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## *Trichostomum azoricum* Cardot newly synonymised with *Timmiella barbuloides* (Brid.) Mönk.

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During a revision of the Pottiaceae names related to *Pottiopsis* Blockeel & A.J.E.Sm., *Trichostomum* Hedw. and *Weissia* Hedw., a complete list of synonyms of names at all taxonomic ranks was extracted from the literature. *Trichostomum azoricum* Cardot was included in this list, following Corley et al. (1981), Sjögren (2001), Gabriel et al. (2005), Ros et al. (2013) and the Azorean Biodiversity Group (2023), who considered it a synonym of *Weissia triumphans* (De Not. ex Schimp.) M.O.Hill (= *Trichostomum triumphans* De Not. ex Schimp.).

This species was described as new by Cardot (1897), along with several other new taxa, in a paper on the mosses of the Azores based on specimens collected in 1894 and 1896 by Mr William Trelease, then director of the Missouri Botanical Garden, and by Mr C. S. Brown, Dr Bruno Carreiro and Sr D. C. Machado.

The name was combined as *Didymodon azoricus* (Cardot) Kindb. by Kindberg (1898) without much explanation, and later, Podpěra (1954) proposed the combination *Trichostomum triumphans* var. *azoricum* (Cardot) Podp., a name used by Wijk et al. (1969), Eggers (1982) and Zander (1993). This taxon has been reported from other Azorean islands, such as Faial, São Jorge and São Miguel (Eggers 1982), and from mainland Portugal, in Coimbra (Podpěra 1954).

Cardot (1897) indicated in the protologue that the new species was 'Allied to the European *T. triumphans* De Not. and *T. pallidisetum* H. Müll., but distinguishable at first sight by its larger leaves and red pale pedicel'. Probably it was this opinion that caused all the authors dealing with these names to consider them closely related or even synonymous, without studying any type specimens (Kindberg 1898; Podpěra 1954).

On examining the original collections deposited in Cardot's herbarium at PC and a duplicate kept at MO, we observed that both clearly belong to the genus *Timmiella* (De Not.) Limpr. Although Cardot (1897) carefully described and drew the gametophyte and the sporophyte, he did not notice some important morphological

characters, especially the very strong stem central strand; the bistratose leaf lamina that obscures the lamina cells, as mentioned in the protologue; and the cells that are strongly mamillate and bulging on the ventral side of the leaf but flat on the dorsal side of the leaf. All these characters are diagnostic for species in the *Timmiella*-ceae (Zander 1993; Inoue and Tsubota 2014). The large size of the leaves and setae, as well as the red setae, are clearly diagnostic for species in the genus *Timmiella* (Soria et al. 2006). Another important character that separates this genus from *Pottiopsis*, *Trichostomum* and *Weissia* is the peristome, which consists of 16 teeth that are regularly divided into a pair of segments of similar length (Soria et al. 2006). In *Pottiopsis caespitosa* (= *Weissia triumphans* = *Trichostomum pallidisetum*), the peristome can be similar, but then it is divided into two segments of different length, sometimes anastomosed or perforated (Ros and Werner 2007). Although the capsules of *Tr. azoricum* were described in the protologue as having a two-row annulus (as in *Pottiopsis caespitosa* and some *Timmiella* species), we could not confirm this character in the type specimens studied. In our opinion, what Cardot considered to be the annulus corresponds to the two uppermost rows of cells around the capsule mouth, which are hyaline but remain attached to the urn and are not deciduous as is the case with the true annulus of *Pottiopsis* and some *Timmiella* species. The absence of the annulus, the straight peristome teeth, and the monoicous sexual condition (according to Cardot; we could not confirm this in the type specimens because of the scarcity of material) indicate that the correct placement for *Tr. azoricum* is under *Ti. barbuloides* (Brid.) Mönk. Our identification coincides with the floristic data published from the Azores, from where only *Ti. barbuloides* has been reported, namely from the islands of Faial, Pico, São Jorge, São Miguel and Terceira (Gabriel et al. 2005; Azorean Biodiversity Group 2023).

The plants of *Timmiella barbuloides* are found in the original material mixed with some sterile plants of *Trichostomum crispulum* Bruch and *Didymodon vinealis*

(Brid.) R.H.Zander. The latter has leaves that are morphologically very different from both *Trichostomum* and *Timmiella*, which makes it easy to separate from those species. However, the leaves of *Tr. crispulum* can be similar to those of *Ti. barbuloides*, and it could be argued that Cardot used plants of this species to describe *Tr. azoricum*. This is highly unlikely, however, as there are very few plants of this species in the type specimens, and they lack sporophytes. In addition, *Tr. crispulum* is dioicous. The only plants in the type specimens that are monoicous and have sporophytes correspond to *Ti. barbuloides*.

The only original specimen in Cardot's Herbarium in PC is here designated as the lectotype, with a duplicate in MO, and we formally propose the following synonymy.

***Timmiella barbuloides*** (Brid.) Mönk., Laubm. Eur. 273. 1927.

≡ *Trichostomum barbuloides* Brid., Muscol. Recent. Suppl. 1: 233. 1806.

= ***Trichostomum azoricum*** Cardot, Rep. (Annual) Missouri Bot. Gard. 8: 58. 5. 1897. ≡ *Didymodon azoricus* (Cardot) Kindb., Rev. Bryol. 25: 91. 1898. ≡ *Trichostomum triumphans* var. *azoricum* (Cardot) Podp., Consp. Musc. Eur. 193. 1954. **syn. nov.** Type citation: "Terceira" (Trelease, Pl. Az. no. 1383)". Type: [Portugal] Plants of the Azores distributed by the Missouri Botanical Garden, N° 1383, Terceira, 6/29 1894, *Wm. Trelease* (lectotype [designated here], PC0058456!; isolectotype, MO2849878).

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## Disclosure statement

No potential conflicts of interest were reported by the authors.

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