

Solanum pulneyensis Soosairaj, sp. nov. (Solanaceae)
from Palani Hills National Park of Tamil Nadu, India

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***Solanum pulneyensis* Soosairaj, sp. nov. (Solanaceae) from Palani Hills National Park of Tamil Nadu, India**

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ABSTRACT

KEY WORDS
Solanaceae,
Solanum,
India,
subcapsular fruit,
new species.

A new species, *Solanum pulneyensis* Soosairaj, sp. nov. (Solanaceae) is described from the woody savanna forest of Palani Hills National Park, Tamil Nadu, India. This species is unusual and special as it has subcapsular fruits unlike other Indian *Solanum* L. species that have berry fruits besides being entirely enclosed within persistent calyx as that of *S. wightii* Nees. A detailed morphological description with line drawings is provided here.

RÉSUMÉ

MOTS CLÉS
Solanaceae,
Solanum,
Inde,
fruit subcapsulaire,
espèce nouvelle.

Solanum pulneyensis Soosairaj, sp. nov. (Solanaceae), du Parc national de Palani Hills, Tamil Nadu, Inde. Une espèce nouvelle, *Solanum pulneyensis* Soosairaj, sp. nov. (Solanaceae), est décrite de la savane arborée du Parc national de Palani Hills, Tamil Nadu, Inde. Cette espèce est très inhabituelle par ses fruits subcapsulaires, contrairement aux autres espèces indiennes du genre, qui présentent des fruits bacciformes complètement enfermés dans un calice accrescent, comme chez *S. wightii* Nees. Une description morphologique détaillée, accompagnée de dessins au trait, est fournie ici.

TABLE 1. — Features that distinguish *S. pulneyensis* Soosairaj, sp. nov. from *S. wightii* Nees.

	<i>S. wightii</i>	<i>S. pulneyensis</i> sp. nov.
Prickle on stem	> 4 mm long	< 2 mm long
Leaf apex	acute	obtuse
Leaf margin	sinuately lobed	undulate
Petiole	prickles	unarmed
Flowers	> 2.5 cm across	< 2.5 cm across
Pedicel	> 3 cm long, prickled	< 2 cm long, unarmed
Calyx	> 1 cm long	< 1 cm long
Corolla lobes	ovate, acute	orbicular, undulate
Anthers	longer ones > 10 mm long, hairy	longer ones < 9 mm long, glabrous
Style	> 18 mm long	< 12 mm long
Stigma	capitate	simple
Fruit	berry > 12 mm across	subcapsular, < 11 mm across

INTRODUCTION

The Palani Hills Wildlife Sanctuary and National Park is a protected area in Tamil Nadu, India with an area of 610 km² that was established in 2013 (WII 2020). This protected area is made up of *sholas* and three quarters of montane grassland (Matthew 1999a). *Sholas* are the patches of stunted tropical montane forest in valleys amongst regular grasslands in Southern India. These patches of *shola* are usually separated from one another by undulating montane grassland (Thomas & Palmer 2007). This park comes under Category II of IUCN protected area categories that increases the protection of natural habitat and wildlife conservation (Stolton *et al.* 2013). These *sholas* are often hotspots to many narrowly endemic and threatened plants (Matthew 1994).

Solanum L. is a large and complex genus that contributes almost 75% of the species in the family Solanaceae (Symon 1981). It is a cosmopolitan or subcosmopolitan genus, with 1500 species that are distributed mostly in tropical, sub-tropical and warm temperate regions globally (Mabberley 2017; Fawzi & Habeeb 2016). The genus is represented by 48 species in India (Reema Kumari 2004), 20 species in the Eastern Ghats of India (Kalidass & Panda 2019), 15 species in the Madras Presidency (Gamble 1923) and 35 species from Tamil Nadu (Nair & Henry 1983). The genus comprises many economically and medicinally important species like *S. tuberosum* L., *S. lycopersicum* L., *S. melongena* L. and *S. trilobatum* L. (Aubriot *et al.* 2016).

During a recent intensive floristic exploration in the Palani Hills National Park (PHNP), Dindigul district, Tamil Nadu, India, a specimen of *Solanum* L. was collected. The morphological description and diagnosis was carried out after a critical examination of relevant literature (Gamble 1923; Nair & Henry 1983; Matthew 1999b; Reema Kumari 2004), and consultation of herbarium deposits at Madras Herbarium (MH), Coimbatore, The Rapinat Herbarium (RHT), Tiruchirappalli and various herbarium specimens from the Kew Herbarium Catalogue (<http://apps.kew.org/herbcat/navigator.do>), Naturalis – the Netherlands' Natural History Museum (<https://biportal.naturalis.nl/>) and the Muséum national d'Histoire naturelle, Paris (<https://science.mnhn.fr/institution/mnhn/>

collection/p/item/search), and finally it was found to be a new species. Hence, it is described and illustrated below.

SYSTEMATICS

Family SOLANACEAE Juss.

Genus *Solanum* L.

Solanum pulneyensis Soosairaj, sp. nov.
(Figs 1; 2)

TYPUS. — **India.** Tamil Nadu, Dindigul district, Palani Hills National Park, Thonimalai, (10°22'37.95"N, 77°46'41.99"E), c. 1300 m, 29.I.2018. *S. Soosairaj* 2514 (holo-, RHT!; iso-, MH!).

DIAGNOSIS. — This species differs from other *Solanum* species by subcapsular fruits that are entirely enclosed by calyx. It has supra axillary cyme inflorescence with 2-3 flowers. This species also has distinctive features such as obtuse leaf apex, unarmed petiole and pedicel, simple stigma and glabrous anther.

HABITAT AND PHENOLOGY. — *Solanum pulneyensis* Soosairaj, sp. nov. was found growing in savanna forest in the Western Ghats of Palani Hills National Park, on a slope at 1300 m elevation amidst tall grasses like *Cymbopogon citratus* (DC.) Stapf. The vegetation type has been described as sub-tropical hill savanna (8A/DS1) which is interrupted with patches of southern hill top wet evergreen forests (Champion & Seth 1968). The new species was found associated with *Breynia retusa* (Dennst.) Alston, *Peperomia blanda* (Jacq.) Kunth, *Kalanchoe bhidei* Cooke, *Hedyotis swertiioides* Hook.f., *Pogostemon mollis* Benth., *Desmodium parvifolium* DC., *Kleinia grandiflora* (DC.) N. Rani, *Smithia hirsuta* Dalzell, *Arundinella ciliata* (Roxb.) Nees ex Miq., *Eragrostis deccanensis* Bor. and *Polygala rosmarinifolia* Wight & Arn. The species is found growing in steep slope and soil is shallow with exposed rocks. Flowering occurs in January-March, and fruiting from February and March.

DISTRIBUTION. — *Solanum pulneyensis* Soosairaj, sp. nov. is known only from the Thonimalai, Palani Hills National Park, Dindigul district from Tamil Nadu, India.

ETYMOLOGY. — The specific epithet is chosen to represent the Palani hills, the collection locality which is a part of Western Ghats of India.

CONSERVATION STATUS. — The population of this species was noted at two locations at a close proximity observed to be populated with about 15-20 individuals. Based on the field observations made periodically, the conservation status of the species has been evaluated following the latest IUCN Red List Criteria (Version 3.1; IUCN 2012). The species qualifies for Critically Endangered under criteria B2, C2 and D. Criterion B1 cannot be estimated as the EOO required to predict is at least 2 locations (Fig. 3).

Criterion B2: This species is found only at the Thonimalai (subcriterion a). The AOO measured at 2 km² grid size for *Solanum pulneyensis* Soosairaj, sp. nov. is 4 km². A continuing decline of population is inferred (subcriterion b) in terms of quality of habitats such as the construction of estate and tea plantations. As this estimate is less than 10 km², the species qualifies for Critically Endangered category.

Criterion C2: A continuing decline of population is inferred in terms of quality of habitats as the establishment of estate and tea plantations push this species to extreme. The number of mature individuals in the population noted was about 15-20 individuals.

Criterion D: Only ten to fifteen individuals in total were documented during the study period which is much lower than the threshold level of fifty mature individuals and makes the species qualify for Critically Endangered category criterion.

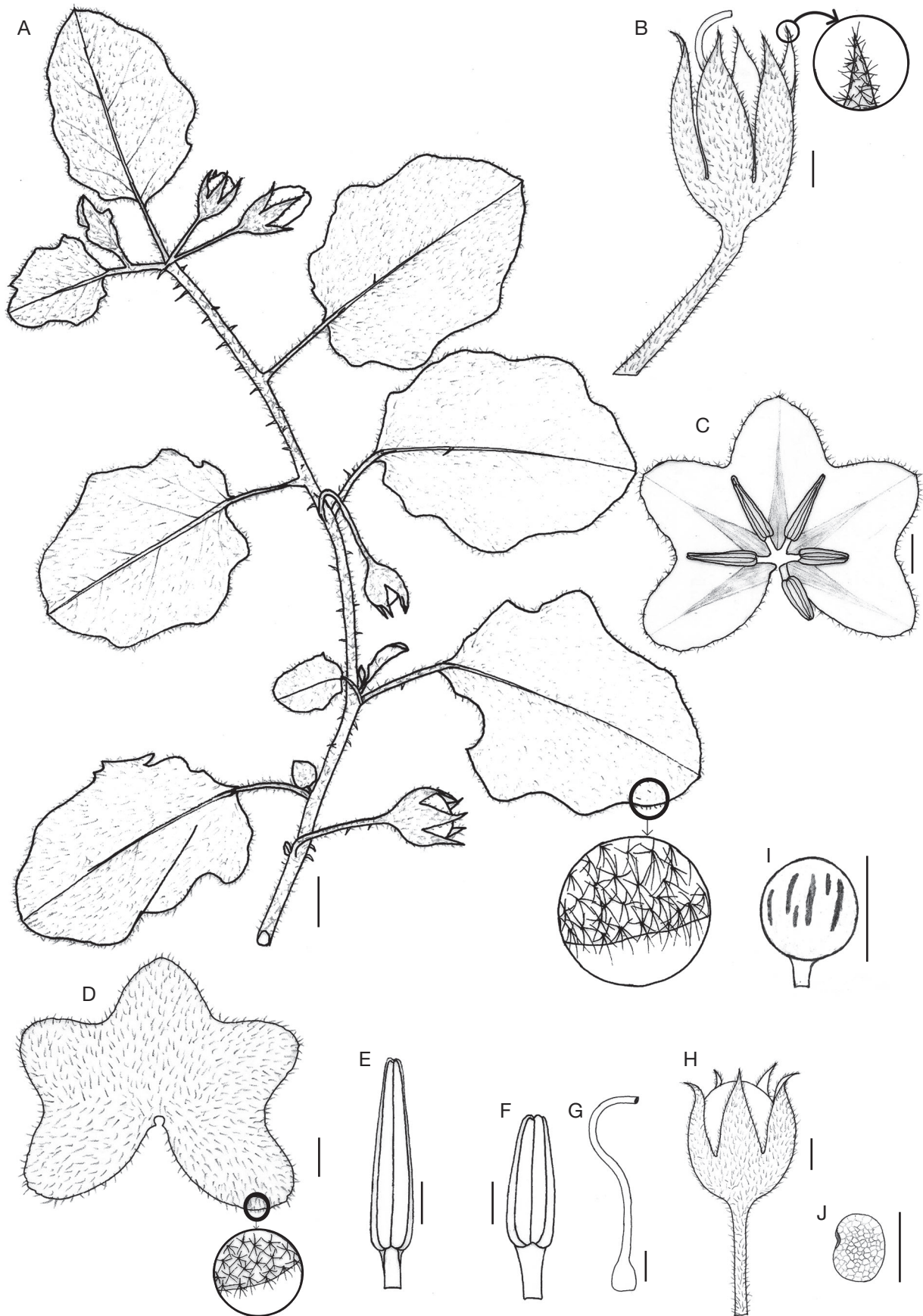


FIG. 1. — *Solanum pulneyensis* Soosairaj, sp. nov.: **A**, habit (a twig); **B**, calyx; **C**, corolla (with stamens); **D**, corolla (without); **E**, **F**, anthers; **G**, pistil; **H**, fruit (with calyx); **I**, fruit; **J**, seed; **A–J**, drawn from the type Soosairaj 2514. Scale bars: **A**, 1 cm; **B**, **H**, 2.5 mm; **C**, **D**, 5 mm; **E–G**, 2 mm; **I**, 8 mm; **J**, 4 mm.

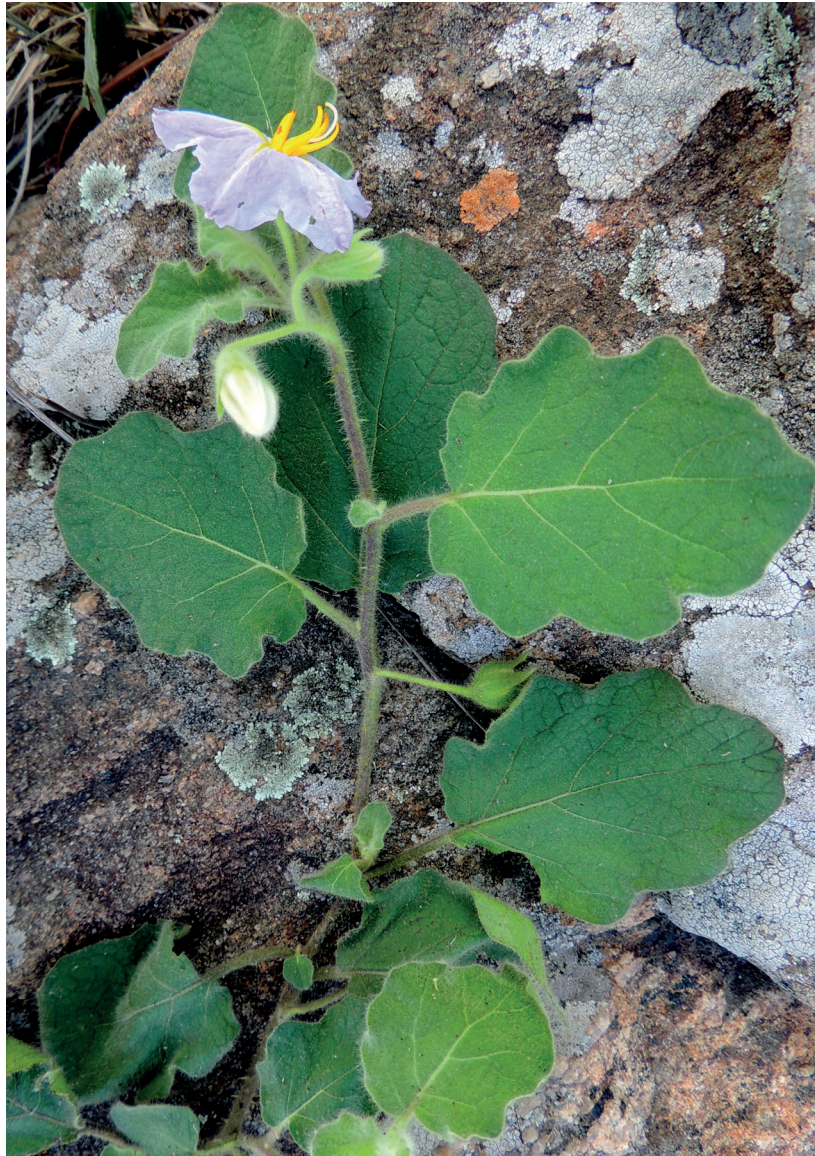


FIG. 2. — *Solanum pulneyensis* Soosairaj, sp. nov., a twig.

Though this species could be considered as Data Deficient (DD) due to its distribution, we could anticipate that the uncertainty on the conservation of the habitats which are favorable for the growth of *Solanum pulneyensis* Soosairaj, sp. nov. shall be assessed as Critically Endangered criteria CR[B2ab(iii); C2a(i); D].

DESCRIPTION

Armed, undershrub, 50-70 cm tall, stellate tomentose throughout. Stem stellate tomentose, prickled, prickles straight, 1-1.5 mm, yellow. Leaves simple, alternate, oblong-ovate, 3-6.5 × 2-4 cm, base truncate, oblique, margin undulate, stellate tomentose on both the surfaces, apex obtuse, midrib with 1 or 2 prickles below, lateral nerves 3-4 pairs, without prickles; petiole 8-23 mm, prickled. Inflorescence a cyme, supra axillary, 2-3 flowered, peduncle 5-6 mm long. Flowers 20-23 mm across, pedicel up to 18 mm, not prickled; Calyx cupular, rotate, 9-10 mm, densely stellate tomentose without, glabrous within, lobes 5, lanceolate with prominent midnerves,

5-6 mm, apex acuminate; Corolla rotate, 5 lobed, pale purple, lobes orbicular, 4-5 mm, undulate, stellate tomentose without, glabrous inside, midnerve yellowish from the base; Stamens 5, filaments 1-2 mm, glabrous, anthers unequal, 3 long, 7-8 mm, falcate, 2 short, 5-6 mm, lanceolate, glabrous, yellow, poricidal. Pistil 12 mm; ovary ovoid, 1-1.5 mm, style 11-12 mm long, capillary, glabrous, curved; stigma simple. Fruit subcapsular, globose, 8-10 mm across, pale green with white patches, fruiting calyx accrescent, 13-14 mm, lobes 10-11 mm, stellately tomentose, not prickled. Seed rhomboid, 3.5 × 3 mm, pale brown, alveolate, margin bulged.

AFFINITIES

Solanum pulneyensis Soosairaj, sp. nov. is a distinct species since it has a subcapsular fruit. It resembles with *S. wightii* Nees in having accrescent fruit calyx that covers the fruit completely but differs in having subcapsular fruit, obtuse



FIG. 3. — Distribution map of *Solanum pulneyensis* Soosairaj, sp. nov., generated using GeoCAT.

leaf apex, glabrous anther, calyx and petiole without prickles (Table 1). It is also similar to *S. cordatum* in having similar features like oblong-ovate leaves, 2-3 flowered cymes but differs in having subcapsular fruit that dehisces irregularly at apex and fruit that is pale green with white patches. Although most of the *Solanum* species have berry as common fruit type, Symon (1979, 1981) reports subcapsular fruit in *Solanum rostratum* Dunal, a widespread weed in his revision of Australian *Solanum* species.

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