

# *Ipomoea simoesiana* (Convolvulaceae): a new species from the Western Ghats, India

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**Abstract:** *Ipomoea simoesiana*, a new species of Convolvulaceae is described from the Western Ghats of India. The species is morphologically similar to *I. ochracea* (Lindl.) G.Don but it is distinguished by its hirsute stem and sepals, leaves with an acute apex, globose capsule, and hirsute seeds. A detailed description, distribution, phenological period and relevant taxonomic notes are provided to facilitate its easy identification. An identification key for all yellow-flowered species of *Ipomoea* in India is also included. The conservation status has been provisionally assessed as Endangered.

**Keywords:** Biodiversity, Rocky crevices, Maharashtra, Morning Glory, Sahyadri range

## Introduction

*Ipomoea* L. is the largest genus of the family Convolvulaceae (morning glory family) and has about 635 species mainly distributed in the tropical and warm temperate regions of the world (POWO, 2024). Kattee (2019) revised the genus for India and reported 52 species, two subspecies, three varieties and one forma. During a field trip to the Pateshwar hills, a part of eastern escarpment of the Western Ghats in Satara district, authors located an interesting population of *Ipomoea* with yellow flowers and brown hirsute seeds. These distinctive characters prompted a detailed comparative study, which confirmed it to be a hitherto undescribed species. The observations were confirmed through a review of relevant literature (Clarke, 1883; Cooke, 1905; Verdcourt, 1958; Johari,

1983; Fang & Staples, 1995; Biju, 1997; Wood *et al.*, 2020), consultation of herbarium specimens (including type material), and examinations of living collections of allied species in the National Collection of Convolvulaceae, Paris. The new species, named *I. simoesiana*, showed close morphological similarities with *I. ochracea* in some vegetative and floral characters but is distinct in several characters, as detailed in Table 1. The new species is described and illustrated here with photographs, line drawings, and notes on its distribution and its provisional conservation status. A key to all yellow-flowered *Ipomoea* species in India is also provided to facilitate identification.

## Methods and Materials

As a part of revisionary studies on family Convolvulaceae, a field expedition was conducted in the ranges of Sahyadri, especially in Pateshwar hills (Satara district, Maharashtra). During this visit, yellow flowered specimens were collected and brought to the laboratory at The New College, Kolhapur in Maharashtra, India, for critical observations of vegetative as well as floral characters. Additionally, visits were also made to the Singapore Botanic Garden to consult authentic herbarium sheets of *I. ochracea* (Staples, 1936) and to the National Collection of Convolvulaceae (CNS) at Paris, France to study living plant material of allied taxa. The protologues, type specimens and relevant literature were consulted using online taxonomic databases such as JSTOR Global Plants

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(<https://plants.jstor.org>), GBIF (<https://www.gbif.org>), POWO (2024, continuously updated) and the Biodiversity Heritage Library (<http://www.biodiversitylibrary.org>). Photo plates were prepared to illustrate comparative morphological analysis, along with detailed images of all plant parts of the species. An identification key for yellow-flowered *Ipomoea* species occurring in India was also prepared. Herbarium specimens were deposited at BSI, CAL, NCK and SUK herbaria (Thiers, 2024, continuously updated). The Conservation Status of the novelty was also provisionally assessed according to the guidelines of IUCN categories and criteria version 3.1 (IUCN, 2022). Dried seeds were subjected to SEM. The seeds were mounted on an aluminum stub using double-sided sticky carbon tape, which was then coated with gold/palladium for 75 seconds using a Quorum SC7620 sputter coater. The seed coat surface was examined using a TESCAN VEGA3 scanning electron microscope at 10 and 15 kV.

## Taxonomic treatment

***Ipomoea simoesiana*** Shimpale, A.V. Kattee & S.B. Patil **sp. nov.** **Figs. 1–3**

The new species is morphologically similar to *Ipomoea ochracea* (Lindl.) G. Don in terms of habit and flower color but can be distinguished by several key features: it has hirsute stems (*vs.* glabrous or tomentellous); leaves that are cordate at the base and acute to acuminate at the apex (*vs.* broadly cordate at the base and finely acuminate); densely hirsute sepals (*vs.* glabrous to tomentellous sepals); a corolla tube that is yellow throughout (*vs.* purple inside at the base); and globose fruits (*vs.* ovoid fruits), and hirsute seeds (*vs.* seeds reticulate, glabrous to tomentose at margins).

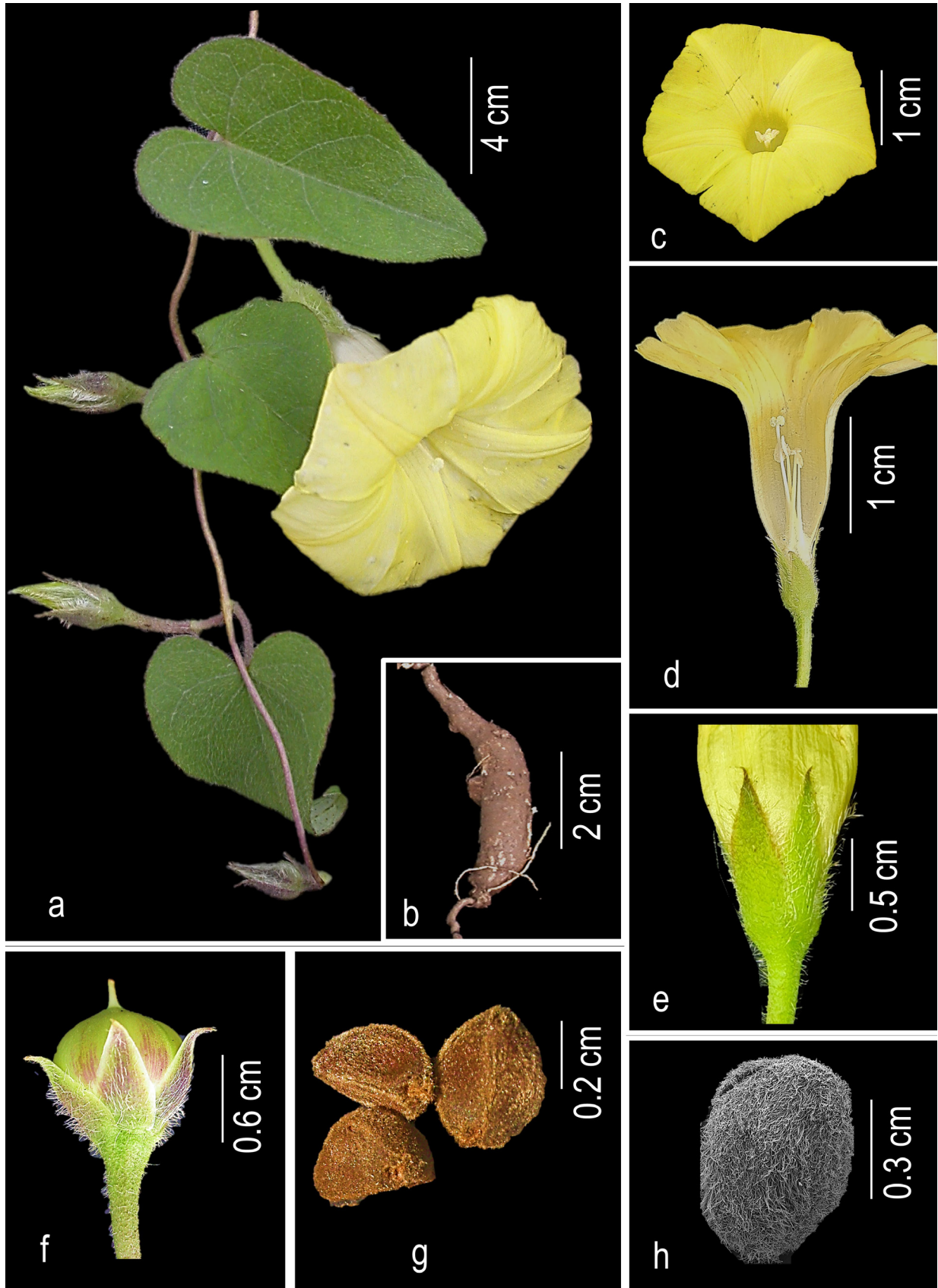
*Type:* INDIA, **Maharashtra**, Satara district, Pateshwar hills, 881 m, 17°37'18.40" N, 74°2'5.52" E, 29.08.2016, *Amrapali Kattee* AVK-1538 (holo CAL; iso BSI, SUK).

Perennial climbers, *c.* 3 m long; roots tuberous, slender, *c.* 5 × *c.* 3 cm. Stems profusely branched, terete, densely hirsute, without milky latex; young branches hairy; hairs silvery. Leaves broadly ovate, 3–6.5 × 2.5–5 cm, base cordate, apex acute

to acuminate, hispid on both surfaces; petioles 1–5 cm long, densely hispid; exstipulate. Cymes axillary, 1–3-flowered, 0.7–1 cm long. Flowers 3–3.6 × 3–3.2 cm; pedicels 0.7–1.2 cm long; bracts lanceolate, 0.3–0.5 × *c.* 0.1 cm, at joint of pedicel with peduncle, covered with silky hairs. Sepals 5, densely silvery-silky hairy on outside, glabrous inside, lobes subequal, 0.9–1.2 × 0.2–0.3 cm, oblong-acute. Corolla funnel shaped, 3–3.6 cm long, sulphur yellow; tube *c.* 2 cm long, pubescent outside, glabrous inside; limb entire, 3–3.2 cm across. Stamens 5, subequal, included, adnate to corolla tube at *c.* 5 mm above base; filaments 0.8–0.9 cm long, glandular at base; anthers 0.2–0.3 cm long, basifixed; pollen grains globose, 68–70 μm in diam., pantaporate, echinate. Ovary sessile, ovoid, 0.3–0.4 cm long, glabrous; style 1.3–1.5 cm long, glabrous, slender; stigma 2-lobed. Capsules ovoid, 0.8–1.2 × 0.7–0.9 cm, glabrous, 4-valved, 2-celled. Seeds 2–4, *c.* 0.5 × 0.4 cm, densely hirsute throughout, brown in colour.

*Flowering & Fruiting:* Flowering from August to September; fruiting from September to November.

*Habitat:* The species is primarily found in the semi-deciduous forests of the Western Ghats, growing in the crevices of rock cliffs at an elevation of ±881 m above sea level in Pateshwar hills. It twines on grasses such as *Ischaemum rugosum* Salisb. and *Apluda mutica* L. Commonly associated species include *Boswellia serrata* Roxb., *Diospyros melanoxylon* Roxb., *Senecio bombayensis* N.P. Balakr., *Evolvulus alsinoides* L., *Crotalaria nana* Burm.f., *Lavandula bipinnata* Kuntze, *Striga densiflora* Benth., and *Polygala persicariifolia* DC. In the Pateshwar hills, only 50–70 mature individuals were located, all bearing well-developed fruits. Rasingam *et al.* (2018) also collected same species from the Eastern Ghats of India, but they identified it as *I. clarkei* Hook.f. In the Eastern Ghats, it occurs in mixed dry deciduous forests and open rocky grasslands mostly associated with *Asparagus racemosus* Willd., *Heteropogon contortus* (L.) P. Beauv. ex Roem. & Schult. and *Pentanema indicum* (L.) Ling.



**Fig. 1.** *Ipomoea simoesiana* sp. nov.: **a.** Flowering twig; **b.** Tuberous root; **c.** Corolla—top view; **d.** Flower—split open showing stamens and gynoecium; **e.** Calyx; **f.** Capsule; **g & h.** Seeds.

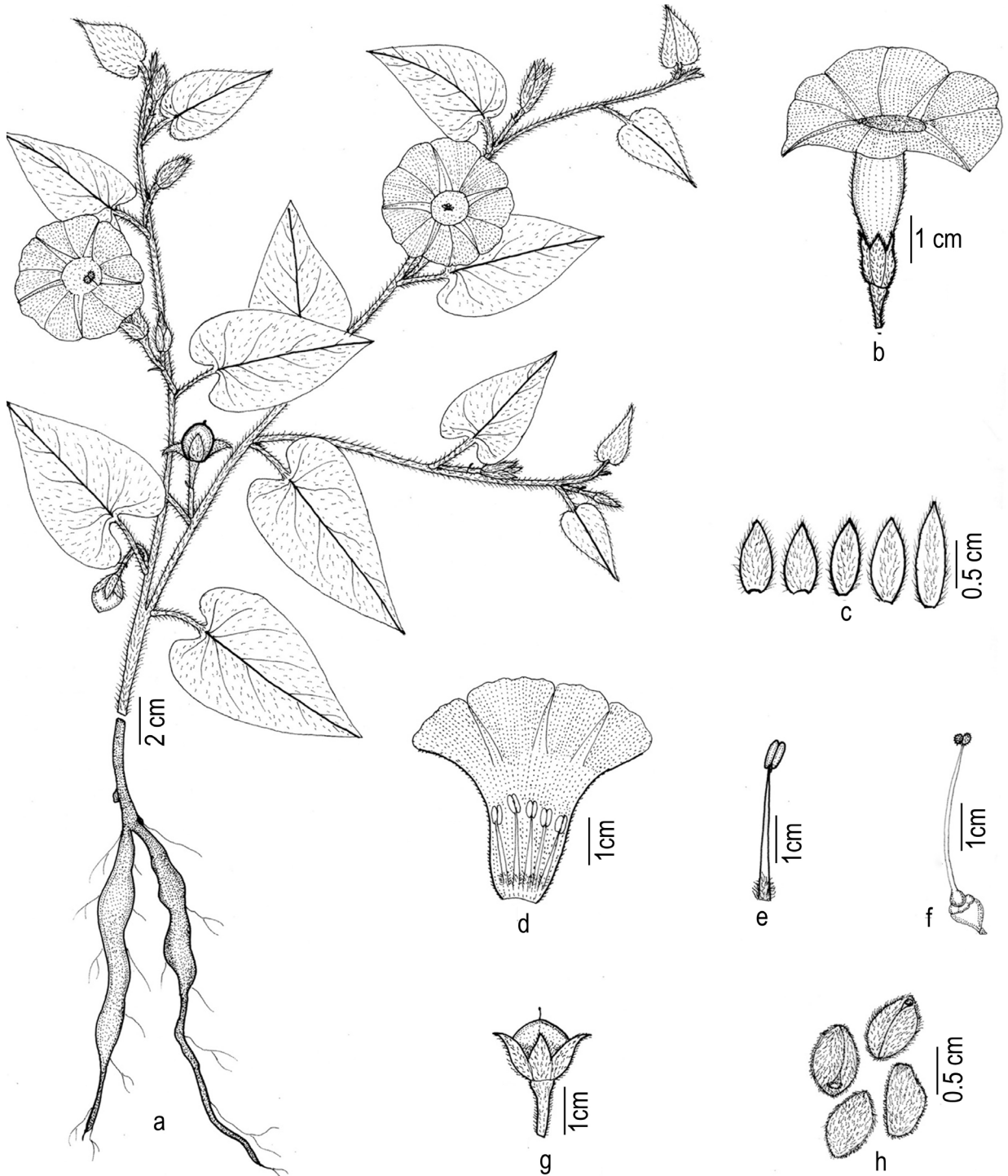


**Distribution:** It is known from three localities in India from Andhra Pradesh, Maharashtra and Telangana.

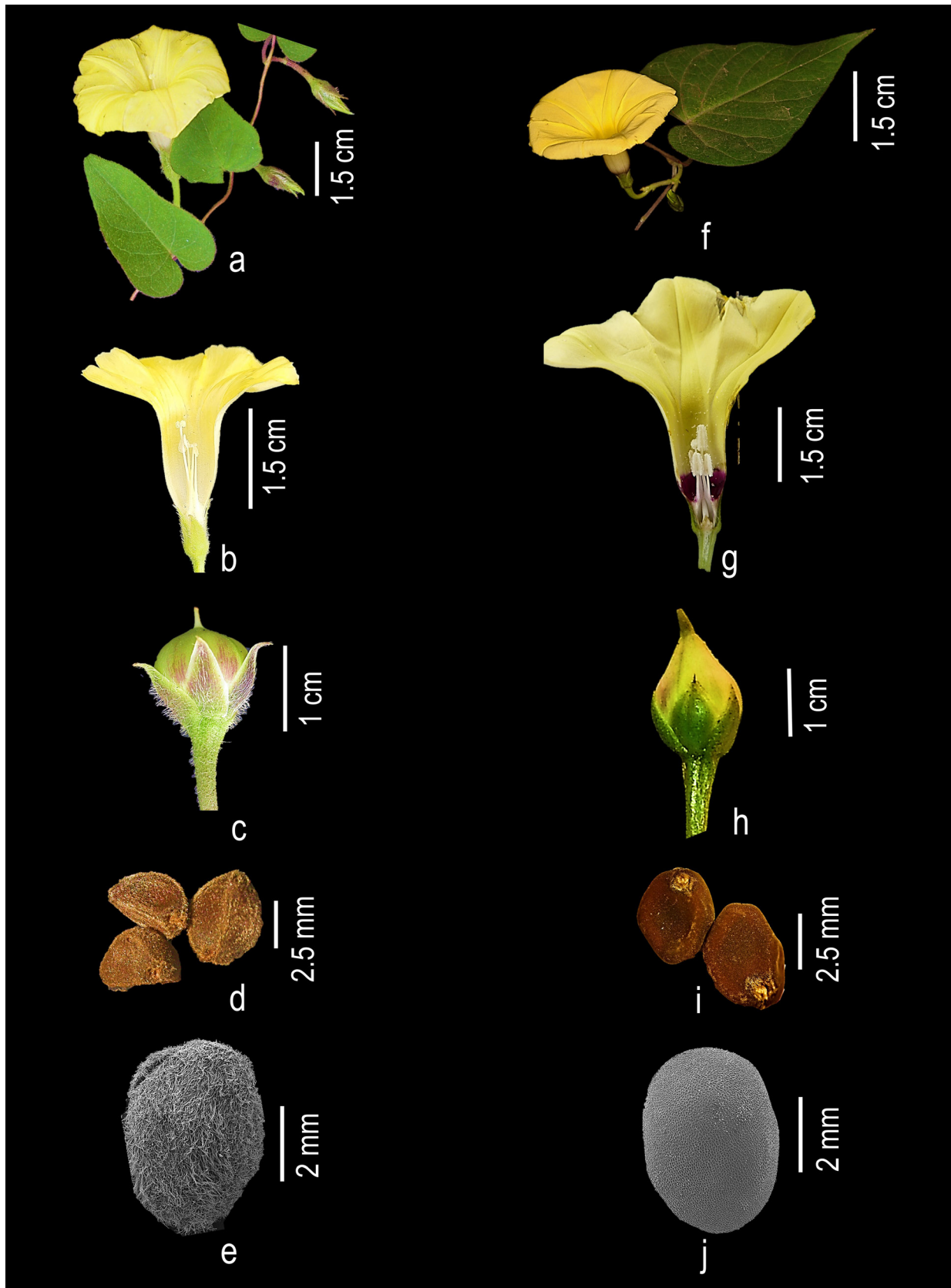
**Etymology:** The species is named after Dr. Ana Rita G. Simoes, Scientist at Royal Botanic Gardens, Kew, UK in recognition of her contribution to the

studies of the family Convolvulaceae, especially in tribe Merremieae.

**Conservation status:** The species is known from three populations and area of occupancy (AOO) is estimated 5000 Km<sup>2</sup>, EOO could not be calculated, hence it is also estimated as 5,000 Km<sup>2</sup>. As a result,



**Fig. 2.** *Ipomoea simoesiana* sp. nov.: **a.** Habit; **b.** Flower; **c.** Calyx lobes; **d.** Flower—Longitudinal section; **e.** Stamen; **f.** Gynoecium; **g.** Capsule; **h.** Seeds.



**Fig. 3.** *Ipomoea simoesiana* sp. nov. (a–e): **a.** Flowering twig; **b.** Corolla–split open; **c.** Capsule; **d.** Seeds; **e.** SEM photograph of seed showing hirsute nature of seed surface. *I. ochracea* (f–j): **f.** Flowering twig; **g.** Corolla–split open; **h.** Capsule; **i.** Seeds; **j.** SEM photograph of seed showing glabrous nature of seed surface.

*I. simoesiana* is provisionally assessed here as Endangered [EN B1B2ab(iii)], in accordance with the IUCN categories and guidelines (IUCN, 2022).

*Additional specimens examined:* INDIA, **Maharashtra**, Satara district, Pateshwar hills, 18.08.2024, V.B. Shimpale 7698 (NCK); **Andhra Pradesh**, Neelganga, Srisailam, Nagarjunasagar-Srisailam Tiger Reserve, 16°67'63.10" N, 78°83'78.58" E, 07.12.2012, L. Rasingam & M. Sankara Rao 10138 (BSID); **Telangana**, Saleswaram, Nagarjunasagar-Srisailam Tiger Reserve, 710 m, 16°16'66.3" N, 78°63'63.7" E, 23.10.2016, L. Rasingam & J. Swamy 8005 (BSID).

*Notes:* *Ipomoea simoesiana* is closely related to *I. ochracea* (Lindl.) G. Don in overall appearance, habit and flower colour. Previously, this species was erroneously identified as *Ipomoea ochracea* (Lindl.) G. Don (Shimpale *et al.*, 2012). However, during the course of study, one of the authors (VBS) visited the Singapore herbarium and examined sheets of *I. ochracea* and also personally observed living material at the National Collection of Convolvulaceae (CNS) at Paris, France.

Notably, Wagner *et al.* (1999) reported chromosome count  $2n=30$  in *I. ochracea* while the

proposed new species have  $2n=60$  (Chougule *et al.*, 2023). Although Rasingam *et al.* (2018) identified it as *I. clarkei*, it differs from *I. clarkei* in having tuberous roots, leaves hispid on both surfaces, peduncles shorter than petiole, sepals densely silky hairy on the outside, a corolla tube not constricted at the base, and densely hirsute seeds.

**Key to yellow flowered *Ipomoea* in India**

1. Leaves palmatipartite; sepals protuberant at centre ..... *I. tuberculata*
1. Leaves entire; sepals flat ..... 2.
2. Roots fibrous; stems glabrous to puberulous; seeds glabrous or tomentellous ..... 3.
2. Roots tuberous; stems densely hirsute; seeds hirsute ..... *I. simoesiana*
3. Corolla tubes  $\leq 1.5$  cm; corolla 2–3 cm wide at mouth ..... *I. obscura*
3. Corolla tubes  $\geq 2$  cm long; corolla 5–6 cm wide at mouth ..... 4
4. Plants with milky latex; stamens equaling the corolla tube; fruits globose ..... *I. clarkei*
4. Plants without milky latex; stamens  $\frac{1}{4}$  of corolla tube; fruits ovoid ..... *I. ochracea*

**Table 1.** Morphological comparison of *Ipomoea ochracea* and *I. simoesiana* along with cytological data

Characters	<i>I. ochracea</i> (Lindl.) G. Don	<i>I. simoesiana</i> sp. nov.
Leaves		
Shape	Broadly ovate	Ovate
Apex	Finely acuminate	Acute to acuminate
Base	Deeply cordate	Cordate
Indumentum	Glabrous except for veins	Hirsute
Sepals	Glabrous to sparsely pubescent	Densely hirsute
Stamen length	$\frac{1}{4}$ to the corolla	$\frac{3}{4}$ to the corolla
Style	Shorter or equal to stamens	Longer than stamens
Capsule	Ovate	Globose
Seeds	Glabrous to tomentellous	Densely hirsute all over
Chromosome count	$2n= 30$	$2n= 60$

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