

New and Interesting Moss Records for Iran

Ahmad GHAHREMAN¹, Moussa FARIDI^{1,*}, Saeed SHIRZADIAN², Farideh ATTAR¹

¹Central Herbarium of Tehran University, Department of Plant Biology, Faculty of Biology,
University College of Science, University of Tehran, Tehran - IRAN

²Department of Botany, Iranian Research Institute of Plant Protection, Tehran - IRAN

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Abstract: Four moss species, namely, *Tetraphis pellucida* Hedw. (Tetraphidaceae), *Ulota crispa* (Hedw.) Brid. (Orthotrichaceae), *Haplohymenium triste* (Ces.) Kindb. (Anomodontaceae), and *Rhynchostegiella litorea* (De Not.) Limpr. (Brachytheciaceae) are recorded from Iran. The specimens were collected from Kheiroodkenar Forest, Mazandaran Province (north of Iran).

Key Words: Bryophytes, Mosses, Iran, Mazandaran Province

Introduction

Bryophytes (mosses, liverworts and hornworts) rank second among the major groups of green plants, with an estimated 20,000 species worldwide, and they have successfully exploited many environments, possibly because they are rarely in direct competition with higher plants. The Iranian bryoflora, in total, comprises 399 species including 330 species of mosses (Bryopsida) in 114 genera and 69 species of hepatics and hornworts (Hepaticopsida and Anthocerothopsida, respectively) in 36 genera (Gahreman et al., 2003; Akhiani & Kürschner, 2004; Kürschner & Ramezani, 2005), or somewhat more than 1.5% of the world's bryophyte species. Unfortunately, despite bryophyte diversity, phylogenetic importance and their ecological roles, the study of the biology and taxonomy of bryophytes has long been neglected compared with flowering plants in Iran, perhaps because of their small size and the lack of indigenous specialists. Previous studies on Iranian bryophytes were mostly carried out by foreign botanists. In fact, the first study was started in the second half of the 19th century by Boissier & Buhse (1860). They were followed by Juratzka & Milde (1870), Schiffner (1897, 1901, 1908, 1910), Bornmüller (1908, 1910, 1911, 1915), Froehlich (1950, 1952-1953, 1959), Townsend

(1966), Tregubov & Tregubov (1969-1970), and Frey & Kürschner (1977, 1979, 1981, 1983, 1991). These often consisted of incomplete report lists from small parts of Iran. Consequently, from the bryological point of view, most of the territory remained totally unknown. In recent decades, Frey and Kürschner have undertaken valuable studies both on the bryoflora and bryogeography of south-west Asia and Iran. We expect that the number of recorded species will increase in Iran in the near future.

In the present study, 4 new species are added to the moss flora of Iran: *Tetraphis pellucida* Hedw., *Ulota crispa* (Hedw.) Brid., *Haplohymenium triste* (Ces.) Kindb. and *Rhynchostegiella litorea* (De Not.) Limpr.

Materials and Methods

Kheiroodkenar Forest, with approximately 100 km² surface area, part of the south Caspian forests (Hyrcanian sub-province, according to Zohary (1973)), is situated 7 km from Nowshahr on the way to Nour city, in Mazandaran Province in the north of Iran. This forest is completely unknown bryologically as compared with its higher plants (Figure 1).

Several field trips were made by the second author to collect bryophyte samples between November 2004 and

*E-mail: moussafaridi@gmail.com

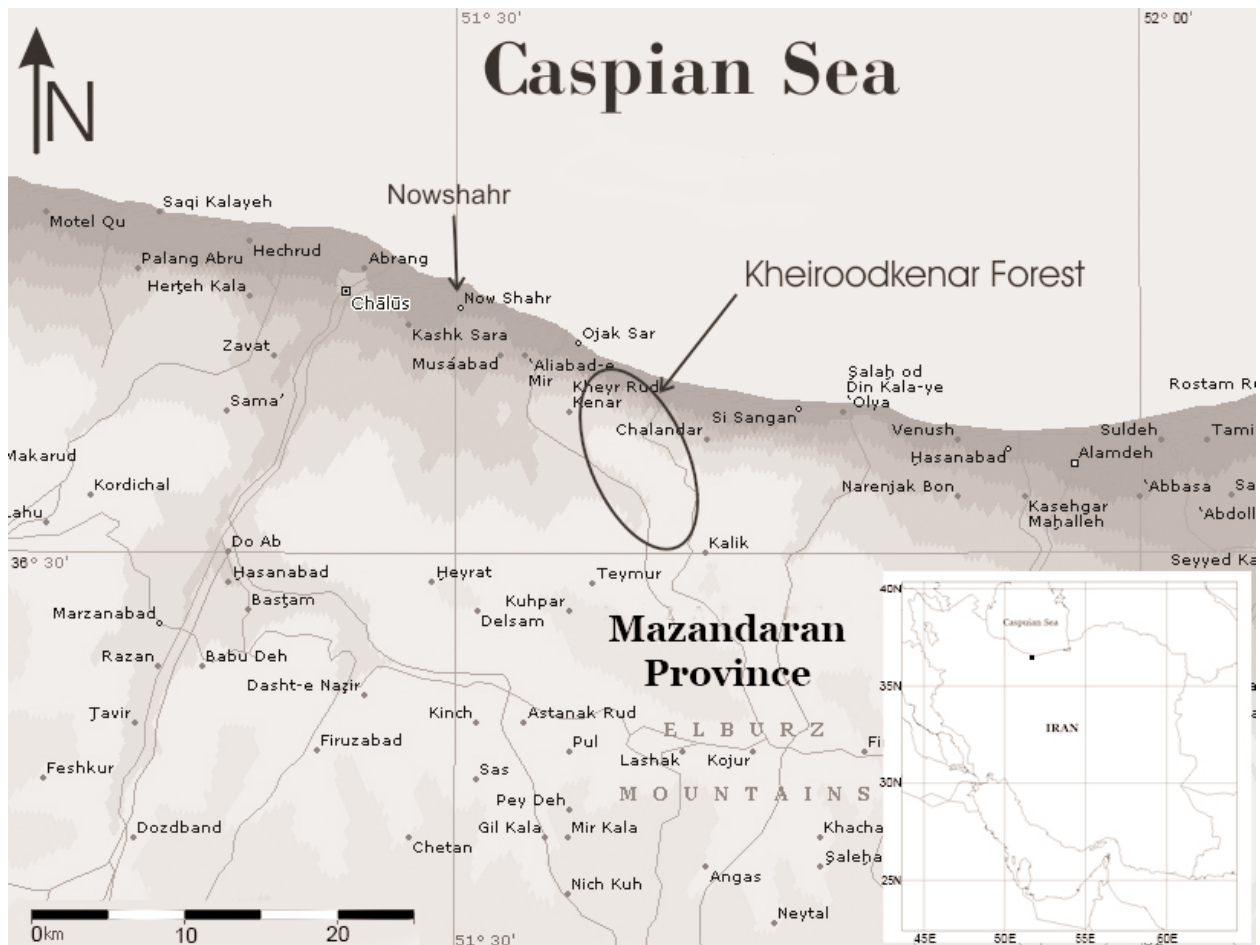


Figure 1. Exact location of Kheiroodkenar Forest, Mazandaran Province, north of Iran.

September 2005 during his investigations of Kheiroodkenar Forest bryophytes. Voucher specimens are deposited in the Central Herbarium of Tehran University (TUH). The identification of the specimens followed Crum & Anderson (1981), Noguchi (1991), Nyholm (1998), and Smith (2004). As these are the first collections of the species from Iran, a description, illustration and notes on ecology are also provided for each species.

Taxonomic treatment

Tetraphidaceae

Tetraphis pellucida Hedw.

Syn: *Georgia pellucida* (Hedw.) Rabenh.

Plants small, greenish to slightly brownish, about 8 - 18(-20) mm high; leaves appressed when dry, erect-

patent when moist, the lower leaves broadly ovate to ovate and distant, upper ovate to lanceolate and crowded, acute, about 0.9 - 1.7 mm long; margins plane, entire; costa ending well below the apex; cells incrassate, smooth, irregularly rounded to hexagonal, becoming quadrate towards margins, 12-17 μ m wide in mid-leaf, becoming oblong at base. Perichaetial leaves oblong-lanceolate.

Seta elongate, erect; capsule cylindrical, about 1-1.5 mm long; peristome with 4 solid teeth; spores small, ca. 10 μ m in diameter, nearly smooth to finely roughened (Figure 2).

Asexual reproduction commonly occurs by multicellular and disc-shaped gemmae produced in cup-shaped receptacles formed by a rosette of leaves at the tips of sterile stems.

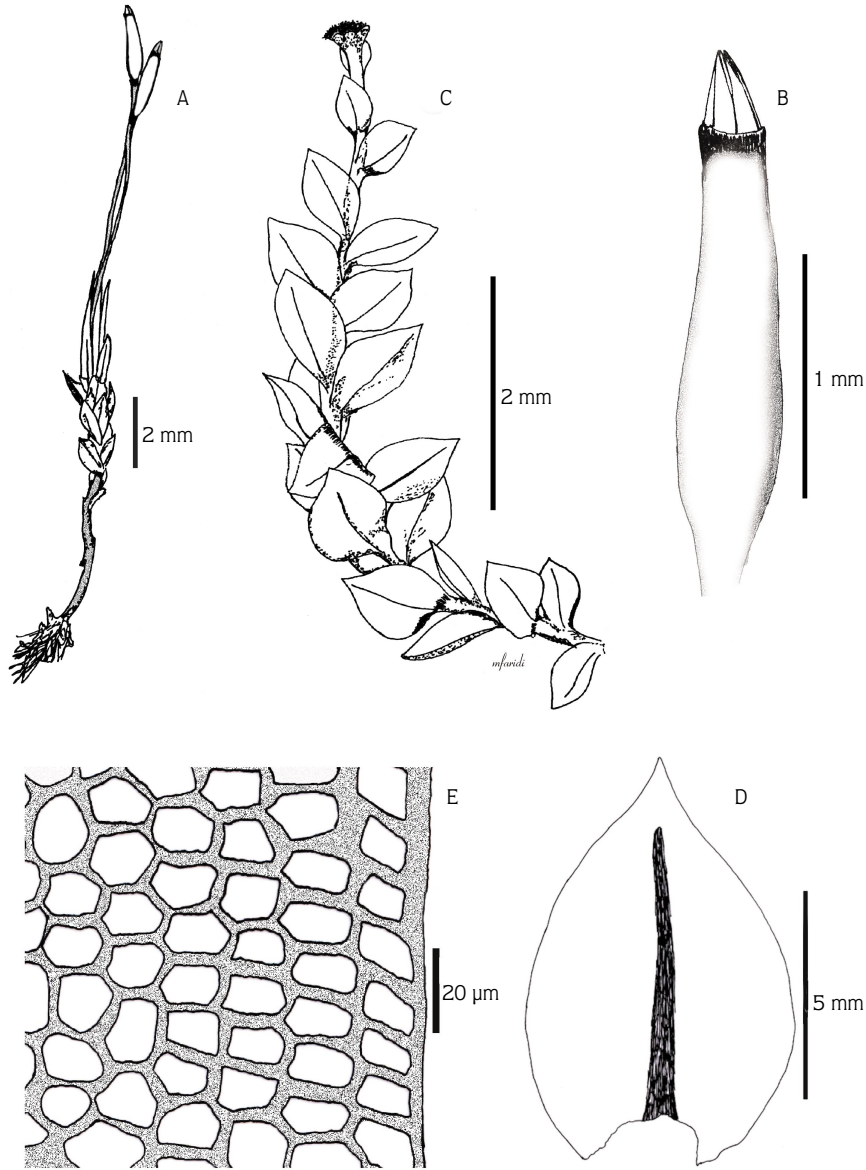


Figure 2. *Tetraphis pellucida*: A. habit (moist), B. enlarged capsule, C. sterile plant, D. stem leaf, E. mid-leaf cells.

Tetraphis pellucida Hedw., an acidophytic moss, grows on decaying or rotten stumps. The sterile plants can be easily recognised by the gemma cups (at the apex of sterile plants), resembling those of *Marchantia polymorpha* or *Lunularia cruciata*.

Distribution: A widespread plant in North America, Europe, Turkey, Caucasus, Siberia, Japan, Formosa and Korea.

Specimen examined: Mazandaran Province: 10 km from Nowshahr on the way to Nour city, Najardeh village, ca. 10 km after Najardeh village towards the south, Patom, Darrehsuch district, on decaying tree stump, 750 m, 04 Dec. 2004 (TUH 1270).

Orthotrichaceae

Ulota crispa (Hedw.) Brid.

Syn: *Ulota crispula* Brid.

Plants in small green tufts, 0.5 - 2 cm high; leaves strongly crisped and curled when dry, erect-spreading when moist, lanceolate from broad, concave base, acute to acuminate; margins plane, entire; costa ending in or below apex; basal leaf cells rectangular to linear, upper cells incrassate, rounded-quadrate, ca. 10 μ m in mid-leaf, unipapillose, papillae very low.

Setae 4-5 mm long; capsules exerted, 1-2 mm long, ellipsoid to oblong-cylindrical from a long tapered neck, with 8 striae on the entire length, contracted at mouth when dry and empty; peristome double, exostome teeth

united in 8 pairs, yellow to yellowish brown, reflexed when dry; calyptra hairy; spores about 20 μ m in diameter (Figure 3).

This plant grows on bark of trees, and was collected only from 2 locations in the forest studied. Growing in small tufts, strongly crisped leaves and pale, striate capsules with long neck help in the recognition of this widespread species. The generic and specific names refer to its crisped and curled leaves.

Distribution: This moss, like other members of the family Orthotrichaceae, is distributed mainly in the temperate zones, the northern part of North America, Europe (widespread), Canary Islands, North Africa, the Caucasus, Turkey, Siberia, eastern Asia and Tasmania.

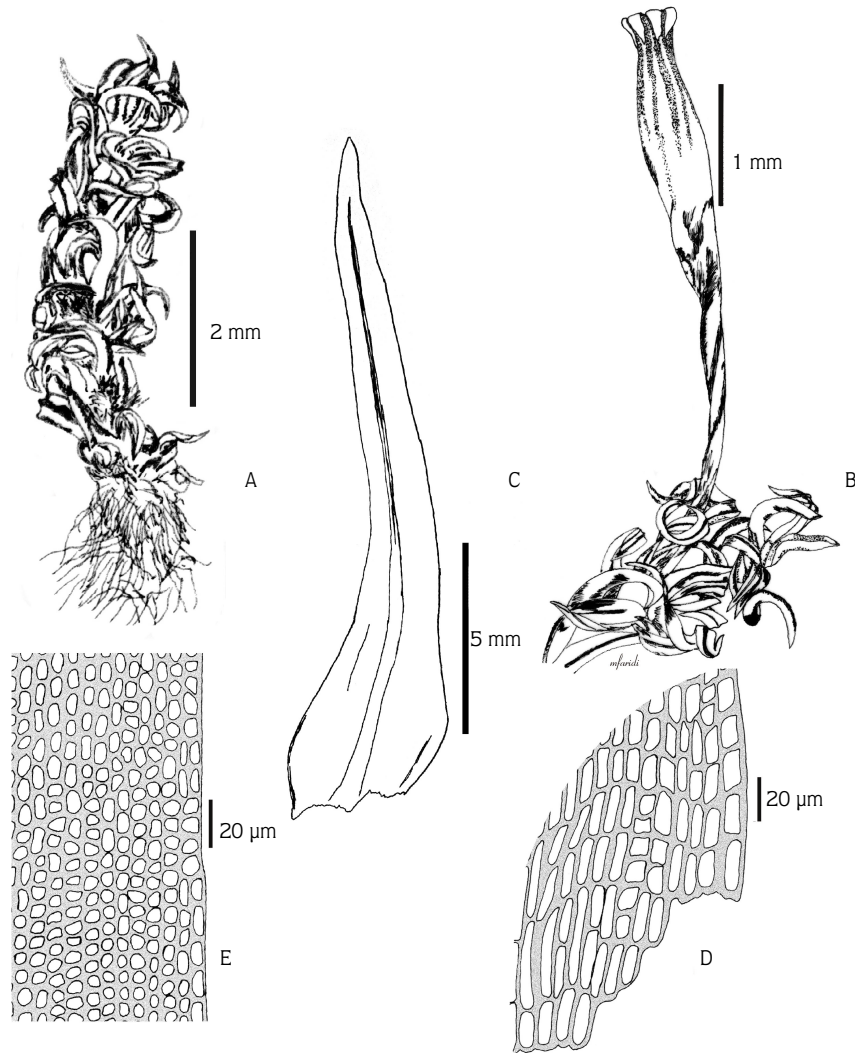


Figure 3. *Ulota crispa*: A. habit (dry), B. capsule, C. stem leaf, D. basal marginal cells, E. mid-leaf cells.

Specimen examined: Mazandaran Province: 10 km from Nowshahr on the way to Nour city, Najardeh village, 23 km after Najardeh village towards the south, Gorazbon, Tash-e Zeh district, on the bark of *Quercus castaneifolia*, 850 m, 2 Mar. 2005 (TUH 1013).

Anomodontaceae

***Haplohymenium triste* (Ces.) Kindb.**

Syn: *Leskia tristis* Ces. ex De Not.

Plants slender, dull yellow to dark green, in loose rigid mats; stems procumbent, branches somewhat ascending,

freely and irregularly branched, branches terete when dry, paraphyllia none; stem and branch leaves similar, imbricate when dry, spreading to squarrose when moist, base broadly ovate, narrowed to a lanceolate acumen, usually broken off at the tips; margins plane, crenate all around because of papillose cells; costa single, slender, extending up to 1/4 of the leaf length; mid-leaf cells rounded-quadrate to rounded-hexagonal, thin-walled, 10-15 μm , pluri-papillae on both surface, cells around the costa oblong and pellucid at the insertion. Sporophytes were not found (Figure 4).

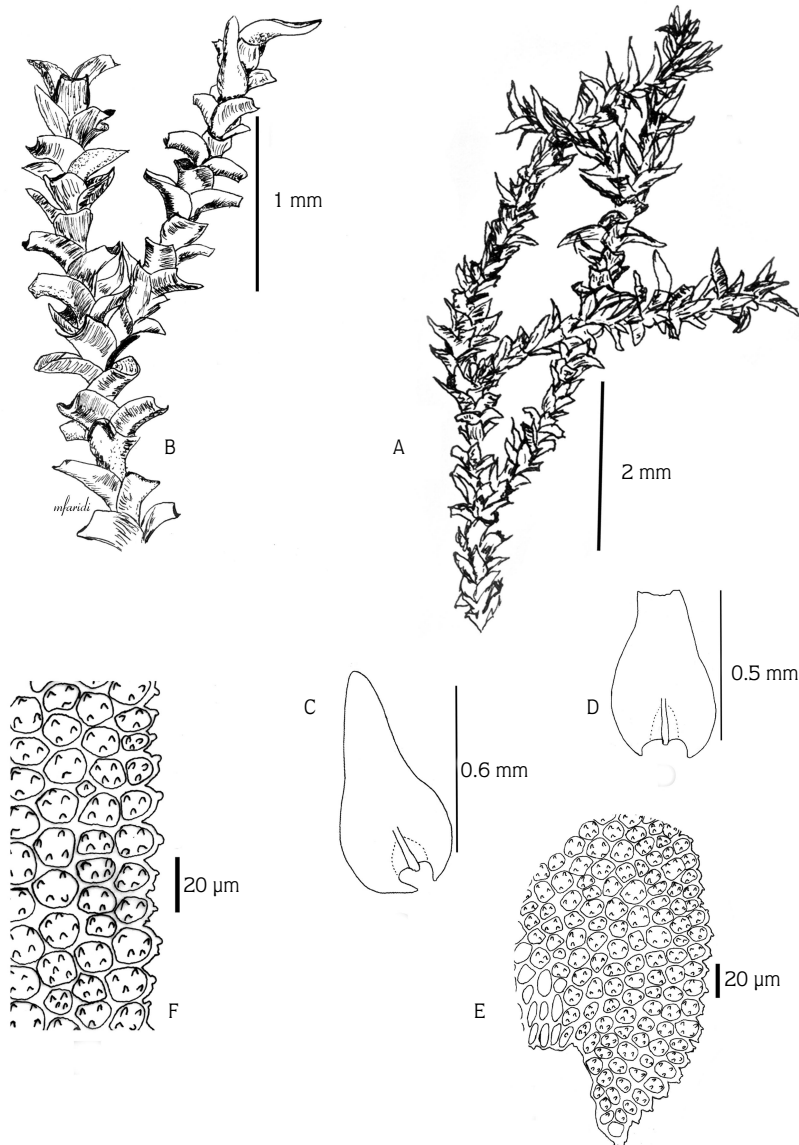


Figure 4. *Haplohymenium triste*: A. habit (moist), B. enlarged habit (moist), C & D. branch leaves, E. basal and marginal cells, F. mid-leaf cells.

This plant mostly grows on the bark of tree trunks at the study site. *Haplohymenium triste* is rather similar to *Anomodon attenuatus* in habit and is readily segregated by its smaller and more slender gametophytes from *A. attenuatus*. Furthermore, there are many stem and

branch leaves that are usually cut off in *H. triste*. The specific epithet refers to a dull appearance in *H. triste*.

Distribution: eastern North America, Hawaii, central Europe, Caucasus, Siberia, China, Japan and Turkey.

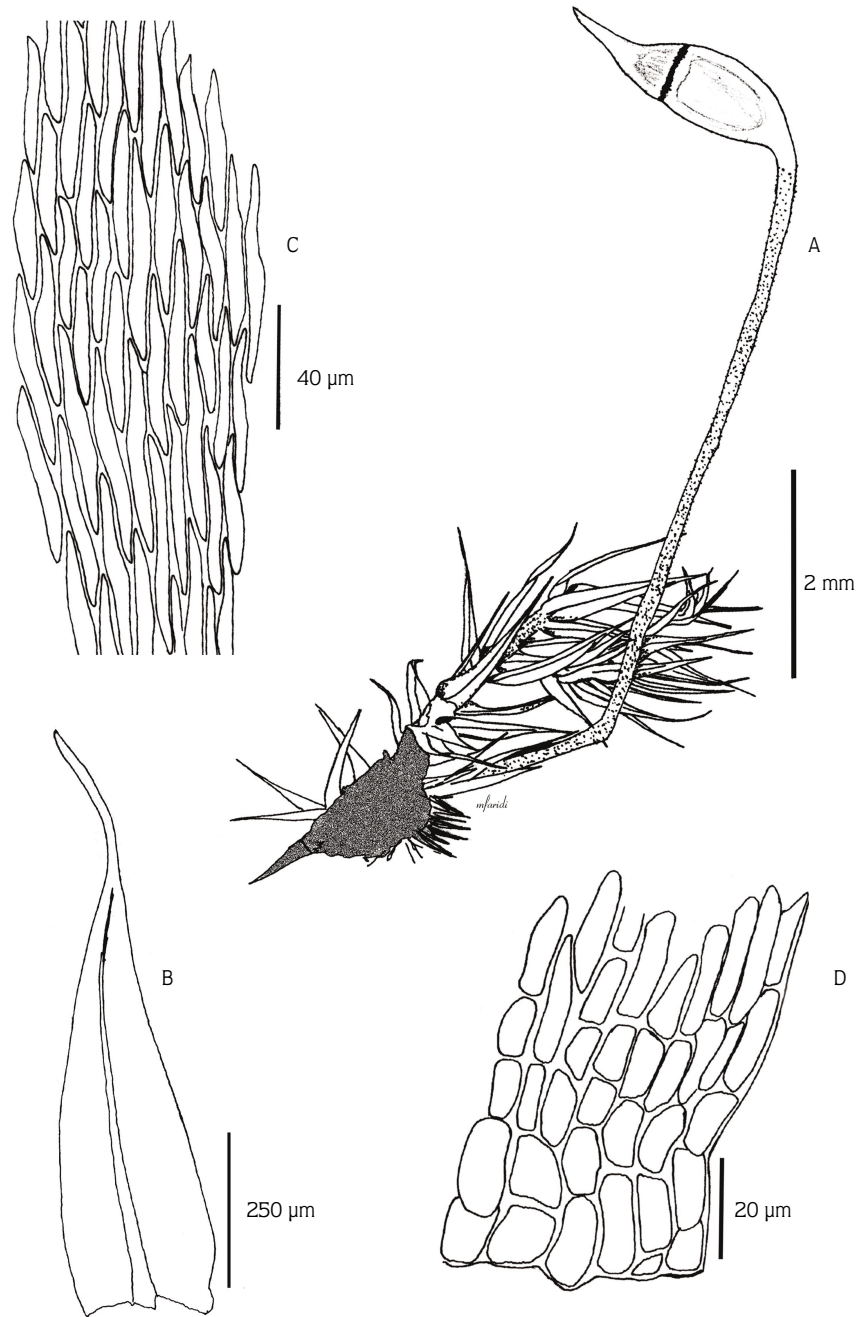


Figure 5. *Rhynchostegiella litorea*: A. habit (moist) with papillose seta, B. stem leaf, C. basal marginal cells, D. mid-leaf cells.

Specimen examined: Mazandaran Province: 10 km from Nowshahr on the way to Nour city, Najardeh village, ca. 10 km after Najardeh village towards the south, Patom, Darreh Such district, on *Diospyros lotus* trunk, 750 m, 04 Dec. 2004 (TUH 1464).

Brachytheciaceae

Rhynchostegiella litorea (De Not.) Limpr.

Syn. *Rhynchostegiella tenella* (Dicks.) Limpr. var. *litorea* (De Not.) Richs. & Wall.

Plants slender, small yellowish green to green patches; stems closely and irregularly branched; leaves patent to erect-spreading, sometimes slightly homomallus when dry, branch leaves similar to stem leaves but slightly smaller and with longer acumen than stem leaves, linear-lanceolate, gradually acuminate, about 0.7-1.2 mm; margins plane, entire; costa narrow, mostly extending up to about the leaf-point; cells in mid-leaf linear-rhomboidal, thin-walled, 5-8 x 40-80(-100) μm , shorter and broader at base, more or less differentiated at the basal angles.

Setae reddish brown, papillose; capsules horizontal; operculum with oblique subulate beak; spores about 10-12 μm in diameter (Figure 5).

This plant mainly grows on stumps and logs unlike *Rhynchostegiella tenella*, which usually occurs on tree trunks. Capsules common, mature in the autumn to

spring. *R. litorea* is very similar to *R. tenella* but the plants have papillose setae, fewer longer tapering leaves and more or less entire margins.

Distribution: Widely distributed in the Mediterranean region of Europe, Britain, Caucasus, Turkey, Madeira, Morocco, Algeria and South Africa.

Specimen examined: Mazandaran Province: 10 km from Nowshahr on the way to Nour city, Najardeh village, about 5 km after Najardeh village towards the south, Patom, on tree stumps, ca. 400 m, 04 Dec. 2004 (TUH 1293).

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