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Frullania tamarisci var. *azorica* (Jubulaceae, Marchantiopsida), a new taxon from the Azores

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Abstract: *Frullania tamarisci* (L.) Dumort. var. *azorica* J.-P.Frahm (subg. *Frullania*) is described as new from the islands of Terceira and Pico (Azores, Portugal). It resembles var. *tamarisci*, but differs in longly apiculate, incurved leaf apex ending in an unicellular tip and not decurrent underleaves.

In August 2004, I spent two weeks of holidays on the islands of Terceira and Pico in the Azores. Amongst the specimens I collected during this trip were some new records of species, which were published separately (Frahm 2005a). Some specimens still withstand the identification, since these (especially pleurocarpous mosses) are possibly not European species but maybe tropical ones or perhaps also endemics. Endemics are here regarded as palaeoendemics, relicts of the bryoflora of continental Europe in the Tertiary, which survived here on the Makaronesian Islands. This effect is indicated by the genera *Echinodium* and *Andoa*, which are known as fossils from the Tertiary of Europe, but presently left over only in the Macaronesian Islands.

One of the unidentified liverworts was a *Frullania*. The plants are very conspicuous at first glance in view upon the dorsal side because of the incurved leaf apices, which end in a long fine acumen. They were collected several times on top of Serra de Santa Barbara in Terceira and once in Pico. Pictures viz. specimens of this taxon were sent to J. Vana, S. Robbert Gradstein, Tamas Pócs, Alfons Schäfer-Verwimp or Manuela Sim-Sim, specialist on Macaronesian *Frullania* species. The colleagues had either no opinion on this specimen, confirmed that it is a species not known from Europe, regarded it as an tropical species or included the specimen into the large variability of *F. tamarisci*. The acuminate-apiculate leaf lobules clearly place the specimens in *Frullania* sect. *Tamariscinae*, but the question is whether these specimen belong into the variability of *F. tamarisci*, represent an infraspecific taxon of the latter, a species described from overseas or a new hitherto overlooked species.

The variability of *Frullania tamarisci* is treated in several publications (Müller 1958, Grolle 1970, Hattori 1972, Bisang et al. 1989). Müller (1958) described the species as very polymorphous and distinguishes five varieties except for the typical variety in Europe and Macaronesia:
var. *robusta* Lindbg. with evolute lobules and almost lacking ocelli.
var. *sardoa* De Not. with long teeth at base of the underleaves.
var. *mediterranea* De Not. = var. *atlantica* Schiffn. with blunt leaves and round underleaves and almost lacking ocelli.
var. *cornubica* Carr. with acute leaves and lacking, scattered ocelli, only rarely arranged in a line,
var. *atrovirens* Carr. with evolute lobules and scattered ocelli, similar to var. *robusta*.
None of the varieties listed fit the specimens from the Azores.
Grolle (1972) gave no description of the varieties.
Hattori (1972) provided a worldwide overwiew of the *Frullania tamarisci* complex, the infraspecific taxa of the European *F. tamarisci* and the closely related species in North America and Asia. Neither his key leads to the taxon from the Azores nor the numerous illustrations describing the great variability fits this taxon.
Bisang et al. (1989) refer to the same varieties mentioned by Müller (1958). The other relevant literature (Paton, Damsholt) gives no indication of forms of *F. tamarisci* with such a long spiny leaf apex. Therefore it can almost be excluded that this taxon has already been described before as infraspecific taxon of the latter. The differences of the Azorean plants are, however, so important to recognize these plants as infraspecific taxon of *F. tamarisci*. Therefore it shall be described here as new variety.

Frullania (subg. *Frullania*) *tamarisci* (L.) Dumort. var. *azorica* J.-P. Frahm var. nov. (sect. *Tamariscinae*)

Differs a var. tamarisci stature minore, cellulis laminalibus minoribus lobulis dorsalibu. Lobuli dorsales cum apicibus longis, incurvatis, as 12 cellulas longis, in extreme apice uniseriatis, foliis ventralibus nec decurrentibu, ocellis uniseriatis.

Types: Portugal, Azores, Terceira, Serra de Santa Barbara, *Calluna-Juniperus* heathland NE of the radio station, 950 – 1000 m alt., on branches of shrubby junipers, leg. Frahm 22.8.2004 no. Az 316. Hholotype hb. Frahm (BONN), isotype LISBON. Pico, southern flanc of Mt. Pico above the villages of S. Mateus and S. Caetano, grazed *Laurus-Pittospermum-Erica*-forest 515 m alt., on bark, leg. Frahm 28.8.2004 no. Az 315 (paratype).

Description. Plants prostrate, in loose mats between other hepatics, light olive brown, dark brown or brown with lighter, stem and branch tips, sometimes pinkish (as in *F. fragilifolia*) never red brown or copper coloured as *F. tamarisci*, 1 (-3) cm long and 0.36 – 0.4 mm wide, sparsely and irregularly 1(-2) times branched. Stems about 80 µm, branches 40-60 µm wide. Leaves imbricate, lobes 200 µm long and 300 µm wide, oval, the apex incurved for about 1/3 of the length of the lobe, ending in a very acute tip. The leaf tip is 4-5 cells wide at base and gradually narrowed into a long acumen which ends in an unicellular row of 4-5 cells. Ocelli in a median unicellular row of 5-11 cells in most but not all leaves, rarely additional single scattered cells. Laminal cells roundish, 8-10 µm in diameter, with small trigones. Oil bodies 5-8 per cell, 1,5-3 µm large, round to ellipsoid. Lobules 150-160 µm long and 80 µm wide, twice as long as wide; evolute lobules not seen. Underleaves obovate, 160 – 200 µm long and 140 – 160 µm wide, twice as wide as the stem, slightly longer than wide, not decurrent along the stem but at base, with a short tooth at each side, sinus ¼ of the length, margins plane or rarely slightly incurved in the middle. Male branches orbicular. Female bracts bifid to about half the length. Perianth 0.8 mm long and 0.4 mm wide, twice as long as wide, in the upper part with three edges and short beak, 80 µm long. Sporophytes not seen.
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Distinction. The species resembles much *Frullania tamarisci* in the field, but is much

Frullania tamarisci var. *azorica*, holotype: 1. Mat. 2. Single plant. 3., 4., 6. Plants from below, 5. Incurved leaf with uniseriate leaf apex. 7. Laminal cells. 8. Perianths. 9. Plant with male bracts.

smaller. It can be distinguished already in the field with a hand lens by the much incurved leaf tip which ends in a long, fine tip. This tip is 1-4 cells long in *F. tamarisci* but about 12 cells long in this new variety, of which the outermost cells form a unicellular row of about 6 cells. Under the microscope it gets apparent that the underleaves are not decurrent as *in F. tamarisci* and longer. The line of ocelli can be 2 cells wide in *F. tamarisci* or even branched, which is not the case in var. *azorica*. The oil bodies are more numerous and smaller than those of *F. tamarisci* and the laminal cells and perianths are much smaller. *Frullania tamarisci* has also the leaf apices incurved, however, very much shorter.

Ecology. On Terceira, *Frullania tamarisci* var. *azorica* was found in wet subalpine haethland dominated by *Calluna vulgaris* and *Juniperus brevifolia*. Dominating bryophytes were *Campylopus shawii, Herbertus azoricus, Bazzania azorica, Breutelia azorica, Sphagnum denticulatum* (also in monoclade expression, see Frahm & Sabovljevic in prep.), *S. cuspidatum, S. palustre, S. imbricatum, S. subnitens* and *Scapania compacta*. The species grew in thick hepatic mats covering almost horizontal branches in the sheltered inside of dwarf shrubs of *Juniperus brevifolia*. together with *Plagiochila* spp., *Odontoschisma prostratum, Lepidozia pearsonii* (new to the Azores, see Frahm 2005a), *Lepidozia stuhlmannii, Scapania gracilis, Lejeunea mandonii* and *Echinodium prolixum*. As it can be seen from the enumeration of species, this locality is a bryologically hot spot (Frahm 2004) and protected as part of a larger FFH-area. On Pico, the new variety grew on bark of trees in a low, grazed forest. Accompanying bryophytes were on bark *Porella obtusata, Frullania teneriffae, F. fragilifolia, Sematophyllum substrumulosum, Lejeunea eckloniana, Metzgeria leptoneura, Radula holtii, R. aquilegia, Hypnum uncinulatum, Lejeunea lamacerina, L. cavifolia, L. mandonii, L. flava* (? with smooth perianth), *Radula aquilegia, Marchesinia mackayii, Harpalejeunea ovata,* and on soil *Dumortiera hirsuta, Leucobryum juniperoideum, Atrichum angustatum, Jubula hutchinsiae, Fossombronia angulosa, Entosthodon obtusus, Chiloscyphus polyanthus, Calypogeia azorica* and others. Although this locality is also part of the protected FFH-area, it was much disturbed. Nevertheless it is still very rich in species and one of the few true (although low) *Laurus* forests of the island, whereas the so called forests in the interior are very low, shrubby, much degraded and partly inaccessible. The species richness is possibly due to the high humidity. Although south exposed, there was often a cloud belt reaching from the W-slope around the foot of Mt. Pico. Unfortunately, the (less steep) western slope is clear cut and transformed into meadows.

Frullania tamarisci var. *azorica* resembles somehow *F. elongatistipula* (Verd.) Hatt. (*F. monilata* var. *elongatistipula* Verd. in Handel-Manzetti) known from two collections from Yunnan. This species has also very long leaf apices but not as long as here and never ending in unicellular tips, and longer and more deeply incised underleaves.

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