



Notes on Early Land Plants Today. 26. Miscellaneous synonyms in liverworts (Marchantiophyta)

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The identity of *Aneura bipinnata* (Sw.) Nees and its β *flabellifera* (Nees) Nees

Aneura bipinnata (\equiv *Riccardia bipinnata*, described from Jamaica as *Jungermannia bipinnata* (“2-pinnata”) by Olof Swartz (1788, 1806), is one of the oldest names in Aneuraceae and one of the poorest known. Swartz' original description and the brief diagnosis in Synopsis Hepaticarum (Gottsche *et al.* 1846) are the only available descriptions for the species. Stephani (1899) was unable to locate material of *Aneura bipinnata* and listed the species without description in his Species Hepaticarum. Swartz (1806) compared his *Jungermannia bipinnata* with *Jungermannia multifida* (\equiv *Riccardia multifida*), a widespread Holarctic species. My study of the holotype material of *Jungermannia bipinnata* kept in S revealed that the species is identical to *R. multifida* and a synonym of the latter. Characteristic are the creeping to somewhat procumbent, several cm long shoots with regularly 2(-3)-pinnate branching, the linear, broadly winged branches and the swollen, biconvex main axis with or without a narrow wing.

The Swartz collection constitutes the only known record of *R. multifida* from Jamaica (Söderström *et al.* 2011) and from the Caribbean as a whole. A field search should therefore be undertaken to confirm its occurrence on Jamaica. At the same time, efforts should be made to confirm the occurrence in Jamaica of *Riccardia palmata* (Hedwig 1784: 87) Carruthers (1865: 302), a Holarctic species that is not known from the tropics with certainty except from Mexico. Like *R. multifida*, *R. palmata* was collected on Jamaica by Swartz (1788, 1806) and never afterwards. Unfortunately, the Jamaican material of *R. palmata* (originally described as *Jungermannia polyphylla* Swartz 1788: 145) could not be found in S.

A plant with flabellate branching from southern Brazil was described by Nees (1833) as *Jungermannia bipinnata* β *flabellifera*. This plant clearly differs from *Riccardia multifida* by having a stoloniform main axis giving rise to erect, irregularly pinnate to flabellate branches, and is similar to *Riccardia regnellii*. The latter is a rather common and characteristic species of the Atlantic rain forests of eastern and southern Brazil, ranging from Pernambuco to Rio Grande do Sul (Gradstein & Costa 2003).

The new synonymy is as follows:

Riccardia multifida (L.) Gray, *Nat. Arr. Brit. Pl.* 1: 684, 1821 (Gray 1821).

Basionym:—*Jungermannia multifida* L., *Sp. Pl.* 1: 1136, 1753 (Linnaeus 1753).

= *Jungermannia bipinnata* Sw., *Prodr.* (Swartz): 145, 1788, “2-pinnata” (Swartz 1788) **syn. nov.** Type:—JAMAICA. "inter muscos (nec ad lapides) in summis montibus Jamaicae", Swartz *s.n.* (holotype S-B25044!). \equiv *Aneura bipinnata* (Sw.) Nees, *Syn. Hepat.* 4:500, 1846 (Gottsche *et al.* 1846). \equiv *Riccardia bipinnata* (Sw.) Trevis., *Mem. Reale Ist. Lombardo Sci., Ser. 3, C. Sci. Mat.* 4: 431, 1877 (Trevisan 1877)

Riccardia regnellii (Ångstr.) K.G.Hell, *Bol. Univ. São Paulo, Bot.* 25: 110, 1969 (Hell 1969).

Basionym:—*Pseudoneura regnellii* Ångstr., *Öfvers. Kongl. Vetensk.-Akad. Förh.* 33, 7: 90 1876 [1877] (Ångström 1877).

= *Jungermannia bipinnata* Sw. β *flabellifera* Nees, *Fl. Bras. (Martius)* 1 (1): 326, 1833 (Nees 1833). Type:—BRAZIL, Santa Catarina, São João Ba(p)tista, *Martius s.n.* (STR–Nees!), **syn. nov.** \equiv *Aneura bipinnata* (Sw.) Nees β *flabellifera* (Nees) Nees, *Syn. Hepat.* 4: 500, 1846 (Gottsche et al. 1846).

The identity of *Lopholejeunea nigricans* (Lindenb.) Schiffn. β *monstrosa* (Nees) Schiffn.

Lopholejeunea nigricans (Lindenb. in Gottsche et al. 1845 : 306) Schiffner (1893 : 293) (*Lejeunea nigricans* Lindenb.) is a widespread pantropical species (Zhu & Gradstein 2005). In his original description of *Lejeunea nigricans*, Lindenberg (Gottsche et al. 1845) mentioned the existence of a small, densely branched form of the species described by Nees (1830) as *Jungermannia applanata* β *monstrosa* Nees. Whereas *Lopholejeunea nigricans* has been studied by many authors, its β *monstrosa* has not been given attention since the original description. My study of the holotype material of *Jungermannia applanata* β *monstrosa* in the liverwort herbarium of C. G. Nees von Esenbeck (STR–Nees) revealed that the plant is identical to *Lopholejeunea zollingeri* (Stephani 1890) Schiffner (1898), a widespread Southeast Asian species. The new synonymy is as follows:

Lopholejeunea zollingeri (Steph.) Schiffn., *Consp. Hepat. Arch. Ind.*: 296, 1898 (Schiffner 1898).

Basionym:—*Lejeunea zollingeri* Steph., *Hedwigia* 29: 14, 1890 (Stephani 1890).

= *Jungermannia applanata* Reinw., Blume et Nees β *monstrosa* Nees, *Enum. Pl. Crypt. Javae*: 35, 1830 (Nees 1830). Type:—INDONESIA. Java, *Blume s.n.* (STR–Nees!), **syn. nov.** \equiv *Lejeunea nigricans* Lindenb. β *monstrosa* (Nees) Nees, *Enum. Pl. Crypt. Javae*: 35, 1830 (Nees 1830). \equiv *Lopholejeunea nigricans* β *monstrosa* (Nees) Schiffn., *Consp. Hepat. Arch. Ind.*: 293, 1898 (Schiffner 1898).

The identity of *Archilejeunea fischeriana* (Nees) Steph.

The authors of *Synopsis Hepaticarum* (Gottsche et al. 1845) and Gradstein (1994) compared *Phragmicoma fischeriana* (\equiv *Archilejeunea fischeriana*) with *Lopholejeunea nigricans* (\equiv *Lejeunea nigricans* = *Lejeunea javanica* Gottsche et al. 1845: 320, etc.), a common pantropical species (see above). If the two species would be conspecific, the name *Phragmicoma fischeriana* would have priority. My re-examination of the holotype of *P. fischeriana* in the Nees Herbarium (STR–Nees) fortunately revealed that *L. nigricans* and *P. fischeriana* are unrelated. The lack of an enlarged epidermis and the presence of lejeuneoid innovations in *P. fischeriana* indicate that the latter species is actually a member of *Archilejeunea* (Spruce 1884: 88) Schiffner (1893: 130) (subg. *Dibrachiella* (Spruce 1884: 90) Schiffner 1893: 130). The small, usually reduced lobules with a single, short tooth, the isodiametric leaf cells with small trigones, the rounded leaf apices and the small, widely distant, suborbicular underleaves of *Phragmicoma fischeriana* leave no doubt that the material belongs to the very common and widespread neotropical *Archilejeunea parviflora*. The new synonymy is as follows:

Archilejeunea parviflora (Nees) Schiffn., *Hedwigia* 33:185, 1894 (Schiffner 1894).

Basionym:—*Jungermannia parviflora* Nees, *Fl. Bras. Enum. Pl.* 1 (1): 353, 1833 (Nees 1833).

= *Phragmicoma fischeriana* Nees, *Repert. Pharm.* 76: 44, 1842 (von Flotow et al. 1842), **syn. nov.** Type:—BRAZIL. Rio de Janeiro: on bark of Páo Pereira, *Neumann s.n.* (holotype STR–Nees!), \equiv *Lejeunea fischeriana* (Nees) Nees, *Syn. Hepat.* 2: 320, 1845 (Gottsche et al. 1845). \equiv *Symbiezidium fischerianum* (Nees) Trevis., *Mem. Reale Ist. Lombardo Sci., Ser. 3, C. Sci. Mat.* 4: 403, 1877 (Trevisan 1877). \equiv *Archilejeunea fischeriana* (Nees) Steph., *Sp. Hepat. (Stephani)* 4: 713, 1911 (Stephani 1911).

The identity of *Pycnolejeunea inflata* (Nees) Steph.

He (1999) in her recent monograph of *Pycnolejeunea* Schiffner (1893: 124) left the name *Pycnolejeunea inflata* (\equiv *Lejeunea inflata*) as an excluded and doubtful taxon. My study of the holotype of *Lejeunea inflata* in the Nees herbarium (STR-Nees) revealed that *Pycnolejeunea inflata* is a member of *Ceratolejeunea* (Spruce 1884: 77) Jack & Stephani (1892: 16) and is identical to *Ceratolejeunea grandiloba* Jack & Stephani (1892) from South America. Although the holotype of *Lejeunea inflata* consists only of a single, poorly preserved shoot, the identity of the material is unequivocal. Because of the existence of *Ceratolejeunea inflata*, a species validly described from Java, transfer of the name *Lejeunea inflata* Nees to *Ceratolejeunea* would create an illegitimate combination. The latter species should therefore be treated as a synonym of *Ceratolejeunea grandiloba*.

By coincidence, the neotropical *Ceratolejeunea grandiloba* is very similar to the Javanese *Ceratolejeunea inflata*; according to Dauphin (2003) the two species might actually be conspecific. My comparison of the two species reveals that they are identical except for a slight difference in the gynoecium (see key below). Because of their very different geographical distributions, the two taxa are best treated as geographical subspecies. The Neotropics–Java disjunction of *Ceratolejeunea grandiloba* and the apparent absence of the species in Africa is remarkable. Indeed, virtually all liverwort species occurring in the New World tropics and in tropical Asia also occur on the African continent. *Ceratolejeunea grandiloba* should therefore be searched for in Africa. Since it is a canopy-dweller, the species may well have been overlooked. An effort should also be made to collect further material of the species in SE Asia; hitherto, only two old, 19th century collections of *Ceratolejeunea grandiloba* are known from Asia, both from Gede-Pangrango National Park, West Java.

***Ceratolejeunea grandiloba* J.B. Jack et Steph., *Hedwigia* 31: 16. 1892 (Jack & Stephani 1892).**

Type:—COLOMBIA. Antioquia: páramo de Sonsón, 1000 ft., 1872, *Wallis s.n.* (holotype G-60757 [=G-19549]¹), isotypes BM!, FH, G, W).

= *Lejeunea inflata* Nees, *Syn. Hepat.*: 360, 1845 (Gottsche *et al.* 1845), **syn. nov.** Type:—PERU. "in cortice peruviano", *s.coll.* (STR–Nees!). \equiv *Pycnolejeunea inflata* (Nees) Steph., *Sp. Hepat. (Stephani)* 5: 608. 1914 (Stephani 1914).

Distribution (Dauphin 2003):—Epiphyte in the canopy and at the margins of humid montane forests of the tropical Andes, from Colombia to Bolivia, at 1400–3000 m elevation. In addition, the species occurs on the tepuis of the Guyana Highland of Venezuela.

Ceratolejeunea grandiloba* J.B. Jack et Steph. subsp. *inflata* (Mizut.) Gradst. *comb. et stat. nov.

Basionym:—*Ceratolejeunea inflata* Mizut., *J. Hattori Bot. Lab.* 49: 312. 1981 (Mizutani 1981).

Type:—INDONESIA. Java: Mt. Pangrango, 6500 ft., on tree trunk, *Amann s.n.* (L!).

Distribution (Mizutani 1981):—West Java, Mt. Pangerango, West Java (2 collection), on tree trunks in humid montane forest at about 2000 m elevation. Because of its brown pigmentation, the subspecies is probably restricted to the forest canopy.

1. Citation of specimens in G should preferably use the barcode (M. Price, pers. comm.) but for comparability the numbers printed on the specimen, which have often been cited by previous authors, are also given here in square brackets.

Key to the subspecies of *Ceratolejeunea grandiloba*

- Female bracts entire or crenulate, female bracteole undivided. Neotropical
..... *Ceratolejeunea grandiloba* subsp. *grandiloba*
Female bracts denticulate, female bracteole short bifid. Java *Ceratolejeunea grandiloba* subsp. *inflata*

The identity of *Dicranolejeunea lillieana* Pearson

Dicranolejeunea lillieana from Mt. Elgon, Uganda, was treated as a synonym of the Afro-American *Brachiolejeunea phyllorhiza* (Nees 1833: 348) Kruijt & Gradstein (1986: 299) by Kruijt & Gradstein (1986), but Gradstein (1994) subsequently showed that the material had been misidentified and belonged to the genus *Acanthocoleus* Schuster (1971: 339). My study of type material of *D. lillieana* in S has shown that the species because of its isodiametrical leaf cells with simple-triangular trigones is a synonym of *Acanthocoleus madagascariensis*. The new synonymy is as follows:

Acanthocoleus madagascariensis (Steph.) Kruijt, *Bryophyt. Bibl.* 36: 98, 1988 (Kruijt 1988).

Basionym:—*Dicranolejeunea madagascariensis* Steph., *Sp. Hepat. (Stephani)* 5: 158, 1912 (Stephani 1912).

= *Dicranolejeunea lillieana* Pearson, *Ark. Bot.* 19 (5): 11, 1924 (Pearson 1924), **syn. nov.** Lectotype (Kruijt & Gradstein 1986):—UGANDA. Terrem, Mt Elgon, 25 July 1920, *Lindblom s.n.* (S-B22430!); Uganda, Kaimosi, Aug 1920, leg. Lindblom s.n. (paralectotype, S-B22429!).

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References

- Ångström, J. (1877 “1876”) *Primae lineae muscorum cognoscendorum, qui ad Caldas Brasiliae sunt collecti. II. Hepaticae. Öfversigt af Kongl. Vetenskaps-Akademiens Forhandlingar* 33: 77–92.
- Carruthers, W. (1865) On the nomenclature of the British Hepaticae. *Journal of Botany* 3: 297–302.
- Dauphin, C. (2003) *Ceratolejeunea. Flora Neotropica Monograph* 90: 1–86.
- Gottsche, C.M., Lindenberg, J.B.G. & Nees von Esenbeck, S.G. (1845) *Synopsis Hepaticarum, fasc. 3.* Meissner, Hamburg, pp. 305–464.
- Gottsche, C.M., Lindenberg, J.B.G. & Nees von Esenbeck, S.G. (1846) *Synopsis Hepaticarum, fasc. 4.* Meissner, Hamburg, pp. 465–624.
- Gradstein, S.R. (1994) Lejeuneaceae: Ptychantheae, Brachiolejeuneae. *Flora Neotropica Monograph* 62: 1–216.
- Gradstein, S.R. & Costa, D.P. (2003) The Liverworts and Hornworts of Brazil. *Memoirs of the New York Botanical Garden* 87: 1–317.
- Gray, S.F. (1821) *Natural Arrangement of British Plants. Vol. I.* London, 824 pp.
- He, X.-L. (1999) A monograph of the genus *Pycnolejeunea* (Lejeuneaceae, Hepaticae). *Acta Botanica Fennica* 163:

- Hedwig, J. (1784) *Theoria Generationis et Fructificationis Plantarum Cryptogamicarum, ed. 1*. Typis Academiae imper. scientiarum, Petropoli [St. Petersburg], 164 pp.
- Hell, K.G. (1969) Briofitas talosas dos arredores da cidade de São Paulo (Brasil). *Boletim da Universidade de São Paulo, Botanica* 25: 1–190.
- Jack, J.B. & Stephani, F. (1892) Hepaticae Wallisiana. *Hedwigia* 31: 11–27.
- Kruijt, R.C. & Gradstein, S.R. (1986) On *Brachiolejeunea phyllorhiza* (Nees) Kruijt & Gradstein comb. nov. *Nova Hedwigia* 43: 299–309.
- Kruijt, R.C. (1988) A monograph of the genera *Dicranolejeunea* and *Acanthocoleus*. *Bryophytorum Bibliotheca* 36: 1–135.
- Linnaeus, C. (1753) *Species Plantarum, ed. 1*. Impensis Laurentii Salvii, Holmiae [Stockholm], 1200 pp.
- Mizutani, M. (1981) Notes on the Lejeuneaceae. 5. Some Asiatic species of the genus *Ceratolejeunea*. *Journal of the Hattori Botanical Laboratory* 49: 305–318.
- Nees von Esenbeck, C.G. (1830) *Enumeratio plantarum cryptogamicarum Javae et insularum adiacentium, quas a Blumio et Reinwardtio collectas describi edique curavit Christ. Godfr. Nees ab Esenbeck professor vralislaviensis. Fasciculus prior, hepaticas complectens, ab editore illustratis*. Grass, Barth & Co., Breslau, 86 pp.
- Nees von Esenbeck, C.G. (1833) Hepaticae. In: Martius, C.F.P. von (Ed.), *Flora brasiliensis seu enumeratio plantarum, Vol. 1, Pars Prior*. J. G. Cotta, Stuttgart and Tübingen, pp. 294–390.
- Pearson, W.H. (1924) A collection of Hepaticae from Mount Elgon. *Arkiv för Botanik* 19(5): 1–16.
- Reinwardt, C.G.C., Blume, C.L. & Nees von Esenbeck, C.G. (1824 “1825”) Hepaticae Iavanicae, editae coniunctis studiis et opera. *Nova Acta Physico-medica Academiae Caesareae Leopoldino-Carolinae Naturae Curiosorum Exhibentia Ephemerides sive Observationes Historias et Experimenta* 12: 181–238.
- Schiffner, V. (1893) Hepaticae (Lebermoose). In: Schiffner, V. (Ed.), *Die Natürlichen Pflanzenfamilien, Teil. I, Abt. 3*. Engelmann, Leipzig, pp. 1–96.
- Schiffner, V. (1894) Revision der Gattungen *Bryopteris*, *Thysananthus*, *Ptychanthus* und *Phragmicoma*. *Hedwigia* 33: 170–189.
- Schiffner, V. (1898) *Conspectus Hepaticarum Archipelagi Indici*. Staatsdruckerei, Batavia, 382 pp.
- Schuster, R.M. (1971 “1970”) Studies on Hepaticae, XLIX–LIII. New Lejeuneaceae from Dominica and Jamaica. *Bulletin of the Torrey Botanical Club* 97: 336–352. <http://dx.doi.org/10.2307/2483854>
- Spruce, R. (1884) Hepaticae Amazonica et Andinae. *Transactions and Proceedings of the Botanical Society. Edinburgh* 15: 1–308.
- Söderström, L., Hagborg, A., Váña, J. & von Konrat, M. (2011) Land of wood and water: A checklist of liverworts and hornworts of Jamaica. *The Bryologist* 114: 67–91. <http://dx.doi.org/10.1639/0007-2745-114.1.67>
- Söderström, L., Hagborg, A. & von Konrat, M. (2012) Notes on Early Land Plants Today. *Phytotaxa* 65: 41–42.
- Stephani, F. (1890) Die Gattung *Lejeunea* im Herbarium Lindenberg. *Hedwigia* 29: 1–23.
- Stephani, F. (1899) Species Hepaticarum 1. *Bulletin de l'herbier Boissier* 7 (2): 727–764.
- Stephani, F. (1911) *Species Hepaticarum* 4. George & Cie, Genève & Bale, pp. 465–736.
- Stephani, F. (1912) *Species Hepaticarum* 5. George & Cie, Genève & Bale, pp. 1–176.
- Stephani, F. (1914) *Species Hepaticarum* 5. George & Cie, Genève & Bale, pp. 481–704.
- Swartz, O. (1788) *Nova Genera et Species Plantarum, seu Prodromus descriptionum vegetabilium maximum partem incognitorum quae sub itinere in Indiam occidentalem annis 1783–1787*. Uppsala, 152 pp.
- Swartz, O. (1806) *Flora Indiae Occidentalis, Tomus III: Musci Hepaticae*. J. Palmius, Erlangen, pp. 1842–1855.
- Trevisan de Saint-Léon, V.B.A. (1877) Schema di una nuova classificazione della Epatiche. *Memorie del Reale Istituto Lombardo di Scienze e Lettere, Serie 3, Classe de Scienze Matematiche e Naturali* 4: 383–451.
- von Flotow, J., Göppert, R. & Nees von Esenbeck, C.G. (1842) Ueber Páo Pereira und mehrere darauf wachsende kryptogamische Pflanzen. *Repertorium für die Pharmacie* 76: 32–55.
- Zhu, R.-L. & Gradstein, S.R. (2005) Monograph of *Lopholejeunea* (Spruce) Schiffn. (Lejeuneaceae, Hepaticae) in Asia. *Monographs in Systematic Botany from the Missouri Botanical Garden* 74: 1–98.