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A new species of *Impatiens* (Balsaminaceae) and rediscovery of *Impatiens aliciae* from the Western Ghats of India

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ABSTRACT: A new *Impatiens* species, *I. periyarensis* is described from the Western Ghats, India. It is found on the open dripping rocks in semi-evergreen forests in Idukki. Additionally, an enigmatic taxon *I. aliciae*, from Valara, Idukki, is rediscovered after its type collections in 1933 by Barnes. A detailed description, illustration, phenology, and notes on both the species are provided.

KEY WORDS: Balsams, *Impatiens josephia*, Kerala, Travancore.

INTRODUCTION

Impatiens Linnaeus, consists of more than 1000 species, chiefly distributed in the montane forests of the tropics and subtropics of the Old World with five centres of diversity namely tropical Africa, Madagascar, South India and Sri Lanka, Sino-Himalaya and South east Asia (Grey-Wilson, 1980; Mabberley, 2017). In India, the number of species of *Impatiens* is estimated to be more than 210 and its distribution is remarkably local and occurs in two well-defined regions viz., the eastern Himalaya in north and the Western Ghats in south (Bhaskar, 2012). Among these, approximately 120 species of *Impatiens* are endemic to the Western Ghats, of which more than 80% are endangered (Bhaskar, 2012, Bhaskar and Sringeswara, 2017; Mani and Thomas, 2017; Mani *et al*., 2018, Salish *et al.*, 2019, Subbiah and Vellingiri, 2019; Vishnu *et al*., 2020). During the botanical explorations in the Western Ghats the authors came across two interesting specimens of *Impatiens* from Alady and Valara in Idukki district, Kerala. A detailed analysis of the specimens followed by consultation of relevant literature (Fischer, 1934, Bhaskar, 2012, Bhaskar and Sringeswara, 2017, Mani and Thomas, 2017, Ramasubbu *et al*., 2017, Mani *et al*., 2018) revealed that the specimens collected from Alady do not match with any hitherto described species and the latter specimen perfectly match with *Impatiens aliciae* C.E.C. Fisch. Therefore, the former specimen is treated as a new species namely *I. periyarensis* while *I. aliciae*, an interesting taxon which created taxonomic ambiguity, and now has been collected after a lapse of 87 years after its type collections by Barnes in the year 1934. This is treated as a rediscovery below.

TAXONOMIC TREATMENT

Impatiens periyarensis B. Mani, Sinj. Thomas & Britto, ***sp. nov.*** **Fig. 1**

Type: INDIA. Kerala, Idukki district, Alady, 900 m a.s.l., 28 August 2016, *Bince Mani 68670* (holotype RHT!, isotypes MH!, RHT!, Acc. 076720)

Diagnosis: *Impatiens periyarensis* is similar to *I. josephia* Sinj. Thomas, B. Mani & Britto but differs by its spatulate and toothed extrafloral nectaries (vs. non-spatulate and non-toothed), lanceolate leaves (vs. linear), glabrous lateral sepals (vs. pubescent), funnel-shaped lower sepal (vs. boat-shaped), 1–2 mm long stout spur (vs. ca. 3 mm long tubular spur), ovate dorsal petal (vs. orbicular), ca. 1 mm long dorsal auricle (vs. ca. 2.5 mm long dorsal auricle), and ellipsoid seeds (vs. reniform-discoid seeds).

Description: Annual upright herbs up to 40 cm long; stem quadrangular, canaliculated, glabrous, pale green, becoming salmon-red; extrafloral nectaries spatulate, toothed, green to salmon-red. Leaves opposite, decussate, 1–2 mm long petiolate; lamina 3–6.3 × 4.5–5 mm, lanceolate, base truncate, margin serrulate, narrowly acute at apex, adaxial surface green, pubescent, abaxial surface pale green, glabrous, midrib distinct, lateral veins obscure. Inflorescence 4–5 flowered in axillary fascicles. Bracts ca. 1 × 0.5 mm, narrowly triangular, pale green, salmon-red at apex. Flowers 7–9 mm across, white to pink, pedicellate; pedicel 1.5–2 cm long at anthesis and extending to 2.2 cm in fruiting, pale green to red-tinged, pubescent along one side; lateral sepals 2, 4.5–5.5 × ca. 0.5 mm, falcate, glabrous; dorsal petal 4.5–5.5 × ca. 5 mm, broadly ovate, glabrous, dorsally keeled, ca. 0.5 mm long mucronate; lateral united petals 2-lobed, 8–9 × ca. 4 mm, glabrous, white to pink; basal lobe ca. 2 × 1 mm, falcate; distal lobe ca. 7 × 4 mm, obovate; dorsal auricle prominent, ca. 1 mm long, strap-shaped; lower

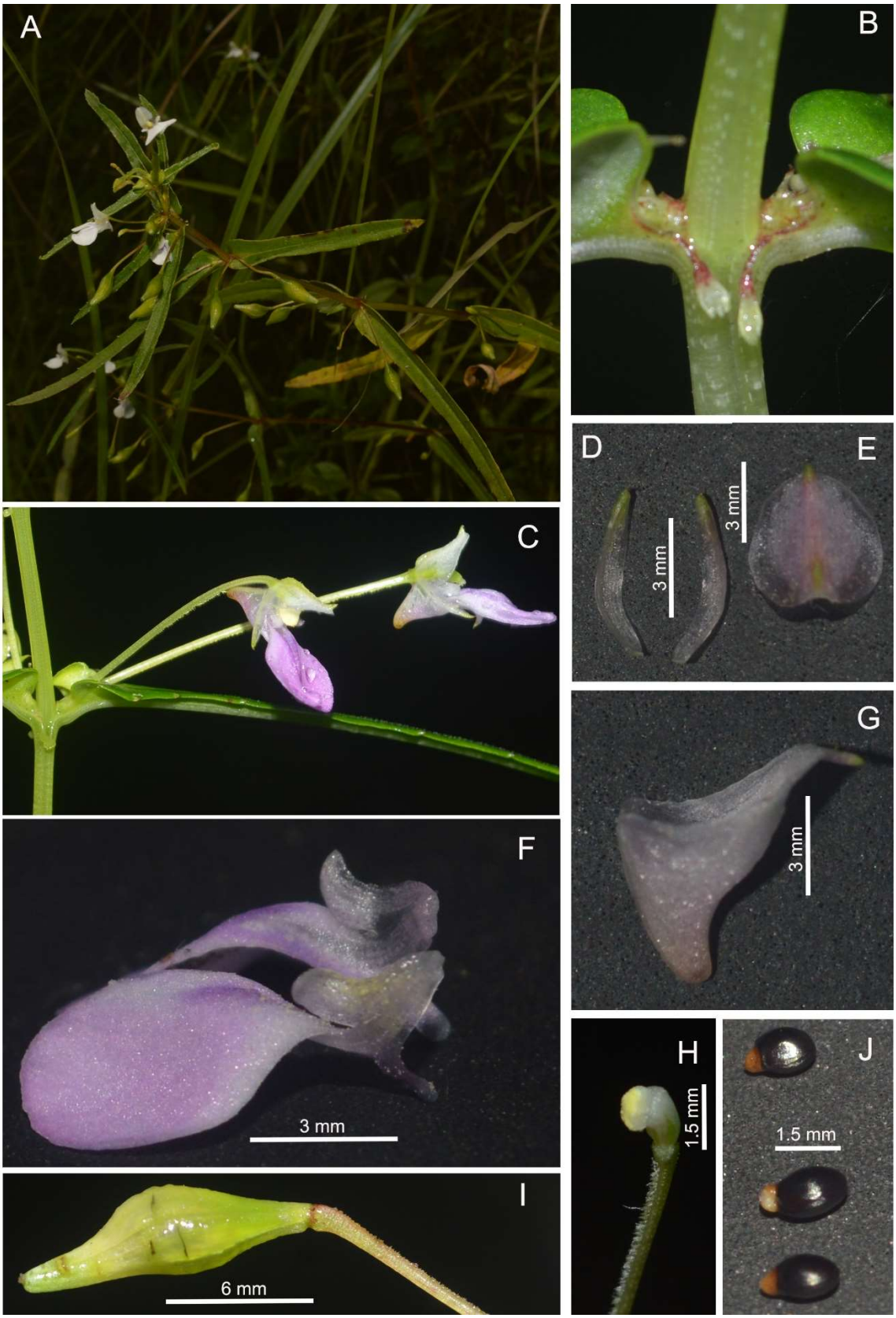

Fig. 1: ***Impatiens periyarensis***. **A**. Habit; **B**. Extrafloral nectaries; **C**. Flowers; **D**. Lateral sepals; **E**. Dorsal petal; **F**. Lateral united petal; **G**. Lower sepal with spur; **H**. Stamen; **I**. Fruit; **J**. Seeds.

Table 1. Comparison of diagnostic morphological characters of ***Impatiens periyarensis***, ***I. josephia*** and ***I. aliciae***.

Characters	***I. periyarensis***	***I. josephia***	***I. aliciae***
Habit	Annual herbs, upright	Annual herbs, upright	Annual herbs, decumbent
Height	25–40 cm	30–55 cm	20–65 cm
Extrafloral nectaries	Green to red, spatulate and toothed	Salmon red, setaceous	Red, setaceous
Leaves	Lanceolate	Linear	Narrowly elliptic–oblong
Lamina apex	Narrowly acute	Narrowly acute	Acute-acuminate
Lamina base	Truncate	Rounded	Cuneate
Inflorescence	Axillary, 4–5-nate	Axillary, 3–5-nate	Axillary, 3–6-nate
Flower colour	Pink to white	Pink	Deep pink to purple
Pedicel	1.5–2.0 cm long	2.5–4.0 cm long	2.3–2.5 cm long
Pedicel in fruit	1.8–2.2 cm long	3.0–4.8 cm long	2.9–3.0 cm,
Lateral sepals	Falcate, glabrous	Falcate, puberulent	Linear, arching, puberulent
Lower sepal	Funnel-shaped, apex form a flap	Boat-shaped, apex cuspidate	Cymbiform, subacute
Spur	1–2 mm long, stout	c. 3.5 mm long, tubular, straight	3–4 mm, tubular–saccate, slightly curved
Dorsal petal	Widely ovate	Orbicular	Orbicular
Lateral united petal	Stipe not prominent	Stipe not prominent	Stipe prominent
Dorsal auricle	ca. 1 mm long, not filiform	ca. 2.5 mm long, filiform	ca. 5 mm long, strap-shaped
Capsule	9–12 mm long, fusiform	12–15 mm long, fusiform	13–16 mm long, ellipsoid
Seeds	10–14 in number, ellipsoid	11–15 in number, slightly reniform–discoid	11–20 in number, sub-globose

sepal 6–7.5 × ca. 3 mm, funnel-shaped, glabrous, apex acute; spur 1–2 mm long, stout, glabrous; Stamens 5, cohering above pistil; column ca. 1.5 × 2 mm, slightly curved; filaments 5, white, narrow and free up to ⅔ rd their length, broad and connate at apex; anther yellow. Pistil ca. 1.5 × 1 mm; ovary narrowly oblong, glabrous, slightly curved; style rudimentary; stigma 5-toothed. Capsule 9–12 × ca. 4.5 mm, fusiform, glabrous, green seeds 9–14 in number, ca. 1.5 × 1 mm, ellipsoid, glabrous, black.

***Etymology*:** The new species is named after the Periyar River, which is the longest river in Kerala, running through the type locality.

***Phenology*:** Flowering and fruiting occurs during September to October.

***Habitat and distribution*:** Grows on wet and dripping open rocky slopes in the semi-evergreen forests at elevations of 800–900 m. Presently, it is known only from the hill ranges of Idukki district in Kerala.

***Notes*:** *Impatiens periyarensis* is similar to *I. josephia* in its habit, nature of inflorescences, shape of the lateral sepals, shape of the basal lobe of the wing petals and organisation of the staminal column. However, it differs from *I. josephia* by various vegetative and floral characters which are depicted in Table 1.

Impatiens aliciae C.E.C. Fisch., Bull. Misc. Inform. Kew 1934(9): 389 (1934) **Fig. 2**

Type: INDIA. Kerala, Travancore Hills, near Munnar, down the Ghat, 5000 ft., September 1933, *Barnes 617* (holotype K!, K000381735 image!)

Description: Annual decumbent branched herbs up to 65 cm long; stem quadrangular, canaliculated, glabrous, salmon-red; extrafloral nectaries setaceous, salmon-red. Leaves opposite, decussate, 1–2 mm long petiolate; lamina 3–12 × 0.5–0.9 cm, linear or narrowly elliptic, base cuneate, margins distantly serrate, the basal 1-3 teeth on either side elongated and glandular, narrowly acute at apex, minutely papillose-hispidulous and dark-green above, glabrous and glaucous below, midrib sub-prominent below, lateral nerves indistinct. Inflorescence 3–6 flowered in axillary fascicles. Bracts minute, ca. 0.5 × 0.5 mm, linear, salmon-red. Flowers 10–12 mm across, deep pink, pedicellate; pedicel 2.3–2.5 cm long at anthesis and extending to 3 cm in fruits, red, with a line of pubescence on one side; lateral sepals 2, 5–6 × ca. 1 mm, linear-oblong, acute, puberulent; dorsal petal 5–6 × ca. 6 mm, orbicular, dorsally keeled and pubescent, apex mucronate; lateral united petals 2-lobed, 12–14 × ca. 6 mm, glabrous, deep pink, stipe and basal lobe with red stripes; basal lobe ca. 6 × 1 mm, falcate, acute at apex; distal lobe ca. 9–10 × 6 mm, broadly obovate, deep-pink with a splash of purple-crimson streaks on the inner side; dorsal auricle ca. 5 mm long, about half as long as the wing, strap-shaped, its edges folded in to form a tube near the spoon-shaped apex, the two auricles descending into the spur with their concave sides facing each other; lower sepal 7–8 mm long, cymbiform, subacute at apex, glabrous; spur ca. 3 mm long, tubular-saccate, stout, slightly curved; Stamens 5, cohering above pistil; column ca. 2 × 1 mm; filaments 5, pink, narrow and free up to ⅔ rd their length, broad and connate at apex; anther pink. Pistil ca. 1.5 × 1 mm; ovary ellipsoid, glabrous, slightly curved; style rudimentary; stigma 5-toothed. Capsule 13–16 × ca. 5 mm, ellipsoid, glabrous, green; seeds 10–20 in number, ca. 2–3 × 2 mm, subglobose, black, glabrous.

***Phenology*:** Flowering and fruiting occurs during September to October.

***Habitat and distribution*:** Grows on wet and dripping open rocky slopes and also in marshy places in the evergreen forests at an elevation of 350–600 m in Idukki, Kerala.

***Notes*:** *Impatiens aliciae*, presumably a narrow endemic species, created confusion among botanists because of the lack of collections after its type collections (Bhaskar, 2012). In many occasions other

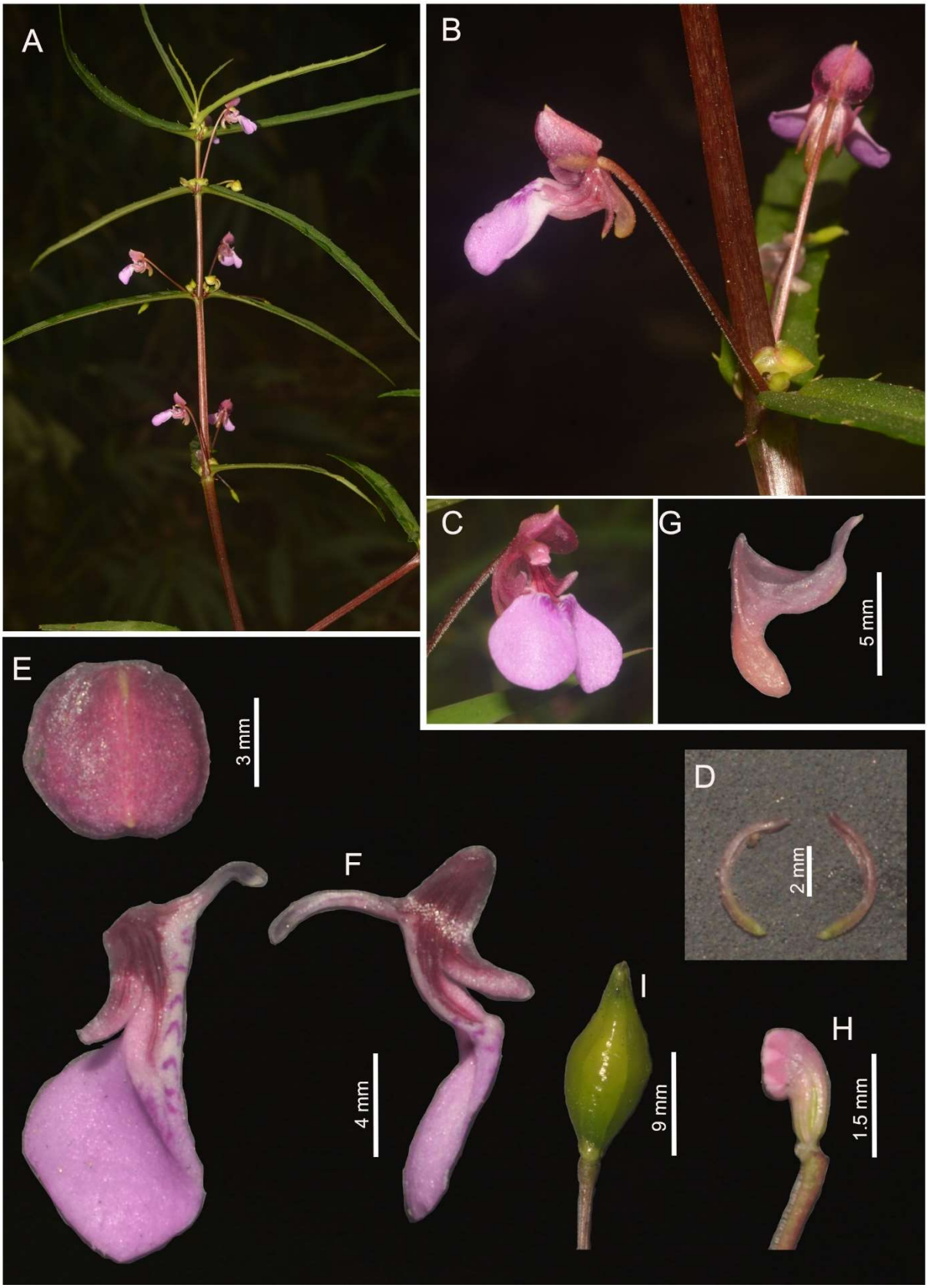

Fig. 2: ***Impatiens aliciae***. **A**. Flowering branch; **B**. A pair of flowers; **C**. Flower front view; **D**. Lateral sepals; **E**. Dorsal petal; **F**. Lateral united petal; **G**. Lower sepal with spur; **H**. Stamen; **I**. Fruit.

species have also been treated as *I. aliciae* (Saldanha, 1996, Efloraofindia Google Group, 2007) by mistake. *Impatiens aliciae* differs from similar species by its prominently stipitate lateral united petals, falcate basal lobe of lateral united petals, ca. 3 mm long, blunt, slightly curved spur and ca. 5 mm long strap-shaped dorsal auricle with edges folded in to form a tube. According Bhaskar (2012) it is allied to *I. tenella* - *I. debilis* - *I. lenta* complexes. However, Bhaskar (2012) himself has clearly presented how *I. aliciae* differs from species of this complex. Our study on the other hand has recognised that *I. aliciae* is more close to *I. josephia* rather than any other species and a comparative account on the diagnostic features of these species are given in Table 1.

***Specimens examined*:** India, Kerala, Travancore Hills, near Munnar, down the Ghat, 5000 ft., September 1933, *Barnes 617* (holotype K! K000381735 image!); Travancore, Kottayam-Munnar New Ghat Road, 2–3000 ft., September 1933, *Barnes 618* (K! K000381734 image!); Idukki, Valara, 400 m a.s.l., 26 August 2017, *Bince Mani 68669* (RHT!).

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