Notes on Cololejeunea standleyi (Steph.) Herz.,
C. subscariosa (Spruce) Schust.,
C. linopteroides Robins. (Hepaticae Lejeunaceae)

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Résumé – Les descriptions originales de Cololejeunea subscariosa (Spruce) Schust. et de
C. standleyi (Steph.) Herz. sont revues, et des caractères permettant de les distinguer sont
ajoutés. Des brefs commentaires nomenclaturaux concernant ces deux espèces sont
présentés. Cololejeunea standleyi est comparé à C. linopteroides Robins. et en particulier à
C. sigmoida Jovet-Ast et Tixier, dont elle est très proche. Cololejeunea subscariosa est
mentionné pour la première fois du Costa Rica.

Abstract – The original descriptions of Cololejeunea subscariosa (Spruce) Schust. and
C. standleyi (Steph.) Herz are revised, and characters allowing separating them are added.
Brief comments on the nomenclature of both species are included. Cololejeunea standleyi is
compared to C. linopteroides Robins. and C. sigmoida Jovet-Ast et Tixier, to which it
is closely allied. Cololejeunea subscariosa is a new record for Costa Rica.

Costa Rica / Hepaticae / Lejeunaceae / Cololejeunea

In 1884, Spruce described a new species of Lejeunea from Rio Negro, Brazil, as Lejeunea subgen. Colo-Lejeunea subscariosa. It is a reddish foliculous plant, whose leaves have very a small lobule and dead, hyaline cells at their apices;
the perianth is flattened. This species is now named Cololejeunea subscariosa (Spruce) Schust. (Schuster, 1963)

Schiffer (1895, cited by Evans, 1911) separated Cololejeunea in two
subgenera: Physocolea, containing species with inflated, five keeled perianths, and
Leptocolea, having compressed perianths with a dorsal keel. Spruce’s species
belonged to the latter genus. Evans (1911) suggested elevating those subgenera to
generic rank; he kept the name Leptocolea and replaced the name Cololejeunea
by Physocolea. Stephani (1916) erroneously reported Physocolea subscariosa from
Costa Rica based on plants that belonged to an unknown species, which Herzog
(1951) later described as C. standleyi. Cololejeunea standleyi (Steph.) Herz. is
recognized by its suborbicular leaves with a subtriangular lobule, a hyaline margin
and sigmoid cells. Dauphin et al. (1998) recorded the species from Costa Rica. The

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specimens misidentified by Stephani (1916), are deposited at the Boissier Herbarium in Geneva. The holotype of *Lejeunea (Colo-Lejeunea) subscariosa* Spruce from Manchester, and *C. standleyi* from Jena, were also studied.

The objectives of the present paper are to include additional characters (i.e., gemmæ and stem structure) to the original descriptions of *Cololejeunea subscariosa* and *C. standleyi*, to compare these two species and to discuss the similarities between *C. standleyi* and both *C. linopteroides* Robins. and *C. sigmoidea* Jovet-Ast et Tixier.

**Cololejeunea subscariosa** (Spruce) Schust.  
Figs 1-4

Plants pale red, foliicolous, very delicate, appressed to the substrate. Stems subpinnate, branches short. Leaves plane, imbricate, oblong rounded, to 0.60 × 0.33 mm, but usually smaller. Merophyte one cell wide. Antical border semicordate, partially covering the stem; apical margin irregular, provided with finger-like hyaline projections; postical border convex (Fig. 1), lobule minute, almost absent, trapezoid, formed by 3-10 cells, the apical cell long, with a hyaline papilla on its apex. Leaf cells subpellucid, not or very little incrassate, some of them (those that are becoming gemmæ), tightly surrounded by an opaque ring, basal cells 20 × 40 µm with large trigones, medial cells 18 × 28 µm, with smaller trigones and thickenings, marginal cells 14 × 20 µm and apical cells hyaline and finger-like (Figs 1, 2). Gemmæ of 22-24 cells (Fig. 3).

Plants autoicous. Perianth obcordate, cuneate, flattened, 0.6 × 0.5 mm, apex emarginate, slightly umbonate, margin irregular, with narrow wings. Dorsal surface subplane, ventral surface gibbous-convex, without a definite keel, capsule globose-elliptic (Figs 4, 4a). Perichaetial bracts obovate, at maturity somewhat smaller than the perianth, cells with small trigones. Male bracts in 3-6 pairs, with two antheridia each.

**Examined material**


The type of *C. subscariosa* is glued to cardboard and several characters of the plant are difficult to observe. Even though, the reddish color of the plant, the small leaves, and the compressed perianth are evident.

**Cololejeunea standleyi** (Steph.) Herz.  
Figs 5-10

Plant large for the genus, monoicous, yellowish. Stems very branched at base, branches separate, forming flat patches 1-3 cm. diameter; branches with leaves to 2 mm wide, with fasciculate rhizoids. Stems ca. 80µm diameter, formed by one medullary cell and 7(8) cortical cell rows: four large, dorsally arranged, and three or four small ventral rows (Figs 9, 10), very much like in *Cololejeunea linopteroides* Robins. (Bernecker-Lücking & Morales, 1999). Merophyte of 2-4 cells wide. Main shoot leaves flat, covering completely the stem, contiguous to
slightly imbricate, 0.6-0.7 × 0.5-0.6 mm, with a very narrow base, obliquely inserted, widely ovate, rounded apex, antical margin subauriculate. Cells very small, marginal cells hyaline, surrounding almost the whole leaf. Apical cells long hexagonal, subflexuose, 30 × 20 µm, basal cells large, oblong and sigmoid on the margin and basal auricles; trigones minute, wall thickenings in the form of small
beads, especially on the apical chlorophyllose cells and leaf auricles (Fig. 5). Cuticle coarsely verruculose. Lobule minute, appressed, sub triangular, with an apical tooth 2-3 cells long (Fig. 6). Gemmae scanty, consisting of 23 cells, three of them modified as cells of attachment (Fig. 7).

Inflorescence lateral in a short branch, with a rarely fertile innovation, perichaetial leaves very unequal in size, the smaller about a third of the size of the perianth, oblong, obtuse, with a narrow hyaline border. Perianth ca 3/4 the leaf length, plane, obcuneate, apex slightly obcordate, wingless, with keels on both sides, ventral surface convex, faintly keeled, dorsal surface smooth, partly covered by stem leaves (Fig. 8). Androecium with two antheridia each, bracts 3-4.

**Examined material**


The original French and Latin on the labels of the following material, belonging to the Boissier Herbarium, have been kept. All have been identified as *Cololejeunea subscariosa* Spruce.


**DISCUSSION**

*Cololejeunea subscariosa* and *C. standleyi* are folicolous taxa occurring at low elevations. They may be confused by their very similar lobe, which is very small, appressed to the lobe and with a long tooth having an apical hyaline papilla in both species. However, in *C. standleyi* the apical tooth is formed by two or three cells in a row, compared to only one in *C. subscariosa* (Figs 1, 6). Other differences between both species include the unusual stem structure of *C. standleyi* (see Table 1).

*Cololejeunea standleyi* seems to be closely related to the Neotropical *C. linopteroides* Robins., and the Asian *C. sigmoidea* Jovet-Ast et Tix. (for a description of *C. linopteroides* see Bernecker-Lücking & Morales, 1999, of *C. sigmoidea* see Zhu & So, 1998). All three species have rounded leaves with sigmoid cells and reduced lobules, gemmae with adherent cells and a very similar perianth. *Cololejeunea standleyi*, however, is a larger plant with leaves having always a border of hyaline cells. Moreover, its leaf cells have thickening in the form of small beads and a verruculose cuticle; its perichaetial leaves are very dissimilar in size.
Table 1. Morphological differences between *Cololejeunea subscariosa* and *Cololejeunea standleyi*.

<table>
<thead>
<tr>
<th>Character</th>
<th><em>C. subscariosa</em></th>
<th><em>C. standleyi</em></th>
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<tbody>
<tr>
<td>Stem anatomy</td>
<td>One medullary cell and 5 cortical cells, merophyte 1 cell wide</td>
<td>One medullary, and 7-8 cortical cells: 4 large dorsal cells and 3-4 small ventral cells, merophyte 2-4 cells wide</td>
</tr>
<tr>
<td>Leaf shape &amp; size</td>
<td>Oblong rounded up to 0.6 × 0.34 mm</td>
<td>Widely ovate 0.7 × 0.6 mm</td>
</tr>
<tr>
<td>Leaf cell outline</td>
<td>Straight</td>
<td>Sigmoid</td>
</tr>
<tr>
<td>Trigones</td>
<td>Conspicuous</td>
<td>Minute</td>
</tr>
<tr>
<td>Thickenings</td>
<td>Sometimes in median cells</td>
<td>In the form of small beads along the cell walls</td>
</tr>
<tr>
<td>Hyaline cells</td>
<td>Finger-like, forming a small group at the leaf apex</td>
<td>Rectangular, around the leaf margin in 1-2 rows</td>
</tr>
<tr>
<td>Gemmae</td>
<td>Without adherent cells</td>
<td>With 3 adherent cells</td>
</tr>
<tr>
<td>Perichaetal bracts</td>
<td>Almost as long as the perianth</td>
<td>Very unequal in size at maturity the smaller one about 1/3 of the perianth</td>
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<tr>
<td>Androecium</td>
<td>Male bracts small, turgid, ovoid, in 3-6 pairs, with 2 antheridia each</td>
<td>3-4 male bracts with 2 antheridia each</td>
</tr>
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</table>

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**REFERENCES**


