

A Note on *Riccia sorocarpa* Bisch. in Turkey

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Abstract

The thalloid liverwort *Riccia sorocarpa* Bisch. belonging to the class *Marchantiopsida* (*Hepaticae*) of the division *Bryophyta* is reported for the first time from Northeast Black Sea Region. The species was collected from Şavşat - Artvin near Georgia-Turkey border. The species is generally distribution West and South Anatolia. This investigation is important on account of the first *Riccia* record for Northeast Black Sea Region and A5 grid-square and extension of *Riccia sorocarpa* distribution area in Caucasus.

Key words: Liverwort, *Riccia*, *Marchantiopsida*, Black Sea Region, Turkey.

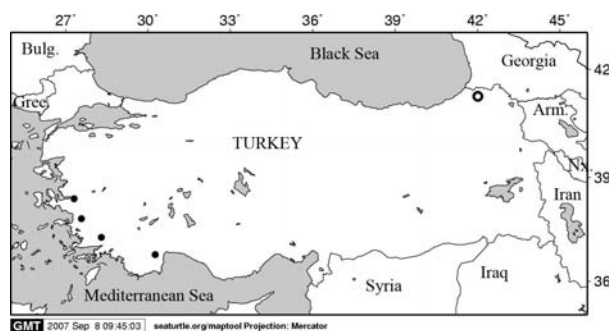
INTRODUCTION

The genus *Riccia* L. (*Ricciaceae*) is one of the richest genera in the Turkish Liverwort Flora, with 17 species reported up to now [1]. First recorded species of *Riccia* from Turkey is *R. bifurca* Hoffm. as reported in 1905 by Penther and Zederbauer [2]. This was followed by *R. macrocarpa* Levier in 1908 reported by Schiffner [3]. Two further additions were making by Bornmüller in 1931 and Jovet-Ast in 1957 [4, 5]. Thus, prior to 1960, the total number of the *Riccia* species recorded was only 4. The detailed studies by Jovet-Ast, Walther, Henderson, Crundwell, Çetin, Gökler and Aysel and us during 1965-2000 raised the species number to 17 for this genus [6-12].

The flora lists about the liverwort of the East Black Sea are not including *Riccia* genus [7, 13-27]. The eastern part of Black Sea Region is connected with that of adjacent western Georgia, including the western part of the main ranges of the Caucasus. The Caucasus region is rich about *Riccia* genus [28, 29].

The collected area is connected with that of adjacent western Georgia, including the western part of the main ranges of the Caucasus. The climate of the region is a somewhat different from the Black Sea Coastal Mountain Region due to the continental effects. The region is under cold and humid, semi humid climatic influences. The mean annual temperature varies between 7-12 °C; the mean July temperature is 16 °C and the mean January temperature is nearly 2 °C. The mean annual precipitation range about 660 mm in this region. There is organic matter accumulation on the soil because the temperature is insufficient for the decaying of the matter. The organic acid and excessive precipitation lead to the increase of the acidity of soils. For this reason acid soils are dominant. The flora of the montane coniferous forests and the alpine zone shows close links with the same zones in the Caucasus. Leading forests are composed of scots pine (*Pinus sylvestris* L.), fir (*Abies nordmanniana* (Stev) Spach. ssp. *nordmanniana*), black pine (*Pinus nigra* Arn.), spruce (*Picea orientalis* (L.) Link.) and oaks appear on the lower part of this region. *Picea orientalis* forests with *Pinus sylvestris* and *Abies nordmanniana* ssp. *nordmanniana* are common in the Şavşat [30].

MATERIAL AND METHODS



Plant specimen was collected from Artvin-Şavşat-Mısırlı in 2005 (Figure 1).

Figure 1: The general distribution of *Riccia sorocarpa* in Turkey.

- The distribution of the *Riccia sorocarpa* species to various provinces.

In the study, the collected area of the *Riccia sorocarpa* in Artvin.

The material was cleaned with water so as to remove the soil and obtain a clear view of the colour, which is an important feature in the identification of some bryophytes. Herbarium specimen was prepared from a part of the material in a well-lit, ventilated room. This was put in a special envelope. Some parts of specimen were kept fresh for the study of their morphological and anatomical characteristics.

Determinations were carried out using different previously reported lists as well as flora books [6, 31, 32]. A specimen was deposited in the herbarium of the Department of Biology, Faculty of Education, Adnan Menderes University.

RESULT AND DISCUSSION

Divisio: *Bryophyta*
Classis: *Marchantiopsida*
Ordo: *Marchantiales*
Family: *Ricciaceae*

Riccia sorocarpa Bisch., 1835

Synonymes: *Riccia minima* L. ; *R. lindenberiana* Saut.; *R. epicarpa* Wallroth ex. Gott. Lindenb. et Nees; *R. lindenbergii* Saut. ex. Gott. Lindenb. et Nees; *R. insularis* Lev. ex Steph.; *R. raddiana* Jack et Lev. ex Steph., *R. sorocarpa* var. *heegii* Schiffn.

Plants glaucous green or rarely violet beneath, usually becoming pale brown or yellowish with age, in partial or complete rosettes, (0.5) 0.8–2 cm diameter (Figure 2). Thalli 2–3 (5) times dichotomously branched, deeply furrowed, lobes 0.5–0.15 (2) mm wide and 3–10 mm length, narrowed to apex, marginal cilia lacking. The best mark of recognition lies in the deep, sharply defined groove in the median line of the thallus. Ventral scales hyaline, soon vanishing.



Figure 2. Thallus of *R. sorocarpa*.

Thallus in transverse section 2-3 times as wide as thick, margin acute, epidermal cells hyaline, rounded, thin walled, soon vanishing, subepidermal cells also hyaline, thick walled and persisting. *R. sorocarpa* may be distinguished in the field by the hyaline, thick walled subepidermal cells, these being thin walled and chlorophyllose in other species (Figure 3).

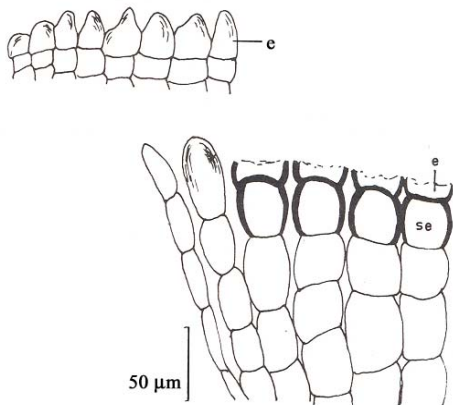


Figure 3. Transverse section of thalli; hyaline, rounded, thin walled epidermal cells and thick walled subepidermal cells. e; epidermal cell, se; subepidermal cell

Monoicous, usually fertile. As in all species of *Riccia*, the rounded antheridia and flask-shaped archegonia are sunk within the tissues of the thallus. The capsule, which remains embedded in the thallus, contains no sterile cells, only spores, which are large and comparatively few in number. Capsule very common, spore dark brown, 75–90 (110) μm . In common with the other species of this genus, the older parts of the plant decay to release the large black spores, which may be seen lying about the surface of the old, discoloured thallus.

It is found on moist acid to base rich, clayey to gravelly or humus rich soil, sometimes on shallow soil on various types of rock including limestone, and on earth-topped walls. In arable fields, gardens and pastures, on paths, track ways, waste ground, roadsides, woodland tracks, besides streams and lakes. Associated with other *Riccia* sp., sometimes *Fossombronia*, *Sphaerocarpos* and members of the *Anthocerotaceae*.

Specimen examined

The new locality of *R. sorocarpa*: A5 grid-square adopted by Henderson (1961), Artvin; Şavşat, Meydancık City Hall, Mısırlı Parish, Georgia-Turkey border, on soil near stream banks forest track. 1100 m, 41° 14. 31' N 42° 21. 52' E, Southwest, 10.08.2005, collector: Hatice Özenoğlu Kiremit (Özenoğlu A5 / 1).

Distribution in Turkey: (Figure1)

İzmir, Pınarbaşı, [7]; İzmir, Örnekköy.

Aydın, Davutlar, Samsun Mountain [9]; Aydın, Davutlar, Dilek Peninsula National Park [33];

Muğla, Söke-Milas road [34]; Muğla, Fethiye [35].; Muğla, Milas, Kapıkırı Village [36].

Antalya, near Finike [9].

Riccia sorocarpa a cosmopolite species in the world.

The *Riccia* members are found practically over all parts of the earth. The *Riccia* genus comprising about 200 species with a worldwide distribution up to the Arctic and Antarctic, but more frequent in areas with Mediterranean-type climates [37]. About 40 species are distribution in Europe and SW Asia. Some species are only distribution in Mediterranean Region such as *Riccia crozalsii*, *R. atromarginata*, *R. gougetiana*, *R. bicarinata*, etc. But some *Riccia*'s widespread distribution is due in part to its ability to tolerate a very wide range of environments such as *Riccia sorocarpa* species.

The genus *Riccia* L. (*Ricciaceae*) is one of the richest genera in the Turkish Liverwort Flora, with 17 species reported up to now [1]. The *Riccia* genus generally distribute to Northwest, West and South Anatolia areas with Mediterranean-type climates (Figure 1) [7, 9, 12, 20, 33-36]. Up to now, members of *Riccia* genus have not been frequently recorded in Black Sea Region and East Anatolia [9, 13-16, 19-23, 25]. Black Sea Coastal Region not a suitable area for *Riccia* members that prefer to Mediterranean-type climates. But climate of inner part of the region, which includes the western part of the main ranges of the Caucasus, is different from the Black Sea Coastal Mountain Region due to the continental effects. The Caucasus Region liverworts flora contains some *Riccia* species be included *Riccia sorocarpa* [28].

This investigation is important on account of the first *Riccia* record for Northeast Black Sea Region and extension of *R. sorocarpa* distribution area in Caucasus. Also the first *Riccia* record for A5 grid-square. We believe that *Ricciaceae* members can be founded only through detailed investigation surveys of localities with ecological conditions suitable for the growth of these plants.

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