

## *Christisonia mira* (Orobanchaceae): A new plant species from Southern Western Ghats, India

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### Abstract

A root parasitic plant, *Christisonia mira* J.Mathew (Orobanchaceae) is described as a new species from the Kerala part of southern Western Ghats, India.

### Introduction

*Christisonia* Gardner is an achlorophyllous (holoparasitic) genus comprising *c.* 17 species distributed in India, Sri Lanka, Laos, SW China, Thailand and Malesia (Nickrent 2012). According to Benniamin et al. (2012), ten species of *Christisonia* have been recorded in India, of which, six species *viz.*, *C. bicolor* Gardner, *C. calcarata* Wight, *C. indica* Anil Kumar, *C. keralensis* Erady, *C. neilgherrica* Gardner and *C. tubulosa* (Wight) Hook.f. are recorded from the Kerala part of the Western Ghats (Nayar et al. 2014). Sasidharan (2013) indicated that *C. indica* and *C. tubulosa* are endemic to the southern Western Ghats; *C. bicolor* and *C. neilgherrica* (= *Campbellia cytinooides* Wight) are Indo-Sri Lanka linkage taxa; *C. calcarata* is a south Indian element and, *C. keralensis* is a southern Western Ghats, north east element. Mathew and George (2015) recently added *C. tomentosa* J.Mathew & K.V.George, as new from the Kerala part of southern Western Ghats. Botanical explorations in the Achankovil forests during 2009–2014 yielded specimens of *Christisonia* that we feel are sufficiently distinctive to warrant taxonomic recognition as a new species. *Christisonia mira* J.Mathew is here described and illustrated.

### Taxonomy

*Christisonia mira* J.Mathew, *sp. nov.* (Figs 1–4)

**Diagnosis:** *Christisonia mira* is morphologically most similar to *C. bicolor* Gardner, but differs from that species in having: a red, 4 cm long corolla (corolla yellow, 6 cm long in *C. bicolor*); bracteoles elliptic to oblanceolate, 5 mm long (8 mm long, lanceolate or acute in *C. bicolor*); racemes of 8 or 9 flowers (racemes of 5 or 6 flowers in *C. bicolor*), and stamens non didynamous and 2.5–2.7 cm long (stamens didynamous, 3–3.5 cm long in *C. bicolor*). *C. mira* is also morphological similar, with similar ecological preferences to those of *C. tomentosa* and *C. neilgherrica* but differs from these species as indicated in Table 1.

Type: India, Western Ghats, Kerala, Kollam district, Vellakkaltheri, altitude 1800 m, 9°07'11" N, 77°13'05" E, 9 Jun 2012, Jose Mathew 3076 (holo: MH; iso: TBGT).

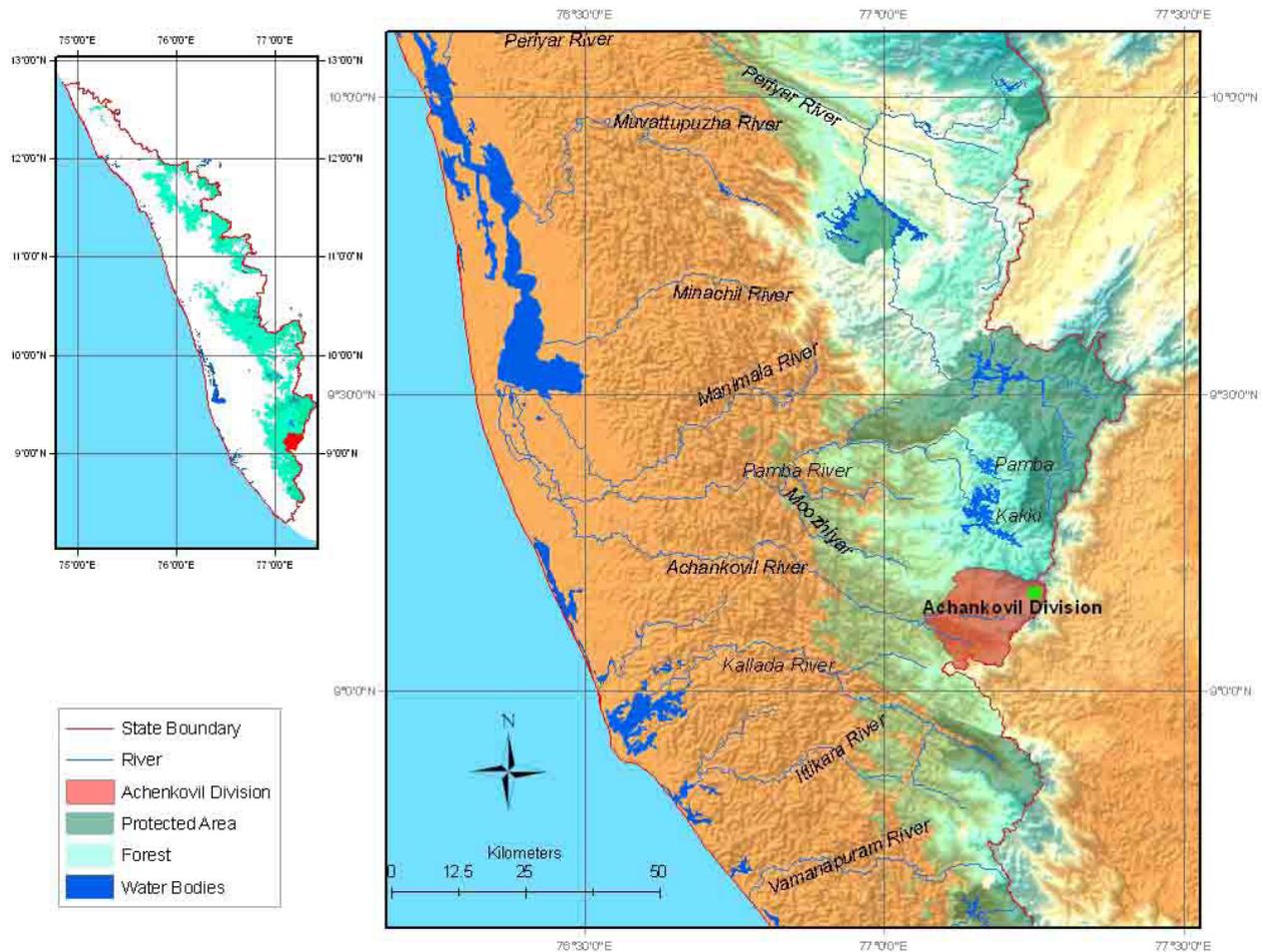


Fig. 1. *Christisonia mira* extent of currently known distribution in the Kollam district of the Western Ghats, India.

Herbs, erect to 5–6 cm, achlorophyllous, parasitic on the roots of *Strobilanthes luridus* Wight., hairy. Roots very numerous, wiry, profusely branched, up to 1.5 mm thick, with haustoria at the place of contact with the host roots and developing many adventitious buds. Stem unbranched, with whorled, oblanceolate bracts. Inflorescence racemose, 8- or 9-flowered. Bracts 5 mm long, 2–3 mm wide, light brownish, glabrous. Pedicels 1 cm long, 3–5 mm thick, erect, pink. Bracteoles 2, elliptic to oblanceolate, 5 mm long, 3 mm wide. Flower buds glandular hairy, covered with copious translucent tasteless slime when young. Calyx 5, 1.2 cm long, 0.6–0.8 cm wide, base creamy white, lobes red, tubular-campanulate with slight median zygomorphy, tube split at the top to one third the length into 5 subequal triangular valvate lobes with acute apex. Corolla tube 3–3.5 cm long, red-coloured, trichomes on both sides, lower half closely appressed to the ovary, upper half inflated; throat yellowish with a tinge of orange; tube expanding into a sub-bilabiate 5-lobed limb; lobes 0.8–1 cm long, orbicular reniform, imbricate, anterior three lobes somewhat equal and slightly smaller than the posterior lobes. Stamens 4, inserted at the constricted part of the corolla tube, included, non didynamous; filaments light purplish, 2.5–3 cm long, glandular hairy throughout; anthers pale purplish, two-celled, one of the cells fertile, ovate, base sharply spurred with tip curved outwards; connective with a prominent swelling on one side. Pollen grains with smooth wall. Ovary of 2 median carpels, syncarpous, superior, unilocular with a tendency to become bilocular at the base; placentae 2, parietal, bipartite, tips expanding into fleshy portions; ovules 180–200  $\mu\text{m}$  long, 125–150  $\mu\text{m}$  broad, numerous, anatropous and arising from the entire surface of the placenta; style glabrous, 3–3.5 cm long, included but reaching above the level of the anthers; stigma peltate and with a narrow depression in the centre. Fruit a capsule, pyriform, ca 1.4 x 1.8 cm, unilocular, enclosed by persistent calyx. Seeds minute, numerous.

**Other specimen examined:** INDIA: KERALA: S Western Ghats, Kollam district, Vellakkaltheri, 9 Jun 2013, Jose Mathew 3094, 3095 (TBGT).

**Etymology:** The specific epithet ‘mira’ refers to the wonderful appearance of this new species.

**Distribution and ecology:** *Christisonia mira* is endemic to the Southern Western Ghats, currently known only from two localities from Vellakkaltheri in the Kollam district (Fig. 1). The species grows on the wet roots of

*Strobilanthes luridus* Wight at altitudes of c. 1800 m. It is found in association with *Ophiopogon intermedius* D.Don (Asparagaceae) and *Elatostema acuminatum* (Poir.) Brongn. (Urticaceae).

**Flowering:** Flowers and fruits in June.

**Conservation status:** *Christisonia mira* is currently known only from 2 localities of Achankovil reserve forest area (Vellakkaltheri in the Kollam district), each separated by 800 m. A total of 90 mature individuals were found in the area. The data gained from the field studies were evaluated according to the IUCN (2015) categorization and at least “vulnerable” status has been proposed for the species.

**Remarks:** *Christisonia mira* is a holoparasite growing on the roots of *Strobilanthes luridus*. *Christisonia tomentosa*, also grows on the roots of the same host at northern Achankovil. *Strobilanthes luridus* is an endemic species, occupying a very restricted area in the evergreen forests of southern Western Ghats (Sasidharan 2013). Thorogood et al. (2007) evinced that host specificity is a driving force in the evolution and speciation of parasitic plants. An enhanced understanding of the evolution, cell biology, and physiology of host specificity in this, and related taxa is crucial.

#### Key to the *Christisonia* in southern Western Ghats

1. Anthers not spurred ..... 7
1. Anthers spurred ..... 2
2. Inflorescence 15–26 cm long, flowers loosely arranged in racemes ... *C. tubulosa*
2. Inflorescence up to 10 cm long, flowers compactly arranged in racemes ..... 3
3. Racemes of 3 or 4 flowers; calyx 1.7–2 cm wide, conceals most of corolla-tube ..... *C. indica*
3. Racemes of  $\geq 5$  flowers; calyx campanulata, up to 1.5 cm wide, conceals 1/3 of corolla tube..... 4
4. Corolla lobes white or cream ..... 5
4. Corolla lobes red or yellow ..... 6
5. Pedicels as long as the calyx or shorter ..... *C. calcarata*
5. Pedicels longer than the calyx (3 cm long) ..... *C. keralensis*
6. Stamens not didynamous, anthers elliptic to oblanceolate; corolla throat orange-tinged ..... *C. mira*
6. Stamens perfectly didynamous, anthers lanceolate or acute, corolla throat concolourous with corolla tube .  
..... *C. bicolor*
7. Corolla lobes red, stamens didynamous ..... *C. tomentosa*
7. Corolla lobes yellow, stamens equal in length ..... *C. neilgherrica*



Fig. 2. *Christisonia mira*: a,b, plants in natural habitat. *J. Mathew 3076*. Photograph: J. Mathew



**Fig. 3.** *Christisonia mira*: **a**, unopened flowers with hairs; **b**, flowers. *J. Mathew 3076*. Photograph: J. Mathew



**Fig. 4.** *Christisonia mira*: **a**, opened flower; **b**, inflorescence; **c**, flower showing stamens and peltate stigma; **d**, flower bracts and bracteoles; **e**, Stamen with spurred anthers and stigma with depressed cavity; **f**, fruit. *J. Mathew 3076*. photograph: J. Mathew.

**Table 1. Ecological and morphological differences between *Christisonia mira*, *C. bicolor*, *C. tomentosa* and *C. neilgherrica***

Character	<i>C. mira</i>	<i>C. bicolor</i>	<i>C. tomentosa</i>	<i>C. neilgherrica</i>
Host	<i>Strobilanthes luridus</i>	<i>Strobilanthes</i> spp. Incl. <i>S.luridus</i>	<i>Strobilanthes luridus</i>	shrubs
Height	5–6 cm	8–12 cm	5–6 cm	5–6 cm
Flowers per inflorescence	8–9	5–6	10–12	10–12
Bracteoles	elliptic–oblanceolate, 5 mm	lanceolate or acute, 8mm	elliptic–oblanceolate, 5 mm	lanceolate or acute, 8–10 mm
Corolla colour and tube length	red, 3–3.5cm long	yellow, 6 cm long	red, 4 cm long	yellow, 6 cm long
Colour corolla throat	yellow to orange	yellow	red	yellow
Stamen form and filament colour	purple, non-didynamous	yellow, didynamous	red, didynamous	yellow, non-didynamous
Anthers	Pale purple, spurred	white, spurred	purplish, not spurred	white, not spurred

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