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Sonerila lundinii, a new species of Melastomataceae from southern Western Ghats with notes on *Sonerila pedunculosa*, a less known taxon from Sri Lanka

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Abstract: *Sonerila lundinii* Resmi & Nampy, a new species of Melastomataceae from the southern Western Ghats is here described. The new species is morphologically similar to *Sonerila pedunculosa* Thwaites by its prostrate or creeping habit, but differs by its pubescence, length of the peduncle, shape of the petals, anthers and capsules. Specimens so far collected from India wrongly identified as *S. pedunculosa*, which is an endemic species with a restricted distribution in Sri Lanka. Therefore, these specimens are considered as novelty and remarks on the occurrence of *S. pedunculosa* in South Indian Floras are clarified in the present paper.

Keywords: India, Endemism, Sonerileae, *Sonerila*, Sri Lanka, Taxonomy.

Introduction

Sonerila Roxb., a taxonomically complex, species-rich, tropical Old World genus in the family Melastomataceae (tribe Sonerileae), is represented by around 180 taxa (Cellinese, 1997; Resmi & Nampy, 2021a, b; Resmi *et al*., 2018; 2021). It is widely distributed spanning an area from Sri Lanka, India, Nepal, Bhutan, South China, Taiwan, Indo-China and the Malay Archipelago. It is the largest genus in the Indian Sonerileae with 49 species and one variety, and exhibits a high percentage of endemism (Resmi, 2022). The greatest diversity of *Sonerila* in India occurs in the Western Ghats, where 43 species and one variety are found with 86% of endemics.

As a part of an ongoing taxonomic revision, the authors collected specimens from across India, and noticed that at Chemunji, in the Thiruvananthapuram district of Kerala, a few populations exhibited a prostrate or creeping habit, a densely villous stem, leaves with finely serrulate laminae, acuminate anthers, and 3-ribbed capsules. Detailed comparative studies with the morphologically allied *S. pedunculosa* Thwaites, and consultation of types and protologues, showed that these specimens are morphologically distinct from any of the previously described taxa, and thus represent a new species.

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Materials and Methods

Materials for this study were collected through extensive field trips to different parts of the southern Western Ghats during 2018–2020. Herbarium specimens were prepared and flowers and fruits were preserved for further study in a solution containing 4% formalin and 70% ethanol (De Vogel, 1987; Forman & Bridson, 1989). Living plants were maintained in the Calicut University Botanical Garden (CUBG) in order to observe variation under cultivation. Detailed morphological observations were recorded and described using terms of Stearn (1992) and Beentje (2016). Photographs were taken with an EZ4 HD stereo microscope (Leica, Heerbrugg, Switzerland) with a 3.0 megapixel digital camera (Leica) and Stemi 508 stereo microscope (Zeiss, Oberkochen, Germany) outfitted with an Axiocam 105 color camera (Zeiss). Relevant taxonomic accounts (Thwaites, 1864; Triana, 1871; Clarke, 1879; Cogniaux, 1891; Stapf, 1892; Trimen, 1894; Willis, 1911; Yoganarasimhan *et al*., 1976; Lundin, 1983; Sharma *et al*., 1984; Giri & Nayar, 1986; Bremer, 1987; Mohanan & Henry, 1994; Saldanha, 1996; Sasidharan, 2004; Nayar *et al*., 2006; Manickam *et al*., 2008; Nayar *et al*., 2014; Murthy

& Nair, 2016), herbarium specimens (BM, K, CAL, CALI, TBGT, XCH), and digital images available from BR, G, HUH, P and PDA were consulted for this study. Acronyms of herbaria follow the Index Herbariorum (Thiers, updated continuously). We generated a distribution map using QGIS ver. 3.28.2 (QGIS, 2022), based on coordinates and geo-referenced estimates of collection localities. The Area of Occupancy (AOO) and Extent of Occurrence (EOO) were estimated using GeoCAT (Bachman *et al*., 2011), and a provisional conservation status was assessed according to the IUCN Red List Categories and Criteria (IUCN, 2012; IUCN Standards and Petitions Committee, 2022).

Sonerila lundinii Resmi & Nampy, **sp. nov.** **Figs. 1–3**

Sonerila lundinii is morphologically close to *S. pedunculosa* sharing a prostrate or creeping habit rooting at nodes, but is distinguished by its densely villous stem (*vs*. glabrous in *S. pedunculosa*), finely serrulate laminae (*vs*. crenate or finely serrate), 2–4 cm long peduncles (*vs*. 3–7 cm), broadly ovate, pale rose petals (*vs*. ovate, dark pink), lanceolate acuminate anthers (*vs*. narrowly ovate, obtuse to acute), and campanulate, 3-ribbed capsules (*vs*. obconic, 6-ribbed).

Type: INDIA, **Kerala**, Thiruvananthapuram district, Agasthyamala Biosphere Reserve, Chemunji, way to hill top, 1200 m, 05.01.2018, *S. Resmi, M.P. Krishnapriya & S. Nampy* 151257 (holo CALI!; iso MH!).

Annual, caulescent, prostrate or creeping herbs. Root stock thick; roots arising from all nodes, 5–8 cm long. Stems terete, 0.2–0.3 cm thick, green or vinaceous, repeatedly branched from a common node and ramify in all directions, densely covered with eglandular trichomes; branches 5–15 cm long; internodes 1–2.5 cm long, short towards apex. Leaves decussate, whorled towards apex forming a rosette in young stage; petioles adaxially grooved or canaliculated, 0.5–3 cm long, green, densely covered with eglandular trichomes; laminae ovate to broadly ovate, 2–5 × 1.7–3 cm, dark green or with a purple tinge adaxially, equal and rounded or sub-cordate at base with non-overlapping margins, finely serrulate at margins with each tooth ending in a terminal eglandular trichome, acute to obtuse at apex, membraneous, densely villous adaxially with eglandular trichomes, but only on veins abaxially; veins pinnate, 1–2 pairs from the base and 1–2 pairs from midrib above, less branched, impressed adaxially, conspicuous abaxially. Cymes scorpioid, unbranched, 3–7-flowered, terminal; peduncles sub-terete to quadrangular, 2–4 × 0.10–0.15 cm, green or green with a vinaceous or claret tinge; bracts sometimes present. Flowers 1–1.5 × 1–1.5 cm; pedicels sub-angular, 1–3 × 1–2 mm, longer in fruit, vinaceous or claret, sparsely covered by gland-tipped trichomes. Hypanthia campanulate, 5–7 × 2–2.5 mm, 3-lobed, 3-ribbed, green with a vinaceous or claret tinge, sparsely covered by gland tipped trichomes; lobes triangular, 1–1.5 × 1–1.5 mm, acute at apex. Petals 3, broadly ovate, 6–9 × 4–5 mm, pale rose with a darker midrib, rounded at base, mucronate at apex, glabrous adaxially, with gland-tipped trichomes on midrib abaxially. Stamens 3; filaments 4–6 mm long, pale pink, glabrous; anthers lanceolate, 4–6 mm long, acuminate at apex. Ovary 2–3 × 2–3 mm; style 8–9 mm long, pale pink, dark towards apex, equal to the stamen; stigma capitate, pink, rugose, glabrous. Capsules campanulate, 5–7 × 3–3.5 mm, green with a vinaceous or claret tinge, 3-ribbed, sparsely covered with gland-tipped trichomes, less so with age. Seeds numerous, obovoid, 0.5–0.6 × 0.2–0.3 mm, pale brown; raphe prominent, excurrent or remaining out into a lateral appendage; testa densely pusticulate throughout, tuberculate at dorsal angle; tubercles pyramidal, covered all over by small pusticles.

Flowering & fruiting: Flowering from December to January and fruiting from January to March.

Habitat: *Sonerila lundinii* occurs in shady habitats with a relatively thick mossy substratum. It grows along the edges of evergreen forests, at elevations between 750–1200 m above sea level, in association with *S. tinnevelliensis* C.E.C.Fisch., *S. brunonis* Wight & Arn. (Melastomataceae), *Cyanotis villosa* (Spreng.) Schult. & Schult.f. (Commelinaceae), *Henckelia repens* (Bedd.) A.Weber & B.L.Burtt (Gesneriaceae), *Justicia betonica* L. (Acanthaceae) and some mosses.

Distribution: Endemic to southern Western Ghats, India (Fig. 4).

Etymology: The epithet 'lundinii' honours the late Roger Lundin for his valuable contribution to the taxonomy of the genus *Sonerila*.

Specimens examined: INDIA, **Kerala**, Thiruvananthapuram district, Chemunji,

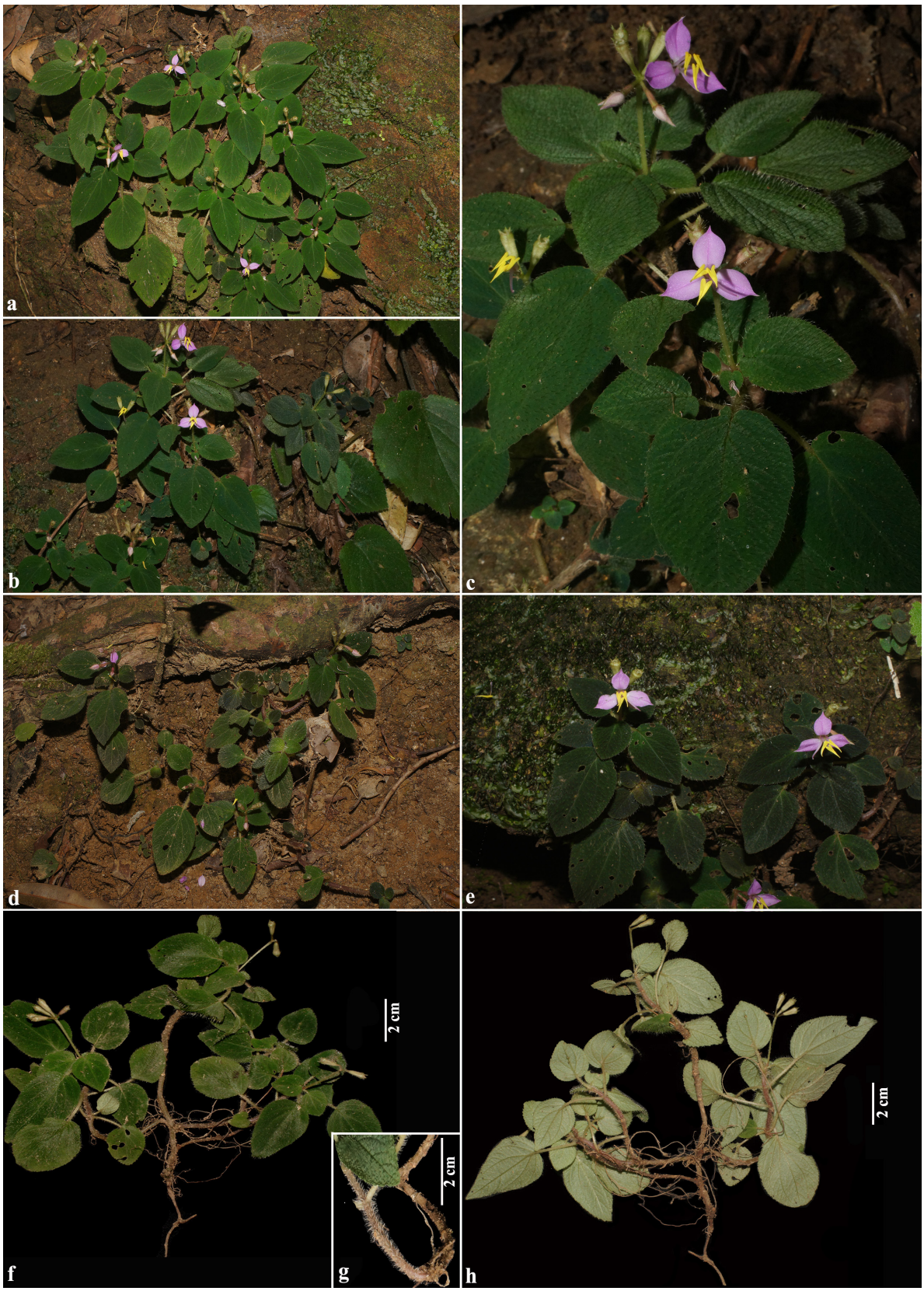

Fig. 1. *Sonerila lundinii* Resmi & Nampy: **a–e**. Plants in its natural habitat at Chemunji hills in the Thiruvananthapuram district; **f**. Habit from above and **h**. from below, note the branching from nodes; **g**. Portion of stem showing dense trichomes (from *S. Resmi, M.P. Krishnapriya & S. Nampy* 151257; photos by S. Resmi).

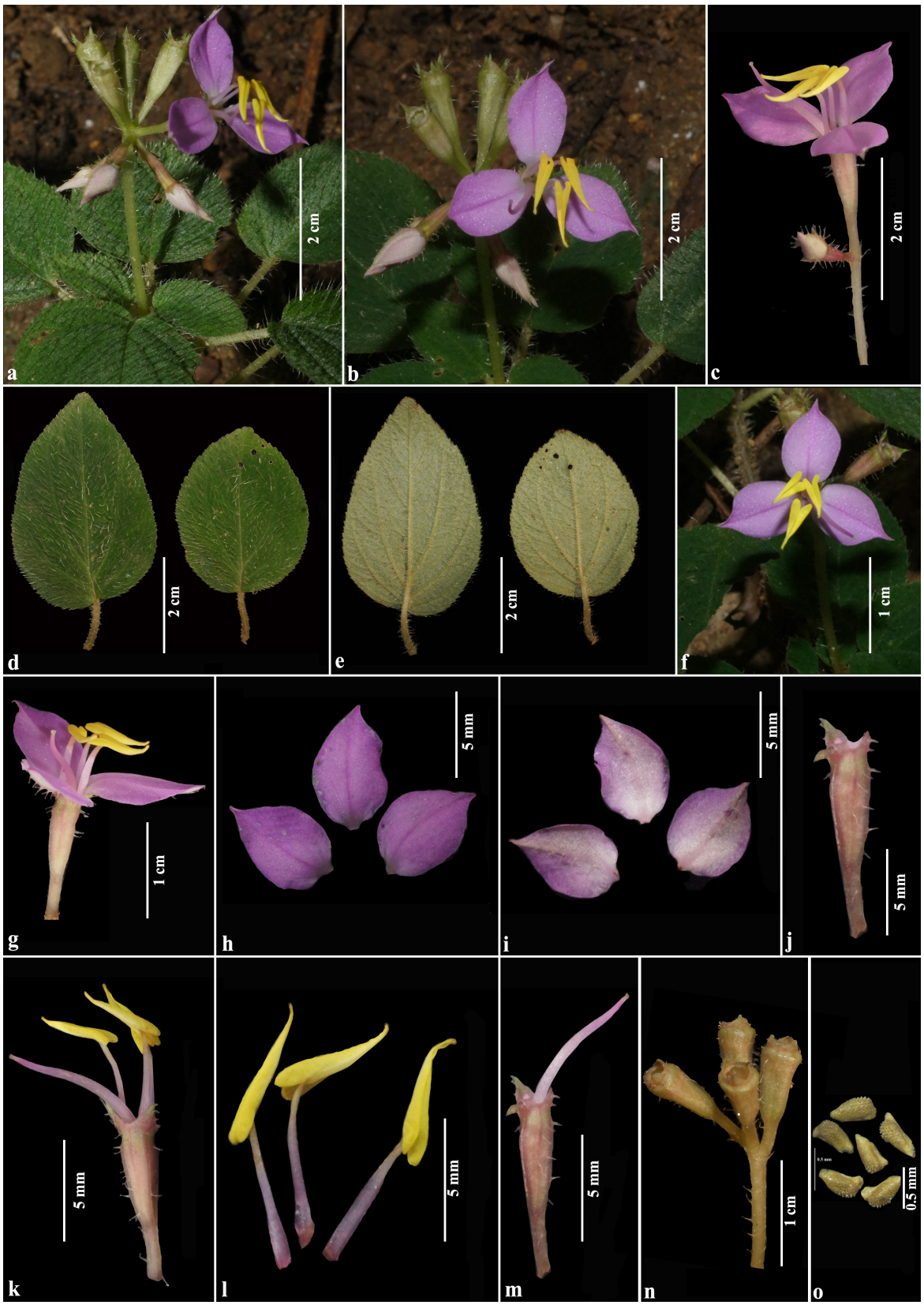

Fig. 2. *Sonerila lundinii* Resmi & Nampy: **a–c**. Cymes in different views; **d**. Leaves, adaxial view; **e**. Leaves, abaxial view; **f**. Flower, front view; **g**. Flower, side view; **h**. Petals, adaxial view; **i**. Petals, abaxial view; **j**. Hypanthium, side view; **k**. Hypanthium with stamens and pistil; **l**. Stamens; **m**. Pistil; **n**. Immature capsules; **o**. Seeds (from *S. Resmi, M.P. Krishnapriya & S. Nampy* 151257; photos by S. Resmi).

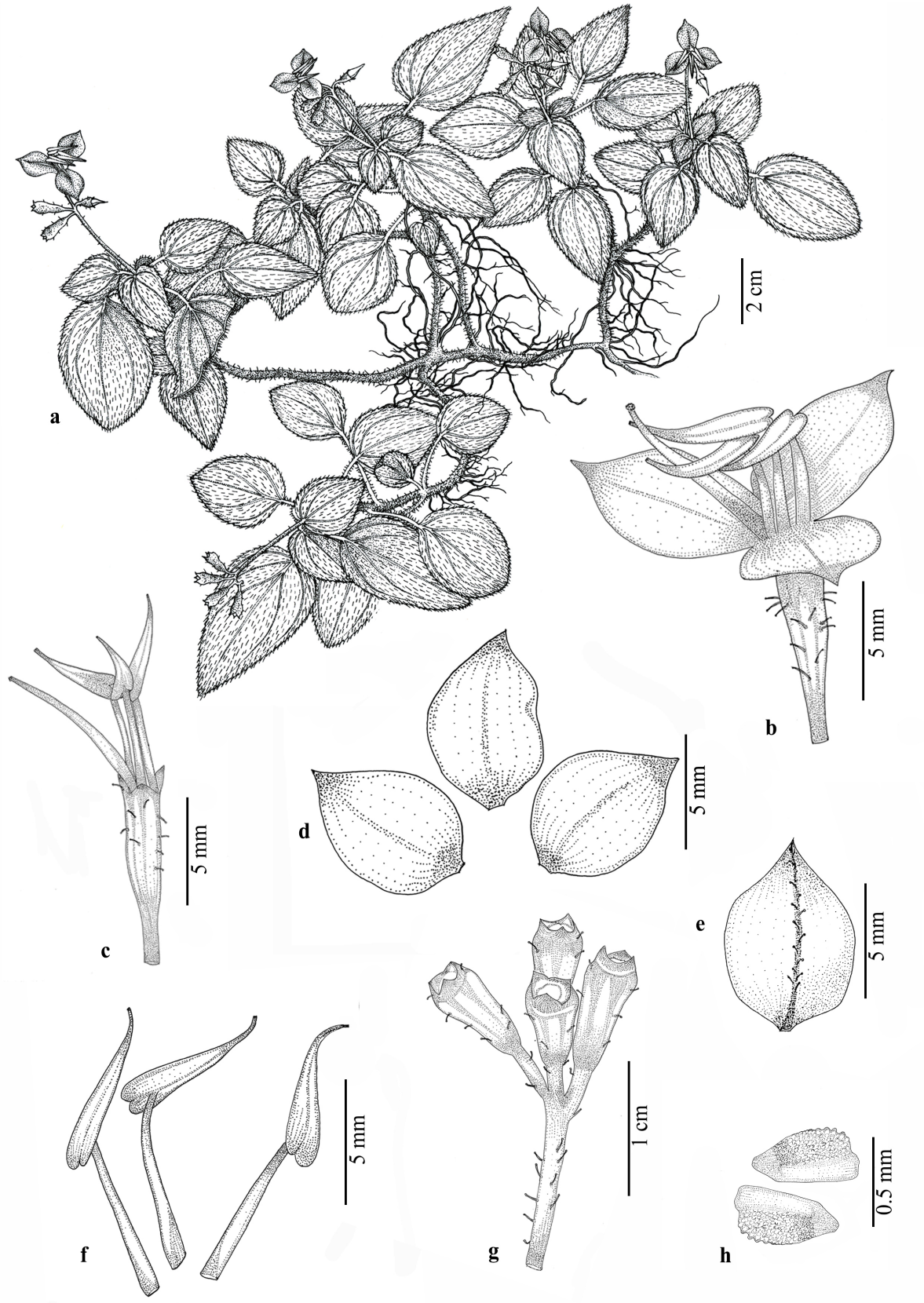

Fig. 3. *Sonerila lundinii* Resmi & Nampy: **a**. Habit; **b**. Flower; **c**. Hypanthium with stamens and pistil; **d**. Petals, adaxial view; **e**. Petal, abaxial view, note the glandular trichomes; **f**. Stamens; **g**. Immature capsules; **h**. Seeds (from *S. Resmi, M.P. Krishnapriya & S. Nampy* 151257; drawn a by V.V. Drisya; b-h by S. Resmi).

21.03.1996, *E.S. Santhosh Kumar* 25412 (TBGT); *Ibid*., 23.12.2020, *M.K. Akhil*, *T.P. Krishnaraj*, *S. Resmi* & *S. Nampy* 164469 (CALI); Kovilthérimala, 750 m, 09.10.2009, *K.P. Deepthikumari* & *A.G. Pandurangan* 60599 (in vegetative state); *Ibid*., 18.10.2010, *K.P. Deepthikumari* & *Usha* 67987 (TBGT).

Conservation status: The new species is currently known only from Chemunji and Kovilthérimala in the Agasthyamala Biosphere Reserve. We were able to observe one population of approximately 90 mature individuals in the Chemunji hills. The habitat is severely affected by controlled burning activities by the Forest Department. It is likely that there may be more populations in similar habitats and these areas will be negatively impacted by further disturbances in the future due to local human activities involving the harvesting of wood, honey and forage grasses. The lack of collections from additional locations precludes the accurate estimation of the Extent of Occurrence (EOO), but the Area of Occupancy (AOO) is *c*. 8 km^2. This species is thus assessed here as Critically Endangered (CR), B2ab (ii,iii,v); D according to IUCN Red List Categories and Criteria (IUCN, 2012; IUCN Standards and Petitions Committee, 2022).

Notes: *Sonerila lundinii* appears to be closely related to *S. pedunculosa* in its creeping habit. Nevertheless, it differs by characteristics of the stem, leaf margins, and the morphology of petals, anthers and capsules. According to Thwaites (1864), *S. pedunculosa* is a distinct, creeping plant, rooting at nodes with rounded or ovate, obtuse, crenate leaves, sparsely hairy adaxially and, nearly so, abaxially. It is also characterised by elongated, few-flowered cymes, cordate-acute anthers, and 6-ribbed capsules. Trimen (1894) and Lundin (1983) added that these plants have glabrous stems with long internodes, which was evident in Lundin's (*l.c.*) illustration (based on *Fagerlind* 1229 in S). Clarke (1879), Cogniaux (1891) and Trimen (1894) recorded the extended distribution of *S. pedunculosa* in Travancore and Quilon by citing specimen *Wight* 1111. However, Stapf (1892), Willis (1911), Bremer (1987) and Lundin (1983) followed Triana's treatment and considered this taxon only to occur in Southwest Sri Lanka (Ceylon).

According to Yoganarasimhan *et al.* (1976), *Wight* 1111 should be identified as *S. rheedei sensu* Wight & Arn. and not *S. pedunculosa* as stated by Clarke (1879). We studied *Wight* 1111 at K[K001325401] and confirm its identity as *S. rheedei*. Yoganarasimhan *et al.* (*l.c.*) cited a collection (*Yoganarasimhan* 1331) from Charmadi Ghats, Chikamaglur district, Karnataka as *S. pedunculosa* and according to Giri and Nayar (1986), this should also be identified as *S. rheedei.* We tried to locate specimen *Yoganarasimhan* 1331 at K, CAL, and PDA, but to no avail.

Several recent authors also wrongly recorded *S. pedunculosa* from the Western Ghats (Sharma *et al*., 1984; Mohanan & Henry, 1994; Saldanha, 1996; Nayar *et al*., 2006 Sasidharan, 2004; Manickam *et al*., 2008; Nayar *et al*., 2014). Manickam *et al*. (*l.c.*) mentioned its distribution in Tamil Nadu, but we confirmed that the voucher specimen deposited at XCH are *Sonerila travancorica* Bedd., not *S. pedunculosa*. Additionally, we noticed that some recent collections from Chemunji and Kovilthérimala in TBGT were also identified as *S. pedunculosa.* According to Murthy and Nair (2016), *S. pedunculosa* reported from India by various authors is actually *S. rheedei* Wight & Arn. This misidentification created ambiguity in the identity and distribution of *S. pedunculosa* rather than clarifying the confusion. Detailed herbarium studies showed that Thwaites specimens of *S. pedunculosa* available at different herbaria (BM, CAL, HUH [HUH00073221], BR [BR000000522366, BR000000522398], K [K001325399], [K001325400], G [G00319944], P [P04888228, P05282776, P05282775] and PDA [PDA00002846]) are very distinct from *S. lundinii*. Further, no collection of this species from other parts of tropical Asia could be located in other Indian and foreign herbaria consulted by us. This study sheds light on the erroneous identification of specimens recorded from Chemunji and nearby areas as reported in local floras, and confirmed the endemism of *S. pedunculosa* in Sri Lanka.

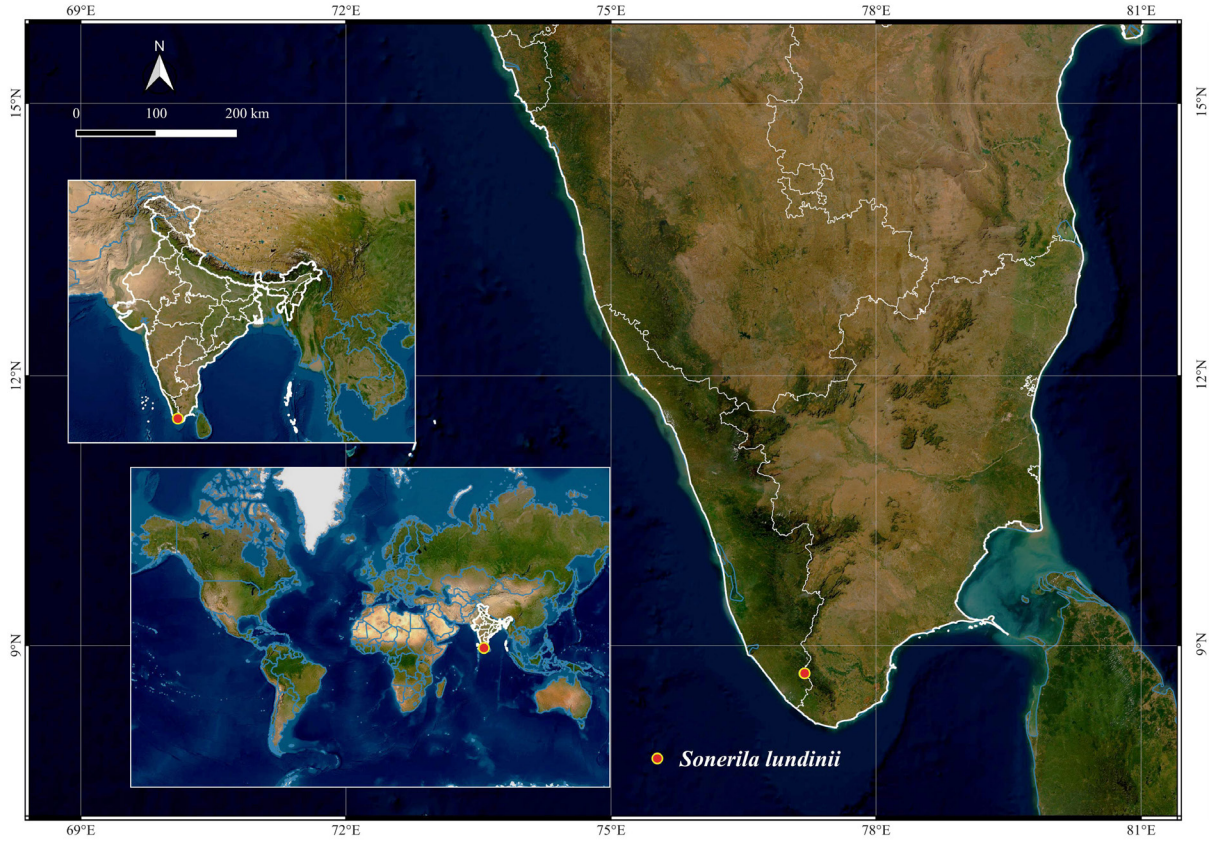

Fig. 4. Distribution points of *Sonerila lundinii* Resmi & Nampy in Kerala, India (drawn using QGIS ver. 3.28.2).

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