

FUNARIA MICROSTOMA, A NEW SPECIES FOR IRANIAN BRYOFLORA

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Based on investigations of mosses in Iran, a new species, namely, *Funaria microstoma* Bruch ex Schimp. is found in Ardebil province (NW Iran) which is a new report for the bryoflora of the country. The species belongs to the family *Funariaceae* under the order *Funariales*. This world widely distributed family consists of 13 genera and nearly 300 species being found in arctic, temperate and tropical regions. Diagnostic characters, geographical distribution and illustrations are provided herewith.

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Funaria microstoma, گونه جدیدی برای فلور خزهای ایران

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با مطالعه روی فلور خزهای استان اردبیل، به یک گونه جدید به نام *Funaria microstoma* Bruch ex Schimp. برخورد گردید که نخستین بار برای فلور خزهای ایران گزارش می‌شود. این گونه متعلق به تیره *Funariaceae* تحت راسته *Funariales* می‌باشد. تیره مذکور دارای ۱۳ جنس و حدود ۳۰۰ گونه می‌باشد که در نواحی قطبی، معتدله و حاره‌ای سراسر جهان پراکنش دارند.

INTRODUCTION

Fifteen bryophyte taxa were added to the flora of Iran by Kürschner in 1996. In another attempt, Kürschner along with his co-workers, published an updated list of 121 taxa, out of which 24 taxa were new for the Golestan National Park (NE Iran) including eight species new for Iran (Kürschner et al. 2000). Akhiani & Kürschner (2004) published an annotated checklist of the Iranian bryoflora including 437 taxa (two hornworts, 68 liverworts and 367 mosses). Kürschner (2006, 2007 and 2008) in a series of work constructed some very useful keys to the acrocarpous and pleurocarpous mosses of the Near and Middle east. Frey & Kürschner (2010) added 42 records to the bryoflora of Iran. The bryophyte flora of Southwest Asia in the first comprehensive and well-structured form is published by Kürschner & Frey (2011). Eighteen new mosses have also been reported from the Hyrcanian forest region (N Iran) by Zare et al. (2011). In a survey to the moss flora of Alvand mountains in Hamedan province (W Iran), 22 mosses are lately reported, out of which 14 species considered new for the province embracing two species as new to the country (Fereidounfar et al. 2011). Recently, Shirzadian (2011) introduced five more records of mosses to the bryophyte flora of Iran.

In the present study, *Funaria microstoma* Bruch ex Schimp. is introduced as a new report for the bryoflora of Iran.

MATERIALS AND METHODS

During moss samples collection from Ardebil province in May 2011, an interesting sample belonging to the family *Funariaceae* was found. Identification was done by the help of Crum & Anderson (1981), Smith (2004), Miller & Miller (2006) and Kürschner (2008).

The voucher specimen is preserved in the herbarium of the Ministry of Jihad-e-Agriculture (IRAN) at the Iranian Research Institute of Plant Protection (Tehran, Iran).

RESULTS

Funaria microstoma Bruch ex Schimp. belongs to the family *Funariaceae* under the order *Funariales* and class *Bryopsida*. *Funariaceae* is a family of short-lived, small to medium-sized, light to low-green and annual to biennial plants that grow gregarious to open tufts (Lang et al. 2008).

Funaria microstoma Bruch ex Schimp. (Fig. 1).

Plants 4–6 mm long, light green. Leaves 2–3 mm proximally on the stem; distal leaves 4–5 mm,

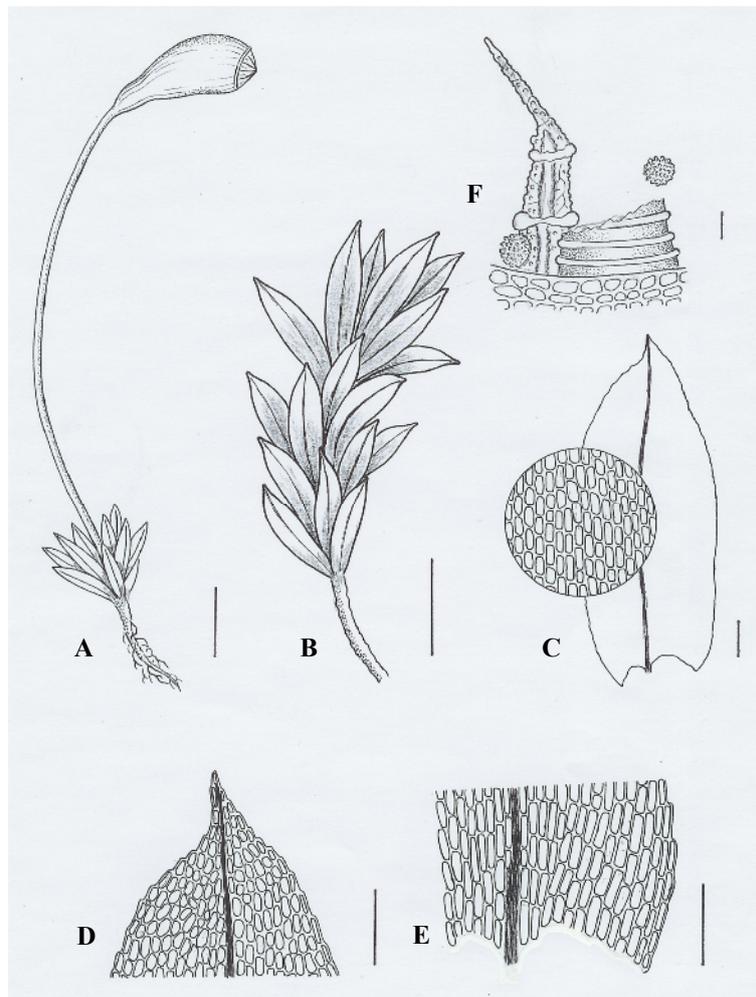


Fig. 1. *Funaria microstoma*. A. & B. habits, C. leaf showing middle cells, D. leaf apex, E. leaf base, F. endostome along with a broken exostome and 2 spores (Scale bars: A & B = 1 mm and C-F = 40 μ m) (IRAN 0360 B).

somewhat crowded distally, oblong-lanceolate, narrowly acuminate, entire; costa ending in the slender apex; distal laminal cells thin-walled, oblong-hexagonal to rhombic-hexagonal, becoming longer proximally. Seta usually 20–25 mm long, slender, hygroscopic, becoming twisted when dry. Capsules 1.5–2.5 mm, obovoid, strongly asymmetrical and curved, inclined to horizontal, becoming sulcate when dry; annulus revoluble; operculum low-conic, small, about 0.5 mm or less than half of the diameter of the mature ones, undehiscent capsule; peristome teeth brownish, slender, appendiculate in the distal hyaline portion; endostome low with irregular membrane, partially adherent to the teeth. Calyptra cucullate, rostrate, smooth. Spores 22–27 μ m, finely papillose.

Geographic distribution. N America, throughout Europe, Asia and Australia.

Ecology. Moist, often gravelly, mineral soil, low to high elevations.

Specimen examined. Iran: Ardebil province, Sar'ein, Alvares heights, on sandy soil, 1190 m, 17.05.2011, col. Eskandari, det. Shirzadian (IRAN 0360 B).

DISCUSSION

The family *Funariaceae* comprises of 13 genera and nearly 300 species widely distributed in arctic, temperate and tropical regions throughout the world (Fife 1985a, b). Fife (1982, 1985a, 1985b, 1996) and Fife & Seppelt (2001) have revised the various taxa in the *Funariaceae* for Australasia. They recognized six species of *Entosthodon* (smooth capsules) and two species of *Funaria* (grooved capsules) for New Zealand.

Funaria microstoma Bruch ex Schimp. found in habitats where the similar *F. hygrometrica* might be

expected. It can be distinguished in the field with a hand lens by the small capsule mouth and the narrow leaves near the stem tip (Miller & Miller 2006). *Funaria hygrometrica* Hedw. is the most polymorphic member of this family in the whole world. According to Crum & Anderson (1981), the capsules of *F. microstoma* are more asymmetric and more strongly ribbed, with a more noticeable neck region as compared to its close member *F. flavicans* Mx..

REFERENCES

- Akhani, H. & Kürschner, H. 2004: An annotated and updated checklist of the Iranian bryoflora. - *Cryptogamie Bryologie*, 25 (4): 315–347.
- Crum, H. A. & Anderson, L. E. 1981: Mosses of Eastern North America, vol. 2. -Columbia University Press, New York. 404 pp.
- Fereidounfar, S., Shirzadian, S., Ranjbar, M. & Ghahremaninejad, F. 2011: A survey to the moss flora of Alvand mountains in Hamedan province, W Iran. -*Iran. Journ. Bot.* 17 (1): 125–132.
- Frey, W. & Kürschner, H. 2010: New and noteworthy records to the bryophyte flora of Iran. -*Nova Hedwigia* 90 (3–4): 503–512.
- Fife, A. J. 1982: Taxonomic and nomenclatural observations on the Funariaceae 1. *Physcomitrium*, *Physcomitrella* and *Goniomitrium* in New Zealand. -*Lindbergia* 8: 96–104.
- Fife, A. J. 1985a: A checklist of the mosses of New Zealand. -*The Bryologist* 98: 313–337.
- Fife, A. J. 1985b: A generic revision of the Funariaceae (Bryophyta: Musci) Part I. -*J. Hattori Bot. Lab.* 58: 149–196.
- Fife, A. J. 1996: Biosystematics of the cryptic flora of New Zealand: Bryophytes. -*New Zealand Journ. Bot.* 32: 645–662.
- Fife, A. J. & Seppelt, R. D. 2001: A revision of the family Funariaceae (Musci) in Australia. *Hikobia* 13: 473–490.
- Kürschner, H. 1996: Towards a Bryophyte Flora of the Near and Middle East. New Records from Iran, Jordan, Kuwait, Lebanon, Oman, Saudi Arabia, Syria and Turkey. -*Nova Hedwigia* 63 (1–2): 261–271.
- Kürschner, H. 2006: A key to the pleurocarpous mosses (Bryophytina p. p. excl. Pottiaceae) of the Near and Middle East. Towards a bryophyte flora of the Near and Middle East, 5. -*Nova Hedwigia* 83 (3–4): 353–386.
- Kürschner, H. 2007: A key to the Pottiaceae (Bryopsida - Bryophytina) of the Near and Middle East. Towards a bryophyte flora of the Near and Middle East, 6. -*Nova Hedwigia* 84 (1–2): 21–50.
- Kürschner, H. 2008: A key to the acrocarpous mosses (Bryophytina p. p. excl. Pottiaceae) of the Near and Middle East. Towards a bryophyte flora of the Near and Middle East, 7. -*Nova Hedwigia* 86 (1–2): 43–103.
- Kürschner, H. & Frey, W. 2011: Liverworts, Mosses and Hornworts of Southwest Asia. (Marchantiophyta, Bryophyta, Anthocerotophyta). - *Nova Hedwigia* (Supplement 139). 240 pp., 9 figs, 1 tab. J. Cramer, Stuttgart.
- Kürschner, H., Papp, B. & Akhani, H. 2000: New records to the bryophyte flora of Iran. Studies on the flora and vegetation of the Golestan National Park, NE Iran IV. -*Nova Hedwigia* 71 (3–4): 509–518.
- Lang, D., Zimmer, A. D., Rensing, S. A. & Reski, R. 2008: Exploring plant biodiversity: the *Physcomitrella* genome and beyond. -*Trends in Plant Science* 13 (10): 542–549.
- Miller, D. H. & Miller, H. A. 2006: Bryophyte Flora of North America, Provisional Pub.- Missouri Botanical Garden.
- Shirzadian, S. 2011: Five new records of mosses to the bryophyte flora of Iran. -*Phytomorphology - Phytomorphology* 61 (3 & 4): 68–71.
- Smith, A. J. E. 2004: The Moss Flora of Britain and Ireland. 2nd edition -Cambridge University Press. 1012 pp.
- Zare, H., Akbarinia, M., Hedenäs, L. & Maasumi, A. A. 2011: Eighteen mosses from the Hyrcanian forest region new to Iran. -*J. Bryol.* 33 (1): 62–65.