

Typification of the names of some infraspecific taxa in the *Tortula subulata* complex (*Pottiaceae*, *Bryophyta*) and their taxonomic disposition

María J. Cano

Departamento de Biología Vegetal (Área de Botánica), Facultad de Biología, Universidad de Murcia, 30100 Murcia, Spain. mcano@um.es

Types for the names *Barbula saxicola* Lamy, *Barbula subulata* var. *longifolia* Kindb., *Syntrichia alpina* Brid., *Tortula inermis* var. *submarginata* Schiffn., and *Tortula subulata* var. *compacta* Schiffn., are designated here. *Syntrichia alpina* is considered conspecific with *T. subulata* Hedw., with which *Tortula inermis* var. *submarginata* and *T. subulata* var. *compacta* are also synonymized, as is *Barbula subulata* var. *longifolia* with *T. schimperi* M.J. Cano & al. *Barbula saxicola* is here considered to apply to the species currently known as *Dialytrichia fragilifolia* (Bizot & Cl. Roux) F. Lara; as *B. saxicola* has priority, this necessitates the new combination *D. saxicola* (Lamy) M.J. Cano.

KEYWORDS: *Bryophyta*, lectotypification, nomenclature, *Pottiaceae*, taxonomy, *Tortula*

INTRODUCTION

Many authors have commented on the taxonomic proximity of *Tortula inermis* (Brid.) Mont., *T. mucronifolia* Schwägr., and *T. subulata* Hedw. (Schimper, 1876; Mönkemeyer, 1927; Podpěra, 1954), whose morphological delimitation and taxonomic status have been treated in different ways. A large number of infraspecific taxa have been described reflecting the high morphological variation and intergradation in these species (see Warnstorff, 1912). This complex of taxa, the *Tortula subulata* complex, is mainly distinguished from the rest of *Tortula* by the long leaves, (2.2–)2.5–5.5 mm long, with no hair-point (generally mucronate or apiculate) and a long capsule with twisted peristome teeth emerging from a high, tessellated basal membrane similar to those present in the genus *Syntrichia* Brid.

While preparing a morphometric and molecular study of the *Tortula subulata* complex (Cano & al., 2005), type material of some names of infraspecific taxa currently included in this group was studied. Some of these were typified in a previous study (Cano & Gallego, 2003), although most remained untypified and their taxonomic disposition was in some cases erroneous. In addition, one name previously included in this complex of taxa on account of its long and mucronate leaves was typified and found not be referable to this group any more. Based on a morphological study and with the aim of enhancing nomenclatural stability, lectotypes for five names of taxa currently included in the *T. subulata* complex are proposed. All type citations refer to the information on the labels of the type material. In all cases where the types are designated, the first name given is the one being typified. The accepted names are shown in bold.

TYPIFICATION AND TAXONOMY

1. *Barbula saxicola* Lamy in Rev. Bryol. 2: 67. 1875 ≡ *Tortula subulata* f. *saxicola* (Lamy) Podp., Consp. Musc. Eur.: 250. 1954 ≡ ***Dialytrichia saxicola*** (Lamy) M.J. Cano, **comb. nov.** – Type citation: Sur la surface nue d'un rocher à l'usine de Parpaillat près d'Isle le long de la route d'Aixe; sur les parois extérieures des murs de l'église de Saint-Priest-sous-Aixe. – Lectotype (designated here): [France]: “Haute-Vienne, sur les murs de Saint-Priest-sous-Aixe”, 26 Mai 1872, *E. Lamy s.n.* – S! (No. B63566)
- = *Dialytrichia mucronata* var. *fragilifolia* Bizot & Cl. Roux in Rev. Bryol. Lichénol. 36: 110. 1969 ≡ *D. fragilifolia* (Bizot & Cl. Roux) F. Lara, Fl. Briof. Ibér. Pottiaceae: Timiella, [...]: 26. 2005.

Lamy de la Chapelle (1875) mentioned in the protologue that W.P. Schimper and B. Boulay thought that his plant could be *Barbula subulata* (Hedw.) P. Beauv., although they saw some differences between both taxa, the new taxon having: “des feuilles obtuses, moins longues, moins larges, d'un vert plus foncé, à tissu plus dense moins transparent, non marginées, à bords repliés en-dessous.”

According to Stafleu & Cowan (1979), the original material of Lamy de la Chapelle is kept at PC; however, no syntypes were found in this herbarium (E. Bury, pers. comm.). Additionally, no material of this species was in BR, where duplicates of Lamy de la Chapelle are deposited. Surprisingly, a syntype of this name was found at S. This syntype is in total accordance with the description provided and is chosen as lectotype. After a study of this specimen, it is concluded that it does not belong to the genus *Tortula*, an assignment that Podpěra (1954) suggested

and that was followed in Wijk & al. (1959, 1969). The type specimen shows quadrate, thin-walled marginal cells of the leaf disposed in 2-strata, and a nerve with two stereid bands, the dorsal band being crescent-shaped, which places it in the genus *Dialytrichia* (Schimp.) Limpr. According to Lara (2005, 2006), two species can be recognized in the genus *Dialytrichia*: *D. mucronata* (Brid.) Broth. in Engler & Prantl, Nat. Pflanzenfam. 1(3): 412. 1902 (*Barbula mucronata* Brid., Muscol. Recent. Suppl. 1: 268. 1806) characterized by leaves not fragile and entire margins; and *D. fragilifolia* with fragile leaves and crenate margins. The type of *Barbula saxicola* shows fragile leaves and crenate margins and is here considered to belong to the species that Lara (2005) named *D. fragilifolia*. However, the transfer of *Barbula saxicola* to the genus *Dialytrichia* necessitates the new combination *D. saxicola* (Lamy) M.J. Cano, since *saxicola* is the oldest available epithet applicable to the species recently named *D. fragilifolia*.

2. *Barbula subulata* var. *longifolia* Kindb. in Bull. Torrey Bot. Club 17: 89. 1890 ≡ *Tortula subulata* var. *longifolia* (Kindb.) Paris, Index Bryol., ed. 2, 5: 60. 1906 – Type citation: on the base of trees near Victoria, Vancouver Island and on rocks at Yale, B.C. – Lectotype (designated here): [Canada] “British Columbia, Yale”, 1875, *J. Macoun s.n.* – S! (No. B63565) [= *Tortula schimperi* M.J. Cano & al. in Bot. J. Linn. Soc. 149: 346. 2005].

Kindberg (in Macoun, 1890) described this taxon as an intermediate between *T. angustata* Lindb. and *T. subulata*, characterized by leaves, which are long and narrow, acuminate and acute, distinctly denticulate above, papillose, yellow, bordered, with a long excurrent costa, but shorter in the perichaetial leaves. Three syntypes cited in the protologue were found at S from the Kindberg herbarium; these were all collected by Macoun and labelled as var. *longifolia*: one labelled “Vancouver Island, Victoria” (B63564), one from “Yale” (B63565), and the third merely labelled “British Columbia” (B63563). The packet labelled as being from Victoria, Vancouver Island (B63564) contained two envelopes inside. That marked “b” is a specimen with smooth upper cells which correspond to those of *T. mucronifolia*, whereas the specimen marked “c” reflects the description provided in the protologue. The other two syntypes from S also agree with the diagnosis. The material from Yale and marked with the number B63565 is chosen as lectotype of this name, because it is not mixed, unlike the syntype from Victoria, and it is better preserved than the syntype labelled “British Columbia” (B63563).

The lectotype specimen shows a border of elongate and bistratose marginal cells, which are characteristic of *T. schimperi* and *Barbula subulata* var. *longifolia* is here synonymized under that species.

3. *Syntrichia alpina* Brid., Muscol. Recent. Suppl. 4: 97. 1819 (“1818”) ≡ *Tortula alpina* (Brid.) Arn., Disp. Méth. Mousses: 38. 1925 ≡ *Tortula subulata* subf. *angustifolia* Warnst. in Hedwigia 52: 71. 1912 ≡ *Tortula mucronifolia* f. *angustifolia* Warnst. in Hedwigia 52: 79. 1912 – Type citation: In Pyrenaeis ubi Junio 1803 legimus et in Alpibus Helveticis ubi Thomas serius invenit. – Lectotype (designated here): [Switzerland] “Alpibus ... Helvetia”, 1803, *Thomas s.n.* – B-Bridel! [= *Tortula subulata* Hedw., Sp. Musc. Frond.: 122. 1801].

Bridel (1819) described *Syntrichia alpina* based upon two specimens collected in the Pyrenees and Switzerland and provided the following diagnosis: “caule erecto ramoso fastigiato, foliis oblongo-lanceolatis, acutis strictis, supremis siccitate apice incurvis, capsulae cylindricae erecto cernuae operculo conico subulato”. The two syntypes mentioned in the protologue are deposited in the Bridel herbarium in B. The sample from the Pyrenees has only one plant, which lacks a capsule and does not have an incurved apex. The specimen from Switzerland has all the characteristics referred to the protologue and is better preserved. For this reason, this latter specimen from Switzerland is chosen as lectotype of this name.

After studying the type material, it is concluded that *Syntrichia alpina* should be included in the variation of *T. subulata*, since it has upper and middle laminal cells with conspicuous papillae (in *T. mucronifolia* they are smooth or, more rarely, have inconspicuous papillae) and elongate middle marginal cells (in *T. mucronifolia* they are usually quadrate or short-rectangular).

Warnstorf (1912) placed *Syntrichia alpina* in synonymy under *Tortula mucronifolia* f. *angustifolia* Warnst. Warnstorf provided two different taxonomic treatments in this paper: an “Übersicht über den Formenkreis der *Tortula subulata*” (pp. 69–71) and a “Zweite übersichtliche Darstellung ...” (pp. 73–80). In the first overview, in which the variation is accommodated entirely under *T. subulata*, he published a *Tortula subulata* subf. *angustifolia* Warnst., providing a description (in the key) but citing no specimens, whereas in the second treatment which exactly follows the first taxonomic structure only with change of rank, the variation is accommodated under several species, including *T. mucronifolia*, under which “f. *angustifolia* Warnst.” appears. Although he gave no description of this name, the identical structure makes it clear that it is an alternative name for what earlier in the same paper (p. 71) he had called *Tortula subulata* subf. *angustifolia* and, being prior to 1953, both names are validly published (Art. 34.2 of the ICBN [McNeill & al., 2006]). The two names, although necessarily homotypic themselves, are not necessarily homotypic with *Syntrichia alpina* because Warnstorf (1912) provided a description of *T. subulata* subf. *angustifolia*

and under *T. mucronifolia* f. *angustifolia* cited a Braun specimen from Switzerland as well as indicating that he has seen material (presumably the type) of *S. alpina*. The Braun syntype of *T. mucronifolia* f. *angustifolia* was not found at B. Therefore, in order to simplify and clarify this unusual nomenclatural situation the name *T. subulata* subf. *angustifolia* (and hence *T. mucronifolia* f. *angustifolia*) is here lectotypified with the lectotype of *S. alpina* (see above). Consequently, these names become homotypic with *Syntrichia alpina* which is conspecific with *T. subulata*.

4. *Tortula inermis* var. *submarginata* Schiffn. in Verh. Zool.-Bot. Ges. Wien 69: 336. 1920 – Type citation: [Greece] Phokis: Delphi, an Böschungen, c. 600 m (no. 13) ebendasselbst, am Schatzhause der Athener, in wenigen Stengeln unter anderen Moosen (no. 18); Parnaß, Hochfläche “Livadhi” über 1200 m, Kalk (no. 84). – Lectotype (designated here): “Phokis, Parnass, Hochfläche ‘Livadi’, 1200 m, V. Schiffner s.n. (Universitätsreise nach Griechenland 8–26 Apr 1911 no. 84)” – FH!; isolectotype: W! [= *Tortula subulata* Hedw., Sp. Musc. Frond.: 122. 1801.]

Schiffner (in Schiffner & Baumgartner, 1920) mainly distinguished this taxon from the typical phenotypes of *T. inermis* by leaves with a margin of differentiated thicker walled cells. In the Schiffner herbarium at FH, the three syntypes of this name mentioned in the protologue were detected. In W, two syntypes (no. 13 and no. 84) were found. Numbers 13 and 18 show leaf margins that are regularly recurved from the apex to near the base with oblate upper and middle cell margins. No clearly differentiated border is distinguished. In fact, these specimens show the typical characteristics of *T. inermis* var. *inermis* and they are identified with that taxon. However, the syntype from Parnass (no. 84) shows irregularly recurved leaf margins (it is possible to find, in the same plant, leaves with recurved margins in the middle part, from basal third to the apex or upper third or totally plane, and even in the same leaf one margin may be plane and another recurved) formed by more quadrate or rectangular cells, although some oblate cells can be seen. It also shows thicker walled marginal cells. This, together with the less recurved or plane margins, provides a more differentiated border than in *T. inermis*. Therefore, syntype no. 84 is more in accordance with the description provided in the protologue and is chosen as lectotype of *Tortula inermis* var. *submarginata*.

According to Düll (1992) this variety has been recorded from Corsica, Crete, Cyprus, and Greece. It has also been detected in the Canary Islands, Morocco, Sicily, Spain, Syria, Turkey (Cano, 2006), and Armenia (Townsend, 2005). According to Cano & al. (2005), this taxon should be included in *Tortula subulata*.

5. *Tortula subulata* var. *compacta* Schiffn. in Österr. Bot. Z. 48: 390. 1898 – Type citation: [Czech Republic] In der Gegend von Prag ist auf Kalk- und Kieselschieferfelsen (z. B. bei Selc; ober Zámky etc.). – Lectotype (designated here): “Prag: Kieselschieferfelsen an der Strasse hinter Selc”, 22 Jul 1898, V. Schiffner s.n. – FH! [= *Tortula subulata* Hedw., Sp. Musc. Frond.: 122. 1801].

In PC there is one syntype labelled “Bei Prag” from the Schiffner herbarium. In the Schiffner herbarium in FH, three syntypes labelled as Prague (two from Selc and another from Zámky) were found. The syntype at FH collected “an der Strasse hinter Selc” is selected as lectotype, because it is the syntype better preserved and is in accordance with the protologue.

According to Schiffner (1898), this taxon is characterized by its compact turfs, its short and narrow capsule, and leaves which sometimes have margins recurved to near the apex. All these characters are included in the variation shown by *T. subulata*.

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