Syntrichia echinata (Schiffn.) Herrnšt. & Ben-Sasson (Pottiaceae, Bryopsida) new to Italy

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Abstract – Syntrichia echinata (Schiffn.) Herrnšt. & Ben-Sasson, previously known in Europe only from Crete and Greece, is reported for the first time in Italy. It has been collected at Rocca Busambra in northern Sicily. Outside Europe, this Mediterranean montane species is distributed in south-western Asia. The principal distinctive characters that separate it from other Syntrichia species with pedicellate papillae, such as S. minor, S. papillosissima and S. subpapillosissima are discussed.

Muscí / Syntrichia echinata / S. minor / S. papillosissima / S. subpapillosissima / distribution / Sicily

INTRODUCTION

During the study of the Sicilian Natural Reserve “Bosco della Ficuzza, Rocca Busambra, bosco del Cappelliere e Gorgo del Drago” we have identified a specimen of Syntrichia Brid. whose singular leaf papillosity did not match any previously known species of this genus in Italy. After the study of several plants, we conclude that they correspond to Syntrichia echinata (Schiffn.) Herrnšt. & Ben-Sasson, a Mediterranean-montane taxon distributed in Europe and South West Asia.

Schöffner (1915) described Tortula echinata from Crete on the basis of the smaller size of its gametophyte and sporophyte in comparison with Syntrichia princeps (sub Tortula muelleri Hook. f. & Wilson), and its higher and branched papillae. Later, Pedývá (1954) assigned this taxon to the genus Syntrichia as a subspecies of S. princeps (De Not.) Mitt. Soon afterwards, Bizoń (1956) considered it as a variety of Tortula princeps De Not. Kramer (1980) reinstated it as a subspecies, but this time of Tortula princeps, while Zander (1993) considered it again as a variety of Syntrichia princeps. Finally, Herrnštad et al. (1982) reinstated it at the specific rank under the new combination Syntrichia echinata, since they considered the different type of papillae of the leaf laminar cells as an
important taxonomic character. Recently, Gallego et al. (2002) stated that the number, length, and shape of the lamina papillae are distinctive characters in the genus Syntrichia, constituting a good character for the separation of species.

MATERIAL AND METHODS


RESULTS

Description of Sicilian specimen

Syntrichia echinata (Schiffn.) Herrnst. & Ben-Sasson, The bryologist 85: 216. 1982 (Fig. 1)

Plants 1.5 cm high. reddish to brownish. Stems erect, branched. Leaves weakly spirally twisted and incurved when dry, erecto-patent when moist, 2.5-3.2 mm long, ovate-lanceolate, obtuse, unistratose, weakly constricted at the middle; hair point hyaline, brown at base, 0.3-0.5 mm long, denticulate; margins recurved from base to the upper third; costa 80-100 μm wide; in cross section with hydroids and 4-6 dorsal stereid rows, with simple or bifurcate papillae, (3)5-6.2 μm high on the dorsal side; upper and middle laminal cells quadrate, (10)12.5-15 μm wide, usually with 1, sometimes with 2 pedicellate and star-shaped papillae per cell, (6)10-12.5(17.5) μm high; juxtastral basal cells rectangular, hyaline, 50-90 x 15-25 μm. Synoicous. Sporophytes not found.

Ecology. – The Sicilian specimen of Syntrichia echinata has been collected on exposed basic rock at 1143 m a.s.l. This is usual for this saxicolous Mediterranean species which is not known to occur above 2000 m. According to Rivas Martinez (1991) the area where this moss grows in Sicily corresponds to the meso-Mediterranean belt with a subhumid ombrotype.

Fig. 1. Syntrichia echinata (from Sicilian specimen). a: Leaves. b: Cross section of the costa in the middle part. c: Detail of the papillae in cross section of the leaf at the middle part.
Table 1. Morphological characters distinguishing *Syntrichia echinata* from other similar taxa.

<table>
<thead>
<tr>
<th></th>
<th><em>S. echinata</em></th>
<th><em>S. minor</em></th>
<th><em>S. papillosissima</em></th>
<th><em>S. princeps</em></th>
<th><em>S. subpapillosissima</em></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Leaf margins</strong></td>
<td>recurved up to the upper third</td>
<td>usually plane, sometimes slightly recurved up to midleaf</td>
<td>recurved up to the leaf apex, sometimes up to the upper third</td>
<td>recurved up to the leaf apex, sometimes up to the upper third</td>
<td>recurved up to the leaf apex, sometimes up to the upper third</td>
</tr>
<tr>
<td><strong>Number of papillae</strong></td>
<td>1-2</td>
<td>1</td>
<td>1</td>
<td>(4)-6</td>
<td>(2)-6</td>
</tr>
<tr>
<td>in the upper and median laminal cells</td>
<td>Star-shaped, pedicellate</td>
<td>Star-shaped, pedicellate</td>
<td>Star-shaped, pedicellate</td>
<td>Bifurcate, not pedicellate</td>
<td>Bifurcate, rarely star-shaped, sometimes pedicellate</td>
</tr>
<tr>
<td><strong>Shape of papillae</strong></td>
<td>(6)-12.5-15(17.5) μm</td>
<td>10-15(7.5) μm</td>
<td>10-15(12.5) μm</td>
<td>2.5 μm</td>
<td>(5)-7.5-10 μm</td>
</tr>
<tr>
<td>in the upper and median laminal cells</td>
<td>(7.5)-12-15(15) μm</td>
<td>(7.5)-10-12.5 μm</td>
<td>10-12.5 μm</td>
<td>12.5-15(17.5) μm</td>
<td>(7.5)-10-12.5 μm</td>
</tr>
<tr>
<td><strong>Length of papillae</strong></td>
<td>12.5-15(17.5) μm</td>
<td>7.5-10-12.5 μm</td>
<td>12.5-15(17.5) μm</td>
<td>7.5-9(10) μm</td>
<td>12.5-15(17.5) μm</td>
</tr>
<tr>
<td>in the costa</td>
<td>12.5-15(17.5) μm</td>
<td>10-12.5 μm</td>
<td>12.5-15(17.5) μm</td>
<td>7.5-9(10) μm</td>
<td>12.5-15(17.5) μm</td>
</tr>
<tr>
<td><strong>Sexuality</strong></td>
<td>dioecious</td>
<td>dioecious</td>
<td>dioecious</td>
<td>dioecious</td>
<td>dioecious</td>
</tr>
</tbody>
</table>

**DISCUSSION**

This species is mainly characterized by the presence of 1, sometimes 2, pedicellate and star-shaped papillae in the upper and median laminal cells, (6)-12.5-17.5(22.5) μm high; the cross section of the costa with 3-7 dorsal stereid rows, with hydroids; the leaf margins recurved up to the upper third; the upper and middle laminal cells measuring (10)-12.5-15 x (12.5)-15-17.5 μm and by the synocious condition.

In the form of its leaf papillae, *Syntrichia echinata* is similar to *S. papillosissima* (Copp.) Loeske, reported from Italy (Cortini Pedrotti, 2004) and recently also recorded in Sicily (Lo Manto & Provenzano, 2004) and *S. minor* (Bizz.); M. T. Gallego, J. Guerra, M. J. Cano, Ros & M. C. Sánchez-Moya, which is unknown in Italy. These three taxa differ (Tab. 1) in their sexuality (*S. papillosissima* shows margins recurved up to the leaf apex, and in *S. minor* they are usually plane) and the size of the middle and upper laminal cells (*S. echinata* has wider laminal cells than *S. papillosissima* and *S. minor*). In addition, *Syntrichia echinata* sometimes exhibits more than one papilla per cell in the upper and middle laminal cells, whereas *S. papillosissima* and *S. minor* have only one, and

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*S. echinata* 
Leaves ~216, 1982 leaf. Leaves moist, 2.5-3 cm long, 0.3-0.5 cm broad, entire at the base; margins recurved up to the upper third; the leaf apex, 3.5-6.2 μm 12.5-15 μm pedicellate and star-shaped papillae per mm, 50-90 μm high. The costa is thick, with 3-7 dorsal stereid rows, with hydroids; the leaf margins recurved up to the upper third; the upper and middle laminal cells measuring (10)-12.5-15 x (12.5)-15-17.5 μm and by the synocious condition.

In the form of its leaf papillae, *Syntrichia echinata* is similar to *S. papillosissima* (Copp.) Loeske, reported from Italy (Cortini Pedrotti, 2004) and recently also recorded in Sicily (Lo Manto & Provenzano, 2004) and *S. minor* (Bizz.) M. T. Gallego, J. Guerra, M. J. Cano, Ros & M. C. Sánchez-Moya, which is unknown in Italy. These three taxa differ (Tab. 1) in their sexuality (*S. papillosissima* and *S. minor* are dioecious), the curvature of the leaf margins (*S. papillosissima* shows margins recurved up to the leaf apex, and in *S. minor* they are usually plane) and the size of the middle and upper laminal cells (*S. echinata* has wider laminal cells than *S. papillosissima* and *S. minor*). In addition, *Syntrichia echinata* sometimes exhibits more than one papilla per cell in the upper and middle laminal cells, whereas *S. papillosissima* and *S. minor* have only one, and
contrary to *S. papillosissima* and *S. minor*, it has hydroids in the costa section. Other species that may have pericellulate papilae is *Synrichia subpapillosissima*, although this taxon usually has (2)-4-6 bifurcate, rarely branched star-shaped papilae per cell, (5)7.5-10 μm high. Moreover, *S. subpapillosissima* has not hydroids, presents upper and middle laminar cells 10-12.5 x (7.5)10-12.5 μm, and is dioecious.

*Synrichia echinata* is also closely related to *S. princeps*, a widespread taxon in Sicily (Dia et al., 1987), since they share the size of upper and middle laminal cells, leaf margins curvature, structure of the cross section of the costa and sexuality. However, these two taxa differs essentially in the type of leaf papilae, since *S. princeps* has (4)-6-12 bifurcate, not pedicellate papilae per cell.

*Synrichia echinata* has been reported from eastern Mediterranean area: Cyprus (Koppe, 1976), Greece (Crete, Schifferm., 1915), Israel (Herrnstadt et al., 1982), Jordan (El-Oqlah et al., 1988), Lebanon (Kramer, 1980) and Turkey (Walther, 1970). Therefore, the Sicilian record extends the distribution range of this taxon to the Central Mediterranean area.

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REFERENCES


Abstract — A new check-list of the mosses of Italy, with a study of tortula species. A new species, *Tortula rigescens*, from Jordan, is described and illustrated. The species is compared with other tortula species in the Mediterranean area and beyond. *Tortula rigescens* is a new record for the Mediterranean region and neighboring areas. The species is also recorded from Israel.


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Mosses / Liverworts

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