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The second locality record of *Gigaspermum mouretii* Corb. (Gigaspermaceae), a rare bryophyte taxon, from Türkiye

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Abstract

In this study, we present *Gigaspermum mouretii*, a rare taxon recorded for the second time from Türkiye. A detailed description of the species is given and presented with anatomical and morphological drawings. The map also displays its distribution areas in the Mediterranean countries.

Keywords: Bryophytes, Flora, Bafa Lake, Metamorphic rocks

Nadir bir karayosunu taksonu olan *Gigaspermum mouretii* Corb.'nin (Gigaspermaceae) Türkiye'den ikinci kaydı

Öz

Bu çalışmada, nadir bir takson olan ve Türkiye'den ikinci kez kaydedilen *Gigaspermum mouretii* sunulmaktadır. Türün ayrıntılı bir tanımı verilmiş ve anatomik ve morfolojik çizimlerle sunulmuştur. Ayrıca, Akdeniz ülkelerindeki dağılım alanları haritada gösterilmiştir.

Anahtar kelimeler: Karayosunları, Flora, Bafa Gölü, Metamorfik kayalar

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1. Introduction

The family Gigaspermaceae consists of six genera represented by limited taxa (three are monotypic), the majority of which occur in the Southern Hemisphere (Laura and Cerda, 2015). Among them the genus *Gigaspermum* Lindb. is represented by two taxa, *G. repens* (Hook.) Lindb. and *G. mouretii* Corb. (Crosby et al., 2000). The subject of this study, *G. mouretii* has been defined by Corbiere (1913) from Morocco. It is mainly restricted to the Mediterranean Basin and known from Balearic Island, Canary Island, Scilly, Spain, Crete, Cyprus, Morocco, Algeria, Israel and Türkiye (Hodgetts and Lockhart, 2020). Specimen was firstly recorded from Hatay/Türkiye and given without any photos and drawings by Tonguç Yayıntaş (Tonguç Yayıntaş, 2009).

In the present study, the detailed description, ecology and distribution of the *G. mouretii*, which is recorded for the second time from Türkiye, are given together with drawings.

2. Material and Methods

2.1 Study area

Samples were collected from the southwestern edge of Bafa Lake (Figure 1). The lake is a natural barrier lake formed by the alluviums carried by the Büyük Menderes River in the west of Türkiye. Located on the borders of Muğla and Aydın provinces, the lake is also the largest lake in western Anatolia. The study area is under the influence of the Mediterranean climate and the natural formation manifests itself as degraded maquis. Since the edge of the lake has been used as a settlement for many years, it is under serious anthropogenic pressure. Especially olives stand out as the most striking agricultural product.

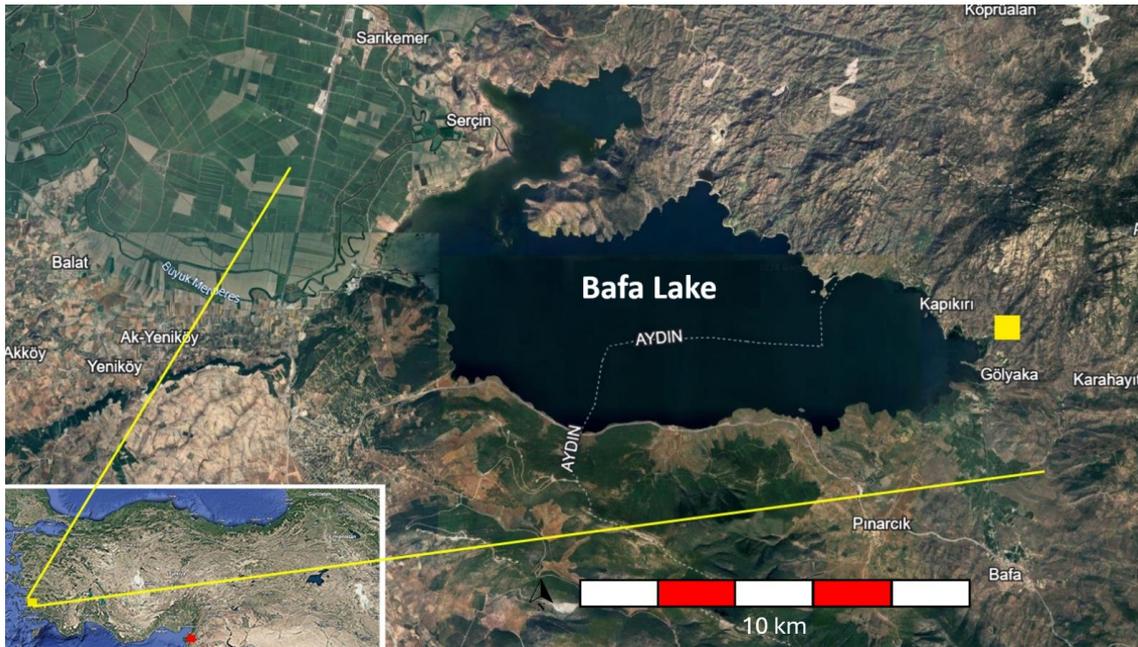


Figure 1. Distribution map of *G. mouretii* on Türkiye ■ first collected locality, ■ second collected locality.

2.2. Specimen examined

Gigaspermum mouretii Corb.

Revue Bryologique 40: 10. 1913.

Turkey: Muğla Province, Bafa Lake, Gölyaka Village: 37° 22' 51" N, 34° 30' 40" E, on soil bank, slope 70%, direction west, 20 m a.s.l., 04 March 2024, leg. and det. M. KIRMACI, H. ÖZENOĞLU, M. E. DEMİR and G. ASLAN.

The research material was collected from the area and identified using the relevant literature

(Carratello and Aleffi, 1998; Guerra et al., 2010; Kürschner and Erdağ, 2023). The plant was made to herbarium material and preserved in Aydın Adnan Menderes Herbarium (AYDN 4050).

Ecology: *G. mouretii* was collected from calcareous soils on the west-facing slopes. The bottom cover of the area, where *Olea europaea* L. and *Quercus coccifera* L. trees are sparsely found, is herbaceous formations *Lupinus* L. sp., *Anemone coronaria* L., *Asphodelus aestivus* Brot.,

Matricaria L., *Erodium* L'Hér. and some crops belonging to gramine. It grows dense grey-green tufts and is associated with *Lunularia cruciata* (L.) Dumort. ex Lindb., *Fossombronia* Raddi spp., *Southbya nigrella* (De Not.) Henriq., *Bryum* Hedw. sp., *Didymodon acutus* (Brid.) K. Saito, *Timmiaella barbuloides* (Brid.) Mönk., *Tortella squarrosa* (Brid.) Limpr. and *Trichostomum crispulum* Bruch. The large size of the spores suggests that they should survive for several years, indicating that the species is adapted to living in unstable habitats.

3. Results and Discussion

Description of the Turkish specimens: Plants light green to yellowish-white, to 1 cm. Stem rhizomatous, branches erect (0,4-1 cm). Leaves sparse on the lower part of the branches and crowded on the upper part, concave, orbicular-obovate, 0.8-1.2 × 1-1,6 mm; apex with hyaline apiculus, 300-500 µm long, margin slightly crenulat. Perichaetial leaves larger than the vegetative ones, hyaline, greenish at the base, elongate-triangular, longly acuminate and strongly concave, extending 3 mm long, enclosing whole capsule. Upper and middle cells irregularly rhomboidal, hexagonal, square or shortly rectangular, 15-25 × 25-50 µm; basal cells rectangular with smooth walls 25-35 × 30-75 µm. Nerve absent, some with a double layer of cells in the central part, like a rudimentary nerve. Capsule is sessile, gymnostomous, wide, urn 0.9-1.2 × 1-1.3 mm., seta short, up to 0.6 mm long, operculum conic. Spores polyhedral, smooth, large up to 120 µm (Figure 2).

As stated, *Gigaspermum mouretii* was firstly recorded from Türkiye in 2009 (Tonguç Yayıntaş, 2009). When we look at the distributions around the countries neighboring the Mediterranean given in this study, it is seen that they overlap with the European distributions (Balearic Islands, Canary Islands, Crete, Cyprus, Greece, Sicily, Spain) given by Hodgetts and Lockhart (2020). In the intervening 15 years, there has been no addition to

the distribution area of the species, at least in the Mediterranean and its surroundings (Figure 3). The western and southern parts of Türkiye are under the influence of the Mediterranean climate. The distance between the first collection locality of the species and the second is 750 km as the crow flies. This shows us that the taxon can be found in different localities where at least the Mediterranean climate is seen (Figure 3). The fact that *Gigaspermum* is represented by very few taxa suggests that the genus is not productive and is an old taxon. Its distribution areas also support this prediction.

It was reported that no samples with sporophytes were found in the first record (Tonguç Yayıntaş, 2009). In the current record, samples contain a high proportion of sporophytes. No results were obtained from the correspondence with the researchers who made the first record on the subject. Therefore, the first record could not be compared with the second one. In order to conduct floristic studies healthily, it is extremely important that herbarium records are regular and accessible.

G. mouretii was most recently assessed for The IUCN Red List of Threatened Species in 2018 (Sergio, 2019). In this list, it was evaluated as NT (Near Threatened) under criteria B2b (iii). It would not be right to comment on the Red List category of a taxon known from only two locations in our country. Therefore, remaining in the DD (Data deficient) category for now is considered appropriate. Scientists agree that the Mediterranean and its surrounding areas will be among the first to be affected by climate change due to the warming of the weather and drought, and that even species such as Pottiaceae members and *G. mouretii* will be affected (Hodgetts et al., 2019). In countries like Türkiye where the bryoflora is not yet fully known, it will not be possible to know to what extent global warming has affected species. Therefore, floristic studies should be completed as soon as possible in order to start protection efforts for endangered species.

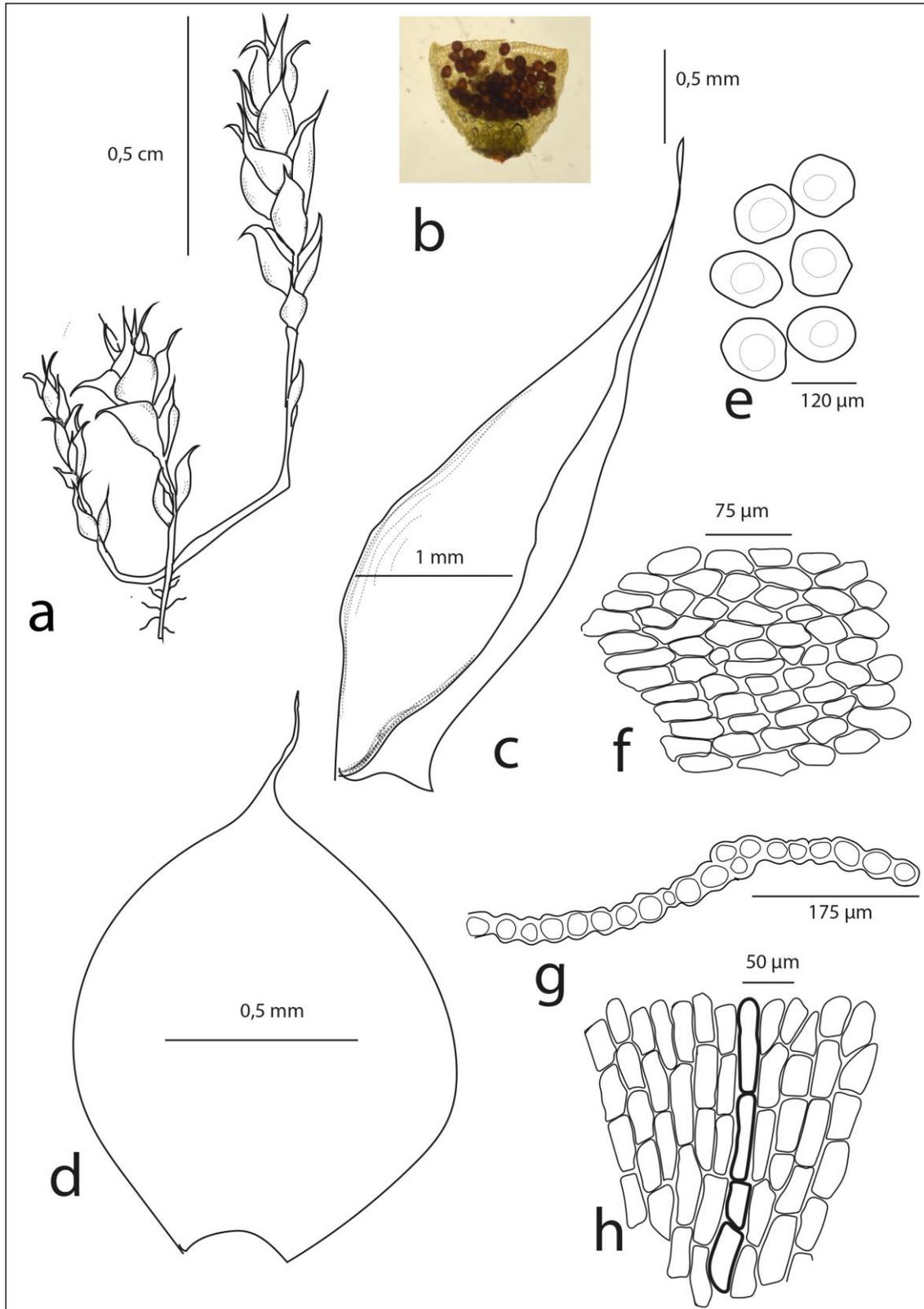


Figure 2. *Gigaspermum mouretii*; a) mature plant, b) sporophyte, c) perichaetial leaf, d) leaf, e) spores, f) median cells, g) cross section of leaf, h) basal cells



Figure 3. The distribution area of the *Gigaspermum mouretii* in the Mediterranean and its surroundings. (Yellow Triangle: Old records; Red Triangle: New record).

Declarations

Authors' contributions: GA, MED, HÖ, and MK have designed the study and collected the data. GA, MED, HÖ, and MK collected moss samples from the field. HÖ, and MK have performed laboratory of the study. HÖ, and MK has written manuscript; HÖ, and MK have reviewed and edited manuscript. All authors have read and approved the final manuscript.

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Conflict of interest: The authors have no competing interests to declare regarding the content of this article.

Ethics approval and consent to participate: This research did not involve human or animal subjects and therefore does not require ethical approval.

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