

- 4. Leaves 3-4(-5)-lobed, trigones not or hardly developed, branching pinnate or bipinnate **Lepidozia**
- 4*. Leaves with truncate, shallowly 2-3-lobed or truncate apices or entire, trigones prominent, branching more or less dichotomously or shortly pinnate
..... **Bazzania**

Lophocoleaceae

- 1. Perianth laterally compressed, the ventral face narrow, plants ± brownish to fuscous pigmented **Leptoscyphus**
- 1*. Perianth ± symmetrically trigonous, the angles often winged, plants lacking brownish to fuscous pigmentation 2
- 2. Leaves moderately to deeply adaxially concave, usually entire, rounded, underleaves not as large as the stem **Clasmatocolea**
- 2*. Leaves usually distinctly bilobed with acute lobes, sometimes irregularly dentate to retuse convex, rarely plane, the apical part often decurved or deflexed (in *C. concretus*), underleaves larger than stem **Chiloscyphus**

Lophoziaceae

- 1. Underleaves large; leaves mostly 2-4 lobed, more than 5/6 the leaf length .. 2
- 1*. Underleaves absent; leaves bilobed less than 5/6 the leaf length 3
- 2. Leaves asymmetrically 3(-4)-lobed, obliquely inserted; leaf cells with large, bulging trigones **Plicanthus**
- 2*. Leaves symmetrically 4-lobed, transversely inserted; leaf cells with indistinct trigones **Tetralophozia**
- 3. Leaves asymmetrically (2-)3-lobed **Tritomaria**
- 3*. Leaves ± symmetrically bilobed 4
- 4. Plants with *Anomoclada*-type filiform branches **Andrewsianthus**
- 4*. *Anomoclada*-type branching absent 5
- 5. Leaf insertion transverse (except decurrent part), plants usually brownish
..... **Anastrophyllum**
- 5*. Leaf insertion oblique, succubous, plants usually green to yellowish green ...
..... **Lophozia**

9.3. Leafy liverwort genera – Keys to Species in Rwanda

Acanthocoleus R.M.Schust.

Bull. Torrey Bot. Club 97: 339 (1970).

A pantropical genus with 7-8 species. Two species in Rwanda.

References: Kruijt (1988), Vanden Berghen (1978a).

1. Antheridia single in lobules of unmodified leaves, perianth usually only narrowly winged ***A. chrysophyllus***
- 1*. Antheridia in specialized bracts with reduced lobes forming androecia on short lateral branches, perianths usually distinctly winged, the wing bearing laciniae ***A. madagascariensis***

Acrolejeunea (Spruce) Schiffn.

In: Engl. & Prantl, *Nat. Pflanzenfam.* 1(3): 128 (1893).

A pantropical genus with 15 species with highest diversity in Tropical Asia. One species in Rwanda.

References: Gradstein (1975).

Adelanthus Mitt.

J. Proc. Linn. Soc. Bot. 7: 243 (1864).

Southern hemispheran genus of ca. 15 species. Two species in Rwanda.

1. Leaves with 1 to 3 teeth at the margin, sometimes with entire margin ***A. decipiens***
- 1*. Leaf margin with numerous teeth ***A. lindenbergianus***

Amphicephalozia R.M.Schust.

Nova Hedwigia 22: 133 (1972).

Three species in Southern Chile (*A. amplexicaulis* R.M.Schust.), Madagascar (*A. geisslerae* Pócs & Váňa) and Rwanda (*A. africana* Váňa & Wigginton).

References: Váňa & Wigginton (2008).

Anastrophyllum (Spruce) Steph.

Hedwigia 31: 139 (1893).

About 35 species worldwide. Two species in Rwanda.

References: Váňa (1993), Váňa & Watling (2004c).

1. Plants large, dark reddish-brown, rigid. Stems up to 3-4 cm long, forming a large compact tuft. Leaves densely imbricate, strongly secund dorsally, ± asymmetrically 2-lobed to 0.5-0.65 of their length, 1.8-2.2 x 1.8-2.2 mm, leaf lobes triangular-ovate, apices subacute. Cells with wide trigones, 10-20 (-35) µm in diameter **A. piligerum**
- 1*. Plants small to medium sized, dark reddish-brown or purple. Stems up to 0.5-4 cm long, creeping to erect. Leaves succubous, contiguous to imbricate, ± asymmetrically 2-lobed to 0.25-0.5 of their length, 0.6-0.8 x 0.6 mm, leaf lobes strongly incurved. Cells with wide trigones, 10-20 µm in diameter
.....**A. auritum**

Andrewsianthus R.M.Schust.
Rev. Bryol. Lichén. 30: 66 (1961)

A mainly austral genus with ca. 15 species. One species in Africa.

References: Váňa & Watling (2004c).

Apomarsupella R.M. Schust.
J. Hattori Bot. Lab. 80: 79 (1996)

Three species. One species in Africa and Rwanda.

References: Váňa (1985, 1993), Váňa & Watling (2004b).

Bazzania S. Gray
Nat. Arr. Brit. Pl. 1: 704 (1821).

Cosmopolitan genus with about 100 species mainly in the Northern Hemisphere and tropical mountains. Three species in Rwanda.

References: Jones (1975), Pócs (1994a).

1. Underleaves distinctly connate on both sides with the leaves, leaf-apices tridentate and usually more or less denticulate 2
- 1*. Underleaves always free or nearly so on both sides 3
2. Leaves caducous, small to medium-sized plants, shoot width never exceeding 2 mm, underleaves usually 2-lobed
.....**B. decrescens ssp. pumila**
- 2*. Leaves not caducous, medium-sized to large plants, shoot width (1.6-)2-3.6(-4) mm, underleaves 2- or 4-lobed
..... **B. decrescens ssp. decrescens**

3. Leaves with a vitta of 2-4 rows of large rectangular cells extending nearly to leaf-apex, underleaves not much wider than stem, cell walls colourless ***B. nitida***
- 3*. Leaves lacking a vitta, underleaves usually 2.5 x as wide as the stem, cell walls with brown pigment ***B. roccatii***

Blepharostoma (Dumort. emend. Lindb.) Dumort.
Recueil Observ. Jungerm.: 18 (1835).

Three northern hemispheric species. One species in Rwanda.

References: Váňa *et al.* (1979), Fischer (1993c).

Calypogeia Raddi

Mem. Soc. Ital. Sci. Modena 18: 31 (1818).

A cosmopolitan genus of ca. 90 species. Four species in Rwanda.

References: Bischler (1970), Jones (1976b), Fischer (1993c).

1. Leaves bilobed with divergent lobes and rounded sinus, underleaves with subulate lobes and teeth ***C. arguta***
- 1*. Leaves entire or if bilobed the lobes non divergent and sinus narrow, underleaves bilobed 2
2. Underleaves 2-3 x as wide as the stem, always decurrent ***C. bidentula***
- 2*. Underleaves 1.5-2 x as wide as the stem, not decurrent 3
3. Leaves triangular-ovate, narrowed gradually to apex, antical margin strongly arched proximally, nearly straight distally, oil bodies colourless ***C. fissa***
- 3*. Leaves oblong-ovate, narrowed more abruptly to a somewhat rounded apex, antical margin nearly straight proximally, arched distally, oil bodies bright blue ***C. afrocaerulea***

Caudalejeunea (Steph.) Schiffn.

In: Engl. & Prantl, *Nat. Pflanzenfam.* 1 (3): 129 (1893).

A pantropical genus of about 15 species. Two species in Rwanda.

References: Vanden Berghen (1984a).

1. Distinct erect propaguliferous branches present, their leaves and underleaves different from prostrate branches, leaves of propaguliferous branches longitudinally folded, underleaves of these branches as wide as the stem **C. yangambiensis**
- 1*. Distinct propaguliferous branches absent, all branches similar . **C. lewallei**

Cephalojonesia Grolle

In: Grolle & Vanden Berghen, *Rev. Bryol. Lichén.* 37: 763 (1970).

Genus with one species and two subspecies. One species in Rwanda. *Cephalojonesia incubata* Grolle & Vanden Berghen ssp. *incubata* is known from tropical Africa, ssp. *mexicana* Burghardt, Gradst. & Váňa from Mexico (Burghardt *et al.*, 2006).

References: Vanden Berghen (1972a), Jones (1987).

Cephalozia (Dumort.) Dumort.

Recueil Observ. Jungerm. 18 (1835).

About 30-40 mainly northern hemisphere species. Three species in Rwanda.

References: Váňa (1988).

1. Leaves ovate to ovate-rectangular, usually longer than wide, subtransversely inserted, never distinctly decurrent **C. bicuspidata**
- 1*. Leaves orbicular to quadrate-rotund, as wide as long, horizontally or very obliquely inserted, decurrent2
2. Leaves usually 8-12 cells wide, leaf lobes 3-5 cells wide at base, usually on soil or decaying wood..... **C. connivens ssp. fissa**
- 2*. Leaves usually 12-25 cells wide, leaf lobes 6-10 cells wide at base, on turf in afro-montane swamps **C. africana**

Cephaloziella (Spruce) Schiffn.

In: Engl. & Prantl, *Nat. Pflanzenfam.* 1 (3): 98 (1893).

Cosmopolitan genus with about 40 species. Two species in Rwanda.

References: Wigginton (2004).

1. Leaves nearly transversely inserted, mostly remote, pectinately oriented; leaf cells more or less thick-walled **C. kiaeri**
- 1*. Leaves subtransversely inserted, not remote and pectinately oriented; leaf cells thin-walled **C. vaginans**

Ceratolejeunea (Spruce) J.B. Jack & Steph.
Hedwigia 31: 13, 16 (1892).

References: Vanden Berghen (1951).

Pantropical genus with about 30 species. One species in Rwanda.

Cheilolejeunea (Spruce) Schiffn.

In: Engl. & Prantl, *Nat. Pflanzenfam.* 1 (3): 121 (1893).

Synonym: *Leucolejeunea* A. Evans, *Torreyia* 7: 225 (1907).

A pantropical genus with about 80 species. Seven species in Rwanda.

References: Jones (1954a,b, 1985a, 1988), Pócs (1994b), Malombe (2009).

1. Leaf lobes usually ovate, strongly convex, apices sharply acute and recurved, underleaves bilobed up to 1/3 of their length, usually not exceeding 4 x the width of the stem (except reniform underleaves of *C. omphalogastris*) 2
- 1*. Leaf lobes rounded to oblong, flat or shallowly convex, apices rounded, plane, hardly recurved, underleaves shortly bilobed to entire or retuse, reniform to orbicular 5
2. Lobule with apical tooth spiniform, unicellular, acute, free marginal cells usually up to 8, cell walls with distinct trigones, leaf lobes caducous, perianth keel 3-carinate, underleaves with sinus narrow, v-shaped..... **C. pocsii**
- 2*. Lobule with apical tooth blunt or rounded, much reduced to multicellular, free marginal cells of ventral side usually up to 13-22, cell walls with trigones small or medium 3
3. Underleaves not exceeding 4 x the stem width, leaf lobe length and width ratio up to 1.2 **C. krakammae**
- 3*. Underleaves at least 4 x the stem width, leaf lobe length and width ratio at least 1.3 or more 4
4. Leaf apex mucronate, underleaves reniform, 5-6 x as wide as the stem, base with auricles..... **C. omphalogastris**
- 4*. Leaf apex acuminate to broadly rounded, underleaves rounded to obcordate, 3-5 x as wide as the stem **C. cordistipula**
5. Lobule rectangular to oblong, usually more than 1/2 as long as the lobe, inflated, ventral free margin inrolled covering the apical tooth, oil bodies 1 per cell **C. xanthocarpa**
- 5*. Lobule ovate to triangular, usually up to 2/5 as long as the lobe, oil bodies more than 1 per cell 6

- 6. Underleaves shortly 2-lobed, apex subacute, truncate or shallowly retuse, lobe apex broadly rounded, autoicous **C. trifaria**
- 6*. Underleaves entire, apex rounded, truncate or shallowly retuse, subacute, dioicous **C. montagnei**

Chiloscyphus Corda

Naturalientausch 12, *Beitr. Naturg.* 1: 651 (1829).

Synonym: *Lophocolea* (Dumort.) Dumort., *Recueil Observ. Jungerm.*: 17 (1835).

A genus with about 100-200 species, mainly in the tropics and the Southern Hemisphere. Five species in Rwanda.

References: Jones (1953c), Grolle (1959), Arnell (1956), Fischer (1993c).

- 1. Leaves obtuse or retuse, the apical part often decurved or deflexed **C. concretus**
- 1*. Leaves ± distinctly bilobed 2
- 2. Leaves oblong or bilobed with apiculate lobes, opposite to subopposite, apex rounded to truncate or retuse, entire or with several cilia, underleaves connate with leaves on both sides 3
- 2*. Leaves bilobed with more or less apiculate lobes, alternate, underleaves completely free from the leaves 4
- 3. Leaves robust, bilobed, nearly rectangular, often 2-3 mm long, margin without cilia **C. martianus**
- 3*. Leaves smaller, 0.5-1.8 mm long, rounded to orbicular or trapezoidal, margin with several cilia 5-8 cells long **C. muhavurensis**
- 4. Minute plants, perianth cylindrical, shortly lobed, exposed surfaces of leaf and perianth usually covered with 1-3 celled hairs **C. muricatus**
- 4*. Plants without hairs on the leaf and perianth surface 5
- 5. Small plants, leaves rarely more than 1 mm long, not very asymmetric, bilobed to not more than a sixth of their length, apiculi short .. **C. difformis**
- 5*. Large plants, leaves often 1.5 mm long or more, strongly asymmetric, with arched front margin and longly decurrent distal margin, the lobes with long fine apiculi **C. coadunatus**

Clasmatocolea Spruce

Trans. & Proc. Roy. Bot. Soc. Edinburgh 15: 440 (1885).

About 20 mostly Southern Hemisphere species. One species in Rwanda.

References: Grolle & Vanden Berghen (1970).

Cololejeunea (Spruce) Schiffn.

In: Engl. & Prantl, *Nat. Pflanzenfam.* 1(3): 121 (1893).

Synonym: *Aphanolejeunea* A. Evans, *Bull. Torrey Bot. Club* 38: 272 (1911).

The genus *Aphanolejeunea*, accepted by Wigginton (2004) was not supported by molecular studies (Heinrichs *et al.*, 2005; Gradstein *et al.*, 2006; Wilson *et al.*, 2006). Subsequently Pócs & Bernecker (2009) transferred all former *Aphanolejeunea* taxa to *Cololejeunea*.

Cosmopolitan, with greatest diversity in montane rainforests, about 200 mainly epiphyllous species. 65 species in Africa and 31 in Rwanda.

References: Jones (1953a,b, 1954c), Vanden Berghen (1971, 1972b, 1977), Pócs (1975, 1984b, 1993), Tixier (1995).

1. Lobule large compared with the lobe, usually exceeding half of lobe, reduced leaves frequent, innovations without basal collar, very small delicate plants **Cololejeunea subg. Aphanolejeunea** 2
- 1*. Lobule usually small compared with the lobe, not exceeding half of lobe surface, reduced leaves absent or rare, innovations of the Lejeunea-type (with basal collar), small or medium-sized plants..... **Cololejeunea s.str.** 5
2. Vegetative leaves uniformly reduced to a sublinear or linear-lanceolate lamella only 2-3(-4) cells wide, lobule always reduced to a single cell, only male bracts with well developed lobule **C. minuscula**
- 2*. Vegetative leaves at least partly with well developed lobule 3
3. At least half of leaves elobulate, reduced leaves also on well developed shoots, apical and proximal tooth separated by a broad, one-celled sinus, well developed leaves much larger than 200 x 100 µm, lobule only half of lobe length and width **C. clavatopapillata**
- 3*. Well developed shoots with majority of leaves lobulate, apical tooth of lobule separated by a very narrow sinus from proximal tooth, the latter always blunt, with rounded apex, well developed leaves less than 240 x 90-140 µm, lobule usually more than half of lobe length and width 4

4. Lobule tooth 2(-3)-celled, falcately curved, lobe apex triangular, obtuse or apiculate, with entire or only slightly irregularly dentate margin, lobe with conical protuberances only at keel or throughout dorsal lobe surface and even on lobule, lobule 55-63% of lobe length, 8-13 cells broad **C. microscopica**
- 4*. Lobule tooth 1-2-celled, straight and sometimes acute, ovate or broad triangular, margin crenulated by protruding cells, lobe evenly covered by conical or fingerlike mammillae, lobule 70-80% of lobe length, 12-16 cells broad **C. grossepapillosa**
5. Hyaline margin present 6
- 5*. Hyaline margin absent 8
6. Hyaline margin long and conspicuous **C. distalopapillata**
- 6*. Hyaline margin short and reduced, only at apex of lobe 7
7. Cells sometimes papillate at apex of lobe, pseudovitta (enlarged ocelli) short, at base of lobe, hyaline margin often reduced or absent **C. cardiocarpoides**
- 7*. Cells never papillate, vitta or pseudovitta absent, hyaline margin reduced, but always present **C. cardiocarpa**
8. Central vitta or pseudovitta present 9
- 8*. Central vitta or pseudovitta absent 13
9. Pseudovitta long **C. platyneura**
- 9*. Pseudovitta short, more or less diffuse 10
10. Perianth spherical **C. sphaerocarpa**
- 10*. Perianth ovoid 11
11. Large inflated lobules and small reduced lobules present **C. heterolobula**
- 11*. All lobules small and reduced 12
12. Lobules triangular **C. obtusifolia**
- 12*. Lobules linear, rectangular **C. lobulilineata**

13.	Leaves ovate-lanceolate, acuminate, lobules entirely reduced or well-developed.....	14
13*.	Leaves of variable shape, if ovate-lanceolate and acuminate, then lobules well developed	16
14.	Two innovations below perianth, plant thus with dichotomic branching pattern	C. augieri
14*.	Only one innovation below perianth	15
15.	Lobules all reduced	C. pusilla
15*.	Well developed lobules and reduced lobules present	C. pseudopusilla
16.	Leaves broadly ovate to orbicular, obtuse	C. minutissima
16*.	Leaves of variable shape, never orbicular	17
17.	Cells of lobe not or only slightly papillate	18
17*.	Cells of lobe papillate, at least the marginal cells	26
18.	Lobe elongate, lanceolate	19
18*.	Lobe rounded	20
19.	Lobe margin dentate	C. malanjae
19*.	Lobe margin entire	C. hildebrandii
20.	Cell walls very delicate	21
20*.	Cell walls normal	23
21.	Reduced lobules present	C. tenuiparietata
21*.	Reduced lobules absent	22
22.	Perianth with protruding cells at mouth, first tooth of lobule with 2 cells, hyaline papilla at base of apical tooth cell	C. harrisii
22*.	Median tooth of lobule with 2 cells in a row and 3 cells at base, hyaline papilla at apex of apical tooth cell	C. magna
23.	Hyaline papilla at apex of median lobule tooth	C. duvigneaudii
23*.	Hyaline papilla at proximal base of median lobule tooth	24

- 24. Apical tooth of lobule prominent, with 4 cells **C. zenkeri**
- 24*. Apical tooth of lobule smaller, with only 1-2 cells, or indistinct, hardly visible25
- 25. Apical tooth distinct **C. fischeri**
- 25*. Apical tooth indistinct, hardly visible **C. pseudoobliqua**
- 26. Medium-sized species, up to 1 mm large (including leaves)
.....**C. runssorensis**
- 26*. Small species, up to 0.5-0.7 mm large (including leaves) 27
- 27. Median tooth of lobule arched **C. tenella**¹
- 27*. Median tooth of lobule different 28
- 28. Lobe rounded **C. capuronii**
- 28*. Lobe acuminate 29
- 29. Margin of lobule irregularly dentate **C. mocambiquensis**
- 29*. Margin of lobule with not more than 1-2 regular teeth 30
- 30. At least some lobules large, about 1/3 of the lobe **C. frahmii**
- 30*. All lobules small, consisting only of few cells and an obliquely erect apical tooth **C. parva**

Colura (Dumort.) Dumort.

Recueil Observ. Jung.: 12 (1835).

Pantropical genus with about 70 species. Five species in Rwanda.

References: Jones & Pócs (1987), Pócs (1991).

- 1. Leaf sac contracted at apex into a narrow horn, leaf cells with trigones large to very small or absent, intermediate thickenings absent 2
- 1*. Leaf sac rounded or conical, not forming a narrow horn, leaf cells usually with large trigones and intermediate thickenings 4
- 2. Leaf sac abruptly narrowed into a beak of c. 1/2 of total leaf length
.....**C. tenuicornis**
- 2*. Leaf sac abruptly narrowed into a beak of 1/4 to 1/3 of total leaf length ... 3

¹ *Cololejeunea tenella* has been recorded by Tixier (1995). I have not seen any specimen, and the record may be *erroneous*. *C. tenella* is thus omitted from the special part.

3. Each cell of lobe and perianth distinctly papillose, walls with large nodular trigones **C. berghenii**
- 3*. Cells of lobe and perianth not papillose, walls without trigones . **C. calyptrifolia**
4. Leaves 1.1-1.8 mm long, valve ovate, bordered by 15-18 hyaline cells, underleaves acute, lobes 5-8 cells wide at base, epiphyllous or epiphytic
.....**C. digitalis**
- 4*. Leaves 1.6-2 mm long, valve ligulate, bordered by 27-30 hyaline cells, underleaves with acute lobes 10-12 cells wide at base, exclusively epiphytic on small twigs of ericaceous shrubs **C. saroltae**

Cylindrocolea R.M.Schust.

Bull. Natl. Sci. Mus. (Tokyo) 12: 666 (1969).

Pantropical genus with about 12 species from lower to medium altitudes. Two species in Rwanda.

References: Jones (1960), Arnell (1963), Váňa (1993).

1. Leaves distant; perianth contracted to the truncate mouth **C. gittinsii**
- 1*. Leaves imbricate or spreading; perianth not contracted to the entire and lobed mouth **C. atroviridis**

Diplasiolejeunea (Spruce) Schiffn.

In: Engl. & Prantl, *Nat. Pflanzenfam.* 1(3): 118, 121 (1893).

Pantropical genus with about 65-70 species. Nine species in Rwanda.

References: Vanden Berghen (1960, 1977), Pócs (1993, 1994a), Tixier (1995).

1. Lobes of underleaves obtuse or subobtuse at apex, 6-12 cells wide at base . 2
- 1*. Lobes of underleaves acuminate or acute at apex, 2-10 cells wide at base ... 5
2. Leaf-lobe with large basal ocellus, stem with leaves 1.2-1.5 mm wide
.....**D. deslooveri**
- 2*. Ocelli absent, stem with leaves 1.3-2.2 mm wide 3
3. Stem with leaves 1.3-1.5 mm wide, leaves with propagules different from remaining leaves, with cylindrically inrolled lobe **D. aulae**
- 3*. Stem with leaves 1.5-2.2 mm wide, leaves with propagules absent or similar to remaining leaves, lobe sometimes involute at apex but never cylindrically inrolled 4

4. Median tooth of lobule double, each half 3-4 cells long, gemmae absent, plants usually epiphyllous ***D. cyanguguensis***
- 4*. Median tooth with a row of 2-3 cells in median position, gemmae present on dorsal face of lobe, plants usually epiphytic on twigs ***D. runssorensis***
5. Lobes of underleaves 8-10 cells wide at base, leaf-lobes without basal ocellus .
..... ***D. cavifolia***
- 5*. Lobes of underleaves 2-5 cells wide at base 6
6. Leaf lobes with isolated or grouped laminal ocelli, 1(-3) basal ocelli present
..... ***D. kraussiana***
- 6*. Leaf-lobes without laminal ocelli, 1-5 isolated or grouped basal ocelli present .. 7
7. Margin of lobe entire or slightly sinuate, not crenulated, median tooth of lobule with 3(-5) rows of 2 cells, sometimes prolonged by 1-2 cells at apex, keels of perianth not distally prolonged into a horn ***D. symoensii***
- 7*. Margin of lobe sometimes obtusely and irregularly paucidentate, crenulated, median tooth of lobule with 2-3 cells, keels of perianth distally prolonged into a short conical horn acuminate at apex, sometimes paucidentate ***D. cornuta***

Diplophyllum (Dumort.) Dumort.

Recueil Observ. Jungerm.: 15 (1835) *nom. cons.*

A genus of ca. 20 species in the Northern Hemisphere and tropical mountains. One species in Rwanda.

Drepanolejeunea (Spruce) Schiffn.

In: Engl. & Prantl, *Nat. Pflanzenfam.* 1(3): 119, 126 (1893).

A pantropical genus of about 100 species. Six species in Rwanda.

References: Vanden Berghen (1961, 1977), Tixier (1995), Buchbender & Fischer (2004).

1. Lobule proximally of 1-2-celled apical tooth with wide sinus, proximal end of sinus separated by 2-3 marginal cells from base of apical tooth, distinctly developed as second tooth, ocelli 3-5, lobes of underleaves lanceolate to linear, ending in (2-)3-5(-6) uniseriate cells ***D. symoensii***
- 1*. Lobule proximally of 1-celled apical tooth with small, narrow sinus filled by hyaline papilla, proximal part of sinus separated from base of apical tooth by only 1 marginal cell, developed as minute and usually reduced tooth, ocelli 1-3, lobes of underleaves without row of uniseriate cells 2

- 2. Cells of lobe papillose on dorsal side 3
- 2*. Cells of lobe not papillose on dorsal side 4
- 3. Apex of lobe obtuse, underleaves usually ending in 2 adjacent cells, female bracts entire or only slightly dentate **D. vandenberghenii**
- 3*. Apex of lobe acuminate, underleaves ending with one single cell, female bracts distinctly dentate **D. physaefolia**
- 4. Lobe entire-sinuate, perianth with smooth keels **D. deslooveri**
- 4*. Lobe dentate, perianth with distinct horns on keel 5
- 5. Lobe with distinct tooth at outer margin at level of lobule apex
..... **D. ruandensis**
- 5*. Lobe without distinct tooth at outer margin **D. cultrella**

Frullania Raddi

Jungermanniografia Etrusca: 9 (1818).

Cosmopolitan with diversity centres in the tropics, about 200-300 species, 14 species in Rwanda.

References: Vanden Berghen (1976a), Fischer (1993c).

- 1. Lobules inflated throughout, the dorsal and ventral faces approximately equal in area, lobule connected to the lobe by a short fold at almost right angles to the stem 2
- 1*. Lobules inflated in the upper part only, the dorsal faces much larger than the ventral faces, with a large, flat region connected to the lobe by an arched fold, whose outer portions are subparallel to the stem (Subgenus *Chonantheria*) 13
- 2. Inflated lobules cylindrical, distinctly longer than broad (usually 1.5-3 x as long as broad (Subgenus *Frullania*) 3
- 2*. Inflated lobules caplike, very short and broad-cylindrical, often compressed at mouth, about as broad as long (lobules sometimes explanate and lanceolate) (Subgenus *Trachycolea*) 9
- 3. Lobules oblique in position to stem, forming with stem an angle between (20) 30-45°, in upper branches up to 60-90° **F. lindenberghii**
- 3*. Lobules arranged parallel to stem or forming with stem an angle less than 30°, sometimes apex of lobule directed towards stem in branches 4

4. Leaf lobes acuminate or apiculate 5
- 4*. Leaf lobes ± rounded-obtuse 8
5. Gynoecia at end of stem or prolonged branch, 1(-2) innovations, dorsal base of leaf lobe appendiculate, convex or truncate 6
- 5*. Gynoecia at end of short lateral branches, generally without innovations, dorsal base of leaf lobe convex or appendiculate 7
6. Dorsal base of leaf lobe distinctly convex, underleaves 3-5 x as large as the stem, frequently with decurved margins ***F. schimperi***
- 6*. Dorsal base of leaf lobe truncate or slightly convex, underleaves 2-3 x as large as the stem, with plane margins ***F. apicalis***
7. Primary branch appendage (hemiphyll) oval, not bilobed, leaf lobe apex generally exposed, lobe and lobule of female bracts ± entire, dioicous species ***F. angulata***
- 7*. Primary branch appendage bilobed, leaf lobe apex generally involute, lobe and lobule of female bracts densely lacinate or dentate ***F. serrata***
8. Gynoeceum at apex of a short lateral branch, without innovations, monoicous ***F. capensis***
- 8*. Gynoeceum at apex of an elongated branch, with 1(-2) innovations, dioicous ***F. imerinensis***
9. Perianth with 2-3(-5) ventral keels 10
- 9*. Perianth 3-carinate, with 1 ventral keel, rough with short processes 11
10. Plants with abundant propagules developing from the marginal cells, stylus small, lanceolate to ligulate, 2-3 cells wide at base ***F. obscurifolia***
- 10*. Plants usually lacking propagules, stylus large, ligulate, 3-6 cells wide at base ***F. socotrana***
11. Mid-leaf cells more than 30 µm long, robust plants, not squarrose in wet state, main shoots (1.3-)2-2.5(-2.8) mm wide, leaf lobule with an ± apiculate rostrum, underleaves with cordate base, perianth smooth ***F. caffraria***
- 11*. Mid-leaf cells less than 30 µm long, less robust plants, main shoots (0.7-) 0.85-1.8(-2) mm wide 12

12. Leaf lobes squarrose in wet state, leaf lobule without an apiculate rostrum, rarely projecting beyond lobe, underleaves longer than wide, perianth verrucose at base ***F. ericoides***
- 12*. Leaf lobes flat or slightly convex in moist state, leaf lobule with apiculate rostrum often projecting beyond lobe, underleaves wider than long, perianth smooth ***F. spongiosa***
13. Perianth (5-)8-10-carinate, female bracts longly connate, inflated part of lobule shorter than large flat region ***F. arecae***
- 13*. Perianth 4-carinate, female bracts only shortly connate, inflated part of lobule usually longer or as long as the flat region ***F. depressa***

Frullanoides Raddi

Critt. Bras.: 13 (1822).

A genus with 7 species mainly in the Neotropics. One species in Rwanda.

References: van Slageren (1985).

Gongylanthus Nees

Naturgesch. Eur. Leberm. 2: 405 (1836).

Five species, mainly Southern hemispheran. One species in Rwanda.

References: Jones (1964).

Gottschea Nees ex Mont.

Ann. Sci. Nat., Bot., ser. 2, 19: 245 (1843)

19 species mainly in the Palaeotropics. One species in Rwanda.

References: Jones (1976a).

Gymnomitrium Corda

In: Opiz, *Beitr. Naturk.* 1: 651 (1829).

About 15 species mainly in the Northern Hemisphere in dry, acidic montane habitats. One species in Rwanda.

References: Váňa & Watling (2004c).

Haplomitrium Nees

Naturg. Europ. Leberm. 1: 109 (1833) *nom. cons.*

Seven species in the Holarctic and tropical mountains, two species in Africa. One species in Rwanda.

References: Grolle (1993).

Harpalejeunea (Spruce) Schiffn.

In: Engl. & Prantl, *Nat. Pflanzenfam.* 1(3): 119, 126 (1893).

Pantropical genus with about 20 species, mainly in the neotropics (10-15 species).
One species in Rwanda.

References: Tixier (1995), Buchbender & Fischer (2004).

Herbertus S.F. Gray

Nat. Arr. Brit. Pl. 1: 705 (1821).

About 40-50 species, widely distributed in the northern hemisphere and on tropical mountains. Two species in Rwanda.

References: Hodgetts (2008).

1. Vitta bifurcating just below sinus, or at least above half way up basal lamina ***H. juniperoideus***
- 1*. Vitta bifurcating at or below half way up basal lamina..... ***H. dicranus***

Isotachis Mitt.

In: Hooker, *Fl. Nov.-Zel.* 2: 148 (1854).

A Southern Hemisphere genus with ca. 15 species. In Rwanda only one species recognized.

References: Váňa (1982), Fischer (1993c).

Jamesoniella (Spruce) Carring

In: Lees, *London Catal. Brit. Moss. Hepat.*, ed. 2: 25 (1881).

14 species worldwide. One species in Rwanda.

References: Grolle (1970).

Kurzia G. Martens

Flora 53: 417 (1870).

Cosmopolitan genus with about 30 species mainly in the Northern Hemisphere and in tropical mountains. Two species in Rwanda.

References: Arnell (1963), Pócs (1984a).

1. Leaves up to 0.22 mm long, deeply 4-lobed, base of lobes 2 cells wide, underleaves 0.08-0.09 mm wide ***K. capillaris***
- 1*. Leaves up to 0.27 mm long, deeply 4-lobed, base of lobes 3 cells wide, underleaves 0.1 mm wide ***K. irregularis***

Lejeunea Libert

Annales Gén. Phys. Bruxelles 6: 372 (1820).

Mainly warm-temperate and pantropical, comprising about 100-150 species. 15 species in Rwanda.

References: Jones (1967, 1968, 1969, 1972, 1974a,b, 1985a,b, 1989), Pócs (1993, 1994a), Vanden Berghen (1961).

1. Leaf apex pointed to acuminate, perianths not compressed, with 5 equal keels 2
- 1*. Leaf apex rounded, perianths variable, compressed or not 5
2. Plants dioicous, usually elongate, little branched and free hanging, cell walls often thickened, with large nodulose trigones and intermediate thickenings ..
..... **L. acuta**
- 2*. Plants monoicous, prostrate, richly branched, cell walls thin, trigones and intermediate thickenings small or absent 3
3. Underleaves large, 3-5 x as wide as the stem, 2-lobed to 0.2 of their length, with a wide sinus, lobes of female bracts and bracteoles dentate
..... **L. amaniensis**
- 3*. Underleaves smaller, 2-3.5 x as wide as the stem, 2-lobed to 0.5 of their length, lobes of female bracts and bracteoles entire 4
4. Perianth keels abruptly expanded distally, forming widely spreading inflated wings, perianths on short lateral branches, with a short sterile or male innovation **L. lyratiflora**
- 4*. Perianth keels shallow, gradually expanded distally, not forming inflated wings, perianths on short innovations which usually bears other gynoecia
..... **Taxilejeunea**
5. Plants autoicous 6
- 5*. Plants dioicous 12
6. Perianths without keels, leaves large, rounded at apex, up to 0.35-0.48 mm long, cell walls thin, without or with very small trigones **L. capensis**
- 6*. Perianths at least with 2 lateral and 2 ventral keels or with 5 keels 7

7. Perianths compressed, cells thin walled, with trigones small or lacking ***L. caespitosa***
- 7*. Perianths terete or slightly compressed, with 4 equal keels (2 lateral, 2 ventral) or with 5 keels, the dorsal keel smaller than the other 4, cells with or without trigones 8
8. Leaf cell walls with large trigones and intermediate thickenings, underleaves large, ovate or cordate-ovate, 2-4 x as wide as the stem, sinus narrow, perianth with dorsal keel weaker than the others or lacking 9
- 8*. Leaf cell walls with small or absent trigones or intermediate thickenings, or, if trigones present then intervening walls thin, underleaves rounded or very small, 2-6 x as wide as stem, sinus wide, perianths with 5 equal keels 10
9. Leaves spreading from stem nearly at right angle, underleaves truncate at base, plants with creeping stems ***L. flava***
- 9*. Leaves erecto-patent, spreading from stem at more narrower angle (often 45-55°), underleaves distinctly cordate at base, stems erect and irregularly pinnate ***L. tabularis***
10. Underleaves 3-6 x as wide as the stem, insertion strongly arched, usually epiphytic on tree ferns ***L. cyathearum***
- 10*. Underleaves 2.5-3.5(-4) x as wide as the stem, insertion nearly straight, usually epiphytic on various species 11
11. Ventral margin of leaf forming deep sinus (-90°) with strongly arched keel, perianth tuberculate or irregularly dentate, sometimes with 2-3-celled processes ***L. villaumei***
- 11*. Ventral margin of leaf ± in line with, or making a wide sinus with gently arched keel, perianth keels usually smooth ***L. eckloniana***
12. Plants small or delicate, leaf cells with sharply defined medium-sized or small trigones, or trigones absent, underleaves 1.5-2.5 x as wide as the stem . 13
- 12*. Plants robust, leaf cells with large trigones and intermediate thickenings, underleaves 3-5 x as wide as the stem 15
13. Underleaves very small, to 1.5 x as wide as the stem, thin-textured and often imperfect, deeply 2-lobed with narrow lobes, antical base of lobe not crossing or scarcely crossing the midline of stem ***L. confusa***
- 13*. Underleaves larger, usually more than 1.5 x as wide as the stem, 2-lobed to 0.5 x of their length, antical base of lobe distinctly crossing the midline of stem 14

- 14. Leaf lobes caducous, laxly imbricate, underleaves 1.5-2(-3.5) x as wide as the stem, subcircular, slightly wider than long ***L. rhodesiae***
- 14*. Leaf lobes never caducous, approximate to distant, underleaves usually 2-2.5 x as wide as the stem, oval, slightly longer than wide ***L. helenae***
- 15. Perianths terete, lacking keels, underleaves nearly round, 4-5 x as wide as the stem, not equalling the leaves in size, the length not exceeding the width of adjacent leaves ***L. ramosissima***
- 15*. Perianths 4-5-keeled, underleaves nearly equaling the size of the leaves, 4-5 x as wide as the stem, their length exceeding the width of adjacent leaves ***L. isophylla***

Lepidozia (Dumort.) Dumort.

Recueil Observ. Jungerm.: 19 (1835).

Cosmopolitan genus with about 75 species mainly in the Northern Hemisphere and in tropical mountains. Five species in Rwanda.

References: Pócs (1984a, 1993).

- 1. Leaves obliquely to subtransversally inserted, (3-)4(-5)-lobed on stems and branches, lobes at least 0.3 x leaf length ***L. succida***
- 1*. Leaves longitudinally inserted, 3(-4)-lobed on stems and 2-lobed on branches, lobes not more than 0.25 x leaf length 2
- 2. Leaves very asymmetrical, dorsal base auriculate, exceeding the midline of the stem and concealing its dorsal side, additional teeth at leaf and underleaf base often present, largest lobes often more than 8 cells wide; leaf cells with evenly thickened wall; underleaf lobes elongate-acute to lanceolate, at 6 cells distance from apex never broader than 2 cells; oil bodies 3-5 per cell, coarsely granulated, plants medium-sized to large, yellowish-green to olive green ***L. cupressina***
- 2*. Leaves less asymmetrical, dorsal base never auriculate, and neither reaching the midline nor concealing the stem, additional teeth on leaf and underleaf never present, largest lobes always less than 6 cells wide; leaf cells thin or unevenly thickened with small trigones; underleaf lobes broad or narrow triangular, at 6 cells distance from apex always 3 or more cells broad; oil bodies 6-16 per cell, homogeneous or consisting of 2-5 segments, small to medium-sized, colour variable (pale to vivid or dull green) 3