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# A New Species of *Ceropegia* L. (Apocynaceae) from Uttarakhand, Western Himalaya, India

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## Abstract

A new species of *Ceropegia*: *C. kumaonensis* Kamal Kishor, G.S. Rawat & S.S. Samant from Western Himalaya, Kumaon region of Almora District, Uttarakhand, India is described and illustrated. This newly described species differs from its allied taxa *C. attenuatula* and *C. parvissima* in having fascicled cymes with multiple drooping flowers per node, flowers without tube, long corolla lobes and having regularly toothed corona.

Keywords: Cropegia kumaonensis, Kumaon, Western Himalaya, Uttarakhand, new species

## Introduction

*Ceropegia* Linneaus (1753: 211) is the largest genus of family Apocyanaceae. According to the latest phylogeny based circumscription, genus *Ceropegia (sensu lato)* comprises 63 sections and about 725 species including the highly succulent Stapeliads and species of *Brachystelma* R.Br. ex Sims (Bruyns *et al.* 2017, Bruyns *et al.* 2018a, 2018b, Bruyns *et al.* 2020). The species under present day *Ceropegia* (earlier *Brachystelma* and *Ceropegia*) include slender, succulent climbers, tuberculate or otherwise, low shrubs, often bearing underground tubers and fascicled roots (Ansari 1984, Jagtap & Singh 1999, Bruyns *et al.* 2017). They are widely distributed in seasonally dry places in and around the semi-arid regions of the old world, from Macaronesia to the southern tip of Africa, Arabian Peninsula and South-East Asia from Pakistan to China, Philippines and Northern Australia (Dyer 1980, Albers & Meve 2002, Surveswaran *et al.* 2009, Kambale *et al.* 2012, Bruyns *et al.* 2017, Kambale & Yadav 2019). In India, most of the *Ceropegia* species are distributed in peninsular India (Kambale *et al.* 2014), especially in the Eastern Ghats and some parts of the Western Ghats (Sardesai *et al.* 2016) and few in the northern and central India. Many species under this genus are endemic or narrow endemic (Nayar & Sastry 1987–1989). In India, the genus is represented by about 108(±2) species including the recently nested genus *Brachystelma*, of which about 58 (±2) are endemic to Peninsular India (Kumar *et al.* 2018, Kambale & Yadav, 2019).

During a recent survey of *Ceropegia* in Kumaon region of Western Himalaya in the state of Uttarakhand the first author (KK) encountered a small population of pendulous flowered plants, which were initially identified as *Brachystelma* (*sensu stricto*) now *Ceropegia* (*sensu lato*). This group of *Ceropegia* (reflex corolla lobed) was hitherto unknown from the state of Uttarakhand. Perusal of the relevant literature, especially newly published species from Asia (Hooker 1883, Swarupanandan & Mangaly 1992, Meve 2002, Kullayiswamy *et al.* 2013, Kidyoo 2014, 2015, 2018, Kambale *et al.* 2014, Britto & Bruyns 2016, Kidyoo & Paliyavuth 2016, Kumar *et al.* 2018, Pullaiah *et al.* 2019, Prasad & Venu 2020) revealed that the collected specimens did not match with any known species. Hence, we describe and illustrate this taxon as new to science and name it *Ceropegia kumaonensis*.

## Taxonomy



Ceropegia kumaonensis Kamal Kishor, G.S. Rawat & S.S. Samant sp. nov. (Figs. 1-2)

FIGURE 1. Ceropegia kumaonensis Kamal Kishor, G.S. Rawat & S.S. Samant a-c. Habit; d&e. Inflorescence and flowers; f. Follicles and seeds; g&h. Corona.

*Ceropegia kumaonensis sp. nov.* is closely related with *Ceropegia attenuatula* Bruyns (2017:429) and *Ceropegia parvissima* Bruyns (2017:430), but differs in having fascicled cymes or umbel inflorescence, multiple drooping flowers per node, tubeless flowers with longer corolla lobes, deep purple corona, interstaminal corona regularly toothed at cupular region, inner or staminal corona covered up to half by purple fleshy mass of outer or interstaminal corona.



**FIGURE 2.** Ceropegia kumaonensis Kamal Kishor, G.S. Rawat, & S.S. Samant a. Habit b. Rootstock c–d. Stem with flower buds e. Flowering twig f. Flower g. Corona (Top view) h. Corona (Side view) Drawn from *K. Kishor-2512* by Kamal Kishor.

**Type:**—INDIA. Western Himalaya Uttarakhand, Almora, Bhikiyasain, Ghatti, June, 2021 *K. Kishor-2512* (Holotype: BSD!, Isotype: WII!)

Perennial, erect tuberous herbs. *Tubers* sub-globose or flattened ca. 4–5 cm in diameter, resembling potato. *Stems* erect, unbranched or sparsely branched, 25–80 cm in height, 0.3–0.5 cm diameter; hypogeal part of the stem white, 1.5–3 cm deep, somewhat thicker and succulent; epigeal part purple to purplish green, pubescent when young, glabrescent on maturity, cylindrical, sometimes flattened towards terminal internodes; first internode short and underground, second and subsequent internodes successively longer, 8–15 cms length, terminal internodes shorter. *Leaves*, opposite, linear

to linear-lanceolate, sessile and variable in size; basal ones small and scaly, 0.2-0.5 cm in length; upper leaves  $3-10 \times 0.2-0.3$  cm, opposite, margins and midrib hairy and purple, upright, apex acute. *Inflorescences* extra axillary, sessile, fascicled cymes or umbellate with 2–20 flowers at each node. *Flowers* pendulous; *pedicels* 3–4 cm long with ca. 0.1 cm diameter, purple and hairy; *sepals* 5, minute, hairy, yellowish brown, fused at the base, acute, apex turned outward. Flower bud almost linear with slightly enlarged base, spirally twisted, greenish white, dark purple at maturity. *Corolla* as long as pedicels, 3–4 cm long, 5–lobed, lobes divided up to base, lobes at anthesis joined at tips to form ovoid cage with acute apex or reflexed, lobes slightly broader at the base, sub-cylindrical, acute to spatulate at apex, then linear, revolute, adaxially dark purple, densely hairy throughout. *Corona ca* 0.5 cm across, bi-seriate; *staminal* and *interstaminal* parts fused laterally to form shallow to form cup, ca.0.5 cm across, slightly higher than gynostegium, dark purple in colour, shiny, attractive, hairy inside glabrous otherwise; *staminal corona* incumbent on anther sacs more than half the length of sacs, lanceolate, yellow with deep purple triangular covering by half length. *Pollinia* ovoid, yellow, attached to brown corpusculum by short caudicles. *Follicles* paired, rarely solitary, 8–12 × 0.2–0.3 cm, erect, shiny green, turning purplish on maturity, apex acute pinkish. *Seeds* comose, narrowly elliptic, ca.  $10 \times 2$  mm, light brown at centre, curved, fragile; *coma* ca. 2.5 cm long, white.

**Etymology:**—The specific epithet "*kumaonensis*" is given based on the location of its type locality i.e., the Kumaon region of western Himalaya to which this species is endemic.

Flowering & Fruiting:—Flowering: mid April to June; fruiting May–June.

Habitat & Distribution:—*Ceropegia kumaonensis* grows mostly in open, relatively dry habitats along the edges of Chir pine (*Pinus roxburghii* Sarg.) forests having clayey-gravelly to loamy soils around 1250 m above mean sea level. So far it is known only from the type locality at Ghatti village in Almora District in Kumaon region, Western Himalaya and is therefore considered to be endemic to Kumaon region.

**Conservation Status:**—*Ceropegia kumaonensis* is so far known only from the type locality. About 150 individuals were located during the extensive survey of the Bhikiyasain and Bhatrojkhan blocks and other areas of Almora District. According to IUCN 2019 Red List Criteria, the species falls under the category Data Deficient (DD). Thorough surveys are required in adjacent districts of Uttarakhand (Western Himalaya) covering similar altitudes and habitats to ascertain its distribution, size of the population, area of occupance and threat status.

At the present locality most of the individuals were defoliated by an unknown caterpillar and most of leaves had small white eggs. Caterpillar defoliates the plants rapidly. Impact of this caterpillar on the natural populations is unknown. Frequent forest fires and habitat degradation are other possible threats to the species.

**Discussion**:—*Ceropegia kumaonensis* falls under section *Tiloris* Huber (1957: 33) which is characterized by short erect geophytic herbs with discoid tuber and corolla tube nearly absent, lobes free (occasionally rotate) or remaining joined at tips (Bruyns 2017:429). This new species described here bears multiple flowers in fascicled cymes or umbellate inflorescences at each node and flowers have characteristic 3-4 cm long purple coloured ciliate corolla. This character of inflorescence is not shared by any species of reflex lobed *Ceropegia* reported from Northern India till date. However, this feature is shared by some reflex lobed *Ceropegia* species of South India. The corolla lobes of this taxon morphologically resemble with *C. attenuatula* and *C. parvissima*, having similar pattern of cilia, colour and reflex lobes. But it differs from these taxa having considerably longer height of plant, long leaves, umbel inflorescences with multiple flowers per node, flowers without tube, larger petals. These species also differ in several details of their coronas. The outer corona lobes in new species are regular toothed at cupular region while they are irregularly toothed in *C. attenuatula* and *C. parvissima*. The outer and inner corona lobes of new species also show variation in colour. The outer corona lobes are with deep purple, shiny flesh which covers inner yellow corona lobes up to half of length in triangular shape. This characteristic feature of new species is not shared by any reflex lobed *Ceropegia*. The morphological characters of reflex lobed Himalayan *Ceropegia* are compared in table 1.

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Character	C. kumaonensis	C. attenuatula	C. parvissima
Stem	Un-branched or sparsely branched, purple to purplish green	Not known	Un-branched, greenish
Leaves	$3-10\times0.2-0.3$ cm, opposite, sessile, linear, linear-lanceolate, margins and midrib hairy, acute	Not known	Sessile 10×0.25 cm slender, filiform glabrous, acuminate
Inflorescence	Extra axillary, in fascicled cymes, 2–20 flowers per node	Solitary	Solitary
Flowers	Flowers pendulous, pedicels 3–4 cm long, 0.1 cm in diameter, purple, hairy	Flowers with filiform corolla 4–5 times as long as tube	Flowers long pedicelled, corolla villous, segments twice as long as tube
Corolla tube	Absent	Present	Present
Corolla lobes	Reflexed as long as pedicel, 3–4 cm long	Reflexed, 4–5 times as long as tube, size not known	Reflexed, twice as long as tube, size knot known
Sepals	2.0 x 0.5 mm, narrowly ovate acuminate, puberulent	Not known	Sepals subulate
Corona	Corona bi-seriate dark purple, shiny, <i>ca</i> 0.5 cm across, regularly toothed at copular portion.	Corona shortly irregularly toothed	Corona shortly irregularly toothed
Distribution	Ghatti village in Kumaon region of Uttrakhand state, India, known from type locality only (endemic)	Doongie, State of Himachal Pradesh, India, known from type locality only (endemic)	Doongie, State of Himachal Pradesh, India, known from type locality only (endemic)

<b>TABLE 1.</b> Comparison	of morphological c	characters of Himalavan reflex 1	obed Ceropegia (sensu	Brachvstelma)
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