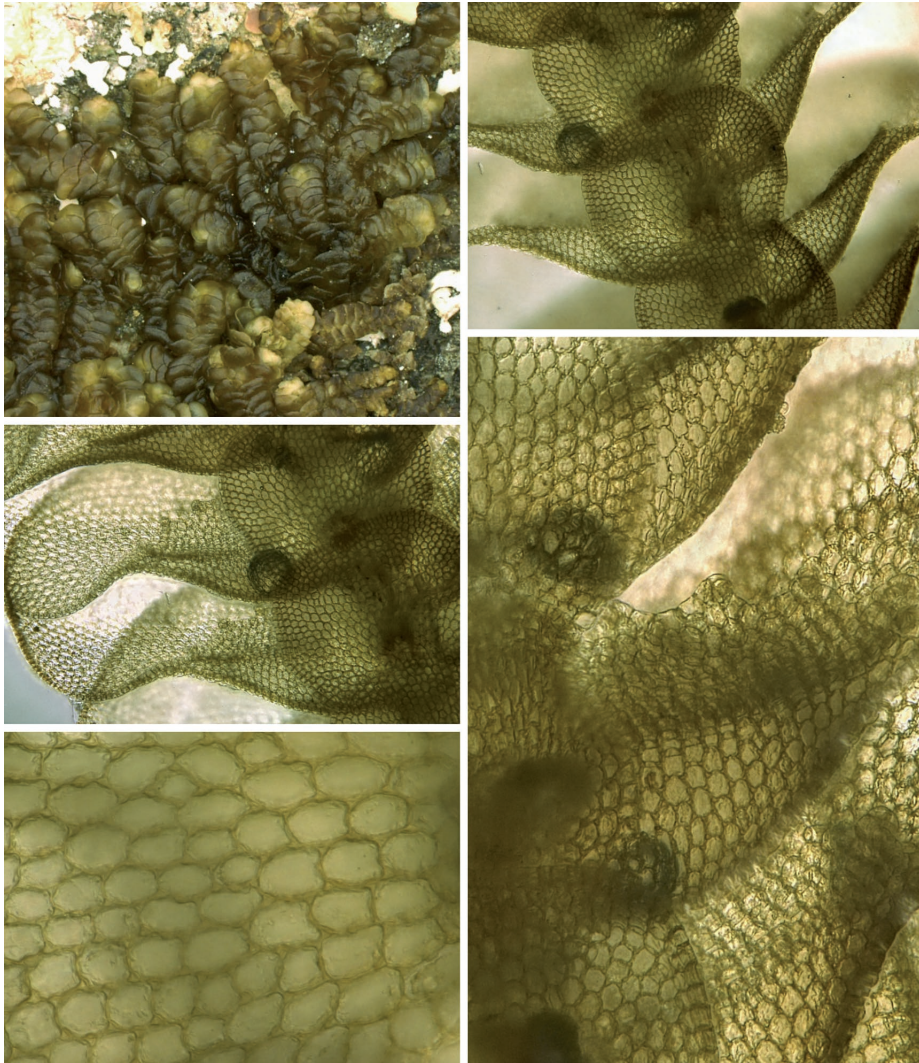


**Fig. 218. *Frullania spongiosa* Steph.**

Plants green to light red-brown, complanate. Leaves imbricate, not squarrose when moist. Leaf lobes ovate, 0.9-1.2 x 0.7-0.9 mm, flat or weakly convex, with basal auricle, rounded at apex. Lobules 0.35-0.55 mm long, about as wide as long, with a strong rostrum that projects beyond ventral margin of lobe. Underleaves orbicular, 3-6 x as wide as the stem, wider than long, bilobed for 0.1-0.2 of their length. Dioicous. Perianths claviform, trigonous. **Habitat:** Epiphytic on exotic trees, probably also in montane forest, 1750 m. **Distribution in Rwanda:** Central Rwanda: Huye (Butare). **Distribution in Africa:** Ivory Coast, Cameroon, Rio Muni, Gabon, scattered in East Africa (Tanzania). Also Cape Verde, Madagascar.





**Fig. 219. *Frullanoides tristis* (Steph.) Slageren**

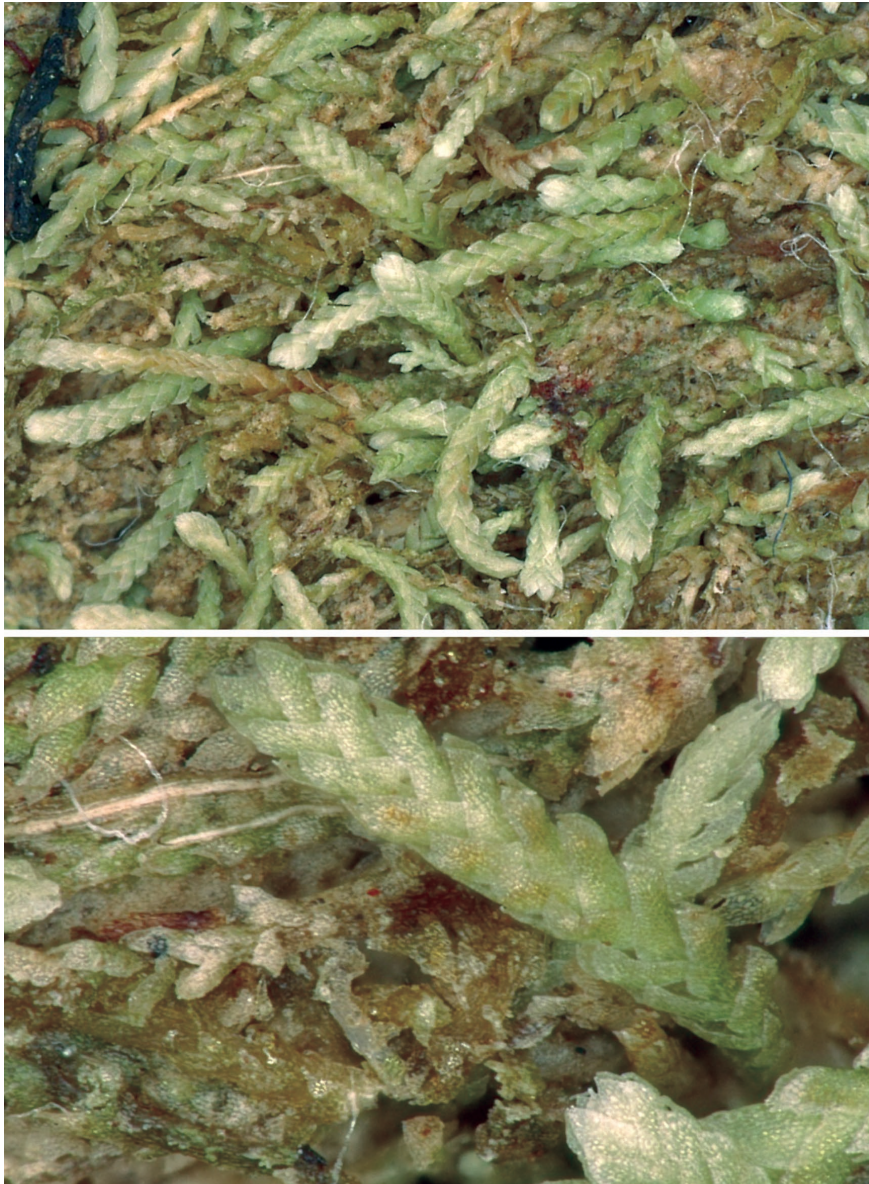
Synonym: *Brachiolejeunea tristis* Steph. Plants robust, blackish green, shoots 1.4-2.5 mm wide. Stem 0.15-0.2 mm in diameter. Leaves densely imbricate, 0.95-1.4 × 0.6-0.9 mm. Lobes ovate, entire, base arching across the stem, apex rounded to acute, ventral margin nearly straight. Lobules large, keel extending 0.5 the distance to lobe apex, apex and free margin arched, with 3-6 incurved papilla-like teeth of 2-3 cells. Underleaves imbricate, c. 4 x as wide as the stem, rounded, apex rounded to slightly retuse, base decurrent in narrow wings. Paroicous. Perianths 1.4-2 mm long, cylindrical to claviform, with 10 keels. **Habitat:** Epiphytic in montane forest, 2000-2200 m. **Distribution in Rwanda:** Gishwati Forest: Gikungu. **Nyungwe NP:** Cyamudongo. **Distribution in Africa:** Sierra Leone, Ivory Coast, Nigeria, Cameroon, Central African Republic, DR Congo, Burundi, Ethiopia, Uganda, Kenya, Tanzania, Angola, South Africa. Also Madagascar, Réunion.



**Fig. 220. *Gongylanthus ericetorum*** (Raddi) Nees

Plants terrestrial, light-green, up to 3 mm wide. Stems prostrate. Leaves opposite, connate on dorsal side, imbricate, up to 1(-1.5) mm long. Cells thin-walled, 25-30 x 30-45  $\mu\text{m}$ , trigones distinct, with a band of elongate cells 15-25 x 40-90  $\mu\text{m}$ , cuticle slightly papillose, oil bodies granular (*Jungermannia*-type), 2-4 per cell. Underleaves lacking. Asexual reproduction by buds in leaf-axils. **Habitat:** On soil in ericaceous forest, 3400 m. **Distribution in Rwanda: Volcano NP:** Muhavura. **Distribution in Africa:** Sierra Leone, Cameroon, DR Congo, Burundi, Ethiopia, Kenya, Tanzania, Malawi, Zambia, Zimbabwe, Lesotho, South Africa. Also Western Europe, Azores, Madeira, Canaries, Madagascar, Réunion.





**Fig. 221. *Gymnomitrium laceratum* (Steph.) Horik.**

Plants greyish-green, whitish-green to glaucous, in dense tufts, 4-10 mm high and 0.2-0.4 mm wide. Stems ascending or erect. Leaves loosely imbricate-squarrose, with decolorate margin, ovate to oblong-ovate, bilobed to 0.3-0.45 of their length. Cells thick-walled, 15-22 x 12-16  $\mu\text{m}$ , without trigones. **Habitat:** On rocks in the paramo, 3600-4300 m. **Distribution in Rwanda: Volcano NP:** Karisimbi, Bisoke. **Distribution in Africa:** DR Congo (Ruwenzori, Virunga), Uganda (Ruwenzori), Kenya, Tanzania, South Africa. Also North, Central and South America, Russia, Nepal, Japan, Borneo.



**Fig. 222. *Haplomitrium blumei* (Nees) R.M.Schust.**

Plants grass-green. Stems erect, more or less radially symmetrical, arising from horizontal rhizome lacking rhizoids. Leaves in 3 similar ranks, subrotund to obovate, up to 5 x 5 mm. Cells thin-walled, without trigones, 50-125 x 40-80  $\mu\text{m}$ . **Habitat:** *Lobelia mildbraedii*-*Cyperus denudatus* bogs in montane forest, 2200-2300 m. **Distribution in Rwanda:** **Gishwati Forest:** Gakeri. **Nyungwe NP:** 1.5 km S of Pindura. **Distribution in Africa:** DR Congo (Kahuzi-Biéga). Also South America (Caribbean, Ecuador, Peru), Asia (Java, Sumatra, Philippines, Papua New Guinea, China).





**Figs 223 and 224 (next page). *Harpalejeunea fischeri* Tixier**

Plants yellowish green, up to 3(-5) mm long and 0.3-0.4 mm wide. Leaves mostly imbricate, entire, (0.3-)0.35-0.4 mm long x (0.25-)0.3(-0.35) mm wide with acute apex. Ocelli present in most leaves, 2 in a single line at the base of the lobe or 3 with 2 adjacent ocelli at apex of line. Lobules  $\pm$  ovate, 200-250  $\mu$ m long x 95-100  $\mu$ m wide, 0.4-0.5 x the length of the lobe, apical tooth 1-celled, curved towards lower margin of lobe. Median cells of lobe 22.5-30  $\mu$ m x 15-17.5(-22.5)  $\mu$ m, walls thin without thickenings, with indistinct trigones. Underleaves 1.5-2 x as wide as the stem, 112.5-137.5  $\mu$ m x 100-125  $\mu$ m, with diverging, rounded-obtuse lobes ending often in a 2-celled apex, separated by a shallow to rounded sinus. Perianths 0.4(-0.5) mm x 0.2(-0.3) mm, obovoid with 5 long deep equal keels and a strong rostrum. **Habitat:** Epiphytic or epiphyllous in the *Hagenia-Hypericum* zone, 3000-3300 m. **Distribution in Rwanda: Volcano NP:** Karisoke. **Distribution in Africa:** DR Congo (Mt. Kahuzi), Uganda side of Mt. Elgon.

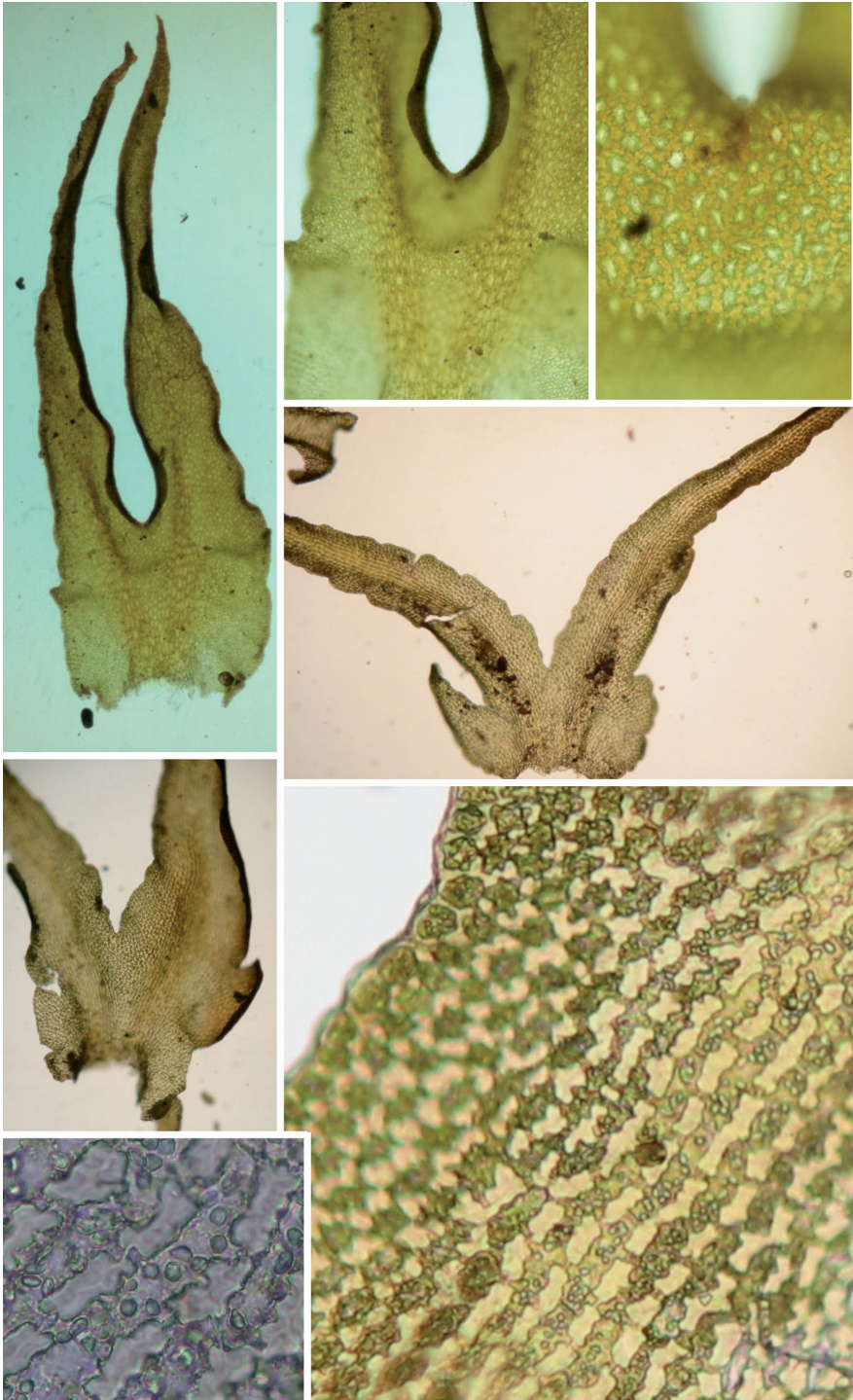




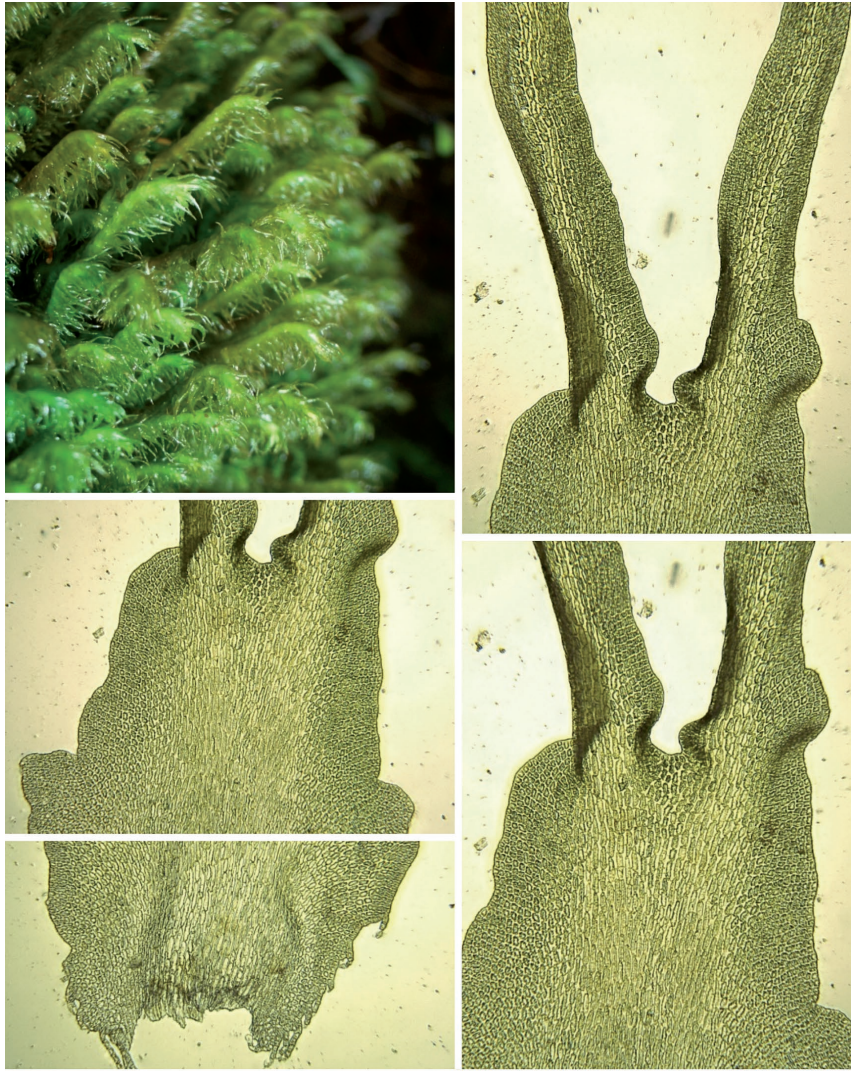


**Figs 225 and 226 (next page).** *Herbertus dicranus* (Tayl. ex Gottsche, Lindenb. & Nees) Trev.

Synonyms: *Herbertus doggeltianus* (Steph.) Demaret; *H. lobatus* (Steph.) Demaret; *H. stuhlmannii* (Steph.) Demaret. Plants slender to robust, shoots 3-20 cm long and 1-4 mm wide, orange-brown, green, olive or reddish. Leaves 1.5-4(-5) mm long and 0.4-2 mm wide, usually bilobed to 0.6 of total leaf-length. Leaf base 1-2 x longer than wide, lobes 0.75-2(-3) mm long, 2-4 x longer than wide. Vitta bifurcating less than half way up to basal disc and reaching up to 3/4 of the lobes, not excurrent. Lamina cells isodiametric to elongate, 14-40(-46) x 10-25(-27)  $\mu\text{m}$ , very thick-walled, with stellate lumina. Vitta cells 19-105 x 14-28  $\mu\text{m}$ . Underleaves similar to lateral leaves but smaller, 1.2-3 x 0.3-1.2 mm. Dioicous. **Habitat:** Epiphytic or on rocks in montane forest and ericaceous forest, 2700-3500 m. **Distribution in Rwanda: Volcano NP:** Bisoke, Sabinyo, Gahinga. **Nyungwe NP:** Mt. Bigugu. **Distribution in Africa:** Liberia, São Tomé, Bioko, Cameroon, DR Congo, Ethiopia, Uganda, Kenya, Tanzania, Malawi, Lesotho, South Africa. Also Comoros, Madagascar, Réunion.

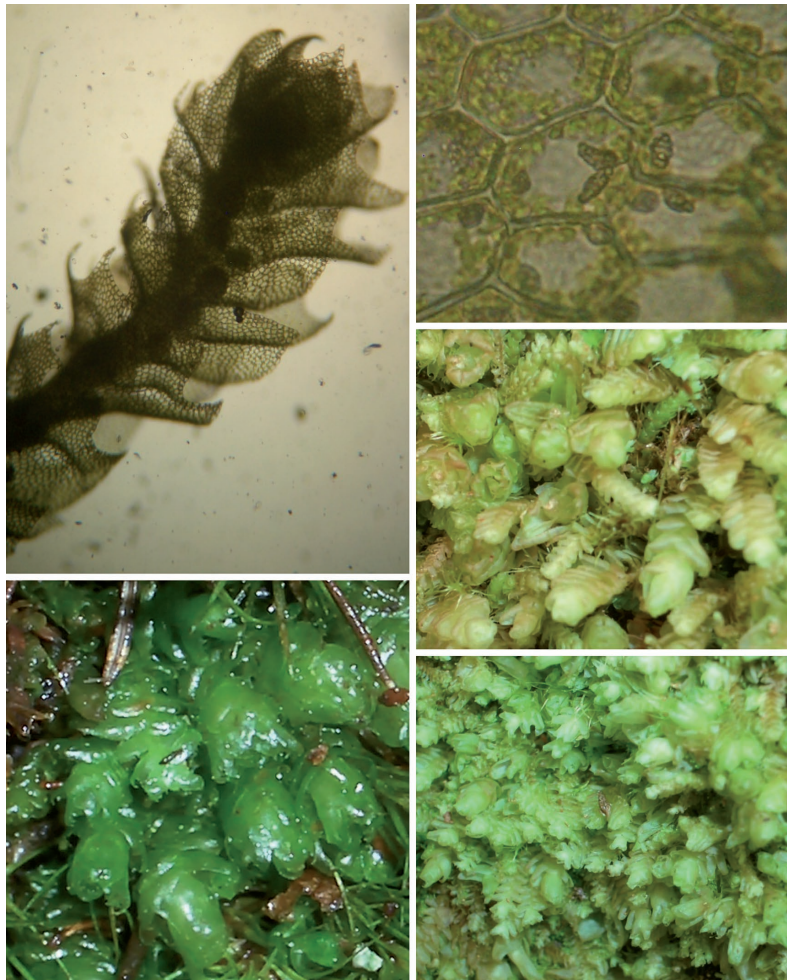






**Fig. 227. *Herbertus juniperoideus* (Sw.) Grolle**

Plants medium-sized, robust, shoots up to 15 cm long and 1.5-4 mm wide, ochraceous to orange-brown. Leaves (1.5-)2-4 mm long and 0.7-1.3 mm wide, closely imbricate, distinctly decurrent ventrally and dorsally, usually bilobed to 0.6 of total leaf-length. Leaf base 1-2 x longer than wide, lobes 1.2-2.3 mm long, 3-5 x longer than wide. Vitta bifurcating just below sinus (or a little lower) and reaching up to 3/4 of the lobes, not excurrent. Lamina cells elongate, 20-40 × 10-27 μm, very thick-walled, with stellate lumina. Vitta cells 40-88 × 12-20 μm. Underleaves similar to lateral leaves but smaller, lobes 1.3-2 mm long, 5- x longer than wide. Dioicous. **Habitat:** Epiphytic or on rocks in montane forest and ericaceous forest, 2000-2500 m. **Distribution in Rwanda: Nyungwe NP:** Gisakura, Karamba. **Distribution in Africa:** Cameroon (Mt. Kupe), Tanzania (Uluguru, Usambara). Also Madagascar, Central and South America.

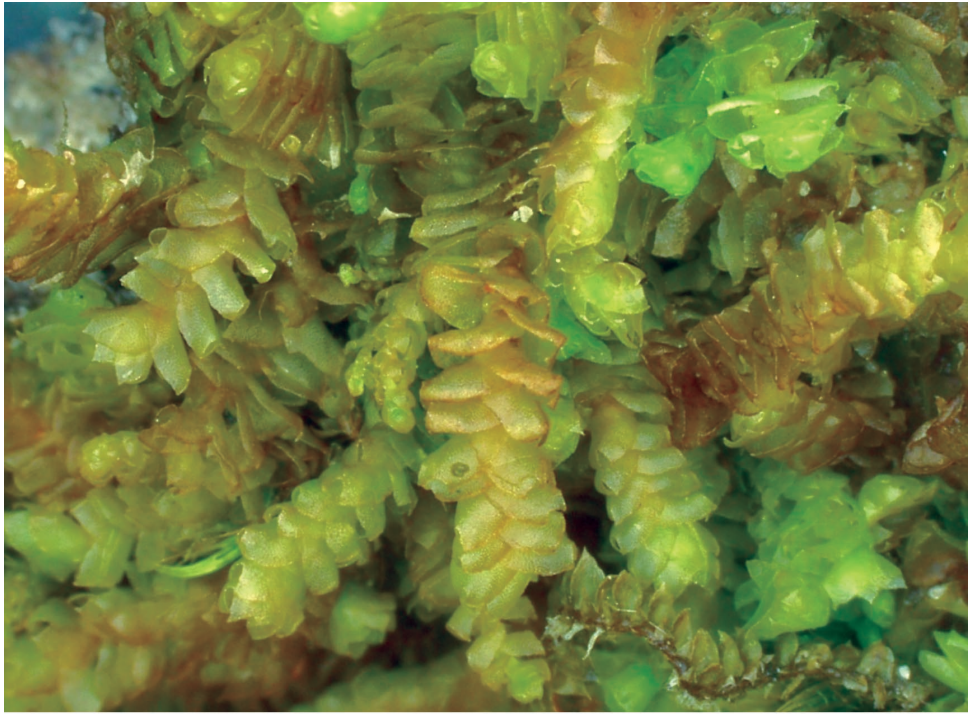


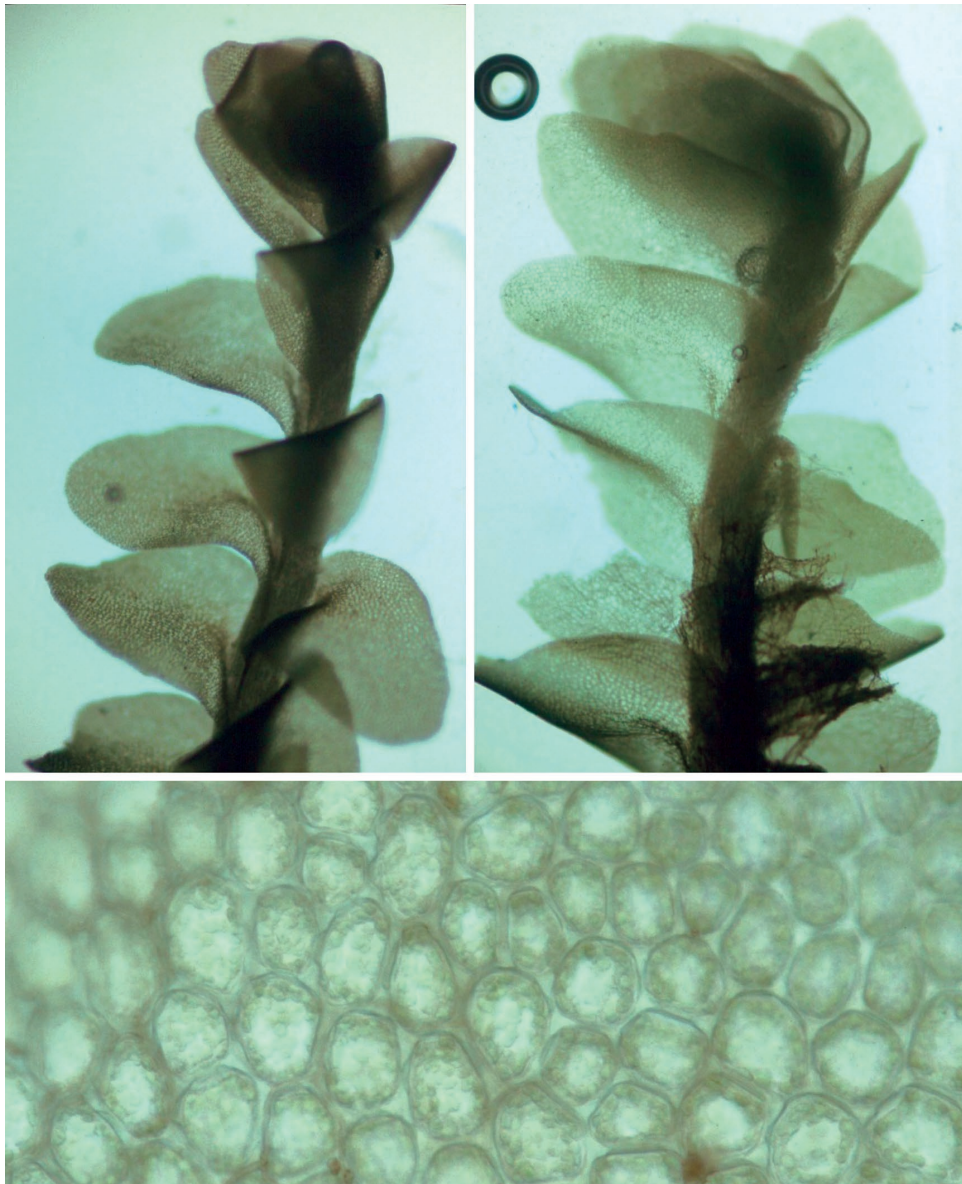
**Figs 228 and 229 (next page). *Isotachis aubertii*** (Schwaegr.) Steph.

Synonyms: *Isotachis conistipula* Steph.; *I. renistipula* Steph.; *I. aspera* Steph. Plants terrestrial, whitish-green to red or brown. Stems with a thick-walled cortex, erect or creeping, 0.3 mm in diameter. Leaves transverse, strongly concave, 1-1.5 x 1-1.5 mm, amplexicaul, bilobed to 0.25-0.35 of their length, the lobe with 1-2-celled incurved apiculi, leaf margin entire except for 1-2 teeth towards base of ventral margin. Cells rectangular, 25-30 x 30-40  $\mu\text{m}$  in mid-leaf, 20 x 60  $\mu\text{m}$  near leaf insertion, thin-walled or slightly thickened, cuticle striate-verruculose. Underleaves similar to leaves, 0.6 x 0.6 mm, bilobed for 0.3-0.5 of their length, lobes acuminate, margins entire except for 1-2 teeth or laciniae.

**Habitat:** on ground and on roadcuts, montane forest, *Cyperus* bogs ("Waldmoor" in Stephani, 1914), to the Ericaceous belt, 2000-3500 m. **Distribution in Rwanda:** Volcano NP: Karisimbi, Bisoke. **Nyungwe NP:** Rwasenkokoko, c. 7 km E of Pindura, Karamba, rocky slopes along abandoned road to Burundi. **Distribution in Africa:** Cameroon, DR Congo, Burundi, Uganda, Kenya, Tanzania, Malawi, Zimbabwe, South Africa. Also Ascension, Comoros, Madagascar, Mauritius, Rodriguez, Réunion, Central and South America.

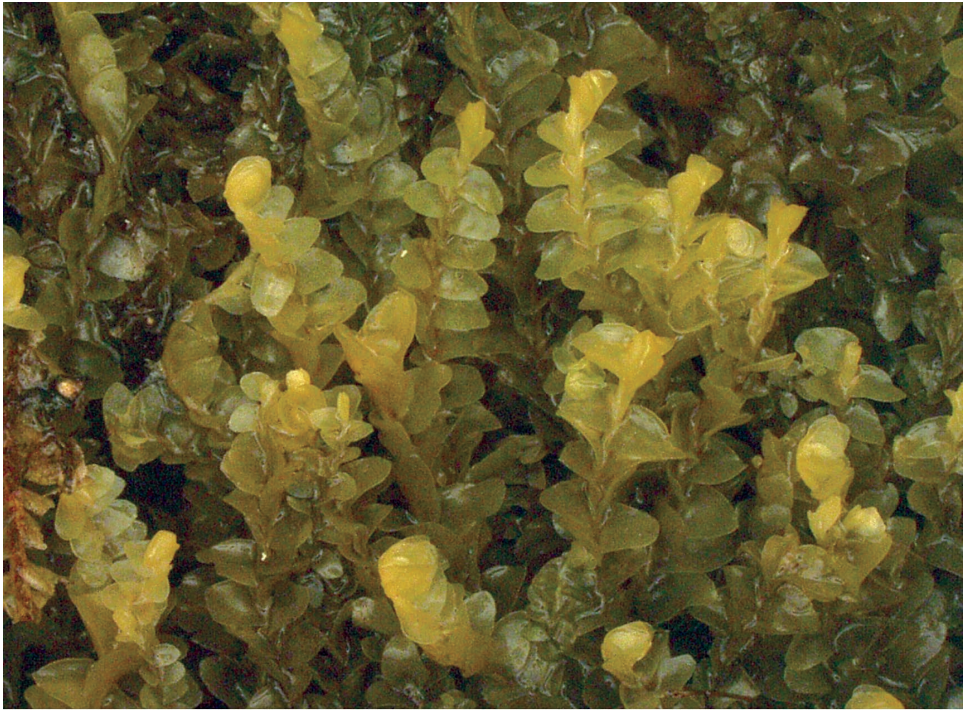






**Figs 230 and 231 (next page).** *Jamesoniella purpurascens* Steph.  
 Plants large, reddish brown to purple. Stems prostrate, up to 2.5 cm long. Stolons lacking.  
 Leaves ovate-orbicular, 1.4 x 1.4-1.7 mm, apex broadly rounded, margins entire and  
 usually somewhat incurved, bases decurrent. Cells elongate at the base, purple, usually  
 with large trigones, 24-30 x 24-30  $\mu\text{m}$ , cuticle smooth. Dioicous. Perianths indistinctly  
 3-4-plicate in upper half. **Habitat:** Quartzitic rocks in montane forest, 2000 m. **Distribution**  
**in Rwanda:** Nyungwe NP: Karamba. **Distribution in Africa:** DR Congo, Tanzania,  
 Malawi, Zambia, South Africa. Also Madagascar, Mauritius, Réunion.







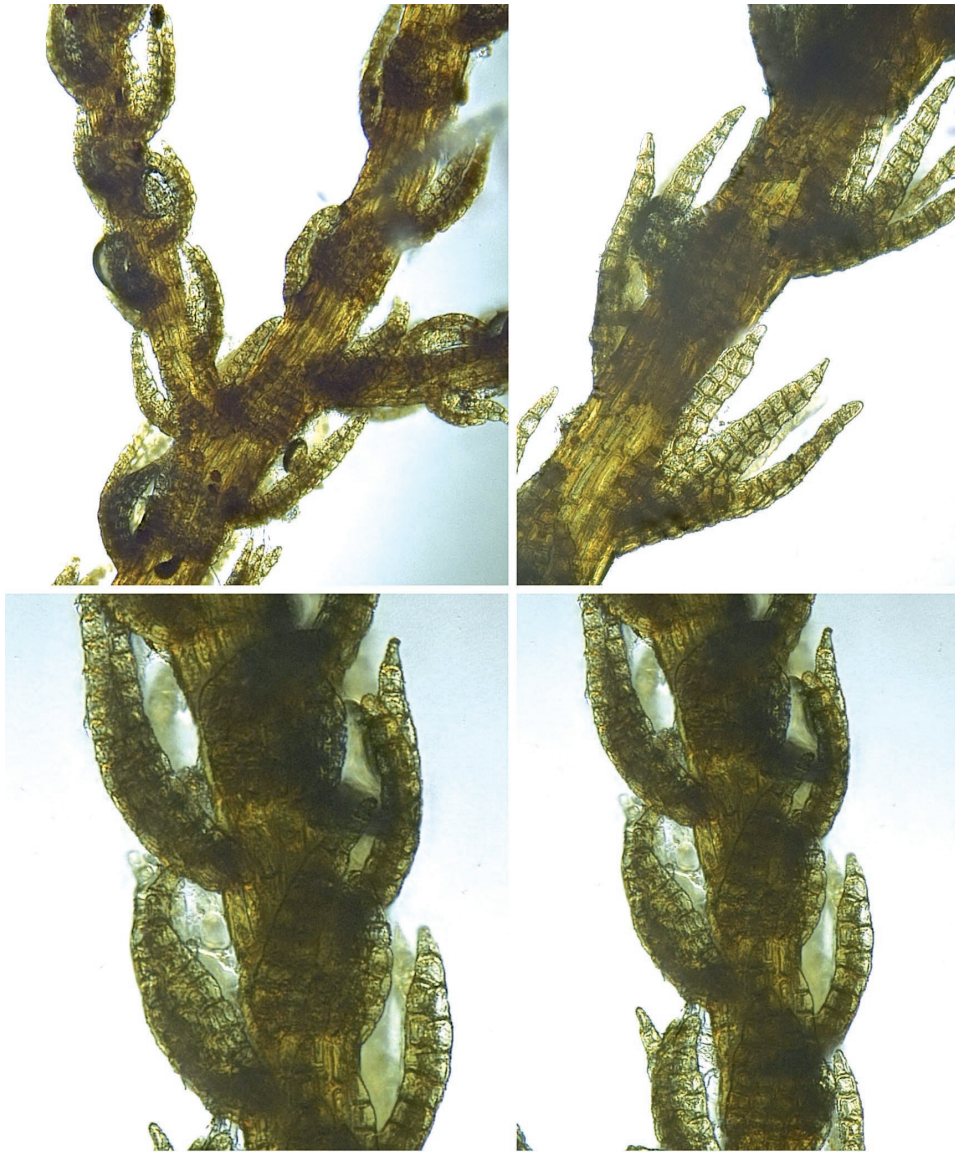
**Figs 232 and 233 (next page). *Kurzia capillaris* (Sw.) Grolle**

Synonym: *Kurzia tabularis* (Steph.) Grolle. Plants minute to medium-sized, dull green to brownish. Stems up to 4 cm long, 1-2-pinnate. Leaves asymmetrically quadrate, up to 0.2 mm long, deeply 4-lobed, lobes incurved, at base almost 2 cells wide and with 3-44 cells long uniseriate end, dorsal lobe shorter. Cells thick-walled, without trigones. Underleaves smaller than lateral leaves, 3-4-lobed, 0.08-0.09 mm wide, as wide as the stem. Dioicous.

**Habitat:** Terrestrial or on decaying wood, 2400 m. **Distribution in Rwanda:** Nyungwe NP: Rugege. **Distribution in Africa:** Tanzania, Malawi, South Africa. Also Madagascar, Mauritius, Réunion, Seychelles.





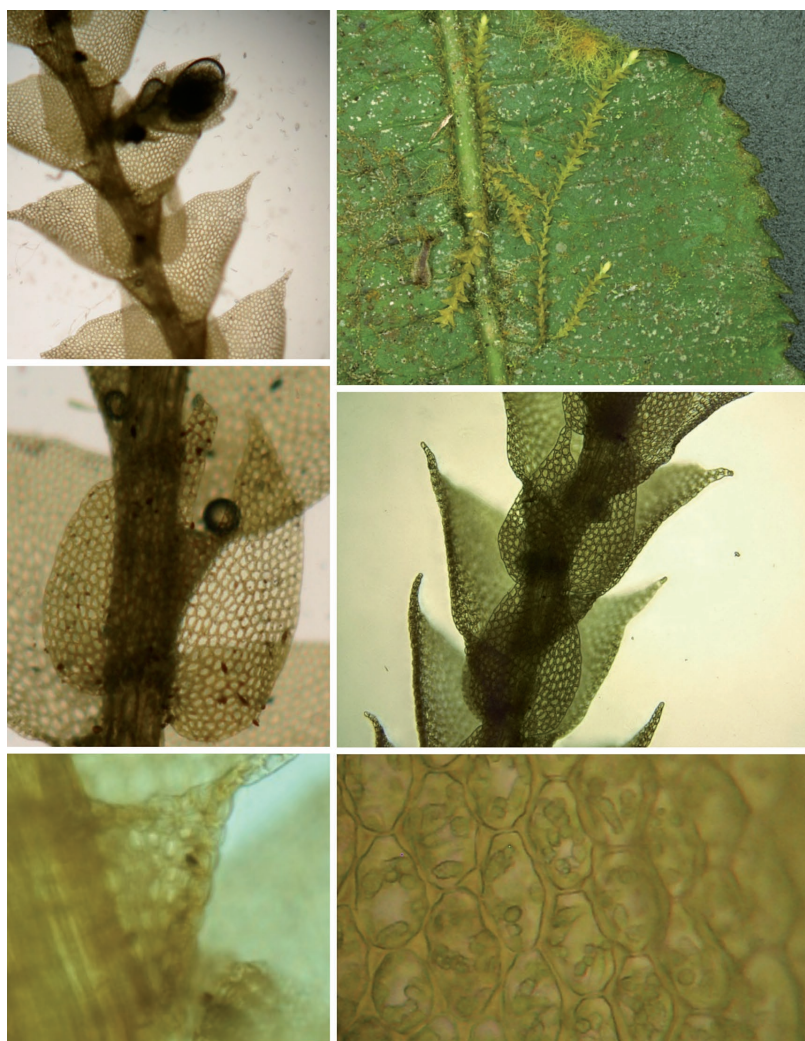


**Figs 234 and 235 (next page). *Kurzia irregularis* (Steph.) Grolle**

Synonym: *Lepidozia irregularis* Steph. Plants minute to medium-sized, dull green to brownish. Stems up to 3-4 cm long, 1-2-pinnate. Leaves asymmetrically quadrate, up to 0.27 x 0.17 mm, deeply 4-lobed, lobes incurved, at base almost 3 cells wide and with long uniseriate end, up to 0.14 mm long and 0.04 mm wide at base, dorsal lobe shorter. Cells thick-walled, without trigones, 17-20 x 16-17  $\mu\text{m}$ . Underleaves smaller than lateral leaves, 3-4-lobed, 0.1 x 0.11 mm, as wide as the stem. **Habitat:** On rocks and dead wood in the paramo, 3500 m. **Distribution in Rwanda: Volcano NP:** Karisimbi. **Distribution in Africa:** DR Congo, Uganda, Kenya, Tanzania, South Africa.







**Figs 236 and 237 (next page). *Lejeunea acuta* Mitt.**

Synonyms: *Stenolejeunea acuta* (Mitt.) Tixier; *Hygrolejeunea acuta* (Mitt.) Vanden Berghen. Plants variable, up to 2-3 cm long and 1-1.8 mm wide. Leaves approximate or slightly imbricate, ovate, acuminate at apex, deflexed when dry. Lobes 1 x 0.65 mm, lobule when well developed c. 0.25 the length of the lobe, free margin of 4 cells, involute, apical tooth short. Underleaves large, ovate, cordate at base, 0.6 x 0.4 mm, c. 4 x as wide as the stem, bilobed to 0.65 into narrow acuminate lobes with wide sinus. Cells 18-22 x 21-28  $\mu$ m, walls distinctly thickened, with large nodulose trigones and intermediate thickenings, oil bodies 2-6 per cell. Dioicous. Perianth clavate or fusiform, c. 1 mm long, 5-keeled.

**Habitat:** Epiphytic in montane forest, also on rocky slopes in heath forest, 2000-2200 m.  
**Distribution in Rwanda:** Nyungwe NP: Karamba, Kamiranzovu, Gisakura. **Distribution in Africa:** Annobón, São Tomé, Bioko, Cameroon, Rio Muni, DR Congo, Burundi, Uganda, Kenya, Tanzania.