

A NEW SPECIES OF *CALYPOGEIA* RADDI (MARCHANTIOPHYTA : CALYPOGEIACEAE) FROM EASTERN HIMALAYA, INDIA

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The genus *Calypogeia* Raddi is represented in India by six species (Singh, 2001). All the six species are found in Eastern Himalaya with three species, *C. aeruginosa* Mitt., *C. fissa* (L.) Raddi and *C. marginella* Mitt., restricted to this region alone in Indian bryoflora. Of the remaining three, *C. arguta* Nees & Mont. is common to Eastern Himalaya, Central India, South India and the Andaman and Nicobar Islands; *C. azurea* Stotler & Crotz occurs in both Eastern and Western Himalaya and South India and *C. lunata* Mitt. is common to Eastern as well as Western Himalaya (Mitten, 1861; Chopra, 1943; Sharma & Srivastava, 1993; Singh & al., 2008). During the course of study on the liverworts and hornworts of Mehao Wildlife Sanctuary in Arunachal Pradesh, Eastern Himalaya, the authors came across an interesting species of the genus *Calypogeia* Raddi. Detailed morphotaxonomic study of the species and study of relevant literature (Bischler, 1962a, 1962b; Srivastava & Sharma, 1986; Sharma & Srivastava, 1993; Paton, 1999) revealed it to be a hitherto undescribed species of the genus. The same has been described and illustrated as *C. udarii* in the present communication.

DESCRIPTION

***Calypogeia udarii* Sudipa Das & D.K.Singh, sp. nov.**

(Figs. 1 - 29)

Calypogeiæ puiggarii Steph. affinis, sed plantis magnioribus, 5 - 8.5 cm longis; foliis magnioribus, 1.3 - 2 × 1.3 - 1.8 mm, apice retusis ad bidentatis; ventraliofoliis ad bases longe decurrentibus, margine laevigatis; folioclullis apicum (16 - 32 × 24 - 44 µm), mediarum (28 - 44 × 20 - 32 µm), et basium (24 - 44 × 44 - 52 µm) brevioribus; trigonis folioclullarum parve triangularibus ad indistinctis & foliis inferioris ad $\frac{1}{4}$ - $\frac{1}{3}$ bilobatis, margine laevigatis differt.

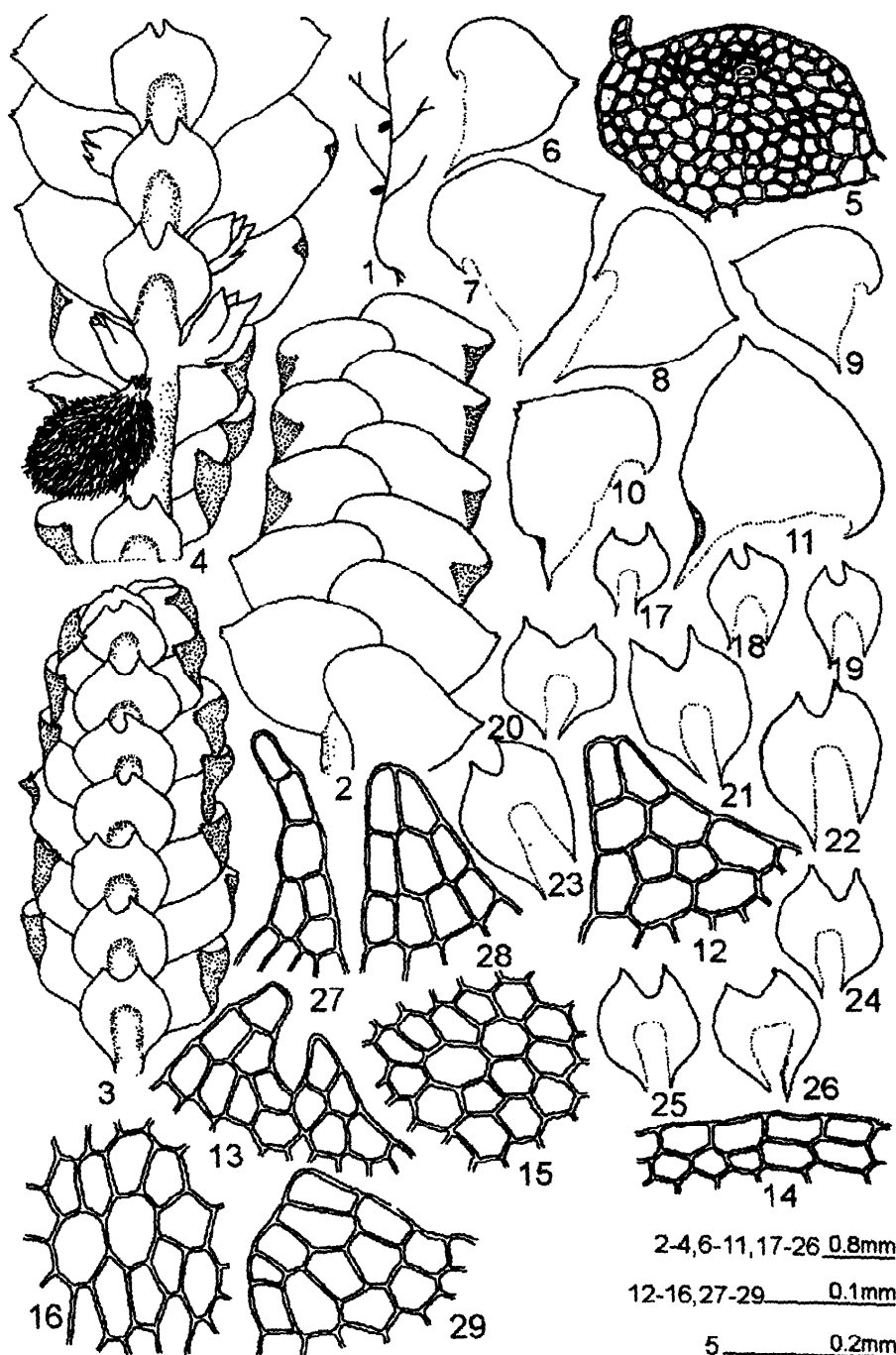
Typus: India: Eastern Himalaya, Arunachal Pradesh, Lower Dibang Valley district, Mehao Wildlife Sanctuary, Mayodia top, c.2850 m, 18. 11. 2000, D.K.Singh 98225 (Holo : BSD).

Plants olive green to brownish-green in herbarium, delicate, prostrate, 50 - 85 mm long, 2.5 - 3.0 mm wide, pinnately branched; branches ventral-intercalary, 4 - 7 mm long, arising at an angle of 45°. Stem brown in colour, stout, elliptic-oval in outline in cross section, 0.24 - 0.36 × 0.16 - 0.24 mm, 12 - 16 cells wide laterally, 9 - 13 cells wide dorso-ventrally, cells undifferentiated, rectangular to polygonal, moderately thick-walled, trigones indistinct; cortical cells 12 - 36 × 12 - 34 µm; medullary cells 14 - 32 × 12 - 40 µm. Leaves closely imbricate, broadly triangular-cordate, 1.3 - 2.1 mm long, 1.3 - 1.8 mm wide, longer than wide, length-width ratio of 1.1 : 1.2 : 1, widest slightly above the base; apex usually recurved, retuse-frequently bidentate; teeth close, subparallel, acute, unequal or rarely equal, 2 - 4 cells long, distally one cell uniseriate, 2 - 4 cells wide at base, separated by narrow, 'U'-shaped sinus; margin entire, asymmetrical with strongly arched dorsal margin covering whole stem, nearly at right angle to the stem, dorsal base extending beyond the stem; ventral base long decurrent; cells thin-walled to moderately thick-walled, trigones feebly triangular to indistinct; apical leaf cells rectangulate-subquadrate, 16 - 32 × 24 - 44 µm; marginal leaf cells rectangulate, 26 - 56 × 18 - 26 µm; median leaf cells polygonal, 28 - 44 × 20 - 32 µm; basal leaf cells elongated-polygonal, 24 - 44 × 44 - 52 µm; cuticle smooth. Underleaves large, overlapping, closely appressed to the stem, elliptical-obovate-reniform, 0.8 - 1.3 mm long, 0.7 - 1.17 mm wide, usually longer than wide, or rarely as long as wide, length-width ratio of 1.1 : 1, widest at middle, 3 - 4 times wider than stem, bilobed to $\frac{1}{4}$ - $\frac{1}{3}$ of underleaf length; lobes triangular, subparallel to slightly divergent, apiculate to acute at apex, 4 - 9 cells long, 7 - 9 cells wide at base, distally

0 - 3 cells uniseriate, sinus broadly 'V'-shaped to 'U'-shaped; margin entire, without any angulation or tooth; base arching, long decurrent. Rhizoids hyaline, in bunch at underleaf bases.

Dioecious (?). Male plants not seen. Gynoecia sessile, borne at apices of very short, leafless, ventral intercalary branches, initially bud like, developing into a subglobose-ovoid-cylindrical, subterranean marsupium; marsupium dark brown, densely covered with rhizoids, 1.0 - 1.5 mm long, c. 1 mm wide, with several small, scale-like bracts at apex; bracts variously lobed, dentate at margin. Mature sporophyte not seen.

Habitat: Epiphytic, growing in cool, moist, partially exposed places in association with *Metzgeria lindbergii*, *Plagiochila devexa* and mosses.



Figs. 1 - 29. *Calypogeia udarii* Sudipa Das & D.K.Singh: 1. Habit (semi diagrammatic); 2. A portion of vegetative plant in dorsal view; 3. The same in ventral view; 4. A portion of fertile plant with marsupium in ventral view; 5. T.S. of stem; 6-11. Leaves; 12, 13. Apical cells of leaf lobe; 14. Marginal cells of leaf; 15. Median cells of leaf; 16. Basal cells of leaf; 17-26. Underleaves; 27-29. Apical cells of underleaf lobe.

Etymology: The species has been named after eminent Indian bryologist late Prof. Ram Udar, FNA for his immense contribution towards the taxonomy of Indian liverworts and hornworts.

DISCUSSION

Calypogeia udarii is characterized by dioecious plants (Fig. 4) with $12-16 \times 9-13$ cells wide stem having undifferentiated, moderately thick-walled cells (Fig. 5); leaves with retuse-frequently bidentate, usually recurved apex with acute teeth, extended dorsal margin beyond further edge of stem and long decurrent ventral margin (Figs. 6 - 11), with length-width ratio of 1:1 - 1.2:1 and closely overlapping underleaves, bilobed to $\frac{1}{4}$ - $\frac{1}{3}$ of their length, without angulations on lateral margins (Figs. 17 - 26), with length-width ratio of 1.1:1.

C. udarii is similar to *C. puiggarii* Steph. in having broadly triangular-cordate leaves with dorsal base extending beyond stem and overlapping underleaves without marginal angulations. It, however, differs from the latter which has smaller plants 1.0 - 1.5 cm in length; thin-walled stem cells; smaller leaves, 1.6×1.6 mm; bilobed leaf apex with rounded lobes and rounded sinus; non-decurrent ventral leaf base with rounded protuberance; thin-walled leaf cells with conspicuous, often nodulose trigones; larger apical, middle and basal leaf cells ($40 \times 25 - 34 \mu\text{m}$, $60 \times 34 \mu\text{m}$ and $68 \times 42 \mu\text{m}$ respectively) and smaller marginal leaf cells ($42 \times 25 \mu\text{m}$); smaller underleaves (0.63×0.84 mm) bilobed to 9/10 of their length with very narrow, pointed sinus and underleaves wider than long with length-width ratio of 1:1.3.

C. udarii also resembles *C. grandistipula* (Steph.) Steph. in the presence of leaves with dorsal margin extending beyond stem and overlapping underleaves, but differs from it as the latter has smaller plants, 1.0 - 1.5 cm long; thin-walled stem cells; leaves with length-width ratio of 1.4:1, usually with entire, rounded or rarely pointed apex, short decurrent ventral leaf base and smaller underleaves with length-width ratio of 1:1.5 bearing rounded protuberance on each side. *C. udarii* superficially resembles *C. aeruginosa* Mitt. as in both of them dorsal leaf base extends beyond stem and the underleaves are nearly orbicular-reniform with entire margins. But the former can be easily distinguished from the latter which has leaves with rounded, entire apex and short decurrent margin and close to distant underleaves.

ACKNOWLEDGEMENTS

The authors are thankful to the Chief Wildlife Warden, Arunachal Pradesh Forest Department for facilitating the exploration work inside the Sanctuary and to Dr. V. J. Nair, Scientist Emeritus, Southern Circle, BSI, Coimbatore for Latin rendering of the diagnosis. One of us (SD) is also grateful to the Director, Botanical Survey of India for financial assistance under 'Flora of India' project.

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