



Fig. 98. *Clasmatocolea vermicularis* (Lehm.) Grolle

Plants small, pale green-brown. Stems prostrate, up to 3 cm long. Leaves imbricate, rounded, c. 0.3-1.5 mm long, dorsally concave, margin entire. Cells thin-walled, without trigones, 18-35 x 20-35 μ m, cuticle smooth. Underleaves narrower than stem, usually bilobed. Dioicous. Perianths rare, campanulate, the mouth 3-lobed. **Habitat:** On open soil or roadcuts in montane forest, 2000 m. **Distribution in Rwanda:** Gishwati Forest : Gikungu. **Nyungwe NP:** Karamba. **Distribution in Africa:** Nigeria, Cameroon, DR Congo, Burundi, Ethiopia, Tanzania, Zimbabwe, Malawi, Lesotho, South Africa. Also Madagascar, Mauritius, Réunion.

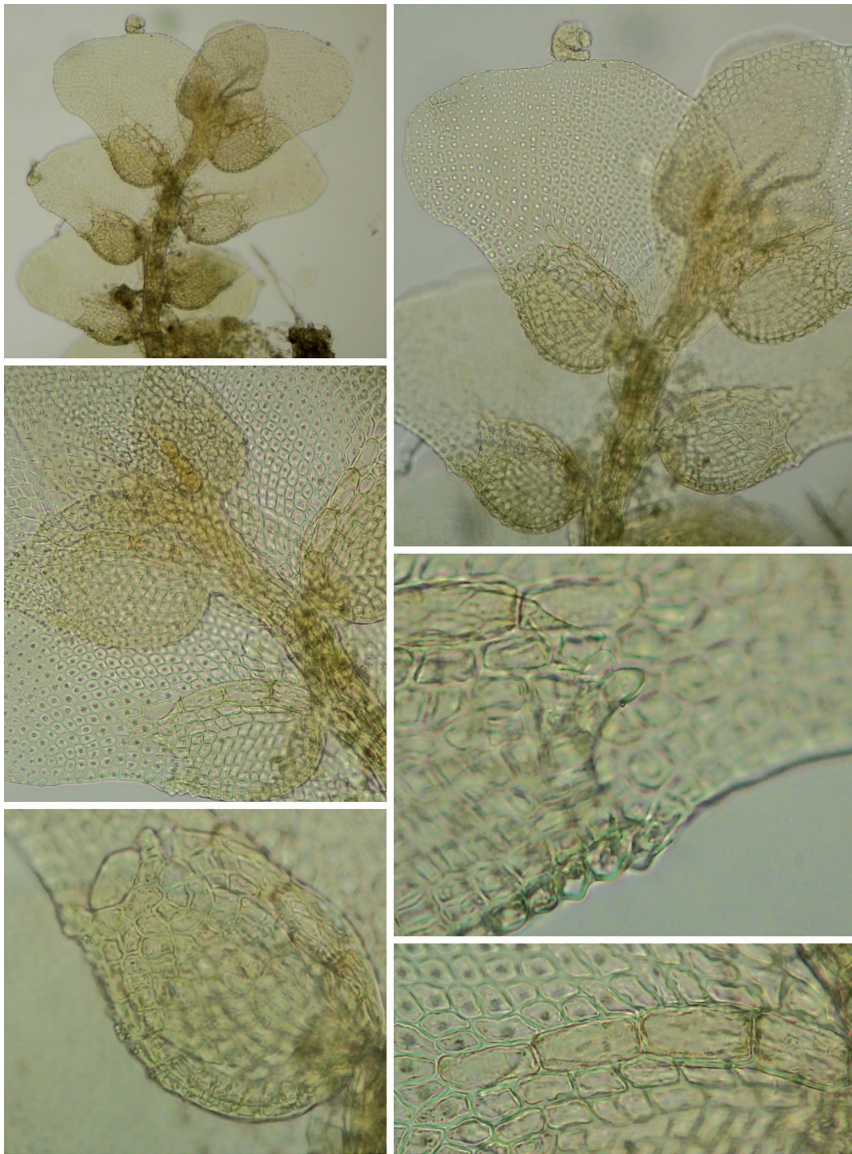


Fig. 99. *Cololejeunea appressa* (A.Evans) Benedix
 Plants small, shoots c. 0.5-0.7 mm wide. Leaves imbricate, spreading. Lobe ovate, 0.3-0.45 x 0.2-0.35 mm, margin crenulated, apex rounded. Cells papillose. Lobule 0.3-0.4 the length of the lobe, ovate, slightly inflated, apical tooth and distal tooth short, each consisting of 1 cell, hyaline papilla in the sinus between the teeth. Autoicous. Perianth obcordate, flattened. **Habitat:** Montane forest, epiphyllous, 2000 m. **Distribution in Rwanda: Nyungwe NP:** Gisakura. **Distribution in Africa:** Sierra Leone, Ivory Coast, DR Congo, Uganda, Kenya, Tanzania, Malawi. Also Comoros, Madagascar, Réunion, Seychelles.

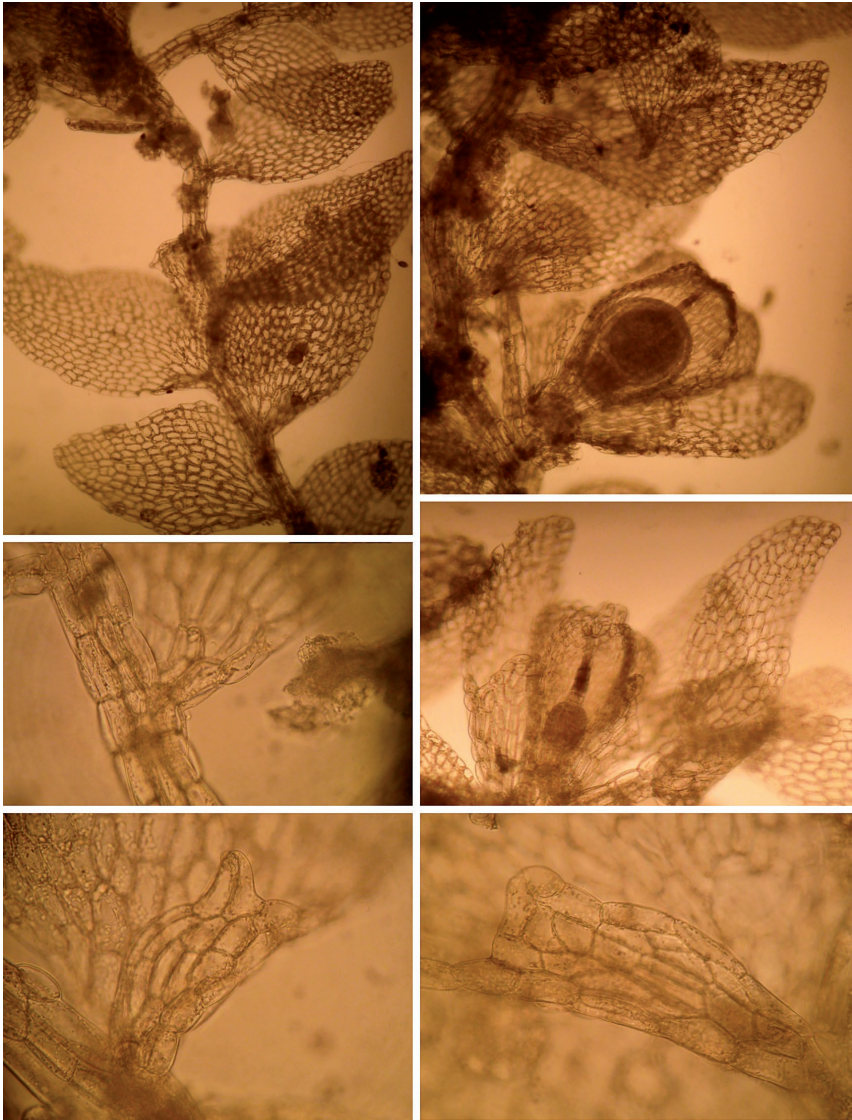


Fig. 100. *Cololejeunea augieri* Tixier

Plants small, up to 0.8 mm wide. Stems up to 1 cm long, branched. Leaves alternate, distant, with insertion at an angle of 60°. Lobes oblong, acuminate at apex, 0.5 mm long and 0.3 mm wide. Lobules saccate, inflated, more or less reduced, with 5-8 cells up to a lobular band, 150 µm long and 80 µm wide, with 1 unicellular tooth. Asexual reproduction with up to 16-celled gemmae. Dioicous. Perianths ovoid, apex rounded, without ventral keels, 0.5 mm long and 0.25 mm wide. **Habitat:** Montane forest, epiphyllous on *Marattia fraxinea*. 2000 m. **Distribution in Rwanda:** Nyungwe NP: Karamba. Only known from the type locality. **Note:** In Geneva, the type bears a wrong label (Kahuzi-Biéga, loc. 126), but the correct collection number (8506 n°6).

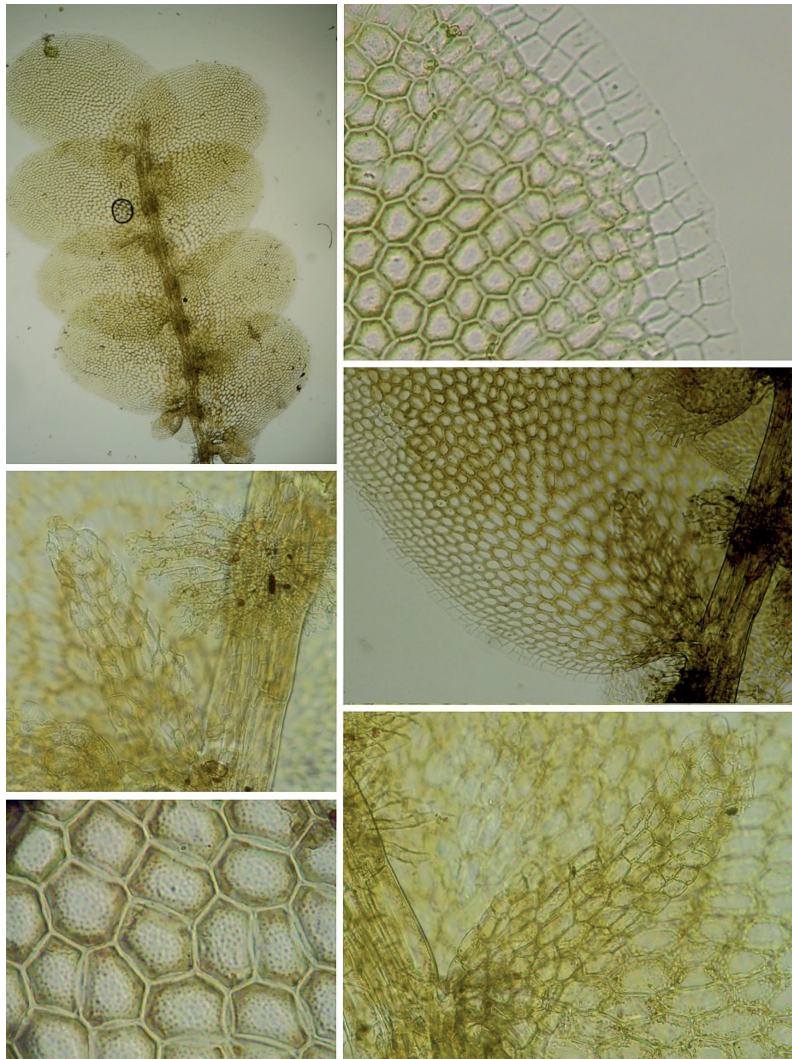
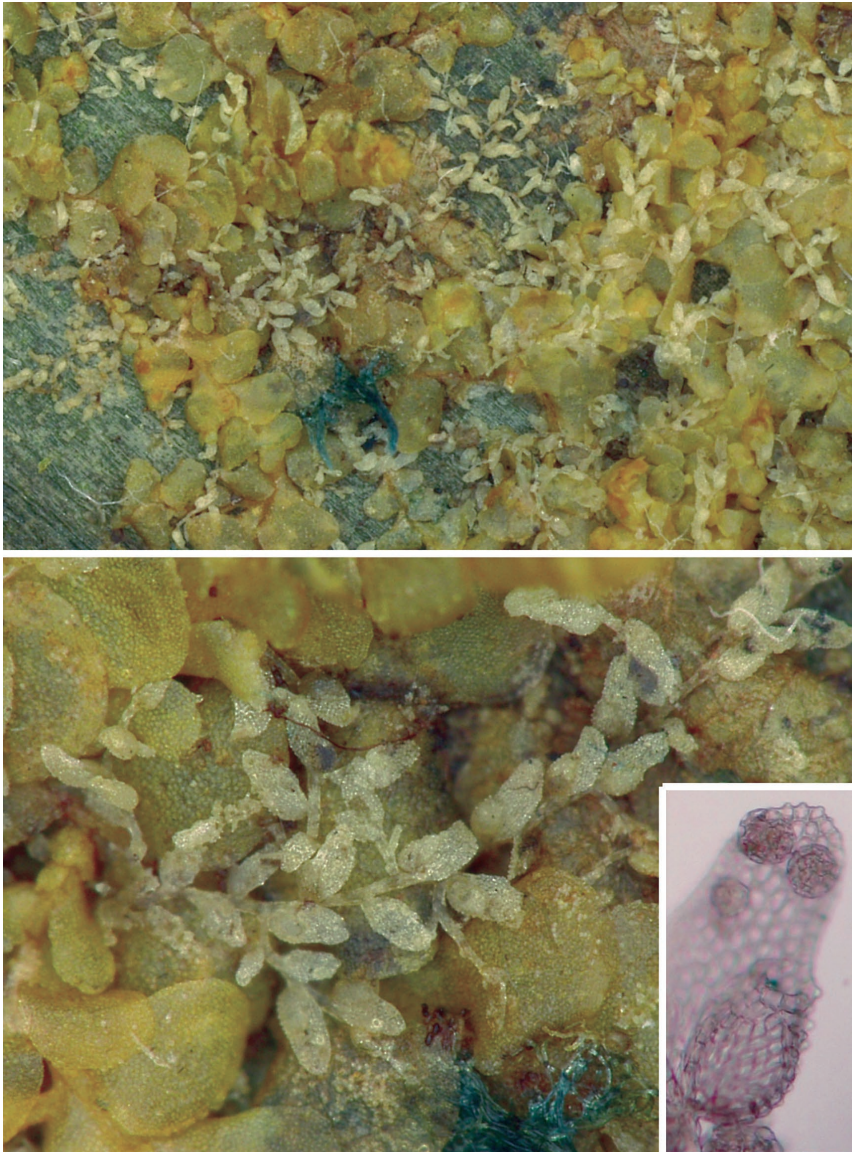


Fig. 101. *Cololejeunea bolombensis* (Steph.) Vanden Berghen

Plants medium-sized, shoots up to 1.8 mm wide. Lobe ovate or obovate, broadly rounded or narrow, (0.5-)0.7-1.1 x (0.4-)0.5-0.8 mm, apex rounded, hyaline margin entire, 2-3(-4) cells wide at apex of lobe, merging into a single row along the dorsal margin to the base, on ventral margin often abruptly ending. Chlorophyllose cells with papillose cuticle.

Lobule narrow, lingulate, 2-7 cells wide at middle, 0.2-0.35 mm long, widest at base, tapering towards apex, hyaline papilla large, at or near apex. Autoicous. Perianth pyriform, compressed, 0.5-0.6 mm long, without dorsal or ventral keels. **Habitat:** Montane forest, epiphyllous, 1700 m. **Distribution in Rwanda: Nyungwe NP:** Cyamudongo Forest.

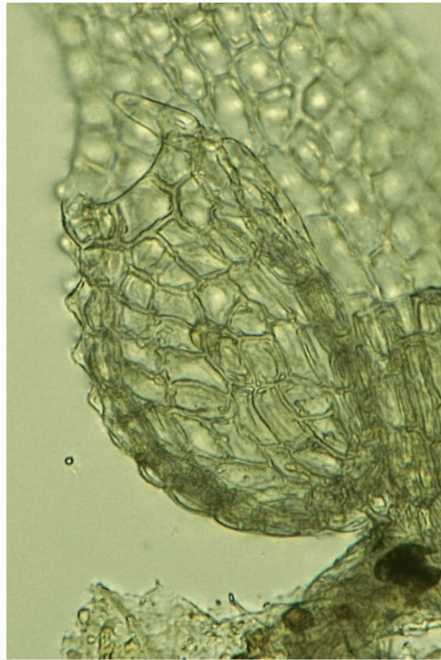
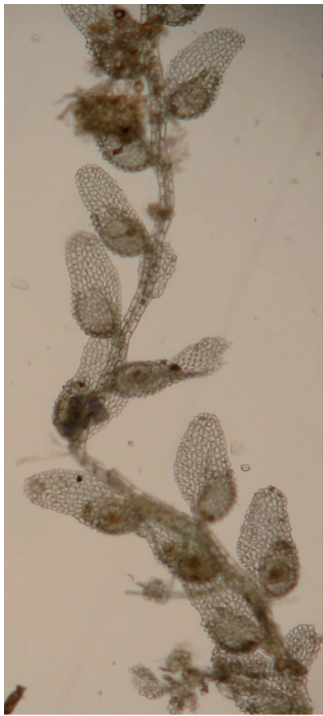
Distribution in Africa: Guinea, Sierra Leone, Ivory Coast, Nigeria, Bioko, Cameroon, Rio Muni, DR Congo, Burundi, Uganda, Kenya, Tanzania, Malawi, Zimbabwe. Also Comoros, Madagascar.



Figs 102 and 103 (next page). *Cololejeunea capuronii* Tixier

Plants minute, stem 0.3-0.35 mm wide, fully developed leaves with lobule and reduced leaves present. Lobes ovate to lanceolate, 0.24-0.26 x 0.1 mm, in reduced leaves 0.06-0.1 x 0.02-0.05 mm, surface papillose, margin crenulated with rounded papillae, apex rounded. Mid-leaf cells of lobe 26 x 12 μ m. Lobules inflated, 0.13 x 0.08 mm, with 1 apical tooth, the tooth 1-celled and often curved, 28 μ m long, cells of lobule 16 x 11 μ m.

Asexual reproduction by disciform gemmae on leaf-lobe surface. **Habitat:** Montane forest, epiphyllous on *Podocarpus*, 1970 m. **Distribution in Rwanda:** Nyungwe NP: Kamiranzovu. Also Madagascar.



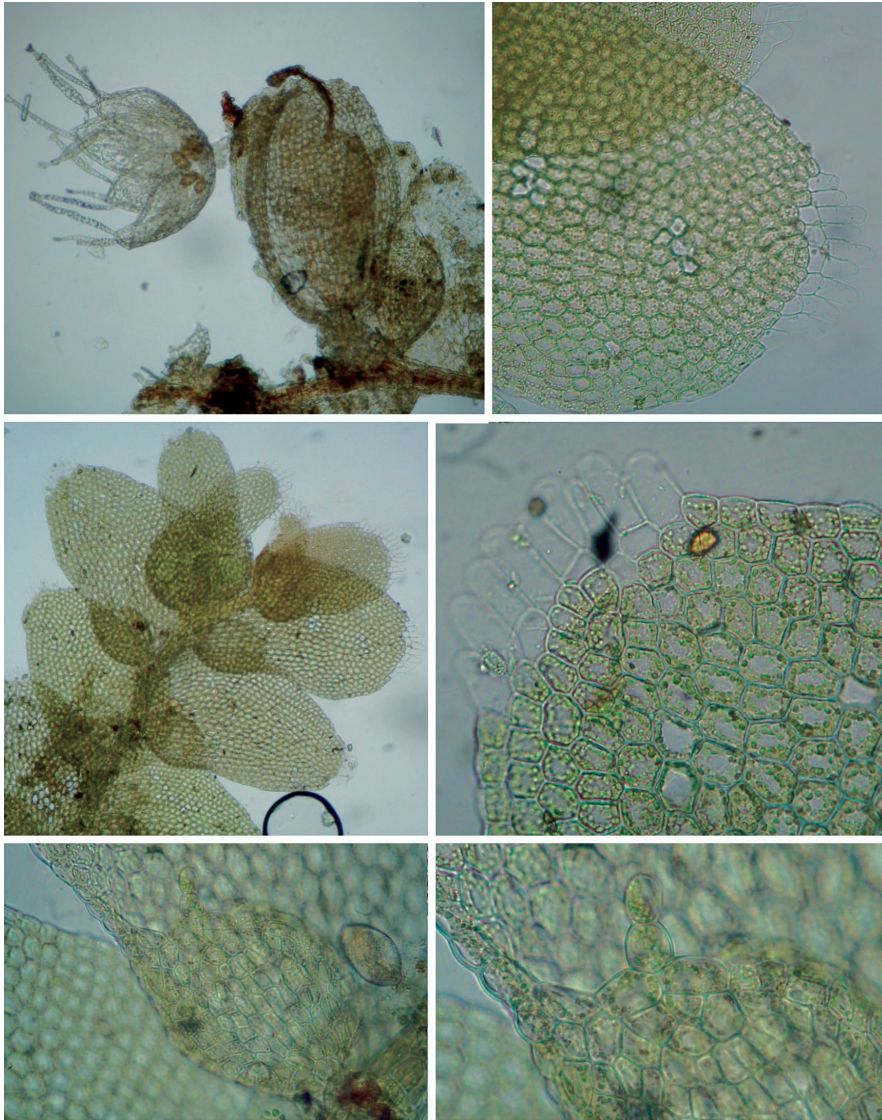
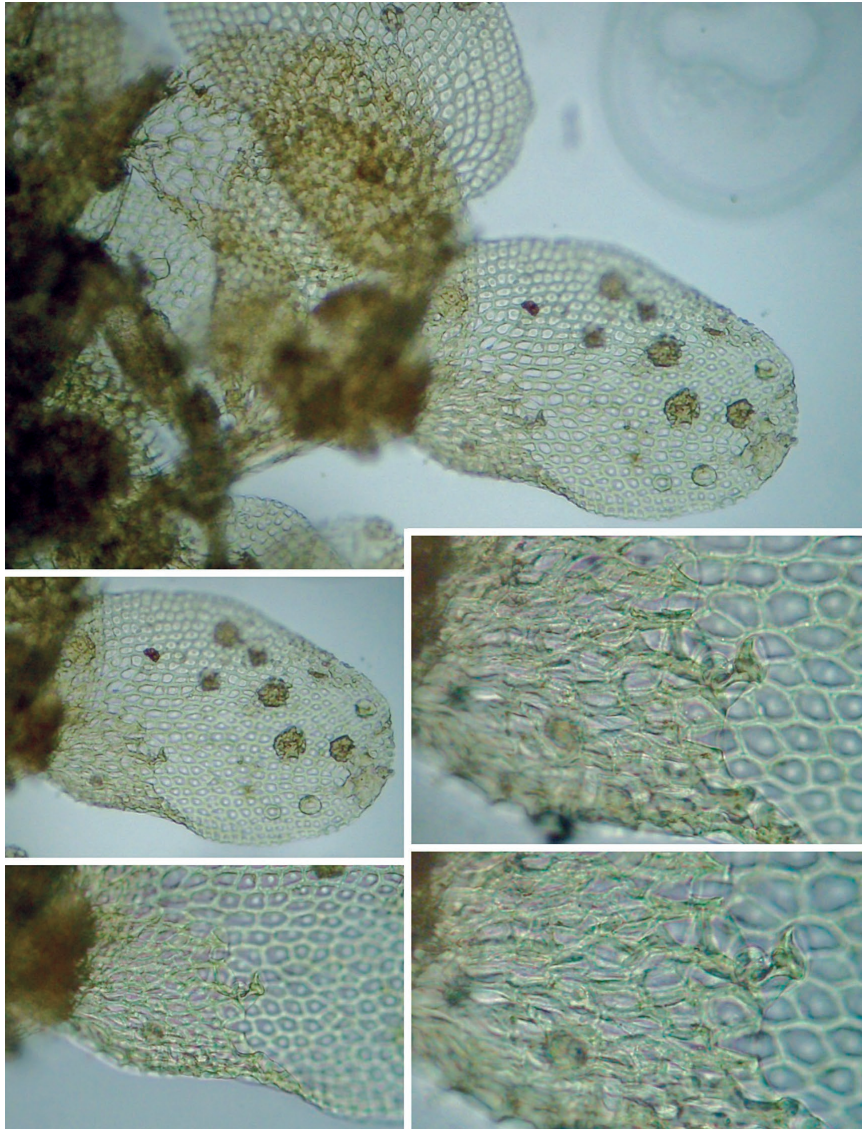


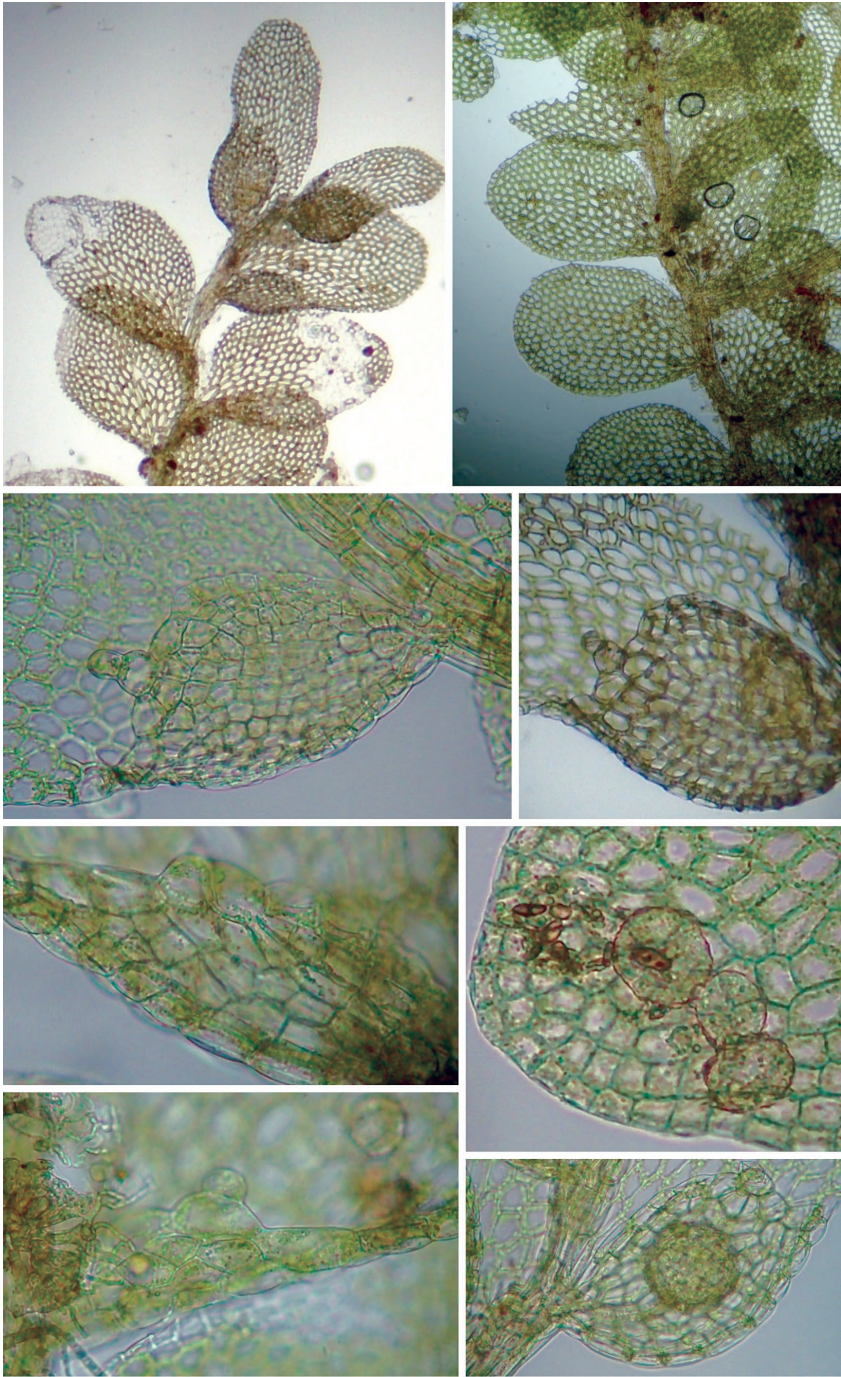
Fig. 104. *Cololejeunea cardiocarpa* (Mont.) R.M.Schust.

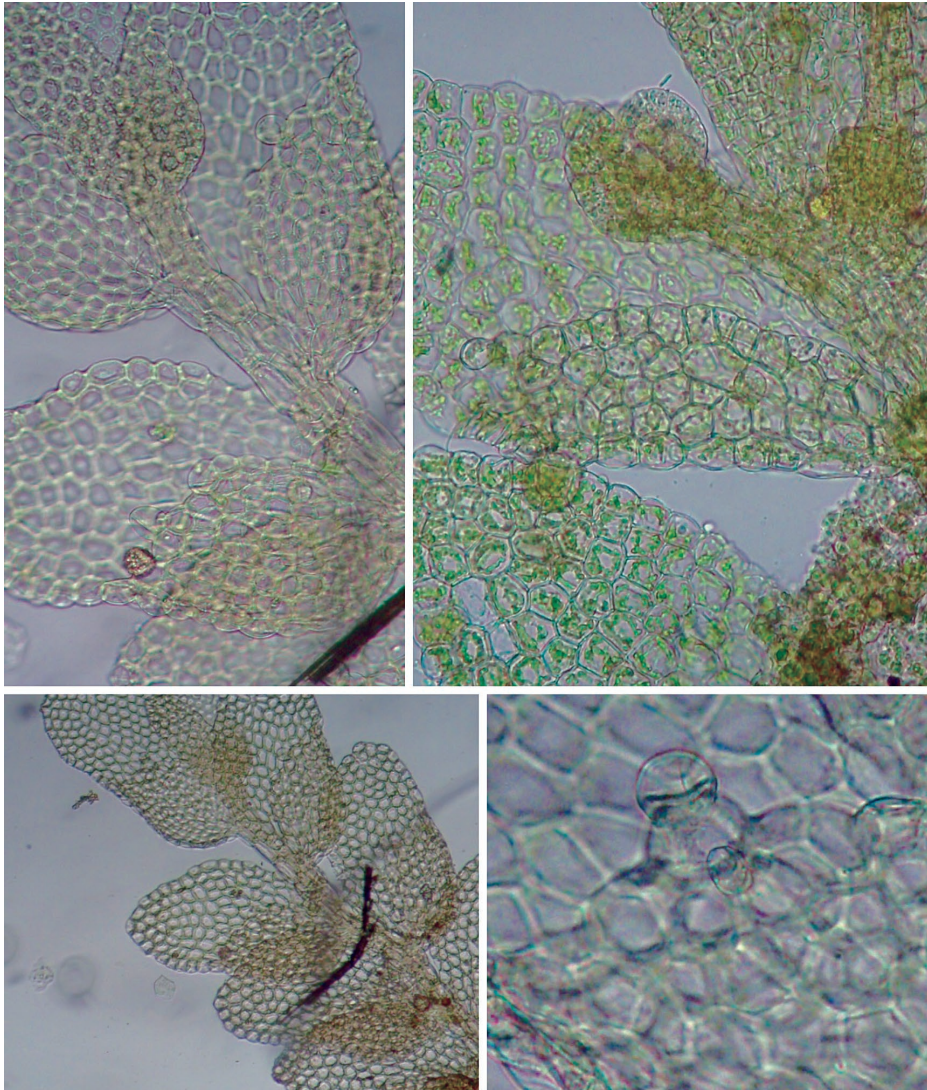
Plants small, shoots 0.5-0.9 mm wide. Lobe ovate, 0.4-0.7 x 0.25-0.45 mm, base broadly rounded, apex usually narrow, hyaline cells variable, usually a sharply demarcated group of 2-12 cells at lobe apex, sometimes also a line of hyaline cells extending towards the dorsal base. Lobule inflated, c. 0.4 the length of the lobe, often also reduced, apical tooth of 2 cells, with small spherical hyaline papilla. Monoicous. Perianth pyriform, compressed, 0.4-0.5 x 0.35-0.45 mm, with 2 long ventral keels. **Habitat:** Montane forest, epiphyllous, 2000 m. **Distribution in Rwanda: Nyungwe NP:** Uwinka. **Distribution in Africa:** Sierra Leone, Cameroon, DR Congo, Burundi, Uganda, Kenya, Tanzania, Zimbabwe, Swaziland, South Africa. Also USA, Central and South America to Ascension, Madagascar.



Figs 105 and 106 (next page). *Cololejeunea cardiocarpoides* Tixier

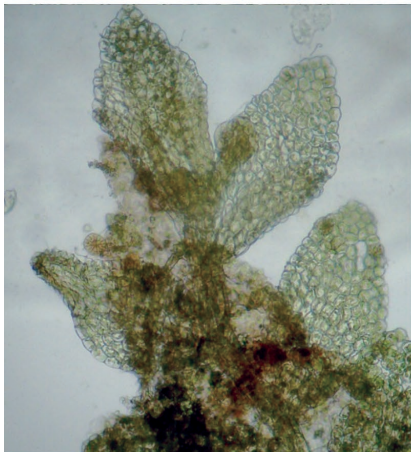
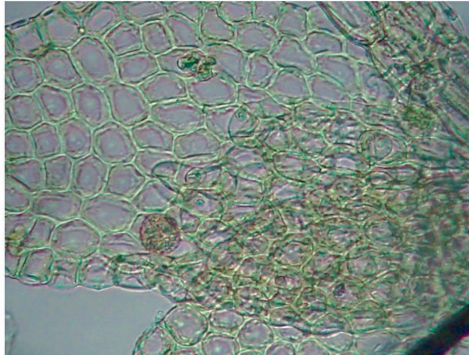
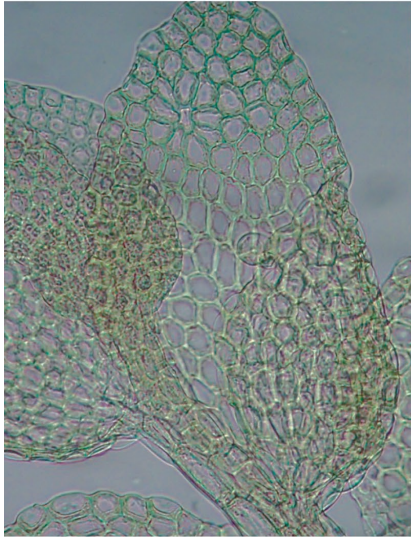
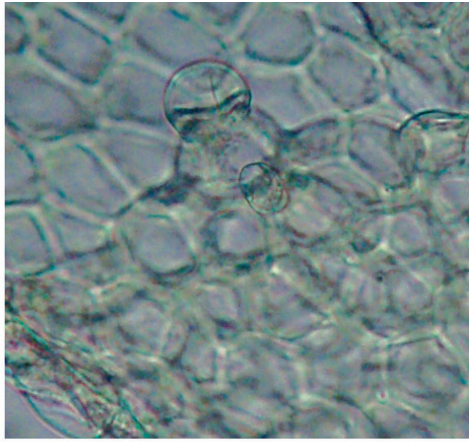
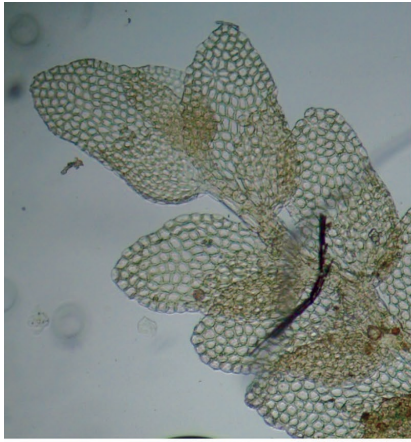
Plants delicate, up to 0.8 mm wide, epiphyllous, densely appressed to substrate. Stems up to 0.5 mm long, more or less branched. Leaves alternate, distant, with insertion at an angle of 90°. Lobes ovate, 0.3 mm long and 0.2 mm wide, hyaline margin at lobe apex with cells 20 x 10 µm, sometimes absent, pseudovitta short, at base of lobe. Lobules discoid, about 1/3 of lobe, 150 µm long and 100 µm wide, with 2 teeth, apical tooth often unicellular, median tooth 2-cellular, hyaline papilla spherical. Asexual reproduction with up to 20-celled gemmae. Dioicous (?). Perianths pyriform, with 2 ventral keels, up to 0.35 mm long and 0.2 mm wide. **Habitat:** Montane forest, epiphyllous, 2000 m. **Distribution in Rwanda:** Nyungwe NP: Uwinka.





Figs 107 and 108 (next page). *Cololejeunea clavatopapillata* Steph.

Synonyms: *Cololejeunea fadenii* Pócs; *Aphanolejeunea fadenii* (Pócs) Pócs. Plants small, shoots up to 5 mm long, 0.18-0.35 mm wide, epiphyllous. Lobes of lobulate leaves 0.3-0.35 x 0.15-0.18 mm, ovate to ovate-lanceolate, surface dorsally mammillate, elobulate reduced leaves few. Lobules inflated, as wide as lobe, and more than half the length of the lobe, with 1 apical tooth, 2-celled and strongly curved, proximal tooth very near, short, obtuse or lacking, cells smooth except the keel. Asexual reproduction by disciform gemmae on marginal cells of the lobe. Autoicous. Perianths inflated, broadly pyriform, about 0.4 x 0.3 mm, obscurely 5-keeled. **Habitat:** Montane forest, usually epiphyllous, 2250-2300 m. **Distribution in Rwanda:** Nyungwe NP: Uwinka. **Distribution in Africa:** Uganda, Kenya, Tanzania.



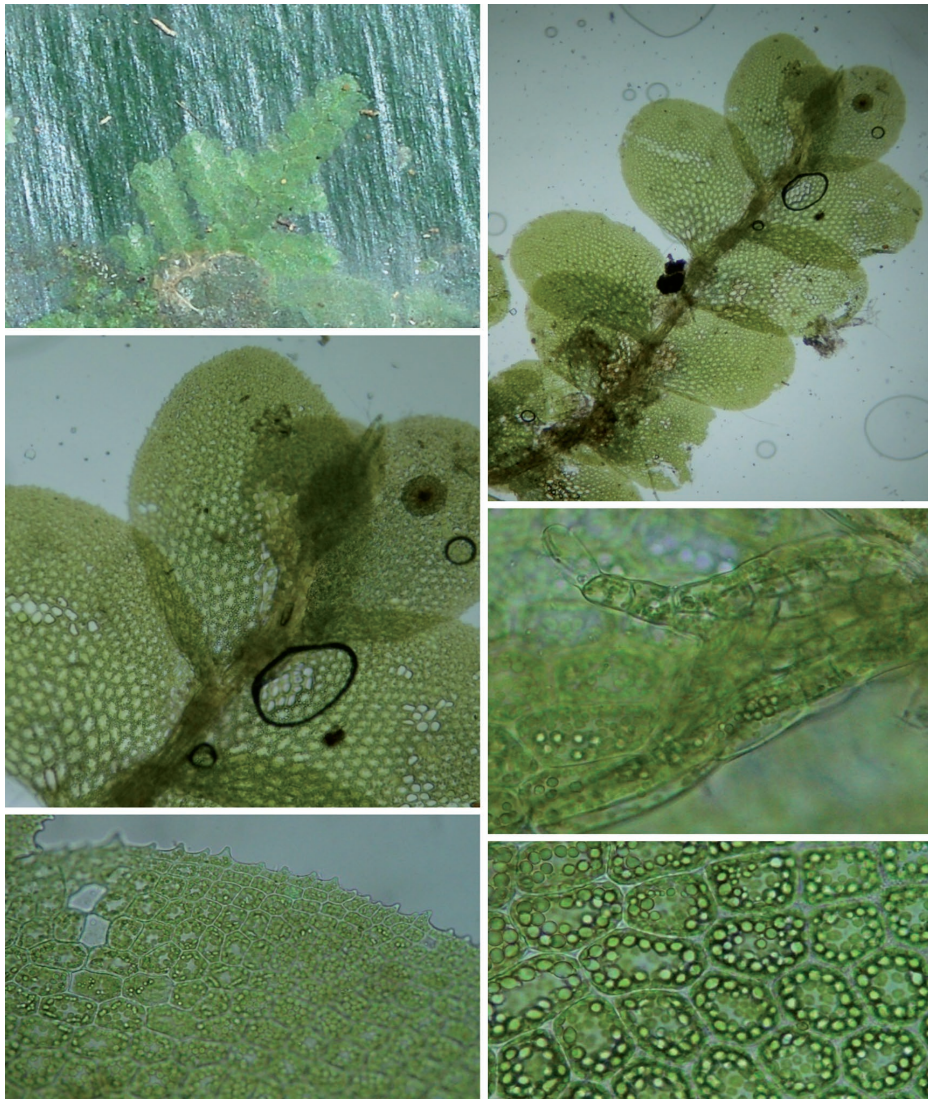


Fig. 109. *Cololejeunea cuneifolia* Steph.

Plants medium-sized, up to 1-1.5 mm wide. Leaves spreading. Lobes obovate, 0.6-0.8 x 0.45-0.6 mm, margin irregularly crenulate with asymmetrical teeth. Lobules small, often reduced, 0.1-0.25 the length of the lobe, apical tooth usually of 2 long cells, hyaline papilla pyriform, on the side or apex of the apical cell. Autoicous. Perianth longly exerted, narrowly obcordate, apex truncate, concave to cordate, with distinct lateral keels. **Habitat:** Montane forest, epiphyllous, 1700 m. **Distribution in Rwanda:** Nyungwe NP: Cyamudongo Forest. **Distribution in Africa:** Guinea, Ivory Coast, Ghana, Nigeria, Cameroon, Rio Muni, DR Congo, Uganda, Tanzania.

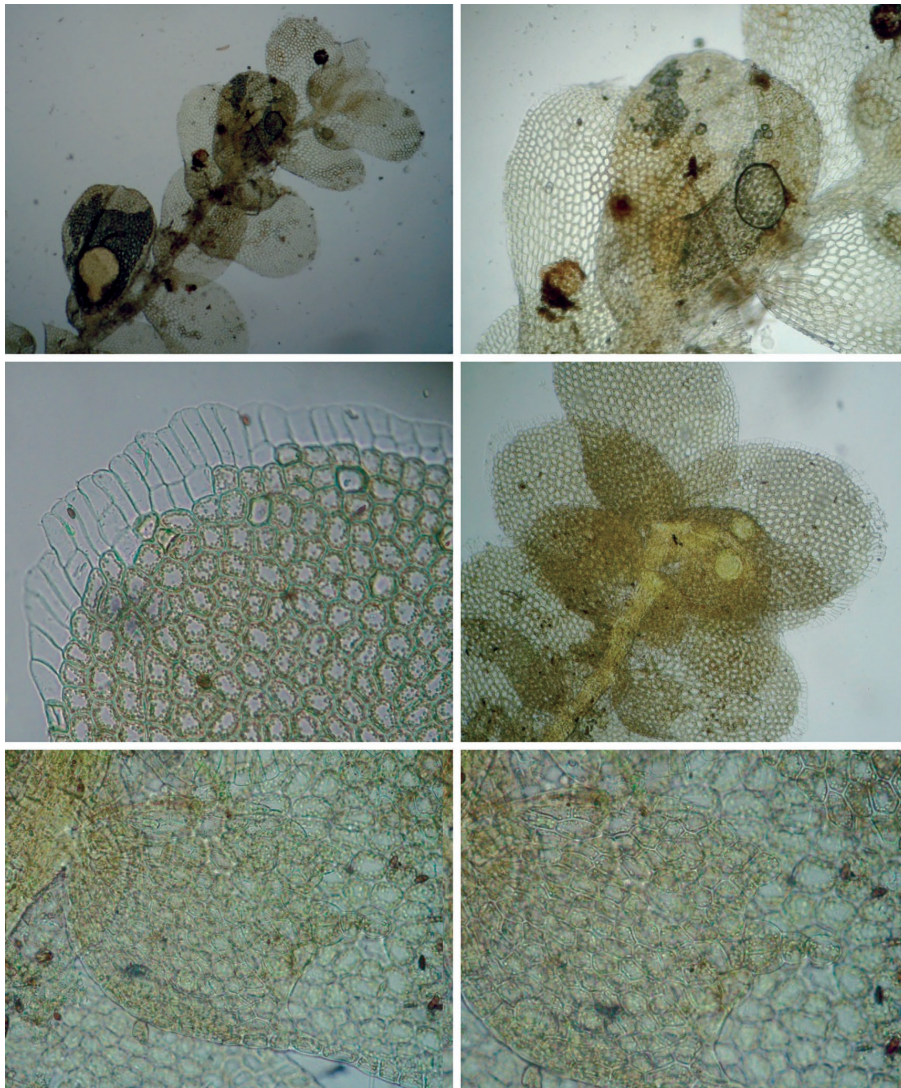


Fig. 110. *Colelejeunea distalopapillata* (E.W.Jones) R.M.Schust.

Plants robust, vivid green, shoots (0.8-)1.2-1.6(-1.8) mm wide and several mm long. Lobe reniform or ovate, 0.56-0.7(-0.75) x (0.75-)0.8-1(-1.2) mm, margin with hyaline cells in 1 or 2 rows, ending 4-10(-16) cells from lobule. Lobule inflated, with arched keel, 0.2-0.23 x 0.22-0.35 mm, apical tooth consisting of 2 cells at base, prolonged by 1-2 cells, hyaline papilla at base of distal side, distal and proximal tooth each 1-celled. Gemmae present, star-shaped. Paroicous. Perianth exserted, compressed, with 2 ventral keels, rounded, truncate or retuse at apex, 0.45-0.68 x 0.55-1 mm. **Habitat:** Montane forest, epiphyllous or corticolous, 2100-2250 m. **Distribution in Rwanda: Nyungwe NP:** Uwinka. **Distribution in Africa:** DR Congo, Kenya, Tanzania, Zimbabwe. Also Comoros, Madagascar.



Fig. 111. *Cololejeunea duvigneaudii* E.W.Jones

Plants robust, shoots 1.2-1.6(-1.8) mm wide. Lobe reniform or ovate, 0.45-0.63(-0.7) x (0.6-) 0.7-0.96 mm, margin finely and irregularly denticulate. Lobule inflated, ovate, 0.1-0.24 x 0.21-0.35(-0.42) mm, sometimes reduced, apical tooth consisting of (1-)2(-3) cells, hyaline papilla at apex or just below apical cell. Gemmae present, star-shaped. Monoicous. Perianth exserted, without keels, rounded, truncate or retuse at apex, 0.3-0.36 x 0.55-0.72 mm. **Habitat:** Montane forest, epiphyllous or corticolous, 1900-2100 m. **Distribution in Rwanda:** Nyungwe NP: Karamba, Kamiranzovu, Uwinka, between Gisakura and Karamba. **Distribution in Africa:** Bioko, Rio Muni, Gabon, DR Congo, Kenya, Tanzania, Malawi, Zimbabwe. Also Comoros, Madagascar, Réunion.

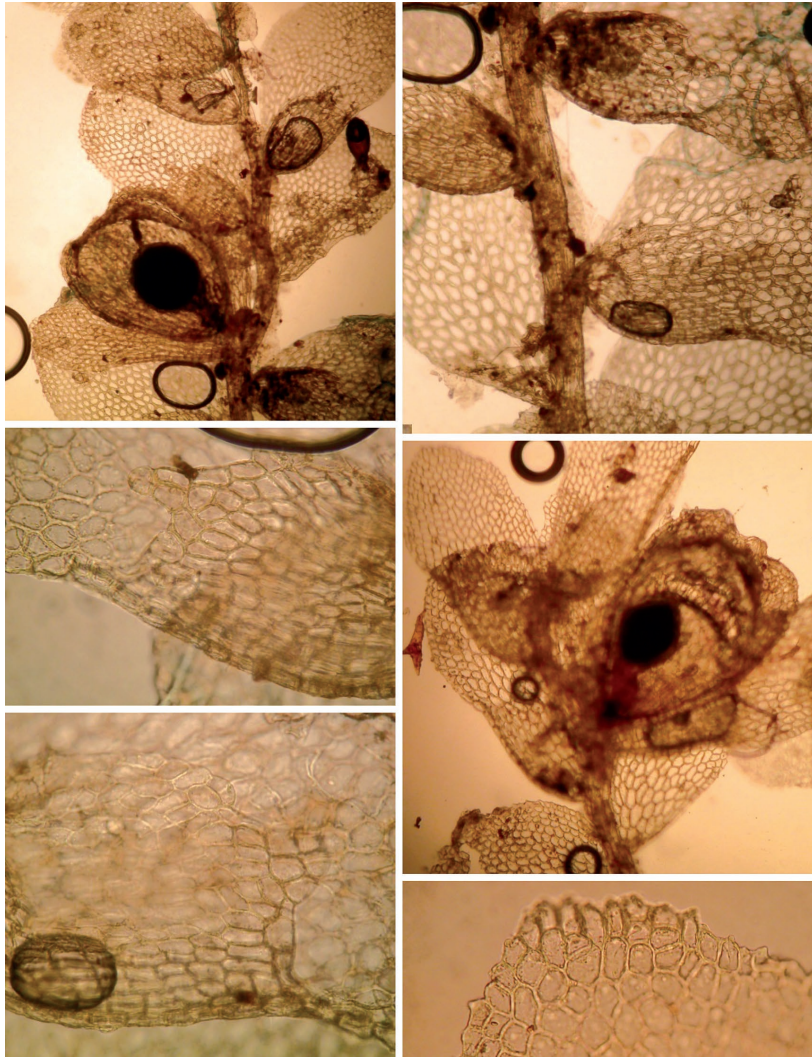


Fig. 112. *Cololejeunea fischeri* Tixier

Plants medium-sized, up to 1 mm wide. Stems up to 1 cm long, branched. Leaves alternate, distant, with insertion at an angle of 80°. Lobes obovate, apex rounded, 0.35 mm long and 0.35 mm wide. Lobules saccate, inflated, truncate at apex, 250 µm long and 150 µm wide, with 2 teeth, apical tooth unicellular, hardly visible, median tooth 2-cellular, hyaline papilla at median tooth. Asexual reproduction with up to 16-18-celled gemmae. Monoicous. Perianths ovate, apex truncate, with 2 ventral keels and short rostrum, 0.5 mm long and 0.3 mm wide. **Habitat:** Montane forest, epiphyllous, 2000 m. **Distribution in Rwanda: Nyungwe NP:** Kamiranzovu. **Distribution in Africa:** DR Congo. **Note:** Tixier (1995) cites erroneously "DR Congo, Station Irangi" as type locality, but indicates the correct collection number from the type locality in Rwanda. Geissler (1996) published a correction of the type data.

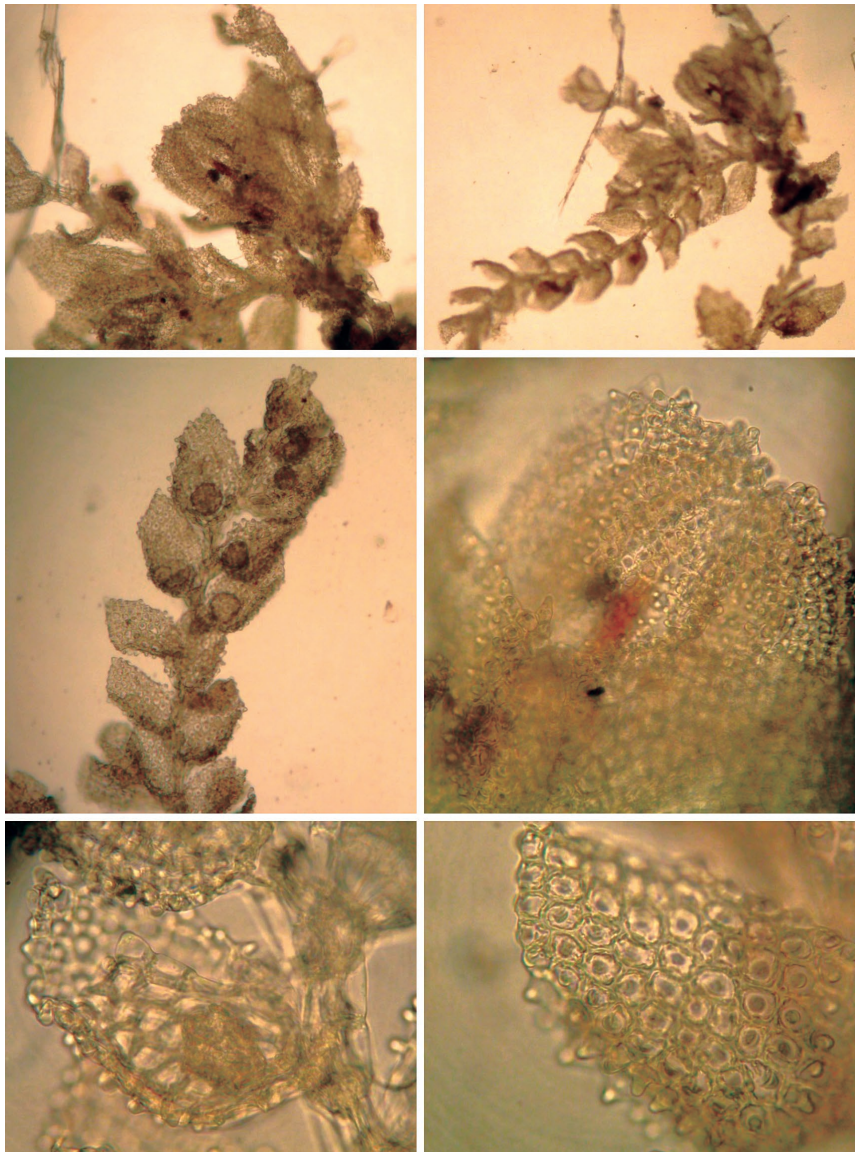
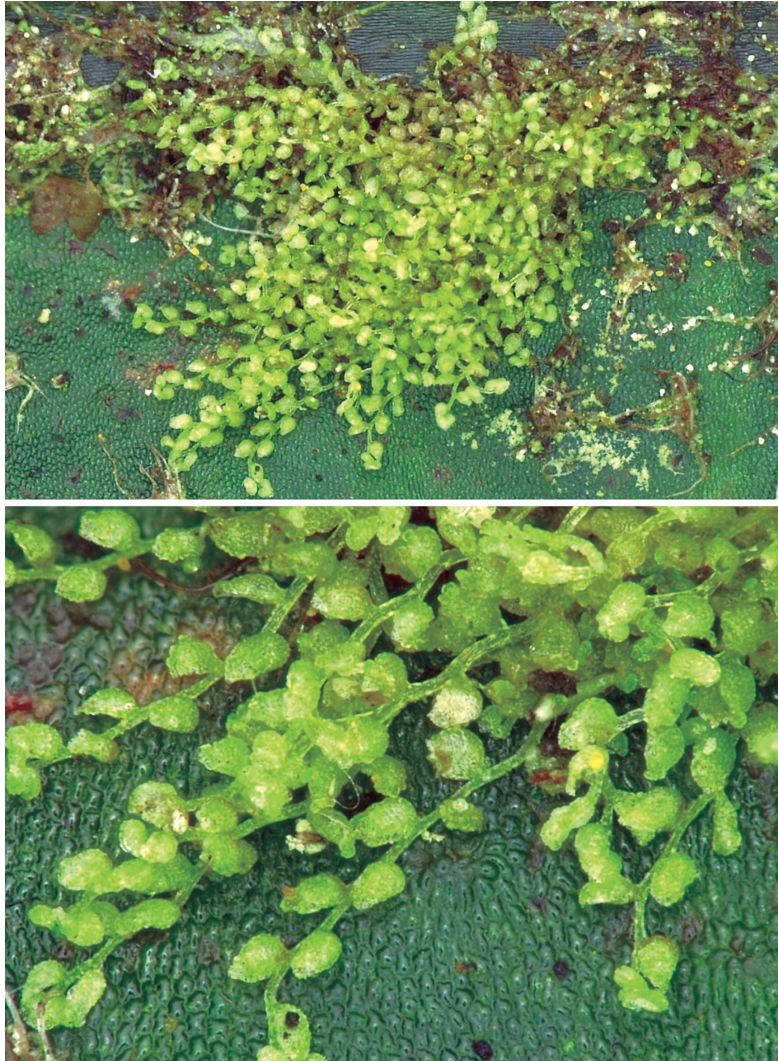


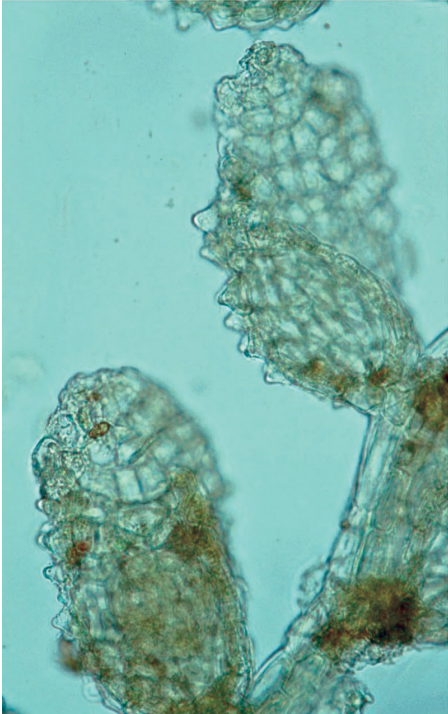
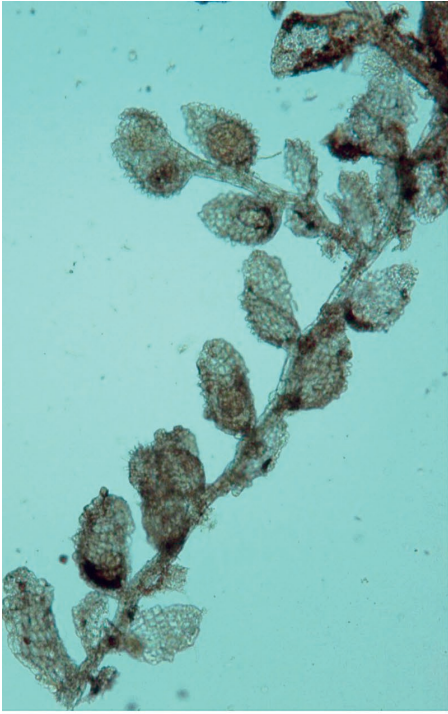
Fig. 113. *Cololejeunea frahmii* Tixier

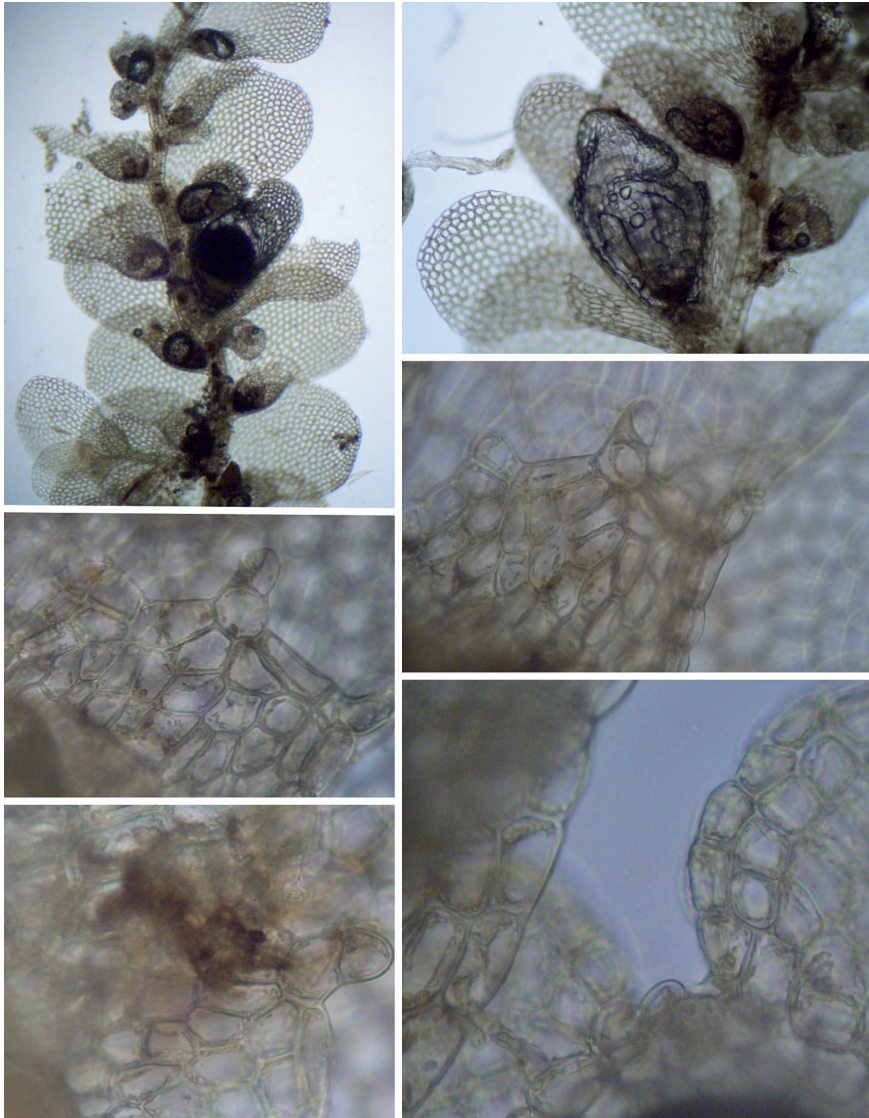
Plants small, up to 0.8 mm wide, with papillose cells. Stems up to 0.5 cm long, richly branched. Leaves alternate, distant, with insertion at an angle of 90°. Lobes lanceolate-ovate, apex acuminate, 150 μ m long and 180 μ m wide. Lobules saccate, inflated, keel rounded, crenulate, 80 μ m long and 100 μ m wide, truncate towards apex, with unicellular apical tooth, reduced lobules sometimes present. Synoicous. Androecia lateral. Perianths obovate, papillose, apex rounded, with ventral keels and short rostrum, 0.25 mm long and 0.15 mm wide. **Habitat:** Montane forest, epiphyllous on *Saintpauliopsis lebrunii*, 2100 m.

Distribution in Rwanda: Nyungwe NP: Uwinka.



Figs 114 and 115 (next page). *Cololejeunea grossepapillosa* (Horik.) Pócs
 Synonyms: *Cololejeunea capensis* S.W. Arnell; *Aphanolejeunea capensis* (S.W. Arnell) S.W. Arnell; *A. mammillata* auct. non (Aongstr.) Steph. Plants minute, shoots 0.3-0.45 mm wide, epiphyllous. Lobes ovate to lanceolate, 0.09-0.18(-0.21) × 0.25(-0.3) mm, surface papillose, margin crenulated with rounded papillae, apex rounded to acuminate. Lobules inflated, 0.1-0.13 × 0.12-0.23 mm, with 1 apical tooth or 2 teeth, the teeth 1-2-celled and often curved, hyaline papilla at inner base of apical tooth. Asexual reproduction by disciform gemmae on leaf-lobe surface. Paroicous. Perianths inflated, 5-keeled, papillose, 0.2-0.28 × 0.3-0.53 mm. **Habitat:** Montane rainforest, epiphyllous, 1950-2300 m. **Distribution in Rwanda:** Gishwati Forest: Gikungu. tRwankuba, Uwinka. **Distribution in Africa:** DR Congo, Burundi, Tanzania, Zimbabwe, Malawi, South Africa.





Figs 116 and 117 (next page). *Cololejeunea harrisii* Pócs

Plants medium-sized, forming dense mats, shoots (0.9-)1-1.3(-1.6) mm wide. Lobe entire, asymmetrically ovate-reniform, apex rounded, (0.37-)0.4-0.6 x (0.48-)0.6-0.9 mm. Lobule variable, if well developed rather long, 0.14-0.22 x 0.2-0.35 mm, ovate, inflated, apical tooth with 2 cells, hyaline papilla at base of apical tooth, free margin of lobule usually with obtuse tooth, lobule sometimes reduced. Monoicous. Perianth exerted, heart-shaped, compressed, laterally with 2 rounded auricles, 0.4-0.5 x 0.5-0.6 mm, beak conical, with protruding cells. **Habitat:** Montane forest, epiphyllous on *Marattia fraxinea*, 1900-2000 m. **Distribution in Rwanda:** Nyungwe NP: Kamiranzovu, Uwinka. **Distribution in Africa:** Burundi, Tanzania.