuals. The Area of Occupancy (AOO) is less than 10 km<sup>2</sup>. No anthropogenic threat was detected as the area falls under a protected forest. However, this area is prone to landslides due to heavy rain, which has occurred in previous years. The habitat has been affected by climate-induced draught after the unexpected floods in 2018 and 2019. We suggest the status of *S. longipedunculata* sp. nov. as Critically Endangered (CR) B1ab(ii) + B2ab(ii) according to IUCN (2019) criteria.

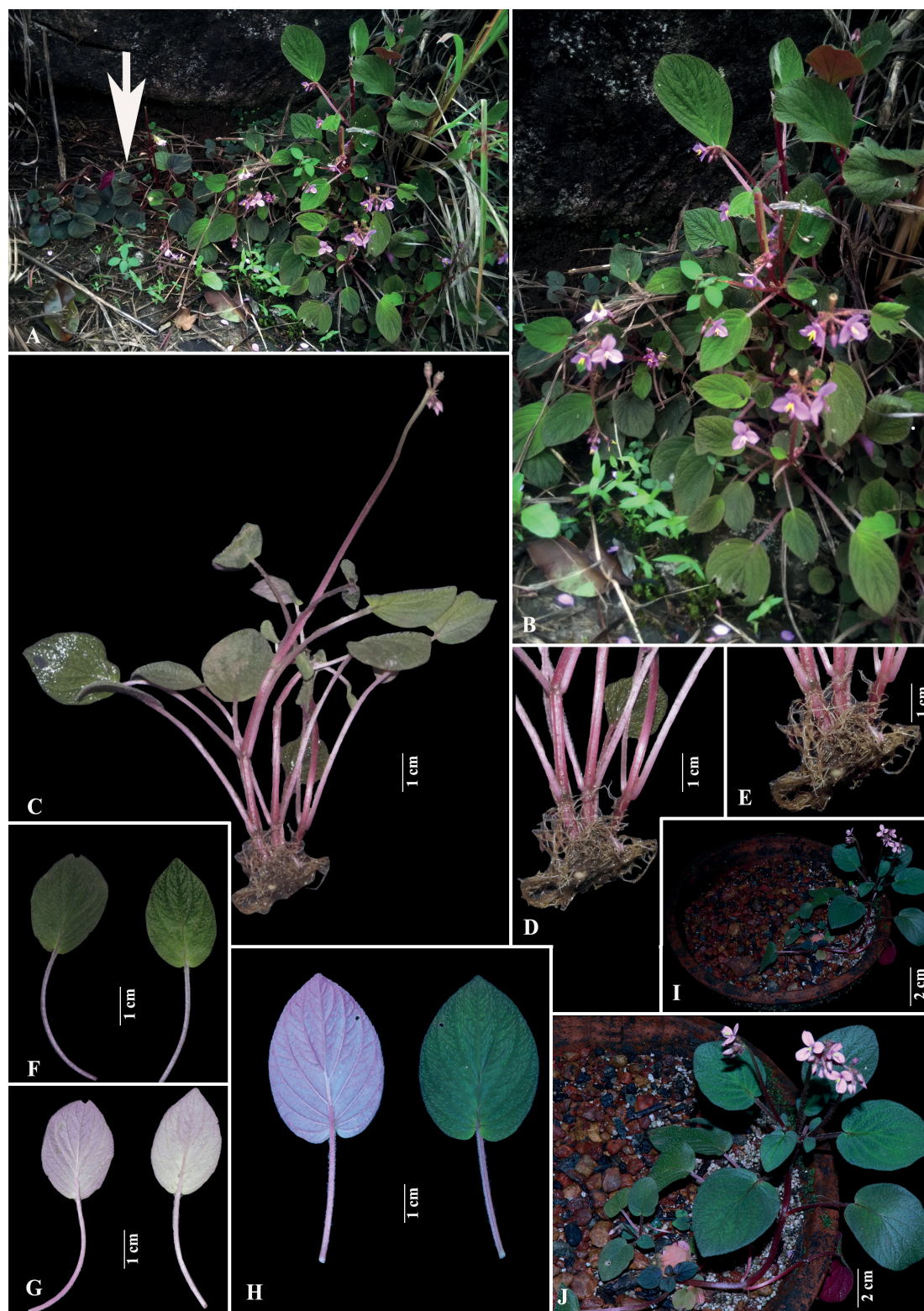
### Notes

The new species is remarkable by the presence of a tuberous root stock (Fig. 2C–E), a feature seen in some of the South Indian caulescent species of *Sonerila* that is apparently absent in Sri Lankan

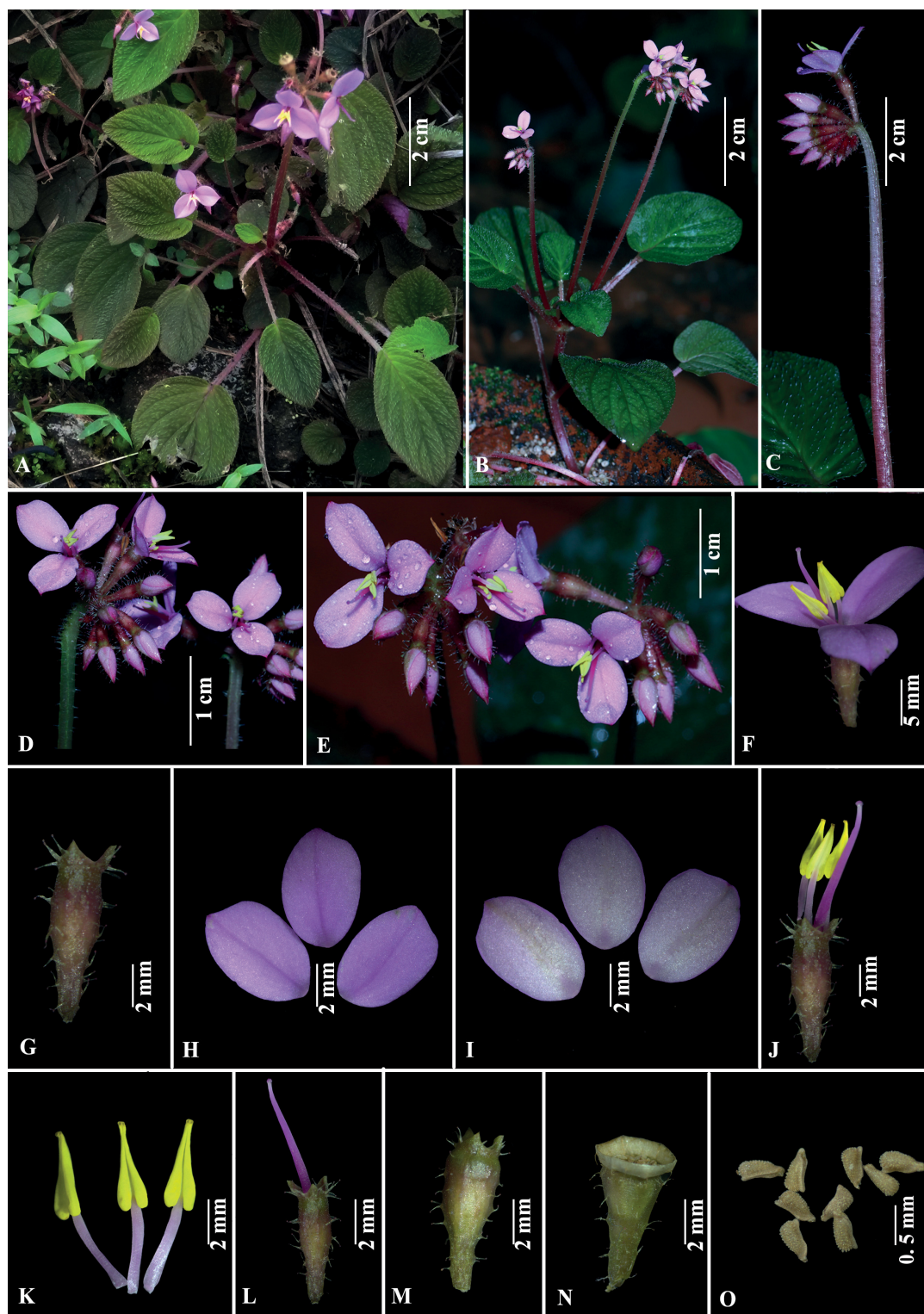


**Fig. 1.** Map showing the distribution of *Sonerila longipedunculata* Resmi & Nampy sp. nov. and *S. travancorica* Bedd.; prepared by Resmi S. using QGIS ver. 3.12.2 (QGIS 2020).



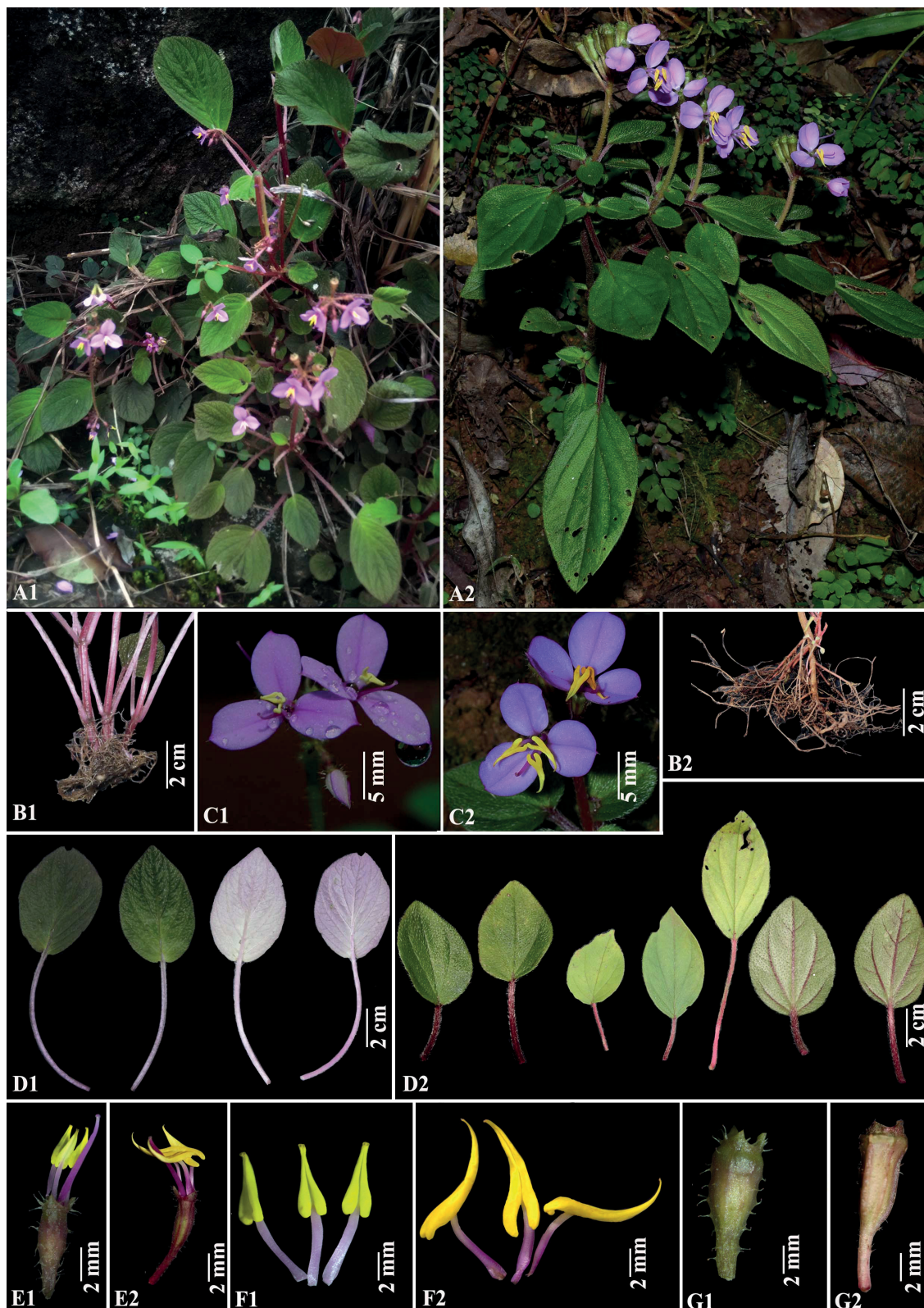


**Fig. 2.** *Sonerila longipedunculata* Resmi & Nampy sp. nov. A–B. Plants in natural habitat, see also *S. raghavana* Ratheesh *et al.* nearby (white arrow). C. Habit. D–E. Base of stem showing tuberous root stock. F–G. Leaves, adaxial and abaxial views. H. Leaves, abaxial and adaxial views showing venation. I–J. Plants under cultivation. Photographs by Resmi S. based on Resmi S. & Santhosh Nampy 151222 (CALI).



**Fig. 3.** *Sonerila longipedunculata* Resmi & Nampy sp. nov. **A.** Habit. **B.** Plant with three inflorescences emerging from the distal node. **C.** Inflorescence. **D–E.** A portion of the inflorescence showing buds, flowers with glandular trichomes on peduncle, hypanthium and the abaxial surface of petals. **F.** Single flower. **G.** Hypanthium. **H.** Petals, adaxial view. **I.** Petals, abaxial view. **J.** Hypanthium with stamens and pistil. **K.** Stamens. **L.** Pistil. **M.** Capsule. **N.** Dehiscent capsule. **O.** Seeds. Photographs by Resmi S. based on Resmi S. & Santhosh Nampy 151222 (CALI).





**Fig. 4.** Comparison between *Sonerila longipedunculata* Resmi & Nampy sp. nov. (A1–G1) and *S. travancorica* Bedd. (A2–G2). **A.** Habit. **B.** Root stock. **C.** Flowers. **D.** Leaves, adaxial and abaxial views. **E.** Hypanthium with stamens and pistil. **F.** Stamens. **G.** Capsule. A1–G1 based on Resmi & Santhosh Nampy 151222; A2–G2 based on Resmi S. & Santhosh Nampy 151284 (CALI).

**Table 1.** Comparative morphological features of *Sonerila longipedunculata* Resmi & Nampy sp. nov. and *S. travancorica* Bedd.

Characters	<i>S. longipedunculata</i>	<i>S. travancorica</i>
<b>Root stock</b>	tuberous	not tuberous
<b>Stem</b>	fleshy with dense white or claret-coloured bristles; internodes 2–4 cm long	woody with dense long white hairs; internodes 2.5–6.5 cm long
<b>Petiole</b>	5–9 cm long	2–7 cm long
<b>Lamina</b>	ovate to cordate, margin serrate, bullate when mature	ovate to elliptic, margin serrulate, velvety when mature
<b>Peduncle</b>	10–16 cm long, angular, longer than petiole, densely glandular-pubescent	3–6 cm long, terete, shorter or equal to petiole, densely eglandular-pubescent
<b>Hypanthium</b>	3-ribbed	6-ribbed
<b>Petal</b>	ovate to elliptic, acute to mucronate at apex	ovate to broadly ovate, mucronate to emarginate at apex
<b>Anther</b>	acute at apex	acuminate to rostrate at apex
<b>Capsule</b>	3-ribbed	6-ribbed

species (Lundin 1983), but also reported in species from the Malay Peninsula, Vietnam and Cambodia (Ridley 1912; Pham 2003; Cho *et al.* 2015; Van Dang *et al.* 2016). These tubers, with the arrival of the monsoon, produce new stem and tufts of roots. The species of *Sonerila* from India are mostly pedunculate (with terete or angular peduncles) and rarely sub-sessile. The longer peduncles (10–16 cm) and petioles (5–9 cm) further distinguish the new species, and these traits are not described in any other caulescent herbaceous species, other than the suffrutescent or woody species of Indian *Sonerila*. *Sonerila longipedunculata* sp. nov. has fleshy and simple stems, which occasionally branch at distal nodes and become procumbent with roots arising from many points along the stem basally, when grown in the greenhouse. *Sonerila longipedunculata* sp. nov. is also similar to *S. raghaviana* Ratheesh, Sunil, Nandakumar & Shaju described by Narayanan *et al.* (2014) in the hair pattern and floral features, but differs from it by the plants being caulescent (vs acaulescent/scapigerous). A comparison of diagnostic characters between *S. longipedunculata* sp. nov. and *S. travancorica* is provided in Table 1.

***Sonerila travancorica* Bedd.**

Figs 1, 4A2–G2, 5–7

*Icones plantarum Indiae Orientalis: or Plates and Descriptions of New and Rare Plants, from Southern India and Ceylon*: 33, tab. 156 (Beddome 1871). – **Type**: INDIA • Kerala, Attraymallay ghat/Travancore; s.d.; *Beddome 3023 & 3022*; lectotype: **here designated**, BM[BM000944457]! (digital image); isoelectotype: BM[BM000793170]! (digital image).

*Sonerila longipetiolata* Josephine, Manickam, Murugan, Sundaresan & Jothi, *Journal of Bombay Natural History Society* 100 (1): 81 (Josephine *et al.* 2003) **syn. nov.** – **Type**: INDIA • Tamil Nadu, Kanyakumari district, Muthukuzhivayal path; 22 Dec. 1999; *V. Sundaresan & M.M. Josephine 20104*; holotype: XCH!.

**Additional material**

INDIA • Kerala, Thiruvananthapuram Dist., Athirumala; 6 Feb. 1988; *N. Mohanan 9407*; TBGT • *ibid.*; 6 Feb. 1988; *N. Mohanan 9454*; TBGT • *ibid.*; 18 Jan. 1993; *N. Mohanan 11230*; TBGT • *ibid.*;



16 Mar. 2016; *Prasobh P., Alfred Joe, Shinoj P. & Resmi S.* 143854; CALI • Pongalappara; 9 Jan. 1996; *E.S. Santhosh Kumar* 25592; TBGT • Tamil Nadu, Tirunelveli Dist., Agasthyamalai, Tirunelveli; 22 May 1901; *s.coll.* 2921; MH • Muthukuzhi; 19 Jan. 1978; *A.N. Henry* 52455; MH • Muthukuzhivayal path, Rajanagappara; 14 Aug. 2018; *Resmi S. & Santhosh Nampy* 151288; CALI • *ibid.*; 18 Feb. 2019; *Resmi S. & Santhosh Nampy* 168265; CALI • *ibid.*; 6 Apr. 2019; *Resmi S. & Santhosh Nampy* 168280; CALI • Sengaltheri to Natterikal; 11 Feb. 1983; *E. Vajravelu* 76549; MH • Thazaiodai forest, Sengaltheri; 14 Feb. 1983; *E. Vajravelu* 80663; MH • Tirunelveli hills; Feb. 1943; *Miss. E. Bowden s.n.*; MH • Upper Kodayar; 21 Mar. 1981; *A.N. Henry & M.S. Swaminathan* 70374; MH • *ibid.*; near Kakkachi Bungalow; 14 Aug. 2018; *Resmi S. & Santhosh Nampy* 151284; CALI • *ibid.*; 18 Feb. 2019; *Resmi S. & Santhosh Nampy* 168263; CALI • *ibid.*; 6 Apr. 2019; *Resmi S. & Santhosh Nampy* 168276; CALI • Way to Muthukuzhivayal; 14 Mar. 1979; *A.N. Henry* 60682; MH.

### Notes on phenology and habitat

*Sonerila travancorica* was collected with flowers and fruits from January to April. This endemic species is found only in the Agasthyamala Biosphere reserve in the southern Western Ghats (Fig. 1). *Sonerila travancorica* occurs in shady terrestrial habitats, but occasionally is found on the base of tree trunks or rocks with a relatively thick mossy substratum. It grows along the margins of sholas and near streams, waterfalls or dam areas at elevations above 1200 m. It is found in association with *Sonerila brunonis* Wight & Arn. (Melastomataceae), *Digitaria ciliaris* (Retz.) Koeler, *Bambusa* Schreb. sp. (both Poaceae), *Impatiens* L. sp. (Balsaminaceae A.Rich.), and certain mosses.

### Provisional conservation status

This species is known from six locations in Agasthyamala Biosphere reserve in Kerala and Tamil Nadu. The estimated Extent of Occurrence (EOO) is ca 300 km<sup>2</sup> and Area of Occupancy (AOO) is 12 km<sup>2</sup>. The authors surveyed three locations and found a total of 230 mature plants. Since these locations are inside a protected area, the risk of a decline due to anthropogenic activity is small. Based on the above data, the species is provisionally assessed here as Endangered (EN) B1ab(iii, iv, v), D (IUCN 2019).

### Discussion

The genus *Sonerila* displays a wide morphological diversity and *S. longipedunculata* sp. nov. is recognised as a new species, thanks to extensive field work across India designed to generate a modern, comprehensive taxonomic treatment of the genus. Two other taxa, *S. travancorica* and *S. longipetiolata*, were examined and re-evaluated in this study.

*Sonerila travancorica* is exceptionally variable in its vegetative and floral morphology, including the shape of lamina (ovate to elliptic), base of lamina (equal or unequal and narrow to sub-rounded to cordate), length of petiole (2–7 cm long), colour and apex of the petals (dark pink to pale pink and mucronate to emarginate at apex), and number of flowers (4–16).

*Sonerila longipetiolata* was described by Josephine *et al.* (2003) from Muthukuzhivayal in Tirunelveli district of Tamil Nadu. During our botanical explorations in different parts of the southern Western Ghats, we studied a large number of specimens of this species from different areas of Kodayar, including the type locality (Kakkachi, Muthukuzhivayal and Kodayar Dam areas). A critical examination of protologues, type specimens and living material showed that the characters used to delimit *S. longipetiolata* fall within the range of *S. travancorica*, hence *S. longipetiolata* is reduced to a synonym of *S. travancorica*.

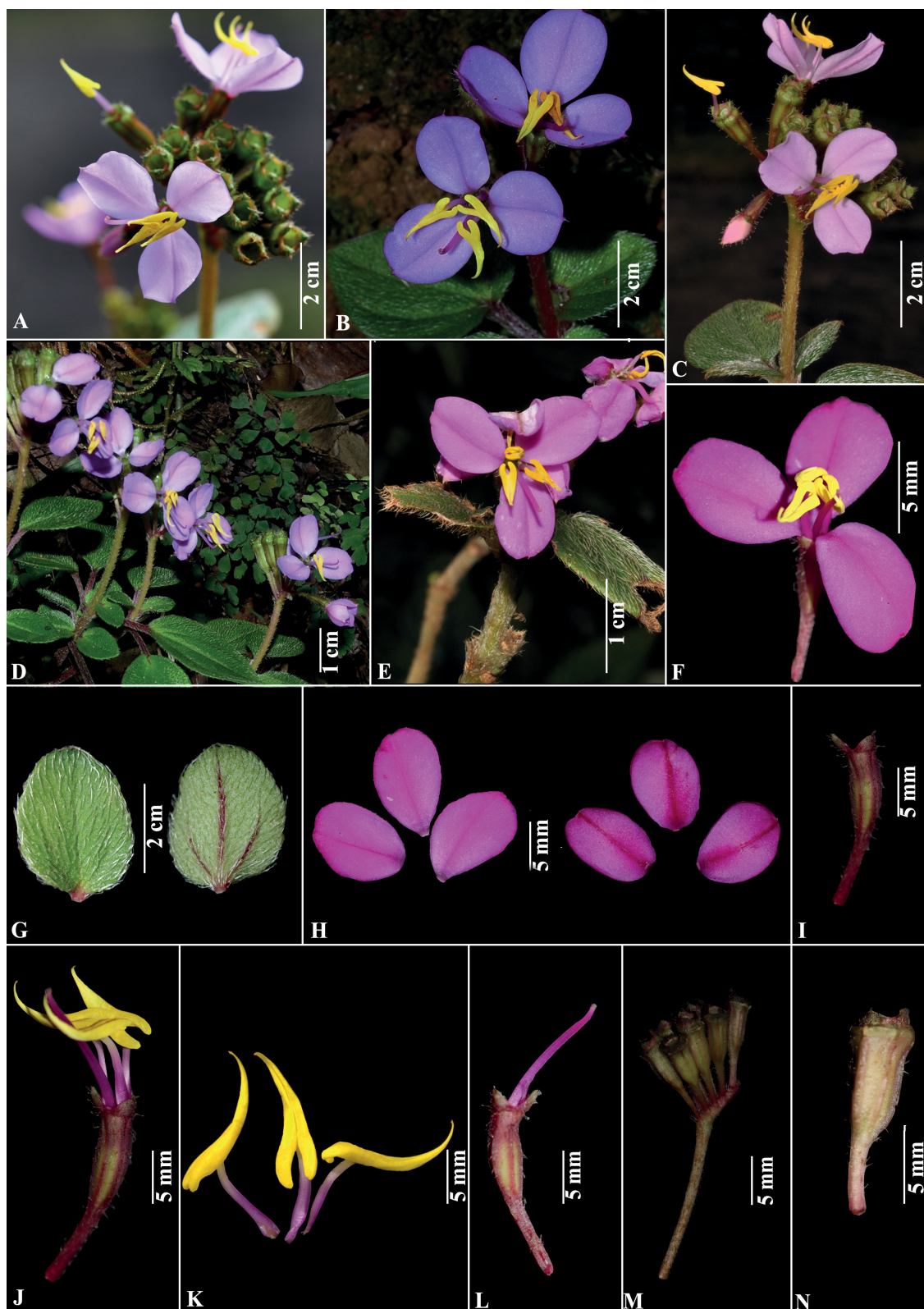
*Sonerila travancorica* was originally described by Beddome (1871) who cited the type locality as “Travancore mountains (Attraymallay), 3500–5000 feet” but did not specify a holotype. The main set of Beddome’s collections (including types) is known to be at BM, K and CAL (Stafleu & Cowan 1976). We





Fig. 5. *Sonerila travancorica* Bedd.; variations in habit.





**Fig. 6.** *Sonerila travancorica* Bedd. **A–D.** Inflorescences showing flowers with emarginated and mucronate petals. **E–F.** Flowers. **G.** Lamina with dense long white hairs. **H.** Petals, adaxial and abaxial views. **I.** Hypanthium. **J.** Hypanthium with stamens and pistil. **K.** Stamens. **L.** Pistil **M.** Immature capsules. **N.** Mature capsule. Photographs: A, C, E by Prashob P.; B, D, F–N by Resmi S.



**Fig. 7.** Lectotype (BM000944457) and isolectotype (BM000793170) of *Sonerila travancorica* Bedd., Beddome 3023 & 3022 (BM); © The Board of Trustees for the Natural History Museum, London. Reproduced with permission.



have found one specimen at K (K000867664) and two specimens at BM mounted on the same sheet with two barcodes numbers (BM000793170 and BM000944457), which bears a field note “Attraymallay ghat/ Travancore 3023 & 3022” in Beddome’s handwriting, and two labels “Herb. Col. R.H. Beddome-Received 1885” and “Type specimen”. The sheet K000867664 bears an annotation “115- from Major Beddome, Travancore 4000ft, 4/1870”. We have selected the specimen BM000944457 as the lectotype because it explicitly mentions the type locality and therefore, it represents the best choice among the available material.

### Acknowledgements

The authors are thankful to the Head of the Department of Botany, University of Calicut, for facilities; the curators of the herbaria at K, BM, CALI, MH, CAL, TBGT and XCH for permitting us to consult the specimens; Kerala and Tamil Nadu Forest Departments for permission to conduct field studies, in particular the Divisional Forest Officer, Range Forest Officer and all other forest officers and watchers of South Wayanad, Kalakkad Mundanthurai Tiger Reserve for various assistance during fieldwork; Adv. Athira P.B., Ms. Aswathi Ganga, Mrs. Dani Francis, Mr. Akhil M.K., Mr. Javad P. and Mr. Aneez for various help during fieldwork. SN is thankful to the Science Engineering Research Board (SERB), New Delhi, for funding (Sanction No: EMR/2016/007346, dated 29 October 2018). SR is grateful to the International Association for Plant Taxonomy for the IAPT Research Grant 2020 and to the Government of Kerala for financial support.

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*Manuscript received: 15 August 2020*

*Manuscript accepted: 10 November 2020*

*Published on: 10 February 2021*

*Topic editor: Frederik Leliaert*

*Desk editor: Radka Rosenbaumová*

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Autor(en)/Author(s): Resmi Sekarathil, Nampy Santhosh

Artikel/Article: [Sonerila longipedunculata sp. nov., a new species of Melastomataceae from the southern Western Ghats, India, with additional notes and lectotypification of \*Sonerila travancorica\* 160-174](#)