

GENUS *COLOLEJEUNEA* (SPRUCE) SCHIFFN. IN NILGIRI HILLS (WESTERN GHATS)

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ABSTRACT

The present paper deals with the status of the *Cololejeunea* (Spruce) Schiffn. in Nilgiri hills of Western Ghats. Till date the genus is represented in Nilgiri hills by 5 species *Cololejeunea nilgiriensis* G. Asthana & S. C. Srivast., *C. latilobula* (Herzog) Tixier, *C. minutissima* (Sm.) Schiffn. *C. appressa* (A. Evans) Benedix and *C. pseudofloccosa* (Horik.) Benedix. Recent investigations have however, shown the presence of two more species, *C. udarii* G. Asthana & S. C. Srivast. and *C. cardiocarpa* (Mont.) A. Evans.

Keywords: Bryophyta, *Cololejeunea*, Hepaticae, Nilgiri hills, Western Ghats.

INTRODUCTION

The Nilgiri hills of Tamil Nadu is considered to be one of the treasure houses of the bryo-diversity including Hepaticae, Anthocerotae and Musci not only in Western Ghats but also in entire peninsular India. Due to the tropical and subtropical climate, coupled with physical and biotic factors, the area is well suited for the growth and differentiation of Lejeuneaceae, Jubulaceae and Porellaceae. The family Lejeuneaceae has maximum generic as well as species diversity in Nilgiri hills. The genus *Cololejeunea* (subfamily Cololejeuneoideae) is frequently distributed in tropical and subtropical part of the world and mostly found as epiphytic population more commonly as foliicolous (epiphyllous) form and less so corticolous (Pócs, 1982). The genus is one of the most delicate among the hepaticae and is characterized by hyaline nature of leaf, lack of underleaves and highly reduced stem anatomy (*i.e.* comprising only single medullary cell surrounded by cortical cells) and asexual reproduction by means of discoid gemmae occurring exogenously on leaf surface. In India the genus has a rich diversity with 30 validly recognized species. The South Indian territory is represented with 22 species of which 5 species are known from Nilgiri, *Cololejeunea latilobula* (Herzog) Tixier, *C. nilgiriensis* G. Asthana & S. C. Srivast., *C. minutissima* (Sm.) Schiffn., *C. appressa* (A. Evans) Benedix and *C. pseudofloccosa* (Horik.) Benedix (Asthana & Srivastava, 2003). During a recent exploration in the area two more species of genus *Cololejeunea*, *C. cardiocarpa* (Mont.) A. Evans, and *C. udarii* G. Asthana & S. C. Srivast. were collected from Nilgiri hills making a total of 7 species in the area. The paper also discusses the peculiarities of the species with range of distribution in India as well as abroad.

Key to subgenera and species of genus Cololejeunea

- 1a. Plants small (up to 2 mm long), fragile in nature;
branching athecal, *Aphanolejeunea*-type;
leaves distantly arranged ...*Cololejeunea* subgen. *Aphanolejeunea* (*C. nilgiriensis*)
- 1b. Plants medium to long (4 mm to 16 mm long);
branching thecal, *Lejeunea* type, leaves
sub-imbricate to closely imbricate ...2
- 2a. Leaves with dimorphic leaf-lobule, ligulate
or inflated; leaf-lobe margin with elongated,
hyaline cells ...*Cololejeunea* subgen. *Pedinolejeunea*...3
- 2b. Leaves with monomorphic leaf-lobule, only inflated,
lingulate lobule absent, leaf-lobe margin crenate
(hyaline cell always absent) ...5

- 3a. Marginal hyaline cells of leaf-lobule elongated
(finger like projection); in cluster at the tip of apex ...*C. cardiocarpa*
- 3b. Marginal cells of leaf-lobe rectangulate, present all along the margin ...4
- 4a. Leaf-lobule lingulate to triangulate, with defined first tooth, while second tooth absent ...*C. latilobula*
- 4b. Leaf-lobule variable, lingulate to inflated, with distinct first and second tooth ...*C. udarii*
- 5a. Dorsal pappilosity on leaf-cells absent,
plants loosely appressed ...*Cololejeunea* subgen. *Leptocolea* (*C. minutissima*)
- 5b. Dorsal pappilosity on leaf-cells well developed and
prominently present throughout all the leaves, plants
closely appressed *Cololejeunea* subgen. *Taeniolejeunea* ...6
- 6a. Vitta present, first tooth larger than second tooth ...*C. appressa*
- 6b. Vitta absent, second tooth larger than the first tooth *C. pseudofloccosa*

1. *Cololejeunea nilgiriensis* G. Asthana & S. C. Srivast., Bryophytorum Bibliotheca 60: 27. 2003.

Type locality : India (Tamil Nadu-Avalanche).

Range : Endemic to India (Nilgiri hills).

Distribution : India : South India: Tamil Nadu-Nilgiri hills (Avalanche, Ebanadu, Ketabettu (see also Asthana and Srivastava, 2003).

Specimen examined : Western Ghats: Tamil Nadu: Nilgiri hills-Coonoor (Ketabettu), 1850-1900 m, 09.04.2002, P.K. Verma, A. Alam and N. Sahu 15330/2002 (LWU).

The species was recently instituted species from Avalanche, Nilgiri hills (Asthana & Srivastava, 2003) and been recently collected from Coonoor (Ketabettu), a new locality from the area. The species is characterized by distantly arranged leaves with crenate margin of leaf lobe and dorsal pappilosity.

2. *Cololejeunea cardiocarpa* (Mont.) A. Evans, Mem. Torrey Bot. Club 8: 177. 1902.

Type locality : North America (Cuba).

Range : Australia, Africa, Central & South America and Asia (see also Wigginton & Grolle, 1996; Verma, 2005).

Distribution : India : South India: Kerala-Murukkaddy; Tamil Nadu-Palni hills-Kodaikanal (Periyakulam, Perumalmalai) (see also Asthana & Srivastava, 2003), Nilgiri hills-Singara Tea Estate.

Specimens examined : Western Ghats: Tamil Nadu: Nilgiri hills – Coonoor (Singara Tea Estates), 1850 m, 11.10.2000, S.C. Srivastava and party 12828/2000 (LWU).

This species is a new addition to liverwort flora of Nilgiri hills, collected from Coonoor and easily separable from other species of *Cololejeunea* subgen. *Pedinolejeunea* in having finger like elongated non-chlorophyllous cells present at the tip of leaf - lobe. The species was earlier known from Kerala (Murukkaddy) and Tamil Nadu (Palni hills: Periyakulam, Perumalmalai) in south India (Asthana & Srivastava, 2003)

3. *Cololejeunea latilobula* (Herzog) Tixier, Bryophytorum Bibliotheca 27: 156. 1986.

Type locality : China.

Range : Africa and Asia (see also Asthana & Srivastava, 2003).

Distribution : India : Western Himalaya: Uttarakhand: Bageshwar, Nainital (Chaubatia). Eastern Himalaya: Meghalaya-Cherrapunji. Central India: Madhya Pradesh (Pachmarhi). South India: Karnataka-Mercara, Jog falls, Agumbe; Kerala-Trichur (Peechi dam), Kottayam, Murukkaddy, Thekkady, Trivandrum; Tamil Nadu - Nilgiri hills (Kendurai, Kalahatty slope, Sim's park; Palni hills – Kodaikanal (Periyakulam) (see also Asthana & Srivastava, 2003).

Specimens examined : Western Ghats: Tamil Nadu: Nilgiri hills-Kalahatty slope reserve forest, 1600-1800 m, 26.03.2001, *P.K. Verma and A. Alam* 13525/2001 (LWU). Kendurai, 2100 m, 28.03.2003, *P.K. Verma and A. Alam* 16775/2003, 16776/2003, 16777/2003 (LWU).

Initially this species was reported from India as *Leptocolea himalayensis* (= *Cololejeunea himalayensis*) by Pande and Misra (1943) from Uttarakhand. It is and extensively distributed in all four major bryogeographical regions of the country. Recently Zhu and So (2001) reduced it as synonymies under *Cololejeunea latilobula* (see also Asthana & Srivastava, 2003).

4. *Cololejeunea udarii* G. Asthana & S. C. Srivast., Bryophytorum Bibliotheca 60: 40. 2003.

Type locality : India: Karnataka (Jog falls).

Range : Endemic to India.

Distribution : India : Eastern Himalaya: Assam; Arunachal Pradesh (Yingkiyong, Siang-Shimar forest). South India: Karnataka-Jog falls, Agumbe (see Asthana & Srivastava, 2003); Tamil Nadu-Nilgiri hills (Avalanche).

Specimen examined : Western Ghats: Tamil Nadu: Nilgiri hills-Avalanche, 2200 m, 09.10.2000, *S.C. Srivastava and party* 12563/2000 (LWU).

Cololejeunea udarii instituted from Jog falls, Karnataka (Asthana & Srivastava, 2003), shows an extended range of distribution in Nilgiri hills (Avalanche). The species is characterized by hyaline marginal cells present only along the antical margin and dimorphic leaf-lobule (lingulate to inflated).

5. *Cololejeunea minutissima* (Sm.) Schiffn., Engler and Prantl, English Bot. Pl. 1633. 1806.

Type locality : Great Britain.

Range : Australia, Africa, Asia, Europe, North and South America (see also Asthana & Srivastava, 2003; Mizutani, 1980, 1984).

Distribution : India : Eastern Himalaya: Meghalaya-Shillong (Vishnupur); West Bengal. South India: Karnataka-Mercara; Kerala-Thekkady, Murukkaddy, Trivandrum; Tamil Nadu-Nilgiri hills (Parson's valley, Emerald, Kendurai, Government Botanical Garden, Avalanche; Palni hills-Kodaikanal).

Specimens examined : Western Ghats: Tamil Nadu: Nilgiri hills - Ootacamund (Kendurai), 2100-2200 m, 30.03.2003, *P.K. Verma and A. Alam* 16771/2003, 16772/2003, 16773/2003, 16776/2003 (LWU).

This species was earlier reported from Nilgiri hills as *Lejeunea minutissima* (Mitten, 1861). Now it is one of the most abundant species of the genus in Nilgiri hills and seems closer to genus *Microlejeunea*, especially *M. ulicina* (Lejeuneoideae) because of its nature of appearance. The species is characterized by small plant, bidentate inflated leaf-lobule, with 2 celled first tooth.

6. *Cololejeunea pseudofloccosa* (Horik.) Benedix, Feddes Repert. 134: 36. 1953.

Type locality : Taiwan.

Range : Australia and Asia (see Zhu & So, 2001).

Distribution : India: Eastern Himalaya: Arunachal Pradesh-E. Siang, Shimar forest; Sikkim; West Bengal-Darjeeling (Rimbic); Meghalaya-Cherrapunji. South India: Tamil Nadu-Nilgiri hills (Avalanche, Coonoor) (see also Asthana & Srivastava, 2003; Verma, 2005).

Specimen examined: Western Ghats: Tamil Nadu: Nilgiri hills –Upper Bhavani (Avalanche), 2200 m, 09.10.2000, *S.C. Srivastava and party* 12563/2000 (LWU).

Cololejeunea pseudofloccosa was recently reported from Avalanche, Nilgiri hills (Asthana & Srivastava, 2003). The species is characterized by leaf lobule morphology where the first tooth of leaf-lobule is crossed over by the second tooth.

7. *Cololejeunea appressa* (A. Evans) Benedix, Feddes Repert. Beih. 134: 31. 1953.

Type locality : Jamaica.

Range: Africa, Asia and South America (see also Zhu & So, 2001).

Distribution : India : Eastern Himalaya: Meghalaya-Cherrapunji, Shillong (Elephant falls); West Bengal – Darjeeling, Jorpokhri. South India: Karnataka-Agumbe, Jog falls; Tamil Nadu-Nilgiri hills [Kotagiri (Shollarmattum), Gudulur (Naduvattam reserve forest), Ootacamund (Ebanadu), Upper Bhavani (Avalanche)]; Palni hills-Kodaikanal, (Perumalmalai); Andaman and Nicobar Isl. (see also Asthana & Srivastava, 2003).

Specimen examined : Western Ghats: Tamil Nadu: Nilgiri hills-Avalanche, 2200 m, 09.10.2000, S.C. Srivastava and party 12563/2000 (LWU).

The species was initially reported from Avalanche, Nilgiri hills (Asthana & Srivastava, 2003). It has also been collected from Gudulur and Coonoor. The species is characterized by 4 celled uniseriate vitta and papillosity of the leaf.

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नीलगिरी पहाड़ियों (पश्चिमी घाट) में वंश कोलोलिज्युनिया (स्पूस) शिफन.

प्रवीण कुमार वर्मा

सार संक्षेप

नील गिरि पहाड़ियों (पश्चिमी घाट) में कोलोलिज्युनिया (स्पूस) शिफन. के स्थिति का वर्णन है। अभी तक नीलगिरी पहाड़ियों में इस वंश की 5 जातियां हैं : कोलोलिज्युनिया नीलगिरिऐसिस, कोलोलिज्युनिया लेटिलोबुला, कोलोलिज्युनिया मिनुटिस्सिमा, कोलोलिज्युनिया एप्रेस, कोलोलिज्युनिया स्यूडोफ्लोक्सोसा हाल की गवेषणा में दो और जातियां मिली हैं: कोलोलिज्युनिया उडारी एवं कोलोलिज्युनिया कार्डियोकार्पा।