

# A catalog of Bryophyta types deposited at the National Museum of Brazil

Paulo E.A.S. Câmara<sup>1,4</sup>, Micheline Carvalho-Silva<sup>1</sup>, Maria Sulamita Dias da Silva<sup>2</sup> and Denilson Fernandes Peralta<sup>3</sup>

Received: 10 April, 2014. Accepted: 7 May, 2014.

## ABSTRACT

While visiting the Herbarium of the Botany Department of the National Museum of the Federal University of Rio de Janeiro (code, R), we located the types of 219 bryophyte names, most of which were published by Karl Müller (cited as Müller Hallensis), whose holotypes were lost during the bombing of the Berlin Herbarium in 1943. A total of 181 names (82%) are possible candidates for lectotypification and most likely not to be found elsewhere. We also found the complete collection of Müller's "Bryologia Serrae Itatiaiae", made by Ernst Ule.

**Key words:** Brazil, Brotherus, Müller Hallensis, types, Ule

## Introduction

Good taxonomic practice relies largely on correct location and identification of type material. However, locating and studying type specimens can be complicated for several reasons. Type specimens are often distributed over several herbaria or lost due to wars or other events. An example is the loss of the Berlin Herbarium in 1943 (Merrill 1943).

Within the realm of bryology, one of the most prolific botanists in describing new species was Karl Johan August Müller (1818-1899), from Halle, Germany (cited as Müller Hallensis). During his active years, he described many new species, probably more than any other bryologist ever. As an example, Müller (1898) described 117 new species, most from a single mountain in Brazil (Serra do Itatiaia). Unfortunately, in 1943, the Berlin Herbarium (the repository of his collections) was bombed and destroyed by fire (Merrill 1943; Hiepko 1987), a catastrophe of major proportions for the field of botany. As a consequence, many types, including some that were on loan from other herbaria and all types of Müller names housed there (many from Brazil), were lost. Since then, locating possible duplicates in other herbaria has been a major challenge and a taxonomic impediment. Many taxonomic works often have to deal with lost Müller types (e.g., Pursell 2007; Reese 1993).

The Herbarium of the Botany Department of the National Museum of the Federal University of Rio de Janeiro (code, R) is the oldest herbarium in Brazil. It was created

in 1818, about the same time as when the first studies of the bryoflora of Brazil were undertaken (Martius 1818; Hooker 1818-1820; Raddi 1822). The Museum was created by King D. João VI of Portugal. For more than a century (until the 1960s), it housed the largest, and only, bryophyte collection in Brazil. It contains all relevant historical collections from Brazil, including many specimens from botanists such as Ernst Ule (1854-1915), Auguste Glaziou (1828-1906), Anders Regnell (1807-1818), Ludwig Riedel (1790-1861), and Per Dusén (1855-1926). Some of those early scientists were hired to work for the National Museum, including Ludwig Riedel, who was the first foreigner to have a permanent position at the Museum, Ernst Ule, who was the director of botany at the Museum, and Auguste Glaziou, who was the director of its public gardens. It currently houses a bryophyte collection of approximately 6015 specimens, including many types. Because the Museum underwent a long period of renovation, the collection was closed for many years. To our knowledge, no one has ever investigated the bryophyte types deposited there. Because it is now open to scientists, we were able to visit the Museum and examine the bryophyte collection. We found many types (mostly Müller Hallensis, as well as other relevant types), which we list here. It is very likely that some of the Müller Hallensis types found at the Museum are the only ones remaining after the 1943 destruction of the Berlin Herbarium and may be the best or even the only specimens available to serve as lectotypes.

<sup>1</sup> Universidade de Brasília, Departamento de Botânica. Campus Darcy Ribeiro, Brasília, DF. Brazil. 70910-900.

<sup>2</sup> Universidade do Estado do Rio de Janeiro, UERJ. Rua São Francisco Xavier, 524, PHLC, sala 224, Maracanã, Rio de Janeiro, RJ. Brazil. 20550-013.

<sup>3</sup> Instituto de Botânica de São Paulo. Av. Miguel Stefano, 3687, Água Funda, São Paulo, SP. Brazil. 04301-012.

<sup>4</sup> Author for correspondence: pcamara@unb.br

## Material and methods

We used the appropriate literature and the website of the Missouri Botanical Garden ([www.tropicos.org](http://www.tropicos.org)) to locate the protologues and compare them with the label data. Because we are not providing a taxonomic revision, no taxonomic considerations are made; we did not perform any lectotypifications, synonymizations, or combinations. Taxonomic comments are provided when needed. Basionyms are presented here in alphabetical order. Protologues are not cited verbatim.

As many of the collections housed at the Museum were made by Ernst Ule, it is important to note that his collections often have two numbers, one is his personal collection number and the other refers to the exsiccata number in his *Bryotheca Brasiliensis* (Brotherus 1899). In the present paper, we present his collection number, using his *Bryotheca Brasiliensis* only when necessary. Because Müller Hallensis holotypes were destroyed in Berlin in 1943 (Hiepko 1987, 1990), all of the Müller names found that have not yet been lectotypified are here considered isotypes or isosyntypes.

## Results and discussion

We found a total of 271 specimens, types of 219 names (some were duplicates), mostly of Müller Hallensis names, including the types of the genera *Cladastomum* Müll. Hal. and *Meiotheciopsis* Broth. Among those are 21 types of species endemic to Brazil. There was one holotype, as well as 130 isotypes, 99 isosyntypes (from 53 names), and 35 isolectotypes. A total of 181 names (82%) are possible candidates for lectotypification. In addition, 105 names (47%) have been already synonymized.

Some of the names presented here seem to have been ignored over the years, because they are mostly absent from the literature, no new combinations or synonymizations having been made. Because there have been few monographic studies of Brazilian mosses, the status of many of those names has yet to be investigated in taxonomic studies.

At the Museum, we also observed numerous original specimens of invalid or unpublished (*in sched.*) names, which are not presented here. We found the complete collection of Müller's "Bryologia Serrae Itatiaiae" (Müller 1898), made by Ernst Ule (1854-1915), German botanist and former Director of Botany at the Museum.

The numbers presented here may yet increase, because some dubious specimens are still under investigation. In addition, the liverworts (Marchantiophyta) have yet to be investigated.

## List of confirmed types found at R:

*Andreaea microphylla* Müll. Hal., Bull. Herb. Boissier 6: 19. 1898. — Type: Brazil, Itatiaia, Agulhas Negras, *E.Ule 1730* (isotype).

*Andreaea pulvinata* Müll. Hal. ex Beckett, Trans. & Proc. New Zealand Inst. 25: 293.40. 1893. — Type: New Zealand, Rockwood, Canterbury, *T.W.N. Beckett 359* (isolectotype, lectotype designated by Vitt (1980)).

*Andreaea spurioalpina* Müll. Hal., Bull. Herb. Boissier 6: 18. 1898. — Type: Brazil, Itatiaia, Agulhas Negras, *E.Ule 1100, 1729* (isosyntypes).

*Andreaea spurioalpina* var. *rubricalyx* Müll. Hal., Bull. Herb. Boissier 6: 18. 1898. — Type: Brazil, Itatiaia, *E.Ule 1727* (isotype).

*Andreaea squarrosofiliformis* Müll. Hal., Bull. Herb. Boissier 6: 19. 1898. — Type: Brazil, Itatiaia, *E.Ule 1728* (isotype).

*Aptychus lageniformis* Müll. Hal., Bull. Herb. Boissier 6: 122. 1898. — Type: Brazil, Minas Gerais, Serra Ouro Preto, *E.Ule 1477*; Brazil, Rio de Janeiro, Serra Itatiaia, *E.Ule 1885* (isosyntypes).

*Barbula capillipes* Broth., Hedwigia 34: 125. 1895. — Type: Brazil, Goyaz, próximo da cidade de Goyaz, *E.Ule 1547* (isotype).

*Bartramia declivium* Müll. Hal., Bull. Herb. Boissier 6: 46. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, *E. Ule 1818* (isosyntype).

*Bartramia faucium* Müll. Hal., Bull. Herb. Boissier 6: 47. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, *E. Ule 1821* (isotype).

*Bartramia pellucidirectis* Müll. Hal., Bull. Herb. Boissier 6: 48. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, *E. Ule 1816* (isosyntype).

*Bartramia rivalis* Müll. Hal., Bull. Herb. Boissier 6: 46. 1898. — Type: Brazil, Itatiaia, *E.Ule 1820* (isotype).

*Bartramia ulei* Müll. Hal., Bull. Herb. Boissier 6: 46. 1898. — Type: Brazil, Santa Catarina, Serra Geral, *E.Ule 36*; Rio de Janeiro, Itatiaia, *E.Ule 1819* (isosyntypes). Comments: The protologue cites two syntypes: *E.Ule 662* from Santa Catarina and *E.Ule 1819* from Itatiaia. Griffin III (1984) and TROPICOS lists as a syntype an *E.Ule 36*, from Santa Catarina; however, this number does not refer to Ernest Ule's collection number but rather the number of his "*Bryophytorum Bibliotheca*". There is no evidence that *E.Ule 36* would correspond to *E.Ule 662*. We would suggest in the future the lectotypification using *E.Ule 1819*, as it is clearly the type material.

*Brachymenium subcrinitum* Paris, Index Bryol. Suppl. 40. 1900 — Type: Brazil, Rio de Janeiro, Serra Itatiaia, *E.Ule 1776, 1777* (isosyntypes). Comments: On the label the name is *Bryum rugosum* Müll. Hal., Bull. Herb. Boissier 6: 30. 1898 an illegitimate name. The new name is *Brachymenium subcrinitum* Paris, with the same syntypes.

*Brachysteleum patens* Müll. Hal., Bull. Herb. Boissier 6: 108. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, *E.Ule 1829* (isotype).

*Brachythecium condensatissimum* Müll. Hal., Hedwigia 40: 75. 1901. — Type: Brazil, Minas Gerais, Paranaíba, *E.Ule 1604* (isotype).

- Brachythecium crinitirameum* Müll. Hal., Hedwigia 40: 75. 1901. — Type: Brazil, Minas Gerais, Ouro Preto, *E.Ule* 1475 (isotype).
- Brachythecium poadelphus* Müll. Hal., Hedwigia 40: 76. 1901. — Type: Brazil, Minas Gerais, Caraça, *E.Ule* 1473 (isotype).
- Brachythecium pseudosulphureum* Müll. Hal., Hedwigia 40:75. 1901. — Type: Brazil, Minas Gerais, Itabira, *E.Ule* 1476 (isotype).
- Braunia macrocalyx* Müll. Hal., Bull. Herb. Boissier 6: 110. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, *E.Ule* 1848, 1849; Agulhas Negras, *E.Ule* 1850, 1851 (isotypes).
- Braunia serrae* Müll. Hal., Bull. Herb. Boissier 6: 111. 1898. — Type: Brazil, Santa Catarina, Serra Geral, *E.Ule* s.n. (isotype).
- Braunia subincana* Broth., Bih. Kongl. Svenska Vetensk.-Akad. Handl. 26 Afd. 3(7): 37. 1900. — Type: Brazil, Rio Grande do Sul, Colonia Ijuhy, *Lindman* 214 (isotype).
- Bryum altopedunculatum* Müll. Hal., Gen. Musc. Frond. 239. 1900. — Type: Brazil, Santa Catarina, Tubarão, VIII-1889, *E.Ule* (*Bryotheca Brasiliensis* 26) (isotype).
- Bryum baenitzii* Müll. Hal., Flora 71: 417. 1888. — Type: Norway, Lyngenfjord, prox. Lyngseidet, *Baenitz* s.n. (isotype).
- Bryum crassicoatum* Müll. Hal., Bull. Herb. Boissier 6: 31. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, *E.Ule* 1775, 1336 (isotypes).
- Bryum duplicatum* Broth., Bih. Kongl. Svenska Vetensk.-Akad. Handl. 26 Afd. 3(7): 29. 1900. — Type: Brazil, Mato Grosso, Cupim, *Lindman* 401 (isotype).
- Bryum fabroniopsis* Müll. Hal., Hedwigia 34: 127. 1895. — Type: Brazil, Goiás (city of Goiás), *E.Ule* 1534 (isotype).
- Bryum grammocarpum* Müll. Hal., Bull. Herb. Boissier 6: 32. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, *E.Ule* 352 (isotype).
- Bryum riparioides* E.B. Bartram, J. Wash. Acad. Sci. 42(6): 180. 1952. — Type: Brazil, Rio Grande do Sul, Vila Oliva, São Francisco de Paula, *Sehnem* 2739 (isotype).
- Bryum superpensum* Müll. Hal., Bull. Herb. Boissier 6: 33. 1898. — Type: Brazil, Rio de Janeiro, Serra Itatiaia, *E.Ule* 1770 (isotype).
- Calymperes uleanum* Broth., Hedwigia 34: 123. 1895. — Type: Brazil, Goyaz, *E.Ule* 1556 (isotype).
- Campylopus sehnemii* E.B. Bartram., J. Wash. Acad. Sci. 42(6): 179. 1952. — Type: Brazil, Rio Grande do Sul, Montenegro, campestre, *Sehnem* 2310 (isotype).
- Catharinea rio-grandensis* Broth., Bih. Kongl. Svenska Vetensk.-Akad. Handl. 26 Afd. 3(7): 32. 1900. — Type: Brazil, Rio Grande do Sul, Silveira Martins, *Lindman* 210 (isotype).
- Cladostomum ulei* Müll. Hal., Bull. Herb. Boissier 6: 21. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, 1894, *E.Ule* 1902 (isotype). Comments: The type specimen of this species is *Ule* 1902, not *Bryotheca Brasiliensis* 201, as cited in TROPICOS.
- Conomitrium generalium* Müll. Hal., Hedwigia 39: 240. 1900. — Type: Brazil, Minas Gerais, Itacolumitica, *E.Ule* 1278 (isotype).
- Conomitrium minutipes* Müll. Hal., Hedwigia 39: 242. 1900. — Type: Brazil, Minas Gerais, Itacolumy, *E.Ule* 1271 (isotype).
- Conomitrium perpygmaeum* Müll. Hal., Hedwigia 39: 243. 1900. — Type: Brazil, Rio de Janeiro, *E.Ule* 1625 (isotype).
- Conomitrium trichopodium* Müll. Hal., Hedwigia 39: 243. 1900. — Type: Brazil, Rio de Janeiro, aqueduct de Corcovado, *E.Ule* 1626 (isoelectotype, lectotype designated by Pursell (2007)). Rio de Janeiro, Corcovado aqueduct, *E.Ule* 1628 (isotype).
- Cryphaea leptopteris* Müll. Hal., Hedwigia 40: 78. 1901. — Type: Brazil, Santa Catarina, Serra Geral, Serra do Oratorio, *E.Ule* s.n. (*Bryotheca Brasiliensis* 71) (isotype). Comments: This specimen lacks a *Ule* collection number (only his *Bryotheca Brasiliensis* number), the protologue cites *E.Ule* 649, but all other data on the label matches, including Müller's handwriting.
- Cupressina anacamptopteris* Müll. Hal., Bull. Herb. Boissier 6: 123. 1898. — Type: Brazil, Serra de Itatiaia, *E.Ule* 1882 (isotype).
- Cupressina campaniformis* Müll. Hal. Hedwigia 40: 72. 1901. — Type: Brazil, Serra dos Órgãos, *E.Ule* 1262, 1263; Caraça, *E.Ule* 1474 (isotypes).
- Cupressina producta* Müll. Hal., Bull. Herb. Boissier 6: 122. 1898. — Type: Brazil, Serra Itatiaia, *E.Ule* 1881 (isotype).
- Daltonia uleana* Müll. Hal., Bull. Herb. Boissier 6: 111. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, *E.Ule* 1868 (isotype).
- Dicranum araucarieti* Müll. Hal., Hedwigia 40: 254. 1901. — Type: Brazil, Santa Catarina, Serra Geral, *E.Ule* s.n. (*Bryotheca brasiliensis* 51) (isotype). Comments: This specimen lacks *E.Ule* collection number (only his *Bryotheca Brasiliensis* number), the protologue cites *E.Ule* 661, but all other data on label matches, including Müller's handwriting.
- Dicranum brasiliense* Müll. Hal., Bull. Herb. Boissier 6: 39. 1898. — Type: Brazil, Rio de Janeiro, Itatiaia, *E.Ule* 1906 (isoelectotype, lectotype designated by Frahm (1991)). Comments: Tropicos lists the protologue as published in Bull. Herb. Boissier 6: 32.1898, when it is actually in Bull. Herb. Boissier 6: 39. 1898.
- Dicranum campiadelphus* Müll. Hal., Hedwigia 39: 252. 1900. — Type: Brazil, Minas Gerais, Serra do Caraça, *E.Ule* 1354; Minas Gerais, Ouro Preto, *E.Ule* 1355 (isotypes).
- Dicranum crispatum* Müll. Hal., Bull. Herb. Boissier 6: 36. 1898. — Type: Brazil, Itatiaia, *E.Ule* 1799 (isoelectotype, lectotype designated by Frahm (1991)); *E.Ule* 1800 (isotype).

- Dicranum dicnemoides* Müll. Hal., Bull. Herb. Boissier 6: 36. 1898. — Type: Brazil, Itatiaia, *E.Ule 1788* (isolectotype, lectotype designated by Frahm 1991).
- Dicranum dichrostis* Müll. Hal., Hedwigia 39: 255. 1900. — Type: Brazil, Minas Gerais, Ouro Preto, *E.Ule 1359* (isolectotype, lectotype designated by Frahm 1991).
- Dicranum filicaudadum* Müll. Hal., Hedwigia 39: 260. 1900. — Type: Brazil, Minas Gerais, Serra de Ouro Preto, *E.Ule 1367* (isolectotype, lectotype designated by Frahm 1991).
- Dicranum flaccidus* Müll. Hal., Hedwigia 39: 251. 1900. — Type: Brazil, Minas Gerais, Serra de Ouro Preto, *E.Ule 1362* (isotype).
- Dicranum gastro-alare* Müll. Hal., Hedwigia 39: 256. 1900. — Type: Brazil, Minas Gerais, Serra de Caraça, *E.Ule 1361* (isolectotype, lectotype designated by Frahm 1991).
- Dicranum gemmatum* Müll. Hal., Bull. Herb. Boissier 6: 34. 1898. — Type: Brazil, Serra Itatiaia, *E.Ule 1789* (isolectotype, lectotype designated by Frahm 1991).
- Dicranum laxobasis* Müll. Hal., Hedwigia 39: 252. 1900. — Type: Brazil, Minas Gerais, Caraça, *E.Ule 1353* (isolectotype, lectotype designated by Frahm 1991).
- Dicranum microjulaceum* Müll. Hal., Bull. Herb. Boissier 6: 37. 1898. — Type: Brazil, Serra do Itatiaia, *E.Ule 1796* (isotype).
- Dicranum pleurocarpum* Müll. Hal., Bull. Herb. Boissier 6: 35. 1898. — Type: Brazil, Itatiaia, *E.Ule 1798* (isolectotype, lectotype designated by Frahm 1991).
- Dicranum pseudobrachymitrium* Müll. Hal., Hedwigia 39: 249. 1900. — Type: Brazil, Minas Gerais, Itatiaia, *E.Ule 1803* (isolectotype, lectotype designated by Frahm 1991).
- Dicranum stricticaule* Müll. Hal., Bull. Herb. Boissier 6: 38. 1898. — Type: Brazil, Rio de Janeiro, Itatiaia, *E.Ule 1795* (isolectotype, lectotype designated by Frahm 1991).
- Dicranum strictisetum* Müll. Hal., Hedwigia, 36: 253. 1897. — Type: Brazil, Minas Gerais, Caraça, *E.Ule 1357* (isolectotype, lectotype designated by Frahm 1991).
- Dicranum subpenicillatum* Müll. Hal., Hedwigia, 39: 257. 1897. — Type: Brazil, Minas Gerais, Caraça, *E.Ule 1365* (isosyntype).
- Dicranum trachynotum* Müll. Hal., Bull. Herb. Boissier 6: 33. 1898. — Type: Brazil, Itatiaia, *E.Ule 1801* (isotype).
- Dicranum ventri-alare* Müll. Hal., Hedwigia 39: 251. 1900. — Type: Brazil, Minas Gerais, Serra Ouro Preto, *E.Ule 1347* (isolectotype, lectotype designated by Frahm 1991).
- Diphyscium ulei* Müll. Hal., Hedwigia, 36: 334. 1897. — Type: Brazil, Serra dos Órgãos, *E.Ule 1237* (isosyntype). Comments: The protologue does not cite any collection numbers (TROPICOS lists a syntype *Ule 228*). As the date and locality matches we considered it a type.
- Dissodon arenarius* Müll. Hal., Bull. Herb. Boissier 6: 24. 1898. — Type: Brazil, Minas Gerais, Caraça, *E.Ule 1398* (isotype).
- Entodon polysetus* Müll. Hal., Bull. Herb. Boissier 6: 118. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, 2000 m, *E.Ule 1870, 1869* (isosyntypes).
- Entosthodon oligophyllus* Müll. Hal., Bull. Herb. Boissier 6: 24. 1898. — Type: Brazil, Serra Itatiaia, *E.Ule 1904* (isotype).
- Entosthodon ouropretense* Paris, Index Bryol. (ed. 2), 2: 145. 1904. — Type: Brazil, Minas Gerais, Ouro Preto, *E.Ule 1310* (isotype). Comments: On the label the name is *Entosthodon obtusifolius* Müll. Hal., Hedwigia 39: 245. 1900, an illegitimate name, so *Entosthodon ouropretense* Paris is a new name but holds the same type.
- Ephemerum grandifolium* Müll. Hal., Bull. Herb. Boissier 6: 20. 1898. — Type: Brazil, Santa Catarina, Tubarão, *Ule Bryotheca Brasiliensis 9* (probably isosyntype). Comments: The material in R matches the date and locality, but lacks collector number.
- Ephemerum lacustre* Müll. Hal., Hedwigia 34: 117. 1895. — Type: Brazil, Goyaz, Tocantins river, *E.Ule 1500, 1501* (isosyntypes).
- Ephemerum pachyneuron* Müll. Hal., Bull. Herb. Boissier 6: 20. 1898. — Type: Brazil, Itatiaia, *E.Ule 1901* (isotype).
- Fissidens antennidens* Müll. Hal. ex Broth., Ergebn Bot. Exped. Südbras. 1901 273. 1924. — Type: Brazil, Santa Catarina, Tubarão, *E.Ule 44* (isolectotype, lectotype designated by Pursell 1994).
- Fissidens araucarieti* Müll. Hal., Bull. Herb. Boissier 6 (2): 23. 1898. — Type: Brazil, num ribeiro da Serra do Itatiaia, *E.Ule 1731* (isosyntype).
- Fissidens constrictus* Müll. Hal., Bull. Herb. Boissier 6: 23. 1898. — Type: Brazil, Rio de Janeiro, Serra Itatiaia, *E.Ule 1733* (isolectotype, lectotype designated by Pursell 1994).
- Fissidens evanescens* Broth. Hedwigia 34: 120. 1895. — Type: Brazil, Goyaz, *E.Ule 1508* (isolectotype, lectotype designated by Pursell (1994)); *E.Ule 1515, 1514, 1512, 1509* (isosyntypes).
- Fissidens faucium* Müll. Hal., Bull. Herb. Boissier 6: 23. 1898. — Type: Brazil, Rio de Janeiro, Serra Itatiaia, *E.Ule 1734* (isolectotype, lectotype designated by Pursell (1994)), *1732, 1735* (isosyntypes).
- Fissidens goyazensis* Broth., Hedwigia 34: 120. 1895. — Type: Brazil, Goyaz, *E.Ule 1510* (isosyntype).
- Fissidens hemibryoides* Müll. Hal., Hedwigia 39: 238. 1900. — Type: Brazil, Rio de Janeiro, Serra dos Órgãos 1225 (isolectotype, lectotype designated by Pursell (1994)); Minas Gerais, Ouro Preto, *E.Ule 1273*; Rio de Janeiro, Tijuca, *E.Ule 1624, Corcovado, E.Ule 1622* (isosyntypes).
- Fissidens malmei* Broth., Bih. Kongl. Svenska Ventensk.-Akad. Handl. 26, Afd. III(7): 13. 1900. — Type: Brazil, Rio Grande do Sul, Porto Alegre, *Lindman 44* (isotype).
- Fissidens mattogrossensis* Broth., Bih. Kongl. Svenska Ventensk.-Akad. Handl. 26, Afd. III(7): 14. 1900. — Type: Brazil, Mato Grosso, Cuyaba, Coxipó, *Lindman 351* (isotype).
- Fissidens opacus* Müll. Hal., Hedwigia 39: 240. 1900. — Type: Brazil, Rio de Janeiro, *E.Ule 1621* (isolectotype, lectotype designated by Pursell (1994)).

- Fissidens rufinervis* Müll. Hal., Hedwigia 39: 240. 1900. — Type: Brazil, Rio de Janeiro, Morro Dois Irmãos, *E.Ule* 1629 (isosyntype).
- Fissidens schwackeanus* Broth., Hedwigia 34: 119. 1895. — Type: Brazil, Minas Gerais, perto de Uberaba, *E.Ule* 1504 (isotype).
- Fissidens schwackeanus* var. *terrestris* Broth., Hedwigia 34: 119. 1895. — Type: Brazil, Goyaz, Mossamedes, *E.Ule* 1513 (isotype).
- Fissidens spuriolimbatus* Broth., Hedwigia 34: 121. 1895. — Type: Brazil, Mossamedes, *E.Ule* 1518 (isolectotype, lectotype designated by Pursell (2007)); *E.Ule* 1522 (isosyntype).
- Fissidens subnutans* Müll. Hal., Hedwigia 39: 239. 1900. — Type: Brazil, Rio de Janeiro, Mte. Corcovado, *E.Ule* 1623 (isotype).
- Fissidens subradicans* Broth., Hedwigia 34: 121. 1895. — Type: Brazil, Goyaz, *E.Ule* 1506 (isolectotype, lectotype designated by Pursell (1994)); Goyaz, Mossamedes, *E.Ule* 1505 (isosyntype). Comments: Tropicos.org presents the mistaken *opus princeps*: Hedwigia 35: 121. 1896.
- Garovaglia ulei* Müll. Hal., Hedwigia 34: 128. 1895. — Type: Brazil, Goiás, Mossamedes, *E.Ule* 1620 (isotype).
- Grimmia itaitiaiae* Müll. Hal., Bulletin de l'Herbier Boissier 6: 109. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itaitiaia, *E.Ule* 1830 (isolectotype, lectotype designated by Muñoz (1998)).
- Haplocladium flavinerve* Müll. Hal., Hedwigia 40: 82. 1901. — Type: Brazil, Goyaz, Lagoa Feia, *E.Ule* 1597 (isotype).
- Harrisonia appendiculatum* Müll. Hal., Oesterr. Bot. Z. 47: 396. 1897. — Type: Brazil, Itaitiaia, *E.Ule* 1854, 1856, 1857, 1858, 1859 (isosyntypes).
- Harrisonia fontinaloides* Müll. Hal., Oesterr. Bot. Z. 47: 389. 1897. — Type: Brazil, Serra do Órgãos, *E.Ule* 1251 (isosyntype).
- Harrisonia fontinaloides* var. *condensata* Müll. Hal., Oesterr. Bot. Z. 47: 390. 1897. — Type: Brazil, Itaitiaia, Agulhas Negras, *E.Ule* 1464 (isosyntype).
- Harrisonia fontinaloides* var. *viridis* Müll. Hal., Oesterr. Bot. Z. 47: 390. 1897. — Type: Brazil, Serra de Itaitiaia, *E.Ule* 1889 (isosyntype).
- Harrisonia pallidipila* Müll. Hal., Oesterr. Bot. Z. 47: 393. 1897. — Type: Brazil, Minas Gerais, Serra do Caraça, *E.Ule* 1462, 1463 (isosyntypes).
- Harrisonia rivularis* Müll. Hal., Oesterr. Bot. Z. 47: 390. 1897. — Type: Brazil, Itaitiaia, *E.Ule* 1871 (isotype).
- Harrisonia rubiginosa* Müll. Hal., Oesterr. Bot. Z. 47: 393. 1897. — Type: Brazil, Itaitiaia, *E.Ule* 1855 (isotype).
- Holomitrium seticalyx* Müll. Hal., Bull. Herb. Boissier 6: 40. 1898. — Type: Brazil, Itaitiaia, *E.Ule* 1779, 1780 (isosyntypes). Comments: The correct publication page is 40 not 41 as listed in TROPICOS.
- Hookeria caudifrons* Müll. Hal., Hedwigia 39: 281. 1900. — Type: Brazil, Minas Gerais, Itacolomy, *E.Ule* 1471, 1469 (isosyntypes). Comments: The specimen *Ule* 1471 has the name *Hookeria leucolomoides* (Nom. Nud.) written on its label.
- Hookeria daltoniaecarpa* Müll. Hal., Bull. Herb. Boissier 6: 112. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itaitiaia, *E.Ule* 1866 (isotype).
- Hookeria glaucifolia* Müll. Hal., Bull. Herb. Boissier 6: 112. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itaitiaia, *E.Ule* 1864 (isotype).
- Hookeria latifrondea* Müll. Hal., Hedwigia 39: 279. 1900. — Type: Brazil, Minas Gerais, Serra de Ouro Preto, *E.Ule* 1472 (isotype).
- Hookeria perfulva* Müll. Hal., Hedwigia 39: 281. 1900. — Type: Brazil, Minas Gerais, Serra de Ouro Preto, *E.Ule* 1495 (isotype).
- Hookeria regnelliana* Müll. Hal., Hedwigia 39: 279. 1900. — Type: Brazil, Minas Gerais, região do Paranahyba, *E.Ule* 1590 (isotype).
- Hookeria tijucae* Müll. Hal., Hedwigia 39: 283. 1900. — Type: Brazil, Rio de Janeiro, Tijuca, *E.Ule* 1704 (isotype).
- Lepidopilum caudicaule* Müll. Hal., Hedwigia 39: 272. 1900. — Type: Brazil, Rio de Janeiro, Serra do Itaitiaia, *E.Ule* 1249 (isotype).
- Leptotrichum itaitiaiae* Müll. Hal., Bull. Herb. Boissier 6: 41. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itaitiaia, *E.Ule* 1809, 1810 (isosyntypes).
- Leptotrichum liliputanum* Müll. Hal., Bull. Herb. Boissier 6: 42. 1898. — Type: Brazil, Serra Itaitiaia, *E.Ule* 1808 (isotype).
- Leucobryum clavatum* var. *brevifolium* Broth., Ergeb. Bot. Exped. Südbras., Musci 277. 1924. — Type: Brazil, Rio de Janeiro, Tijuca, *E.Ule* 1630 (isosyntype).
- Leucobryum goyazense* Broth., Hedwigia 34: 118. 1895. — Type: Brazil, Goyaz, Serra Dourada, *E.Ule* 1524 (isotype).
- Macromitrium adnatum* Müll. Hal., Bull. Herb. Boissier 6(2): 96. 1898. — Type: Brazil, Goiás, Serra Dourada, *E. Ule* 1558 (isotype).
- Macromitrium brotheri* Müll. Hal., Bull. Herb. Boissier 6(2): 97. 1898. — Type: Brazil, Goiás, *E.Ule* 661; Mossamedes, *E.Ule* 658; Goiás, Serra Dourada, *E. Ule* 1559/656 (isosyntypes).
- Macromitrium chrysomitrium* Müll. Hal., Bull. Herb. Boissier 6: 101. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itaitiaia, *E.Ule* 1836 (isotype).
- Macromitrium diversifolium* Broth., Hedwigia 34: 126. 1895. — Type: Brazil, Goiás, Corumbá de Goiás, *E. Ule* 1562 (isotype).
- Macromitrium eriomitrium* Müll. Hal., Bull. Herb. Boissier 6(2): 98. 1898. — Type: Brazil, Serra Itaitiaia, *E. Ule* 1834 (isotype).
- Macromitrium lampromitrium* Müll. Hal., Bull. Herb. Boissier 6: 101. 1898. — Type: Brazil, Rio de Janeiro, *E.Ule* 1837 (isotype).
- Macromitrium podocarpi* Müll. Hal. var. *falcifolium* Müll. Hal., Bull. Herb. Boissier 6(2): 96. 1898. — Type: Brazil, Minas Gerais, Caraça, *E. Ule* 1408 (isotype).

- Macromitrium subpycnangium* Müll. Hal., Bull. Herb. Boissier 6: 100. 1898. — Type: Brazil, Rio de Janeiro, Tijuca, XII-1893, *E.Ule* 1671 (isotype).
- Macromitrium substrictifolium* Müll. Hal., Bull. Herb. Boissier 6: 98. 1898. — Type: Brazil, Rio de Janeiro, Tijuca, *E.Ule* 1672 (isotype).
- Macromitrium undatum* Müll. Hal., Bull. Herb. Boissier 6: 97. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, *E.Ule* 1832 (isotype).
- Meteorium serricolum* Müll. Hal., Bull. Herb. Boissier 6: 116. 1898. — Type: Brazil, Minas Gerais, Serra do Ouro Preto, *E.Ule* 1453; Minas Gerais, Serra do Itacolomy, *E.Ule* 1454; Rio de Janeiro, Serra do Itatiaia, *E.Ule* 1845 (isosyntypes).
- Mielichhoferia grammocarpa* Müll. Hal., Bull. Herb. Boissier 6: 27. 1898. — Type: Brazil, Itatiaia, *E.Ule* 1774 (isotype).
- Mnium acuminatissimum* Müll. Hal., Hedwigia 39: 248. 1900. — Type: Brazil, Rio de Janeiro, Tijuca, *E.Ule* 1644 (isotype).
- Mnium rhynchomitrium* Müll. Hal., Hedwigia 39: 247. 1900. — Type: Brazil, Rio de Janeiro, Corcovado, *E.Ule* 1639, 1640; Minas Gerais, Caraça, *E.Ule* 1312; Minas Gerais, Ouro Preto, *E.Ule* 1311 (isosyntypes).
- Moenkemeyera abrupta* Broth., Bih. Kongl. Svenska Vetensk.-Akad. Handl. 26 Afd. 3(7): 14. 1900. — Type: Paraguay. Santo Antonio, colonia “Elisa” ad arbores, *Lindman* 221 (isotype).
- Moenkemeyera alomifolia* Müll. Hal., Hedwigia 39: 236. 1900. — Type: Brazil, Minas Gerais, Serra do Itacolomy, *E. Ule s.n.* (isotype).
- Neckera araucarieti* Müll. Hal., Bull. Herb. Boissier 6: 115. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, *E.Ule* 1847 (isosyntype).
- Octoblepharum perforatum* Müll. Hal., Hedwigia 34: 119. 1895. — Type: Brazil, Goyaz, Corumba, *E.Ule* 1546 (isotype).
- Octoblepharum raphidostegium* Müll. Hal. in Brotherus, Hedwigia 34: 119. 1895. — Type: Brazil, Goiás, Serra dos Pirineus, *E. Ule* 1525 (isotype).
- Octoblepharum rupestre* Müll. Hal. ex Broth., Ergebn. Bot. Exped. Südbras., 1901. 279. 1924. — Type: Brazil, Minas Gerais, Ouro Preto, *E.Ule* 1392 (isotype).
- Orthodontium arenarium* Müll. Hal., Bull. Herb. Boissier 6: 29. 1898. — Type: Brazil, Minas Gerais, Caraça, *E.Ule* 1399 (isotype).
- Orthostichella subtenuis* Müll. Hal., Hedwigia 40: 88. 1901. — Type: Brazil, Rio de Janeiro, Corcovado, *E.Ule* 1255 (isosyntype).
- Orthotrichum araucarieti* Müll. Hal. ex Broth., Denkschr., Akad. Wiss. Wien Math. Nat. Kl. 83: 287. 1924. — Type: Brazil, Santa Catarina, Serra Geral, 1890, *E.Ule Bryotheca Brasiliensis* 20 (isolectotype, lectotype designated by Lewinsky (1987)).
- Papillaria bipinnata* Müll. Hal., Bull. Herb. Boissier 6: 117. 1898. — Type: Brazil, Serra de Itatiaia, *E. Ule* 1843 (isotype).
- Papillaria capillicuspis* Müll. Hal., Hedwigia 40: 96. 1901. — Type: Brazil, Rio de Janeiro, Corcovado, *E.Ule* 1686 (isotype).
- Papillaria rutenbergiacea* Müll. Hal., Hedwigia 40: 90. 1901. — Type: Brazil, Rio de Janeiro, Tijuca, *E.Ule* 1697 (isotype).
- Papillaria viridata* Müll. Hal. ex Broth., Bih. K. Svenska Vetensk. Akad. Handl. 26, 3(7): 42. 1900. — Type: Paraguay, ad truncos arborum silvae montis Santo Thomas, *C.A.M. Lindman* 256 (isotype).
- Philophyllum bromeliae* Müll. Hal., Bull. Herb. Boissier 6: 123. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, *E.Ule* 1860 (isolectotype, lectotype designated by Buck (1992)).
- Physcomitrium capillipes* Müll. Hal. ex Broth. Hedwigia 34: 127. 1895. — Type: Brazil, Goyaz, rio Paranahyba, *E.Ule* 1532 (isotype).
- Physcomitrium falcifolium* Müll. Hal. ex Broth. Hedwigia 34: 127. 1895. — Type: Brazil, Goyaz, Lagoa Feia, *E.Ule* 1531 (isotype).
- Physcomitrium lindmannii* Broth., Bih. Kongl. Svenska Vetensk.-Akad. Handl. 26 Afd. 3(7): 26. 1900. — Type: Brazil, Rio Grande do Sul, Porto Alegre, *Lindman* 45 (isotype).
- Plagiothecium lepidopiladelphus* Müll. Hal., Bull. Herb. Boissier 6: 119. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, *E.Ule* 1862 (isolectotypes, lectotype designated by Buck & Ireland (1989)); Rio de Janeiro, Serra do Itatiaia, *E.Ule* 1861 (isosyntype).
- Plagiothecium meteoriaceum* Müll. Hal., Bull. Herb. Boissier 6: 120. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, *E.Ule* 1884 (isotype).
- Polytrichum itatiaiae* Müll. Hal., Bull. Herb. Boissier 6: 25. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, *E.Ule* 1764 (isotype).
- Porotrichum minutistolo* Müll. Hal., Bull. Herb. Boissier 6: 114. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, *E.Ule* 1886 (isotype). Comments: This specimen (*Ule* 1886) is also cited as type of *Porotrichum capillistolo* Müll.Hal. Bull. Herb. Boissier 6:113.1898. No plant bearing this name was found in R.
- Porotrichum olidum* Müll. Hall., Bull. Herb. Boissier 6: 114. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, *E.Ule* 1914 (isotype).
- Porotrichum suspectum* Müll. Hal., Hedwigia 39: 287. 1900. — Type: Brazil, Rio de Janeiro, Corcovado, *E.Ule* 1698 (isotype).
- Psilopilum ulei* Broth ex Müll. Hal., Bull. Herb. Boissier 6: 119. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, *E.Ule* 1905 (isotype).
- Pterobryon subangustifolium* Müll. Hal., Bull. Herb. Boissier 6: 114. 1898. — Type: Brazil, Rio de Janeiro, Tijuca, *E.Ule* 1703 (isotype).
- Ptychomnion fruticetorum* Müll. Hal., Bull. Herb. Boissier 6: 126. 1898. — Type: Brazil, Rio de Janeiro, Serra Itatiaia, *E.Ule* 1915 (isosyntype).

- Pungentella spuriopatens* Müll. Hal., Hedwigia 40: 74. 1901. — Type: Brazil, Rio de Janeiro, Pico do Papagaio, *E.Ule 1709* (isotype).
- Raphidostegium panduraefolium* Broth., Bih. Kongl. Svenska Vetensk.-Akad. Handl. 26 afd. 3(7): 44. 1900. — Type: Brazil, Rio Grande do Sul, *Lindman 200* (isotype).
- Rhynchostegium microthamnioides* Müll. Hal., Bull. Herb. Boissier 6: 124. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, *E.Ule 1879* (isotype).
- Schlotheimia gracilescens* Broth., Bih. K. Svensk. Vetensk.-Akad. Handl. 26, 3(7): 23--24. 1900. — Type: Brazil, Rio Grande do Sul, São Leopoldo, Hamburger, C.A. *Lindman 107* (isotype).
- Schlotheimia grammocarpa* Müll. Hal., Bull. Herb. Boissier 6(2): 102--103. 1898. — Type: Brazil, Rio de Janeiro, Serra Itatiaia, *E. Ule 1839* (isotype).
- Schlotheimia horridula* Müll. Hal., Bull. Herb. Boissier 6(2): 105-106. 1898. — Type: Brazil, Minas Gerais, Caraça, *E. Ule 1422* (isotype).
- Schlotheimia macrospora* Müll. Hal., Bull. Herb. Boissier 6: 103. 1898. — Type: Brazil, Minas Gerais, Itabira do Campo, *E.Ule 1424, 1423, 1416*; Caraça, *E.Ule 1421*; Ouro Preto, *E.Ule 1419* (isosyntypes).
- Schlotheimia pseudoaffinis* Müll. Hal., Bull. Herb. Boissier 6(2): 104. 1898. — Type: Brazil, Serra Itatiaia, *E. Ule 1833* (isotype).
- Schlotheimia robusticuspis* Müll. Hal., Bull. Herb. Boissier 6(2): 106--107. 1898. — Type: Brazil, Minas Gerais, Serra Itatiaia, *E. Ule 1417, 1840* (isosyntypes).
- Seligeria itatiaiae* Müll. Hal., Bull. Herb. Boissier 6: 45. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, *E.Ule 1807* (isotype).
- Sematophyllum cataractae* W.R. Buck, Brittonia 35: 328. 1983. — Type: Brazil, Santa Catarina, Serra Geral, *E.Ule 92* (isotype).
- Sigmatella leptosquarrosa* Müll. Hal., Hedwigia 34: 129. 1895. — Type: Brazil, Goyaz, Mossamedes, *E.Ule 1613, 1614* (isosyntypes).
- Sigmatella olida* Müll. Hal., Hedwigia 40: 69. 1901. — Type: Brazil, Rio de Janeiro, Dois Irmãos, *E.Ule 1723* (isotype).
- Sphagnum carneum* Müll. Hal. & Warnst., Hedwigia 36: 145. 1897. — Type: Brazil, Minas Gerais, Ouro Preto, *E. Ule 1289* (isosyntype).
- Sphagnum densum* Müll. Hal. & Warnst., Hedwigia 36: 147. 1897. — Type: Brazil, nos rochedos da Serra de Itatiaia, *E.Ule 1743* (isotype).
- Sphagnum ellipticum* Müll. Hal. & Warnst., Hedwigia 36: 165. 1897. — Type: Brazil, em rochedos da Serra do Itatiaia, *E.Ule 1752* (isotype).
- Sphagnum itacolumites* Müll. Hal., Hedwigia 36: 172. 1897. — Type: Brazil, Minas Gerais, Itacolomi, *E.Ule 1302* (isotype).
- Sphagnum itatiaiae* Müll. Hal., Hedwigia 36: 146. 1897. — Type: Brazil, Serra Itatiaia, *E.Ule 1742*; Agulhas Negras, Serra Itatiaia, *E.Ule 1741* (isosyntypes).
- Sphagnum laceratum* Müll. Hal., Hedwigia 36: 149. 1897. — Type: Brazil, Minas Gerais, Serra do Caraca, *E.Ule 1294* (isotype).
- Sphagnum lindmanii* Warnst., Bot. Centralbl. 76: 418. 1899. — Type: Paraguay, Villa Rica, *Lindman 263* (isosyntype).
- Sphagnum longistolo* Müll. Hal., Hedwigia 36: 169. 1897. — Type: Brazil, em lugares humidios, Serra dos Órgãos, *E.Ule 1227* (isotype).
- Sphagnum minutulum* Müll. Hal., Hedwigia 36: 166. 1897. — Type: Brazil, em pantanos da Serra Itatiaia, *E.Ule 1749* (isotype).
- Sphagnum mirabile* Müll. Hal., Hedwigia 36: 161. 1897. — Type: Brazil, Minas Gerais, Caraca, *E.Ule 1287* (isotype).
- Sphagnum ouropretense* Müll. Hal. & Warnst., Hedwigia 36: 172. 1897. — Type: Brazil, Minas Gerais, Ouro Preto, *E.Ule 1288* (isotype).
- Sphagnum oxyphyllum* var. *nanum* Müll. Hal. & Warnst., Hedwigia 36: 150. 1897. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, *E.Ule 1744, 1903* (isosyntypes).
- Sphagnum paranae* Warnst., Allg. Bot. Z. Syst. 11: 97. 1905. — Type: Brazil, Parana, Porto D. Pedro II, *Dusén 4402* (isotype).
- Sphagnum pseudoacutifolium* Müll. Hal. & Warnst., Hedwigia 36: 148. 1897. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, *E.Ule 1745* (isotype).
- Sphagnum pumilum* Müll. Hal. & Warnst., Hedwigia 36: 163. 1897. — Type: Brazil, em rochedos das Agulhas Negras na Serra de Itatiaia, *E.Ule 1750* (isotype).
- Sphagnum ramulinum* Warnst., Bot. Centralbl. 78: 4. 1898. — Type: Brazil, Minas Gerais, Serra do Ouro Preto, *E.Ule 1304* (isotype).
- Sphagnum rotundatum* Müll. Hal. & Warnst., Hedwigia 36: 162. 1897. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, *E. Ule 1760* (isotype).
- Sphagnum rotundifolium* Müll. Hal. & Warnst., Hedwigia 36: 159. 1897. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, *E.Ule 1756* (isotype).
- Sphagnum subovalifolium* Müll. Hal. & Warnst., Hedwigia 36: 162. 1897. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, *E.Ule 1754* (isotype).
- Sphagnum subundulatum* Müll. Hal. & Warnst., Hedwigia 36: 152. 1897. — Type: Brazil, Minas Gerais, Serra do Ouro Preto, *E.Ule 1298* (isotype).
- Sphagnum trigonum* Müll. Hal. & Warnst., Hedwigia 36: 158. 1897. — Type: Brazil, Rio de Janeiro, Tijuca, *E.Ule 1634, 1635* (isosyntype).
- Sphagnum trigonum* var. *laxifolium* Warnst., Hedwigia 36: 159. 1897. — Type: Brazil, Rio de Janeiro, *E.Ule 1632* (isotype).
- Sphagnum vesiculare* Müll. Hal. & Warnst., Hedwigia 36: 173. 1897. — Type: Brazil, Minas Gerais, Itacolumy, *E.Ule 1301* (isotype).
- Stereophyllum lindmanii* Broth., Bih. K. Svenska Vet. Akad. Handl. 26 Afd. 3(7): 50. 1900. — Type: Paraguay, Santo Thomas, *Lindman 244* (isolectotype, lectotype designa-

- ted by Ireland & Buck (1994)); Santo Antonio, *Lindman* 239 (isosyntype). Comments: There is a mistake on Tropicos and also on Ireland & Buck (1994), the correct page is 50 (not 150).
- Syrrhopodon arenarius* Müll. Hal., Hedwigia 39: 262. 1900. — Type: Brazil, Minas Gerais, Caraça, *Ule* 1387 (isolectotype, lectotype designated by Reese (1993)); Serra Ouro Preto, *E.Ule* 1385 (isosyntype).
- Syrrhopodon brotheri* Müll. Hal., Hedwigia 39: 266. 1900. — Type: Brazil, Goiás, Pr. Massamedes, *E.Ule* 1542 (isotype).
- Syrrhopodon calochlorus* Müll. Hal., Hedwigia 39: 263. 1900. — Type: Brazil, Rio de Janeiro, Tijuca, *E.Ule* 1669 (isolectotype, lectotype designated by Reese (1993)).
- Syrrhopodon cymbifolius* Müll. Hal., Hedwigia 39: 262:1900. — Type: Brazil, Goyaz, flum. Corumba, *E.Ule* 1571 (isolectotype, lectotype designated by Reese (1993)).
- Syrrhopodon goyazensis* Broth., Hedwigia 34: 122. 1895. — Type: Brazil, Goyaz, Passo Tempo, *E.Ule* 1540 (isotype).
- Syrrhopodon laeviusculus* Broth., Hedwigia 34: 122. 1895. — Type: Brazil, Goiás, Corumbá, *E.Ule* 1544 (isolectotype, lectotype designated by Reese (1993)); *E.Ule* 1545 (isosyntype).
- Syrrhopodon persordidus* Müll. Hal., Hedwigia 39: 264. 1900. — Type: Brazil, Minas Gerais, Serra de Ouro Preto, *E.Ule* 1383 (isolectotype, lectotype designated by Reese (1993)).
- Syrrhopodon rhizogonioides* Müll. Hal., Hedwigia 39: 266. 1900. — Type: Brazil, Minas Gerais, Caraça, *E.Ule* 1389 (isolectotype, lectotype designated by Reese (1993)).
- Syrrhopodon rosulatus* Müll. Hal., Hedwigia 39: 264. 1900. — Type: Brazil, Rio de Janeiro: Tijuca, *E.Ule* 1666 (isolectotype, lectotype designated by Reese (1993)).
- Syrrhopodon rubicundus* Müll. Hal., Hedwigia 39: 263. 1900. — Type: Brazil, Minas Gerais: Serra de Caraca, *E.Ule* 1379 (isolectotype, lectotype designated by Reese (1993)).
- Syrrhopodon terebellatulus* Müll. Hal., Hedwigia 39: 264. 1900. — Type: Brazil, Rio de Janeiro: Tijuca, *E.Ule* 1664 (isotype). Comments: This specimen is an isotype cited by Müller (1900), however Reese (1993) lectotypified the species with another specimen: *E.Ule* s.n.
- Systegium mollifolium* Müll. Hal., Hedwigia 34: 117. 1895. — Type: Brazil, Goyaz, close to Alicuns, *E.Ule* 1499 (isotype).
- Taxicaulis afflictus* Müll. Hal., Hedwigia 40: 68. 1901. — Type: Brazil, Goyaz, close to Mossamedes, *E.Ule* 1616 (isotype).
- Taxicaulis fabroniiformis* Müll. Hal., Hedwigia 40: 69. 1901. — Type: Brazil, Goyaz, close to Mossamedes, *E.Ule* 1617 (isotype).
- Taxicaulis micro-plumosus* Müll. Hal., Hedwigia 40: 68. 1901. — Type: Brazil, Minas Gerais, Ouro Preto, *E.Ule* 1486 (isotype).
- Taxicaulis percondensatus* Müll. Hal., Hedwigia 40: 66. 1901. — Type: Brazil, Goyaz, close to Mossamedes, *E.Ule* 1618 (isotype).
- Taxicaulis sapricola* var. *minor* Müll. Hal., Hedwigia 40: 68. 1901. — Type: Brazil, Rio de Janeiro, Corcovado, *E.Ule* 1722 (isotype).
- Taxiphyllum machrisianum* H.A. Crum, Los Angeles Co. Mus. Contr. Sci. 18: 5. f. 1-4. 1957. — Type: Brazil, Goiás, Chapada dos Veadeiros, *Dawson* 14743a (holotype).
- Tayloria ulei* Müll. Hal., Hedwigia 34: 126. 1895. — Type: Brazil, Goiás, na região do Rio Paranahyba, *E.Ule* 1555 (isotype).
- Tetraplodon itatiaiae* Müll. Hal., Bull. Herb. Boissier 6: 25. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, *E.Ule* 1763 (isotype).
- Thamniium flagellatum* Müll. Hal., Bull. Herb. Boissier 6: 119. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, *E.Ule* 1883 (isotype).
- Trematodon aureus* Müll. Hal. ex G. Roth, Aussereur. Laubm. 278. 1911. — Type: Brazil, Santa Catarina, Tubarão, *E.Ule* (*Bryotheca Brasiliensis* 15) (isotype).
- Trematodon brevifolius* Broth. ex Müll. Hal., Bull. Herb. Boissier 6: 44. 1898. — Type: Brazil, Rio de Janeiro, *E.Ule* 1815 (isotype).
- Trematodon heterophyllus* Müll. Hal., Hedwigia 34: 11. 1895. — Type: Brazil, Minas Gerais, Serra do Caraca, *E.Ule* 1425 (isotype).
- Trematodon pauperifolius* Müll. Hal., Bull. Herb. Boissier 6: 45. 1898. — Type: Brazil, Minas Gerais, Serra do Itacolomy, *E.Ule* 1426 (isotype). Comments: The protologue says, “Itabira do Campo” as locality and the label “Itacolomy”. However the collection number and date match.
- Trismegistia breviflagellosa* Müll. Hal., Hedwigia 40: 74. 1901. — Type: Brazil, Minas Gerais, Serra Ouro Preto, *E.Ule* 1489 (isotype).
- Trismegistia fluminicola* Müll. Hal., Hedwigia 40: 74. 1901. — Type: Brazil, Goiás, Rio das Almas, *E.Ule* 1607 (isotype).
- Trismegistia itatiaiae* Müll. Hal., Bull. Herb. Boissier 6: 121. 1898. — Type: Brazil, Serra Itatiaia, *E.Ule* 1917 (isosyntype).
- Trismegistia tereticaulis* Müll. Hal., Bull. Herb. Boissier 6: 121. 1898. — Type: Brazil, Serra de Itatiaia, *E.Ule* 1887 (isotype).
- Vesicularia oedicarpa* Müll. Hal., Hedwigia 40: 62. 1901. — Type: Brazil, Goyaz, *E.Ule* 1602 (isotype).
- Vesicularia paranahybae* Müll. Hal., Hedwigia 40: 63. 1901. — Type: Brazil, Minas Gerais, Paranahyba, *E.Ule* 1603 (isotype).
- Zygodon araucariae* Müll. Hal., Bull. Herb. Boissier 6: 95. 1898. — Type: Brazil, Rio de Janeiro, Serra do Itatiaia, *E.Ule* 1918 (isosyntype).
- Zygodon capillicaulis* Müll. Hal., Bull. Herb. Boissier 6: 94. 1898. — Type: Brazil, Minas Gerais, Serra Itacolomy, *E.Ule* 1394 (isosyntype). Comments: The protologue says Itabira Hills and the label Itacolomy Hills. However everything else matches including collector number. Also the isosyntype *E. Ule* 1395 was also found but with an empty packet.



*Zygodon dives* Müll. Hal., Bull. Herb. Boissier 6: 94. 1898. — Type: Brazil, Minas Gerais, Serra de Ouro Preto, *E. Ule* 1396; Rio de Janeiro, Serra do Itatiaia, *E. Ule* 1911, 1822 (isosyntypes). Comments: These specimens are isosyntypes cited by Müller (1898), however Calabrese (2006) has lectotyped another specimen: *Dusén s.n.*

## Acknowledgments

This study received financial support from the *Herbário Virtual das Plantas e Fungos* (Virtual Herbarium of Plants and Fungi), which is one of the Brazilian *Institutos Nacionais de Ciência e Tecnologia* (INCTs, National Institutes of Science and Technology). We thank all the faculty and staff of the Herbarium of the Botany Department of the National Museum of the Federal University of Rio de Janeiro, in particular Dr. Luci de Senna Valle, Dr. Mariângela Menezes, Dr. Andrea Costa and Vera Martins, for providing access to the collection. We are especially grateful to Dr. Leonor Costa Maia, of the INCT. We dedicate this paper to those in the past, who are no longer but live again.

## References

- Brotherus, V. 1899. *Ule, E. Bryotheca brasiliensis*, herausgegeben von Dr. C.H. Brotherus in Helsingfors, bestimmt von Carl Müller, C.H. Brotherus und C. Warnstorf. *Hedwigia* 38(1): 57–59.
- Buck, W. 1992. A revision of *Philophyllum* (Hookeriales). *The Bryologist* 95: 334–337.
- Buck, W. R. & Ireland, R. R. 1989. Plagiotheciaceae. *Flora Neotropica Monograph* 50: 1–22.
- Calabrese, G.M. 2006. A taxonomic revision of *Zygodon* (Orthotrichaceae) in southern South America. *The Bryologist* 109: 453–509.
- Frahm, J.P. 1991. Dicranaceae: Campylopodioideae, Paraleucobryoideae. *Flora Neotropica Monograph* 54: 1–238.
- Griffin III, D. 1984. *Breutelia* in Brazil with notes on the occurrence of the genus in the New World. *Journal of the Hattori Botanical Laboratory* 57: 83–95.
- Hiepko, P. 1987. The collections of the Botanical Museum Berlin-Dahlem (B) and their history. *Englera* 7: 219–252.
- Hiepko, P. 1990. *Die Sammlungen des Botanischen Museums Berlin-Dahlem und ihre Geschichte*. In: Schnarrenberger, C., Scholz, H. (ed.) *Geschichte der Botanik in Berlin*. Colloquium Verlag, Berlin.
- Hooker, W.J. 1818–1820. *Musci Exotici*. 2 vols. London.
- Ireland, R.R. & Buck, W.R. 1994. Stereophyllaceae. *Flora Neotropica Monograph* 65: 1–49.
- Lewinsky, J. 1987. *Orthotrichum* (Orthotrichaceae) in South America 2. Taxonomic revision of the taxa with superficial stomata. *Memoirs of The New York Botanical Garden* 45: 326–370.
- Martius, C.F.P. 1818. *Icones plantarum cryptogamicarum, quas in itinere annis 1817–1820 per Brasiliam jussu et auspiciis Maximiliani Josephi I. Bavariae regis augustissimi instituto collegit et descripsit*. Monachi. 138 p.
- Merrill, E.D. 1943. Destruction of the Berlin Herbarium. *Science* 98(2553): 490–491.
- Müller, C. 1898. Bryologia Serrae Itatiaiae (Minas Gerais Brasiliae) adjectus nonnullis speciobus affinibus regionum vicinarum. *Bulletin de la Herbarie Bossier* 6: 18–48.
- Müller, C. 1900. *Genera Muscorum Frondosorum* vi + 474 pp. Eduard Kummer, Leipzig.
- Muñoz, J. 1998. Materials toward a revision of *Grimmia* (Musci, Grimmiaceae): nomenclature and taxonomy of *Grimmia longirostris*. *Annals of the Missouri Botanical Garden* 85: 352–363.
- Pursell, R.A. 1994. Taxonomic notes on Neotropical *Fissidens*. *The Bryologist* 97: 253–271.
- Pursell, R.A. 2007. Fissidentaceae. *Flora Neotropica Monograph* 101: 1–279.
- Raddi, G. 1822. *Crittogame brasiliane raccolte e descritte*. *Memoire della Società Italiana delle Scienze residente in Modena* 19: 27–57.
- Reese, W.D. 1993. Calymperaceae. *Flora Neotropica Monograph* 58: 1–102.
- Vitt, D.V. 1980. A comparative study of *Andreaea acutifolia*, *A. mutabilis*, and *A. rupestris*. *New Zealand Journal of Botany* 18: 367–377.