Lectotypification of twenty names of taxa referable to *Tortula* Hedw. (*Pottiaceae, Bryophyta*)

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Lectotypes for twenty names currently included in *Tortula* Hedw. are designated here. *Tortula santorinensis* Schiffn. is considered to be conspecific with *T. solmsii* (Schimp.) Limpr., of which it becomes a synonym, and *T. eucalyptrata* Lindb. conspecific with *T. euryphylla* R. H. Zander (≡ *T. latifolia* (Hedw.) Lindb., *nom. illeg.*), over which it has priority. In addition, the following infraspecific taxa, sometimes accepted in current literature, are not considered to be recognisable taxonomically, and are synonymized under the *Tortula* species involved: *Desmatodon latifolius* var. *muticus* (Brid.) Brid. (≡ *Dicranum latifolium* var. *muticum* Brid.) (= *Tortula eucalyptrata*), *Tortula cuneifolia* var. *marginata* M. Fleisch., *T. muralis* f. *incana* (Schimp.) Sapjegin (≡ *Barbula muralis* var. *incana* Schimp.), and *T. revolvens* var. *obtusata* Reimers.

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The genus *Tortula* Hedw. (*Pottiaceae*, *Bryophyta*) has been circumscribed in several ways during the last two centuries, and there has been no consensus about which species or even other genera should be included in it. Zander (1989, 1993), in his new classification of the genera of *Pottiaceae*, provided convincing characters to recognise genera such as *Chenia* R. H. Zander, *Dolotortula* R. H. Zander, *Hennediella* Paris, *Hilpertia* R. H. Zander, *Sagenotortula* R. H. Zander, *Stonea* R. H. Zander or *Syntrichia* Brid., as segregates of *Tortula*. On the other hand, he included in *Tortula* sect. *Pottia* (Rchb.) Kindb., taxa that traditionally were placed in other genera such as *Pottia* Ehrh. ex Fürnr. or *Phascum* Hedw. (e.g., *Phascum cuspidatum* Hedw.), but with gametophytic characters very similar to *Tortula*. For the same reason, he included the genus *Desmatodon* Brid. in *Tortula* sect. *Tortula.*

According to the treatment by Zander (1993), the genus *Tortula* includes 141 species worldwide (Crosby & al., 1999). In Europe, approximately 18–30 species have been recognised, depending on the taxa that different authors included in *Tortula*. In spite of this controversy, there is no taxonomic revision of this genus as represented in Europe and very few papers that include typification of names of European species of *Tortula*. Thus, only *Tortula freibergii* Dixon & Loeske (Crundwell & Nyholm, 1972), *T. muralis* Hedw. (Guerra & al*.,* 1992) and *T. subulata* Hedw. (Margadant & Geissler, 1995) have previously been typified. Moreover, since the revised classification by Zander (1993), the study of type material of some names is very important in order to ascertain their correct assignment in Zander's classification. Thus, species placed by Zander (1993) in *Syntrichia*, such as *S. inermis* (Brid.) Bruch or *S. bolanderi* (Lesq. & James) R. H. Zander have, after morphological and molecular studies, been included in *Tortula* (Gallego, 2002; Werner & al., 2003).

In order to fix the usage of names in connection with our studies of the genus *Tortula* for the "Flora Briofítica Ibérica" project, we designate lectotypes for twenty names of taxa currently included in *Tortula*, which have not previously been typified. The lectotypification of *Tortula limbata* Lindb. will be dealt with separately in association with consideration of the nomenclature and taxonomy of this taxon and *Tortula solmsii* (Schimp.) Limpr.

All type citations refer to the information on the labels of the type material, and […] indicates portions of the label text that we could not decipher. In all the cases where types are designated, the first name given is the one being typified. The names that we accept are shown in bold, and, where these are not homotypic with the name being typified (i.e., are taxonomic synonyms), appear between brackets following the typification.

1. *Barbula bolanderi* Lesq., Trans. Amer. Philos. Soc. 13: 5. 1865 ≡ ***Tortula bolanderi*** (Lesq.) M. Howe, Erythea 4: 51. 1896. – Lectotype (designated here):

[U.S.A.:] "California", *H. Bolander s.n.* (NY!; isolectotypes BM!, H-BR!, NEU!, US!; all specimens numbered as "139").

Lesquereux (1865) described *Barbula bolanderi* from specimens of mosses collected by H. Bolander in California between 1862 to 1863 on "rocks near the Bay of San Francisco". We found syntypes in BM, H-BR, NEU, NY and US, which represent duplicates from a homogeneous collection. We selected as lectotype a syntype kept at NY, since it is labelled as "Ex. Herb. Leo Lesquereux Purchased 1911".

2. *Barbula fiorii* Venturi, Rev. Bryol. 12: 66. 1885 ≡ *Tortula revolvens* var. *obtusata* Reimers, Hedwigia 79: 284. 1940 – Lectotype (designated here): [Italy:] "[…] gypshalt. Boden […] v. Reggio bei Modene" 1885*, A. Fiori s.n.* (JE!). ***Tortula revolvens*** (Schimp.) G. Roth, Eur. Laubm. 1: 350. 1904.

According to Venturi (1885), the original material was collected by Adrien Fiori "…dans les collines de Modène…". A search in the main herbaria where Venturi specimens are kept (B, E, H, G, PC, QK, TR, UPS) was unsuccessful. Surprisingly, a specimen collected by Fiori and matching the original locality was found at Jena (JE) in the Herzog Herbarium. It was handwritten as "type" by an unknown writer different from the person who wrote the remaining data on the label. Since there is no other original material available and the Jena specimen is completely in accordance with the protologue, we have selected it as lectotype.

Reimers (1940) proposed a new name at varietal rank for *Barbula fiorii* (*Tortula revolvens* var. *obtusata*), which is currently recognised by European bryologists (Kürschner, 2000; Casas & al., 2001; Cortini-Pedrotti, 2001). To date it has been separated from the typical variety by the costa, which ends before the leaf apex (in *T. revolvens* var. *revolvens* the leaf apex is mucronate due to an excurrent costa), rounded leaf apex (in *T. revolvens* var. *revolvens* it is acute), leaves slightly spirally twisted and not contorted (in *T. revolvens* var. *revolvens* they are contorted and spirally twisted). Also, Cortini-Pedrotti (2001) states that *T. revolvens* var. *obtusata* is dioicous and *T. revolvens* var. *revolvens* is autoicous. The lectotype of *Barbula fiorii* possesses the characteristics described above for *T. revolvens* var. *obtusata* (leaf apex rounded, costa ending 1–2 cells before apex, leaves slightly spirally twisted when dry). However, after study of other populations from the Mediterranean Region, we conclude that *T. revolvens* var. *obtusata* is not sufficiently distinctive to justify taxonomic recognition. We have found samples without mucronate apex that are cladautoicous, and plants in the same turf, even the same plant, in which the apex varies between mucronate or not mucronate. The presence or absence of a mucro, apiculus or even hair-point is in general very variable in *Tortula*.

3. *Barbula marginata* Bruch & Schimp., Bryol. Eur. 2: 95, 158 tab. 19. 1843 ≡ ***Tortula marginata*** (Bruch & Schimp.) Spruce, London J. Bot. 4: 192. 1845.– Lectotype (designated here): [Italy:] "Sardinia auf Felsen", *F.A. Müller s.n.* (BM!).

Bruch & Schimper (in Bruch & al., 1843) cited different material collected by diverse botanists in the protologue: "In Gallia meridionali prope *Corbières*, loco *hermitage de St. Antoine de Galamus* a cl. Montagne detecta, serius in Sardinia prope *Iglesias* (Müller) et in Lusitania (Holl) lecta; ex Algeria a W. Schimper relata".

We have found a folder in the Bruch herbarium at BM that has several syntypes. There are two sheets of this species collected by Müller (e, f), the material marked by "e" being from Sardinia. Another sheet marked "a", is from "Lusitania" but two collectors' names appear in the label: "Holl." and "Reichenbach". Probably, this material was collected in Portugal by Holle and was kept in Reichenbach's herbarium. There are also two sheets marked with "b" and "d" collected by Schimper in Algeria, this material being mixed with *Rhynchostegiella tenella* (Dicks.) Limpr. Apart from this admixture, all syntypes are in accordance with Bruch and Schimper's description, and consequently any could be selected as lectotype. Thus, we here select the specimen from Sardinia collected by Müller ("e") in BM as lectotype, because it is better preserved material. Furthermore, there is no doubt about the collector (as with the "Lusitania" specimen), and it is not mixed (as is the "Algeria" specimen).

4. *Barbula muralis* var. *incana* Bruch & Schimp., Bryol. Eur. 2: 97, 159 tab. 20β. 1842 ≡ *Tortula muralis* f. *incana* (Bruch & Schimp.) Sapjegin, Bot. Jahrb. Syst. 46: 14. 1911 – Lectotype (designated here): [Switzerland?:] "*Barbula muralis*, *incana*, bei Bex auf Mauern", Jun 1840, *W.P. Schimper s.n.* (BM!). ***Tortula muralis*** Hedw., Sp. Musc. Frond.: 123. 1801.

The protologue has the description: "var. β *incana*, brevicaulis, microcarpa, foliis ovali-lanceolatis, brevioribus, longipilis". Later, the habitat of the species is indicated but without any reference to exact localities for the species or varieties: "In muris siccis et tectorum tegulis, rarius in saxis et rupibus, per totam Europam, Americam borealem et Africae regiones septentrionales et meridionales; var. β in muris calcareis, gypsaceis siccissimis".

In BM, we found a syntype of the name, which is in complete accord with the description. It was collected by Schimper in 1840 as indicated above, and it is kept in the Bruch herbarium. This sample, marked with the letter "i", shows the long hyaline hair-point characteristic of

this variety, and it is here selected as lectotype.

This variety was recognised by Casas (1991) and treated by Zander (1993) as *Tortula muralis* f. *incana* (Bruch & Schimp.) Sapjegin. However, the length of the hair-point is very variable in the polymorphic *Tortula muralis*, even in the same specimen. Therefore, this taxon should not in our opinion be recognized taxonomically and hence the name becomes a synonym of *Tortula muralis*.

5. *Barbula revolvens* Schimp., Syn. Musc. Eur., (ed. 2): 195. 1876 ≡ ***Tortula revolvens*** (Schimp.) G. Roth, Eur. Laubm. 1: 350. 1904. – Lectotype (designated here): [France:] "In muro muscoso prope Aix Galloprovinciae", May 1873, *W.P. Schimper s.n.* (BM!; isolectotypes H!, JE!).

The label of Rabenhorst's Bryotheca Europaea (no. 1308) matches the locality, habitat and collector of this species. Only the date does not exactly coincide, because the protologue has: "ubi ad finem Aprilis 1873 copiose legit", although later the author wrote: "Fruct. matur. ad finem m. Aprilis et initio Maji". We have detected this material in three herbaria: BM, H and JE. Rabenhorst's exsiccata was issued in 1876, which could constitute a possible obstacle for selecting the lectotype. However, the material was collected in 1873, three years before the species was described, and at BM, where the original herbarium of Schimper is kept no other material in accordance with the protologue was found. Additionally, the material appears mixed with *Didymodon vinealis* (Brid.) R. H. Zander, which is also indicated in the original description. All these reasons suggest that this material was used by Schimper to describe his *B. revolvens*, and that it should be selected as lectotype, and not as neotype. This specimen bears a revision label by D. G. Long that reads: "*Tortula revolvens* (Schimp.) Roth, type", but to our knowledge this has not been published until now.

6. *Barbula solmsii* Schimp., Syn. Musc. Eur., (ed. 2): 200. 1876 ≡ ***Tortula solmsii*** (Schimp.) Limpr., Laubm. Deutschl. 1: 660. 1888. – Lectotype (designated here): [Portugal:] "San Bartholomeo dos Messines in via [...] ad rupes arenarias", 1866, H.M.C. *Solms-Laubach s.n.* (BM! – printed label "Flora Lusitanica Algarve"; isolectotypes BM! - Hampe herbarium, JE!, M!).

The protologue includes an explicit reference to the locality, collector, and year of the collection. We have found three syntypes at BM (one from K, and the others from the Hampe Herbarium), one at the Karl Schliephacke Osterfeld Herbarium in JE, and another at the Arnold Herbarium in M. The lectotype was selected from the syntype at K, now deposited in BM, where the original herbarium of Schimper was kept. Although it is not indicated whether the specimen belongs to Schimper's herbarium, the handwriting is Schimper's. This material bears a revision label by I. Granzow de la Cerda that reads: "Typus", but to our knowledge the typification was never published.

7. *Barbula subulata* var. *angustata* Schimp., Syn. Musc. Eur., (ed. 2): 224. 1876 ≡ ***Tortula subulata*** var. ***angustata*** (Schimp.) Kindb., Bih. Kongl. Svenska Vetensk.-Akad. Handl. 7(9): 133. 1883. – Lectotype (designated here): [Switzerland?:] "Weissenstein (Jura)", *W.H. Schimper s.n.* (STR!).

The protologue has: "var. δ. *angustata*. Folia longiora, angustiora, linealia, angustius limbata. Capsula valde angustata, cylindrica, subarcuata". Later, the habitat of this species is indicated: "ad aggeres praeprimis arenaceos secus vias sylvaticas, in terra sylvatica atque circa arborum radices, in muris terra obtectis, totius fere Europae; …var. δ. in subalpinis et regione meridionali".

We have examined the Schimper herbarium in BM in order to locate original material. There, we found some material under *Tortula angustata*, but none can be considered to represent a syntype: two sheets collected near York by Spruce, another by Wilson and another with some plants glued on but whose label was illegible. Additionally, we have located some material in L whose label reads: "*Barbula subulata* var. *angustata*, in alpibus Rhaeticis, common, Schimper", but after the revision of this material, we conclude that this material corresponds to *Tortula subulata* var. *graeffii* Warnst. Following Stafleu & Cowan (1985), we checked other herbaria where Schimper material could be preserved (B, BR, BUF, CGE, E, G, H, JE, LIV, MASS, MPU, NY, STR and TUB), and we found potential type material in NY and STR. The NY specimen corresponds to the current use of this name. However, the specimen was apparently collected by Vogel, and on the label is written "Schimp. 1856" in a different hand. Therefore, it is not certain that it is original material. Finally, we found three sheets in STR with material glued to the paper upon which *Barbula angustata* was written in Schimper's hand. However, after studying this material, we conclude that only one sheet corresponds to the current usage of the name (gradually tapering acuminate leaves, sometimes denticulate margins in upper part of the leaf and border broad) and is in accordance with the protologue. We select this syntype as lectotype of *Barbula subulata* var. *angustata*.

8. *Bryum cuneifolium* Dicks., Fasc. Pl. Crypt. Brit. 4: [29, index]. 1801 ≡ ***Tortula cuneifolia*** (Dicks.) Turner, Muscol. Hibern. Spic.: 51. 1804. – Lectotype (designated here): Unknown locality, Herbarium Dillenius (OXF-photo!; isolectotype H-SOL!).

According to Karttunen (1988), *Bryum cuneifolium* was validly published in the index of the fascicule 4 (Dickson, 1801), because the index provides reference to a previously and effectively published diagnosis of this name (Fasc. Pl. Crypt. Brit. 3: 7, 1793; Art. 32.1(c), Greuter & al., 2000). In Dickson (1793) the protologue reads: "BRYUM capsulis erectis cylindricis denticulatis, surculis subacaulibus, *cuneifolium*, foliis cuneiformi-ovatis reticulates pellucidis. Bryum humile, pilis carens, viride et pellucidum. *Dill. musc*. 356. t. 45. f. 15. *Habitat* in arenosis".

There are two possibilities in selecting the lectotype of this name. The first may be to select one of the Dickson's specimens and the second to select the specimen corresponding to the figure in Dillenius' work, which is referred to in the protologue, because Dickson worked by consulting the Dillenian herbarium.

We have studied Dickson's herbarium in BM, but found no material suitable for a lectotype. There was only one specimen under *Bryum cuneifolium* in this herbarium, but it does not correspond to this taxon and does not match the description. On the other hand, we detected material presently kept in the Hooker Herbarium at BM, which could be from Dickson. The material consists of two plants, one *T. muralis,* and the other matching the current concept of *T. cuneifolia*. Below this plant is written: "J.D., Bryum cuneifolium, – murale" and the reference to Dillenius provided in the original description follows. However, it is badly preserved material, which consists of only one plant, with broken leaves and a capsule with no peristome or seta. Moreover, we cannot be sure about its origin, because it was not in Dickson's own herbarium.

The second possibility is to select a type from Dillenius' material. In OXF, there is one specimen of *Tortula cuneifolia* in the Dillenian Herbarium. S. Marner kindly transcribed the label of this specimen as: "15 Bryum humile, pilis carens, viride & pellucidum. The common dwarf transparent Bryum, with green not hoary Leafes". We have only been able to study this material from a photograph, because it cannot be loaned. However, in H-SOL, there is a duplicate of this collection corresponding to Dillenius' *Bryum* no. 15 (p. 356, t.45 f.15). According to Isoviita (1970), the Dillenian bryophyte collection was studied by Lindberg in Oxford in 1872 and he took with him small pieces of Dillenius' specimens for their critical identification in Helsinki. However, it should be remembered that the H-SOL collection was originally formed precisely in order to enable Lindberg to make revisions of this kind, and it is appropriate that it should continue to serve the same purpose.

The specimen from Dillenius' herbarium preserved in H-SOL proved to be *Tortula cuneifolia* as that name is currently applied. It consists of some well preserved plants with young sporophytes and it was also labelled as *T. cuneifolia* by Lindberg. Therefore, we select as lectotype of *Bryum cuneifolium*. Dillenius' specimen in OXF corresponding to figure 15, in table 45 of Historia Muscorum (Dillenius, 1741), the H-SOL material being an isolectotype.

9. *Dicranum latifolium* Hedw., Sp. Musc. Frond.: 140. 1801 ≡ *Tortula latifolia* (Hedw.) Lindb., Musci Scand.: 20. 1879., *nom. illeg*. (non *T. latifolia* Bruch ex Hartm., Handb. Skand. Fl., ed. 2 2: 322. 1832) ≡ *T. euryphylla* R. H. Zander, Bull. Buffalo Soc. Nat. Sci. 32: 223. 1993. – Lectotype (designated here): "*Dicranum latifolium* Hedw. St-Cr. I. 89. t. 33, a, b. Linné jun. acceptum*"* (Herbarium Hedwig-Schwägrichen in G!). ***Tortula eucalyptrata*** Lindb., Bot. Not. 1886: 100. 1886 – see under *T. eucalyptrata* below.

The protologue of this species includes the information: "Habitat in America septentrionali" and a reference to Hedwig (1785–1787) "St. Cr. I. p. 89 t. 33".

The only folder of *Dicranum latifolium* deposited at Hedwig-Schwägrichen Herbarium in G has a label written in Hedwig's hand, which bears only the reference to the earlier publication: "Dicranum latifolium Hedw. St-Cr. I. 89. t. 33, Linné jun. acceptum". In this earlier publication, Hedwig (1785–1787) includes: "singulari benivolentiae beati a LINNÉ, magni LINNAEI filio debeo hunc muscum, qui mihi vix ex itinere redux pauca hic delineata individual vna cum nonnullis aliis Sueciae Lapponiae que indigenis miserat, nomine *Mnium lutescens*. Ex America septentrionali".

This folder contains two specimens. That situated in the upper part of the folder consists of three glued plants. Two of them have sporophytes, one young with calyptra and the second one with a capsule but without peristome. This specimen proved to be *Dicranum latifolium* as that name is currently applied. The other specimen, in the lower part of the folder, is inside a sheet labelled: "*Desmatodon latifolius* Br. S, *Trichostomum pilifer* Sm. […] Suevia ad rupes […] D. Braun?". This specimen corresponds to *Pottia lanceolata* (Hedw.) Müll. Hal. (*Tortula lanceola* R. H. Zander). We therefore select the first mentioned specimen as lectotype.

10. *Dicranum latifolium* var. *muticum* Brid., Muscol. Recent. Suppl. 1: 207. 1806 ≡ *Desmatodon latifolius* var. *muticus* (Brid.) Brid., Bryol. Univ. 1: 525. 1826 – Lectotype (designated here): [Germany:] "Thuringia" (Herbarium Bridel in B!). ***Tortula eucalyptrata*** Lindb., Bot. Not. 1886: 100. 1886.

The protologue of this taxon reads: "*D. latifolium* ϰ *muticum* foliis ovatis acutis muticis. In Thuringico saltu mihi cum vulgari pilifero commixtum passim occurrit". The Bridel herbarium in B contains a folder with three

specimens, on which *Dicranum* (= *Desmatodon*) *latifolium* var. *muticum* is written. The sheet situated in the upper right part of the folder is labelled: "Valais, 1822, Thomas". The upper left sheet is labelled: "Hautes Alpes". The material situated in the lower part of the folder bears a label upon which "Thuringia" is written; in addition it presents the muticous apex characteristic of this taxon. We choose this as lectotype.

This taxon is recognised at varietal rank by some authors, such as Lawton (1971), Nyholm (1989), Casas (1991) and Cortini-Pedrotti (2001). Anderson & al. (1990) and Zander (1993) considered it to be synonymous with *Desmatodon latifolius* and *T. euryphylla*, respectively. *Dicranum latifolium* var. *muticum* is said to be distinguished by the presence of muticous or apiculate leaves, with the costa ending below the apex, while the typical variety is said to have piliferous leaves with the costa excurrent or the lower leaves apiculate. Nyholm (1989) recognised this variety. However, she considered that it could be a phenotypic modification of the species occurring in moist habitats. We share this opinion and do not recognize this taxon, including it as part of the general variation of the species.

11. *Grimmia atrovirens* Turner ex Sm., Engl. Bot. 28: 2015. 1809 ≡ ***Tortula atrovirens*** (Turner ex Sm.) Lindb., Öfvers. Förh. Kongl. Svenska Vetensk.-Akad. 21(4): 236. 1864. – Lectotype (designated here): [Great Britain:] "Anglesea", 1800, *H. Davies s.n.* (Herbarium Turner in BM!).

The protologue includes: "The present were sent by the Rev. H. Davies from North Wales, and grew on the ground in broad patches". Also, the author included as synonyms, *Grimmia starkeana* (Hedw.) Turner, Muscol. Hibern. Spic.: 26. 1804, *nom. illeg*. (non *Grimmia starckeana* (Hedw.) F. Weber & D. Mohr, Index Mus. Pl. Crypt. 2: 1803), and "*G. atrovirens*" Turner, Bot. Guide England: 620. 1805, *nom. inval*. (proposed in anticipation of future acceptance as a species (Art. 34.1(b)), Greuter & al., 2000).

In LINN, there is material of *Grimmia atrovirens* that belongs to the Smith Herbarium marked by 1674.7. We have not studied this material, but from the photographs sent from LINN, it seems to correspond with this taxon. However, there is not any annotation regarding the locality or collector of this plant in order to be sure that it could be original material.

On the other hand, we have detected a syntype in the Turner herbarium in BM that matches the locality and collector indicated in the protologue. Moreover, it is in complete accordance with the protologue. We select this material as lectotype.

12. *Syntrichia subulata* var. *inermis* Brid., Bryol. Univ. 1: 581. 1826 ≡ ***Tortula inermis*** (Brid.) Mont., Arch. Bot. (Paris). 1: 136. 1832. – Lectotype (designated here): [France:] "Lozere", 1820, *E. Requien s.n.* (B!).

In the protologue, Bridel (1826) mentioned two localities from France "In Galliae australioris provincia de la Lozere, in montanis et circa Avenionem", from both of which Requien collected the variety.

In the Herbarium Bridel in B, there are two sheets that correspond with the two localities in the original description, with the same date and collector. Both syntypes, situated in the central and right lower part of the folder no. 480, share a revision label of Herrnstadt & Heyn that reads: "2 spec. on the right of lower row – syntypes of *Syntrichia subulata* γ *inermis*". We here choose the specimen from Lozere situated in the central lower part of the folder no. 480 as lectotype, because the three sporophytes are better conserved than in the other specimen in the folder.

13. ***Tortula brevissima*** Schiffn., Ann. K. K. Naturhist. Hofmus. 27: 481, fig. 23–33. 1913. – Lectotype (designated here): [Iraq:] "Ad confines Mesopotamie et Arabiae borealis: In steppis ad Euphrateum medium inter Meskene et Der es Sor, prope vicum Sabcha", 28 Mar 1910, *H. Handel-Mazzetti 533* (Schiffner Herbarium in FH!).

Schiffner (1913) cited several specimens in the protologue of this species: "In steppis et desertis ad terram, rarius ad muros, solo calcareo et gypsaceo per Syriam orientalem et Mesopotamiam mediam…120–400 m. Haleb (Aleppo), an Mauern (Nr. 249) und auf ausgetrocknetem Schlamm (Nr. 241) gegen Dschengie 19.III.1910; bei El Hammam gegen Rakka (Nr. 504), bei Sabcha (Nr. 533) und nächst Der es Sor (Nr. 580), Kaijim unter Abukemal (Nr. 674) am Euphrat; um Kalaat Schergat (Assur) am Tigris unter Mossul (Nr. 1028); hierher wohl auch die mehrfach zwischen Dschebel Abd el Asis und Belich beobachteten Rasen".

We have detected two syntype specimens from which to select the lectotype: one is Kryptogamae exsiccatae no. 2198 (pr. Kalaat Schergat (Assur) deposited in BM, and the other no. 533 (pr. Sabcha) from the Schiffner herbarium in FH. The latter was used for the plates in the original description (Schiffner, 1913: 482), and it is this specimen that we choose as lectotype.

14. ***Tortula canescens*** Mont., Arch. Bot. (Paris) 1(2): 133, pl. 4 fig. 3. 1833. – Lectotype (designated here): [France:] "Lorient", (PC!; isolectotype BM!).

In the protologue, Montagne (1833) cited material from different localities "Je l'ai trouvée dans le Roussillon, près Collioure, mélangée avec le *T. cuneifolia* Roth. Elle croît aussi en Bretagne, aux environs de Lorient, où je l'ai cueillie en 1824". He also mentioned other specimens from Normandy kept at the Mougeot

herbarium.

We have found two syntypes from the Montagne herbarium, one at PC and the other at BM; on the label of both specimens was written "Lorient" and they are in accord with the protologue. We selected the PC specimen as lectotype, since the Montagne original herbarium is kept there and the material is better preserved.

15. *Tortula cuneifolia* var. *marginata* M. Fleisch., Atti Congr. Bot. Int. Genova 1892: 285. 1893. – Lectotype (designated here): [Italy:] "Albissola marina, […] via campestre", 1869, *A. Piccone s.n.* (FH!); (isolectotype FH!). ***Tortula cuneifolia*** (Dicks.) Turner, Muscol. Hibern. Spic.: 51. 1804.

In FH, we found two sheets from Fleischer's herbarium, the labels of which match the locality and collector of the only material mentioned in the protologue. On one of the sheets, the year of collection is also indicated. We here select this latter sheet as lectotype.

This variety does not appear in the Italian Flora of mosses (Cortini-Pedrotti, 2001), but it was listed by Zander (1993) from Europe. Also, it was cited from Spain (García-Zamora & al., 1998). According to Fleischer (1893) the variety is characterised by the presence of a marginal border in the leaf, formed by thicker cells and the shorter seta than the typical variety. Also, he mentioned, in the original description, that the new variety grew mixed with typical *Tortula cuneifolia.* The type possesses the characters described by Fleischer (1893), and the costa of the leaves is usually excurrent in a mucron or short hair-point. After the study of numerous specimens from the Mediterranean area we think that the features supposedly distinguishing the variety do not justify taxonomic recognition at any rank. It is very common to find smaller plants with subquadrate and thick-walled marginal leaf cells under xeric conditions and the bigger ones in more shaded areas. The length of the seta and whether the costa of the leaves are percurrent or excurrent in a hair-point or mucro are also variable characters.

16. ***Tortula eucalyptrata*** Lindb., *Bot. Not.* 1886: 100. 1886. – Lectotype (designated here): [Norway:] "Opdal", 5 Aug 1882, *C. Kaurin s.n.* (H-SOL! 1963 033).

The protologue includes the statement: "En egendomlig Desmatodon-form hade af Kaurin tagits på klippor i Opdal och af fõredr. på mull i bergspringor nära Kongsvold (reg. subalp.)" [A strange *Desmatodon*-form had been collected by Kaurin on rocks in Opdal, and by the undersigned on humus in rock crevices near Kongsvold (reg. subalpina)]. In H-SOL, we detected three probable syntypes of this name: two from Opdal collected by Kaurin (15 Sep 1881, and 5 Aug 1882) and another collected by Lindberg in Kongsvold (26 Jul 1882). Additionally, we have detected two further syntypes at S, collected by Kaurin and labelled Dorse & Dorse, Opdal (11 Aug 1882, and 8 Jun 1883, respectively). All probable syntypes are in accordance with Lindberg's description, and consequently any could be selected as lectotype. We here select the specimen from Opdal collected by Kaurin (5 Aug 1882) in H-SOL as lectotype, because it is deposited in the original herbarium of the author and it is the syntype with the most individual plants and is the best preserved.

After the study of the type material, we concluded that this is a heterotypic synonym of the illegitimate *Tortula latifolia* (Hedw.) Lindb., Musci Scand.: 20. 1879. (non *T. latifolia* Bruch ex Hartm., Handb. Skand. Fl., ed. 2 2: 322. 1832), and is the correct name for that species in *Tortula* being earlier than *T. euryphylla*, the replacement name for *T. latifolia* (Hedw.) Lindb., proposed by Zander (1993); see under *Dicranum latifolium* above.

17. ***Tortula mucronifolia*** Schwägr., Sp. Musc. Frond. Suppl. 1: 136, tab. 35. 1811. – Lectotype (designated here): "*Tortula mucronifolia* 72" (Herbarium Hedwig-Schwägrichen in G!).

The protologue includes the statement: "Legit in Helvetia Schleicher, in Austria Gebhard, ut videtur alpestrem".

We have studied the collections of *Tortula mucronifolia* in the herbarium of Hedwig-Schwägrichen in G, and we have found only one folder with material of this species that was marked as type by the staff of the herbarium. There is no locality indicated, but in the lower part of the folder, the text "*Tortula mucronifolia* Hg Suppl […]" is present. In this folder there are three specimens. The specimen in the left central part of the folder is very badly preserved, and therefore identification, without destroying the material, is very difficult. Anyway, we can conclude that this sample is not *T. mucronifolia*, but that it belongs to the genus *Syntrichia*. The two specimens in the right-hand part belong to *T. mucronifolia*. The right upper one marked with the no. 18, has four sporophytes, of which three have capsules. The right lower marked one, with the no. 72, bears three sporophytes with capsules, of which two have opercula and calyptrae. Consequently, we select as lectotype the specimen marked as 72, since it is better preserved and fits with the protologue.

18. *Tortula santorinensis* Schiffn., Verh. K. K. Zool.-Bot. Ges. Wien 69: 328, Abb. 5, 1920. – Lectotype (designated here): [Greece:] "Santorini: ober Pyrgos", 8-26 Apr 1911, *V. Schiffner 219* (FH!; isolectotype W!). ***Tortula solmsii*** (Schimp.) Limpr., Laubm. Deutschl. 1: 660. 1888.

Several syntypes were cited in the original description of this species (Schiffner & Baumgartner, 1920): "Santorin: Phira, bei der Stadt Phira (Nr. 220), dann bei und ober Pyrgos (Nr. 45, 219); Nea Kaimeni, auf der neuen Lava, von 1866, spärlich mit *T. aestiva* var. *vulcanicola* (Nr. 40), reichlicher am Georgios-Krater 1707 (Nr. 221)". We have detected syntypes for lectotypification at W (*Schiffner 219* and *221*, although the latter corresponds to *Tortula muralis* var. *aestiva* Hedw.) and at FH (*Schiffner 40*, *45*, *219* and *220*). We select *Schiffner 219* from the Schiffner herbarium in FH as lectotype.

Tortula santorinensis was considered to be a synonym of *Tortula solmsii* by Long & Hill (1982), although these authors did not study the type material of the former. However, *T. santorinensis* is still recognised by some authors, such as Zander (1993) and Crosby & al. (1999). After the study of the syntypes of *T. santorinensis*, we agree with Long & Hill (1982) that this name is clearly a synonym of *T. solmsii*.

19. *Tortula santorinensis* var. *apiculata* Schiffn., Verh. K. K. Zool.-Bot. Ges. Wien 69: 328, Abb. 6, 1920. – Lectotype (designated here): [Greece:] "Santorini: Phira-Pyrgos", 8-26 Apr 1911, *V. Schiffner 222* (FH!; isolectotype W!). ***Tortula solmsii*** (Schimp.) Limpr., Laubm. Deutschl. 1: 660. 1888.

In FH and W, we detected material from the single gathering mentioned in the protologue. We choose the syntype at FH as lectotype, because the best collection of this author is deposited in this herbarium.

After studying the material, we also agree with Long & Hill (1982) that this variety can be included in the variation shown by *T. solmsii*.

20. ***Tortula subulata*** var. ***graeffii*** Warnst., Krypt.-Fl. Brandenburg, Laubm. 2: 268. 1904. – Lectotype (designated here): [Switzerland:] "Graubünden, […], bei Pontresina", Jul 1883, *H. Graef s.n.* (JE!).

Warnstorf (1904) described *Tortula subulata* var. *graeffii* on the basis of "*Barbula graeffii Schlieph. in litt.* (1884)", a taxon never described previously and not validly published, according to Art. 34.1(c) (Greuter & al., 2000), since it was cited as synonym in Warnstorf (1904). A search in the main herbarium where the Warnstorf specimens are kept (B, FH, H, PC) was unsuccessful. However, there is one specimen at Karl Schliephacke Osterfeld herbarium in JE, the label of which matches the locality, date and collector of the single gathering mentioned in the protologue. Also "original" is handwritten on the label. We choose this syntype as lectotype.

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