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Notes on Early Land Plants Today*. 81. Lectotypification of some names in *Frullania*

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Five names in *Frullania*, *F. convoluta* Lindenb. et Hampe, *F. herzogiana* Steph. 1911 (= *F. rio-janeirensis* (Raddi) Ångstr., syn. nov.), *F. herzogiana* Steph. 1916 (= *F. convoluta*), *F. convoluta* var. *ampliata* Herzog (= *F. convoluta*, syn. nov.) and *F. piliflora* var. *appendiculata* Herzog (= *F. peruviana* Gottsche, syn. nov.) are lectotypified.

Introduction

Early authors of plant names often noted only the origin of the plants they described, without specifying any type (holotype). They very often described the taxon from several gatherings or made duplicates and distributed to several herbaria. For all those names, unless it can be demonstrated that there exist only 'a single specimen conserved in one herbarium' (ICN2018 Art. 8.1; McNeill et al. 2018), a lectotype must be selected. After 1990 a holotype must be specified for a name to be validly published and the need to select any lectotypes for newer names do not exist unless it can be demonstrated that the selected holotype consists of several taxa.

Before 1 January 2001, the mention of a 'type' or 'holotype' citing a single gathering can be accepted as a lectotypification, but after that date a statement as 'lectotype here designated' or equivalent is required (ICN2018 Art. 7.11).

It can be difficult to trace all possible type material among the world's herbaria, and if the original publication does not state what the holotype is, it is best to lectotypify the name. If only one possible type is known to the typifying author, but it cannot be ruled out that there exist more material not traced, the 'best practice' recommended by McNeill (2014) should be followed and a statement like 'lectotype here designated, if not a holotype' would permanently attach the name to a single specimen, irrespective of if more possible type material will be found later or not. See also Renner (2021) for further discussion on typification.

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Uribe (2008) 'selected' a 'holotype' of *Frullania convoluta* Lindenb. et Hampe and mentioned several 'isotypes'. However, since Lindenberg and Hampe (in Hampe 1851) did not select any holotype and there exists type material in several herbaria, a lectotype must be chosen. Uribe's use of the term 'holotype' cannot be taken as an inadvertent lectotypification as it is after 2001. Thus, we here formally designate the specimen as a lectotype.

Herzog (1951) described *Frullania convoluta* var. *ampliata* Herzog from seven gatherings and *Frullania piliflora* Steph. var. *appendiculata* Herzog from two gatherings collected by P. C. Standley in Costa Rica. The taxa have never been mentioned since then and never formally lectotypified or synonymized. Material of the syntypes exists at least in JE and US and we here lectotypify the two names. We tentatively synonymize the two names with species in the *Frullania convoluta/peruviana* complex, although the whole complex needs further studies, preferably also molecular, to separate the taxa.

When Stephani described *Frullania herzogiana* Steph. (1911: 673) he only mentioned 'Bolivia, Rio blanco' as type locality. Later he described *Frullania herzogiana* Steph. (1916: 246) again mentioning a Herzog specimen 'Tablas, 3400 m, no. 2829' as the only specimen. Beauverd described *Frullania controversa* Beauv. in Stephani (1924: 549) basing his new species on 'F. *herzogiana* St. mss., non Sp. Hep. IV [1911] 673' giving 'Bolivia (Herzog legit)' as a possible type specimen. The latter has been taken as a new name for *Frullania herzogiana* Steph. (1916). None of those names seems to have been typified before. Uribe (2008) confused the two names and synonymized them with *Frullania convoluta* Steph. However, the earlier name is different and belongs to *Frullania rio-janeirensis* (Raddi) Ångstr. (S. R. Gradstein pers. comm.), which is a new synonym.

Formal treatment

***Frullania convoluta* Lindenb. et Hampe, Linnaea 24 (3): 303, 1851 [1852] (Hampe 1851)**

Original citation: 'Turialea in Costa Rica'.

Lectotype (here designated): Costa Rica, Turrialba, Oersted s.n., G00113901 (www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=238596&lang=en); isoelectotypes G00113902, BM728470, BM728471).

Note. The lectotype was annotated as type by Y. Yuzawa in 1986 and as holotype by J. Uribe in 2002.

= *Frullania controversa* Beauv., *Sp. Hepat. (Stephani)* 6: 549, 1924 (Stephani 1924), syn. fide Uribe (2008).

≡ *Frullania herzogiana* Steph., *Biblioth. Bot.* 87 (2): 246, 1916 (Stephani 1916), nom illeg. (ICN Art. 53.1; hom. illeg. [non Stephani 1911]).

Original citation: 'Tablas, 3400 m, No. 2829'.

Lectotype (here designated): Bolivia, Herzog 2829, G00069159 (www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=112211&lang=en). A specimen in Jena

(JE01000980; <http://herbarium.univie.ac.at/database/detail.php?ID=118307>) is probably an isoelectotype.

= *Frullania convoluta* Steph. var. *ampliata* Herzog, *Rev. Bryol. Lichénol.* 20 (1/2): 129, 1951 (Herzog 1951), syn. nov.

Original citation: 'Costa-rica: Prov. San José, La Palma, 1600 m, [Standley] no. 33014 und 33039; Prov. San José, Zurqui 2000–2500 m, on tree, [Standley] no. 48170; Prov. Heredia, Yerba buena, on tree, 2000 m, [Standley] no. 49844; Prov. Heredia, Cerros de Zurqui, 2000–2400 m, [Standley] no. 50457; Prov. Heredia, Cerro de las Lajas, 2000–2400 m, [Standley] no. 51458; Prov. Heredia, Cerro de las Caricias, 2000–2400 m, [Standley] no. 51986'.

Lectotype (here designated): Costa Rica, La Palma, Province de San José, altitude about 1600 m, 3 Feb 1924, P. C. Standley 33014 (JE04002308, <https://je.jacq.org/JE04002308>).

Note. Morales (1991) listed several syntypes under the species name without formally synonymizing them. Y. Yuzawa annotated the lectotype as 'type' in 1988 but seems never to have published it. The taxon is here tentatively synonymized with *Frullania convoluta* although it shows some characters pointing towards *Frullania peruviana*.

***Frullania rio-janeirensis* (Raddi) Ångstr. Öfvers. Kongl. Vetensk.-Akad. Förh. 33 (7): 88, 1876 (Ångström 1876)**

= *Frullania herzogiana* Steph., *Sp. Hepat. (Stephani)* 4: 673, 1911 (Stephani 1911), syn. nov.

Original citation: 'Bolivia, Rio blanco'.

Lectotype (here designated if not holotype): Bolivia, prov. Velasco, Urwald des Rio Blanco, ca 120 m, Aug 1907, Th. Herzog, Stephani herb no. 16637, G00067439 (www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=119006&lang=en).

Note. We are not aware of any more type material but cannot rule out that there is material elsewhere.

***Frullania peruviana* Gottsche, Syn. Hepat. 4: 465, 1846 (Gottsche et al. 1846)**

= *Frullania piliflora* Steph. var. *appendiculata* Herzog, *Rev. Bryol. Lichénol.* 20 (1/2): 129, 1951 (Herzog 1951), syn. nov.

Original citation: Costa Rica: south slope of volcan de Turrialba, near finca of V.d.T., 2000–2400 m, [Standley] no. 35088; Prov. San José, Las Nubes, wet bank, 1500–1900 m, [Standley] no. 38421.

Lectotype (here designated): Costa Rica, Cartago, southern slope of Volcan de Turrialba, near the Finca del Volcán de Turrialba, altitude about 2000–2400 m, 22 Feb 1924, P. C. Standley 35088 (JE04004146, <https://je.jacq.org/JE04004146>); isoelectotypes G00265605, www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=271882&lang=en; US04646508, <http://n2t.net/ark:/65665/m325a6ab95-d34c-48d5-b2ad-edba09876a05>).

Note. *Frullania piliflora* Steph. was synonymized with *Frullania peruviana* by Uribe (2008) but the variety has never been formally synonymized. The selected lectotype is rich with little admixture.

Data availability statement

There are no additional data for this paper.

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