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## *Grimmia mesopotamica* (Grimmiaceae, Musci) New to Europe

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**Abstract.** *Grimmia mesopotamica* Schiffn. is reported for the first time in Europe from Almería (Spain). The species is illustrated and notes are given on its distribution and ecology.

The arid and semiarid areas of the southwestern Iberian Peninsula possess a xeromorphic and partially unknown bryophyte flora with a distinct number of species of the Old Mediterranean area (Xerothermic-Pangaeic, Circum-Tethyan element) mixed with those that are known mainly from Sahara-Arabian and Irano-Turanian areas, such as *Crossidium laevipilum* Thér. & Trab., *Tortula brevissima* Schiffn., and *Didymodon aaronis* (Lor.) Guerra. The discovery of *Grimmia mesopotamica* adds another species to this array of floristic elements. Until now data on *G. mesopotamica* were relatively scarce despite its being large enough to be detected easily in the field and having well defined gametophytic and sporophytic characteristics. *Grimmia mesopotamica* was described by Schiffner (1913) from samples collected by Handel-Mazzetti from the right bank of the River Euphrates (Iraq). Schiffner classified his new species with *G. triformis* Carestia & De Not., in section *Eugrimmia*, as a link with section *Gasterogrimmia*. Brothier (1924) agreed with Loeske (1913) in considering *G. triformis* as a variety of *G. doniana*, for which reason he placed them near *G. mesopotamica* in subgenus *Guembelia*. Later, Podpera (1954) mentioned *G. mesopotamica* in a note on *G. crinita* Brid. in section *Gasterogrimmia*. Agnew and Vondráček (1975) analyzed the differences between *G. mesopotamica* and *G. pulvinata*-*G. orbicularis*, with which it can be confused when sterile, and *G. crinita*, which, in our judgement, is the taxon to which it has the greatest affinity as regards the morphological characteristics of the gametophyte and sporophyte. Figures 1–6 show the most noteworthy characteristics of *G. mesopotamica* from the material collected in the Iberian Peninsula.

*Grimmia mesopotamica* differs from *G. crinita* as follows: its leaf margins are recurved rather than plane; its capsule is symmetric rather than gibbous; the operculum is obtuse-conical or mammillate

rather than short-rostrate; it is autoicous rather than paroicous; and its seta is straight rather than slightly curved.

A comparison of the plentiful *G. crinita* material from the Iberian Peninsula and the Middle East with *G. mesopotamica* shows that the aspect of the *G. mesopotamica* is less whitish, since most of the vegetative leaves do not have well-developed hyaline hairs, a fact which, though of little taxonomic value, is useful for field identification.

*Grimmia mesopotamica* has been found in Israel (Frey et al. 1990; Herrstadt et al. 1982), Jordan (El-Oqlah et al. 1988), and Iraq (Agnew & Vondráček 1975) (cf. Frey & Kürschner 1991). The most easterly location so far identified is in the Chardzouz region, southeast of Karakum in the Republic of Turkmenia (Abramova & Abramov 1988). The Spanish location in Almería represents a large range extension and a new finding for the European bryoflora (Fig. 7).

*Selected specimens studied.*—IRAQ. ad Euphratem medium inter Abukemal et Ramadi, 10.4.1910, Handel-Mazzetti (herb. Schiffner 884, FH, isotype).

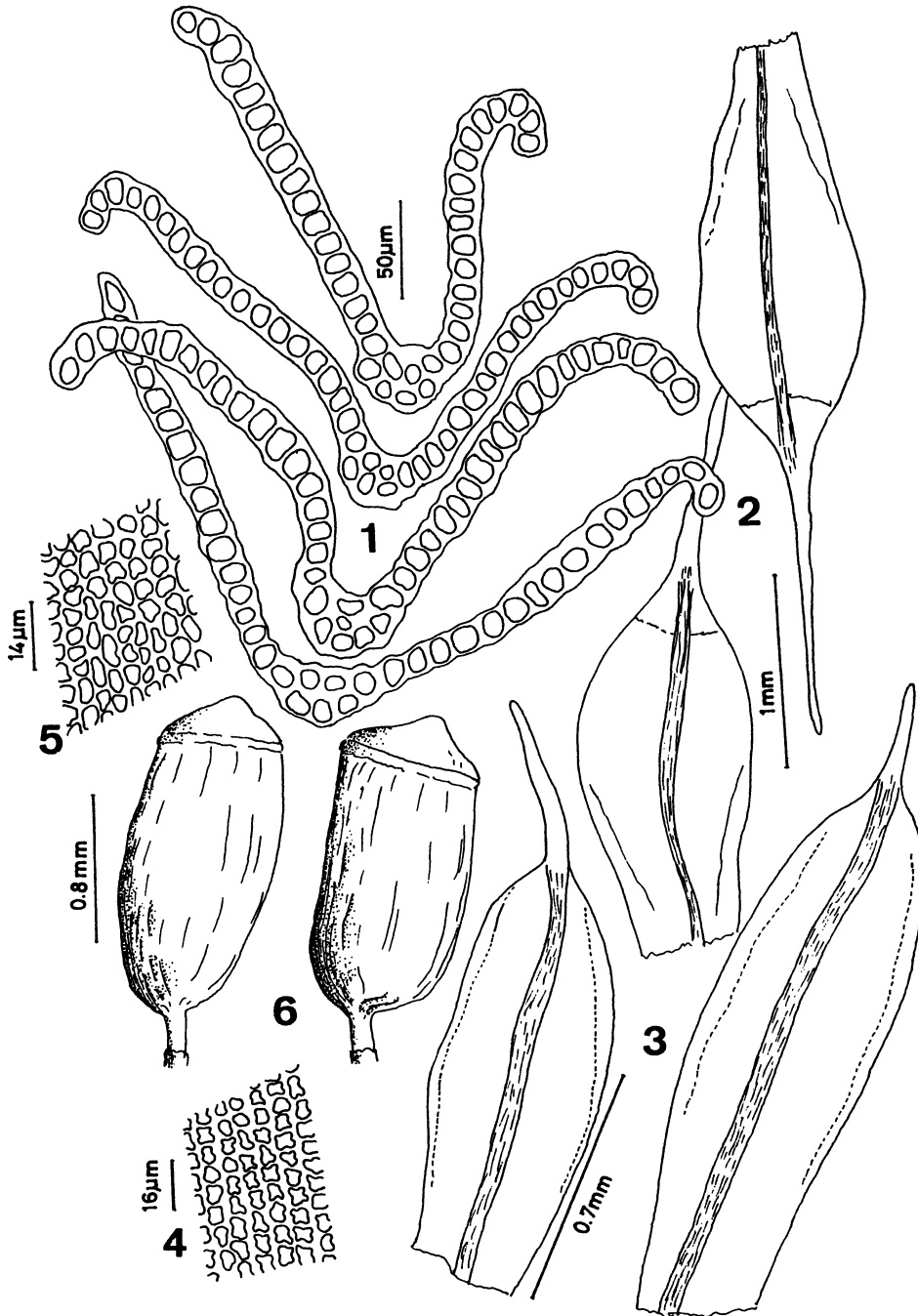
ISRAEL. C. Negev, Karne Ramon, 25.10.1988, Danin (MUB 4511).

JORDAN. Judean Desert, Wadi Qilt near Ein Qilt, 1.3.1990, Danin (MUB 4512).

SPAIN. Almería, Tabernas, El Tablazo, WF4899, 200 m, talud con suelo yesífero en un barranco, Guerra et al. (MUB 4505). Ibidem, Martínez-Sánchez et al. (MUB 4039).

SYRIA. Mesopotamia, prope vici ruinas Gharra, 21.6.1910, Handel-Mazzetti (herb. Schiffner 1778, FH).

*Grimmia mesopotamica* is a species of desert regions which prefers basic substrates, especially loamy limestone and gypsiferous soils, as reported in the literature. Schiffner (1913) described it from a gypsiferous substrate. Abramova and Abramov (1988) mention that in Turkmenia it has been found on sandstone rich in gypsum and on loamy limestones with gypsum. Frey and Kürschner (1992) mention it from the sandstone area of the mountains



FIGURES 1–6. *Grimmia mesopotamica*. — 1. Leaf cross sections, showing margin variations. — 2. Perichaetial leaves. — 3. Vegetative leaves. — 4. Upper cells from vegetative leaf. — 5. Median cells from vegetative leaves. — 6. Capsules. (All from MUB 4039.)

of Edom (Jordan). In Spain it appears on gypsiferous slopes facing north, with *Tortula revolvens* (Schimp.) G. Roth, *Crossidium squamiferum* (Viv.) Jur., *Bryum ruderale* Crundw. & Nyh., and *Crossidium crassinerve* (De Not.) Jur. This ecological behavior is sim-

ilar to that described by Frey et al. (1990) and Frey and Kürschner (1992), i.e., a terri-saxicolous, xerophilous, and moderately photophilous community (*Grimmia mesopotamicae*-*Tortuletum obtusatae*) growing on gypsiferous soils.

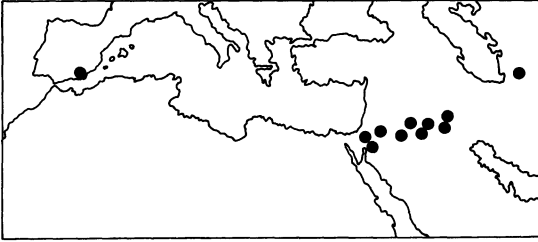


FIGURE 7. Distribution of *Grimmia mesopotamica*.

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