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ENTODON CONCINNUS (DE NOT.) PAR. (MUSCI) – AN ADDITION TO THE MOSS FLORA OF TROPICAL AFRICA

ENTODON CONCINNUS (DE NOT.) PAR. (MUSCI) – ДОПОЛНЕНИЕ К ФЛОРЕ МХОВ ТРОПИЧЕСКОЙ АФРИКИ

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Abstract

Entodon concinnus (De Not.) Par. is for the first time reported from continental Africa. It was collected in Ethiopia in the Bale Mountains at an elevation of 4100 m in afroalpine *Helichrysum* heath. The nearest known localities of this species are in Turkey and Iran. The global distribution of *E. concinnus* is reviewed and mapped.

Резюме

Entodon concinnus (De Not.) Par. впервые найден на африканском континенте. Он был собран в Эфиопии, в горах Бале, на высоте 4100 м над ур. м. в альпийском поясе, в кустарниковых растительных сообществах с доминированием *Helichrysum*. Ближайшие известных местонахождения вида находятся в Турции и Иране. Обсуждается распространение *E. concinnus* в мире и приводится карта его ареала.

The genus *Entodon* Müll. Hal. is well represented in the moss flora of tropical Africa where it is a frequent and locally common or abundant constituent of various types of montane forest vegetation growing either epiphytically or as a ground moss. So far, no less than twelve species have been reported from continental Africa south of Sahara and five additional species are known from the East African Indian Ocean islands. Moreover, two undescribed species are know as *nomina nuda*, namely *E. brevis* Paris and *E. subcompressus* Fleisch. from Ethiopia and Ethiopia and Tanzania, respectively (O'Shea, 1999). Nevertheless, the definite number of species is now difficult to establish with certainty because the genus has not been carefully and critically assessed to provide a sound taxonomic framework for African material.

In the early 1990s we obtained for examination a rich collections of mosses collected in Ethiopia by Drs Sabine and Georg Miehe, then Göttingen now Marburg, Germany. It originated from the Bale Mountains which belong to the Bale-Arsi Massif forming the western section of the south-eastern Ethiopian highlands. The massif is of volcanic origin resulting from Oligocene eruptions and at present its landscape is dominated with trachyte and basalt rocks. When examining this collection a good number of interesting mosses were detected including some new to mainland Africa, for example *Plagiothecium lucidum* (Hook.f. & Wils.) Paris (Ochyra & al., 2000). Also, *Plagiomnium undulatum* (Hedw.) T. J. Kop. was reported as new to Africa from the collection made by the Miehes (Koponen, 1993). A provisional list of moss records from this area was published by Miehe and Miehe (1994a) but without any locality data. In the present article a record of *Entodon concinnus* (De Not.) Paris is described and this is also the first discovery of this species in Africa. Details of this record are as follows: ETHIOPIA. Bale Mountains, Wasama, lat. 6°55'N, long. 39°46'E, alt. 4140 m; afroalpine *Helichrysum* heath: outposts of *Philippia keniensis* with *Helichrysum splendidum – Alchemilla haumannii* dwarf scrub on 38° N-facing slope; solifluction stronger than rodent influence; no trace of fire seen; ground moss, rare companion; 11 Jan 1990, *S. & G. Miehe 875* (KRAM).

Entodon concinnus grows on ground at an elevation of 4140 m in the afroalpine belt situat-

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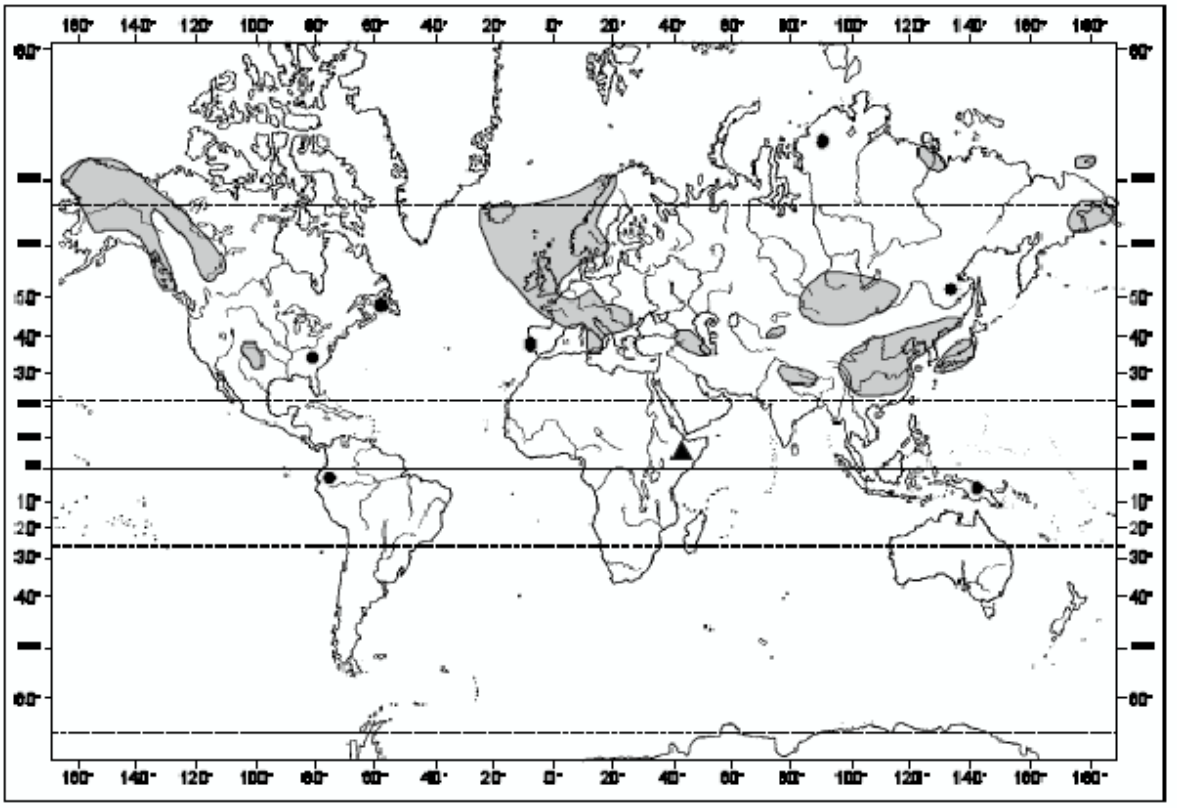

Fig. 1. Global distribution map for *Entodon concinnus* (De Not.) Par. The African locality is marked by the triangle.

ed above the upper limit of continuous ericaceous vegetation. The predominant plant formation in this belt is *Helichrysum* dwarf-scrub dominated by *Helichrysum splendidum*, especially in more humid situations. It forms dense, 30 to 50 cm tall stands in which the common components, apart from *Helichrysum splendidum*, constitute *Alchemilla haumannii*, *Lobelia rhunchopetalum*, *Helichrysum citrispinum*, *H. cymosum* and many others (Miehe & Miehe, 1993, 1994a, b). The frequent bryophyte associates are, among others, *Syntrichia cavallii* (G. Negri) Ochyra, *Orthotrichum affine* Brid., *Encalypta ciliata* Hedw., *E. vulgaris* Hedw., *Ceratodon purpureus* (Hedw.) Brid., *Hypnum cupressiforme* Hedw., *Bryum argenteum* Hedw. and *Frullania tinervis* (Lehm. & Lindenb.) Gottsche & al.

Entodon concinnus is a Northern Hemisphere species having a strongly discontinuous pan-Holarctic range (Fig. 1). In North America it is bicentric in distribution and has an arctic-alpine distribution pattern (Steere, 1975, 1978). It is most frequent in western part of the continent, extending from Arctic Alaska, Yukon and the Northwest Territories south to Alberta and British Colombia and additionally occurring at altimontane localities in the Rocky Mountains of Colorado and New Mexico. In eastern North America it is very rare and occasional in Newfoundland and in the Appalachians of North Carolina.

In contrast to North America, in Europe *Entodon concinnus* occurs mostly in areas with more temperate climates and is predominantly confined to western part of the continent affected by an oceanic climate. It is widespread in Iceland (Jóhannsson, 1996), the British Isles (Finch, 1994) and in western Fennoscandia (Söderström, 1996), whereas on the continent it occurs in the highlands and lower montane areas from France to the Ukraine south to southern Portugal and Sicily. Additionally, it is frequent in the Caucasus (Manakyan,1989; Onipchenko & Ignatova, 1996) and occasional in northern Iran (Frey & Kürschner, 1979).

In Asia *Entodon concinnus* has also an arctic-alpine distribution. It is only rare and widely scattered in Arctic Siberia including the Taymyr Peninsula (Blagodatskikh, 1973; Afonina &

Czernadjeva, 1995), Yakutia (Stepanova, 1986), Wrangel Island and the South and Beringian Chukotka (Afonina, 1989; Afonina & Czernadjeva, 1995), and it is much more widespread and common in Central Asia, Central Siberia (Bardunov, 1974; Ignatov & al., 1996), Mongolia (Abramova & Abramov, 1983) and the Russian Far East (Bardunov & Cherdantseva, 1982; Ignatov & al., 2000), and extending southward to China where it is frequent in many provinces, especially in the eastern part of the country (Redfearn & al., 1996), to Korea (Choe, 1980) and Japan (Mizushima, 1960). It is worth noting that in Japan, in the Himalayan region and in some parts of China it is represented by the separate subspecies, subsp. *caliginosus* (Mitt.) Mizush.

Outside the Holarctic *Entodon concinnus* has so far been recorded only twice in the tropics, namely in Papua New Guinea (Enroth, 1991) and in the Andes of Ecuador in South America (Robinson & al., 1971). In both centres the species occurs at high elevations of 3300–3400 m in Papua New Guinea and of 1550 m in Ecuador. Thus the present record is the third discovery of this species in the tropical region.

Entodon concinnus is easy to recognize by its regularly pinnately branched plants and cuspidate tips of stems and branches. In addition, the leaf apices are obtuse to obtuse-mucronate and the leaf margins are entire. In its cuspidate tips of branches and stems it resembles very much *Calliergonella cuspidata* (Hedw.) Loeske and in fact the first report of this species from Papua New Guinea referred just to this species (Noguchi, 1953). It is worth noting that Ignatov and Pavlov (1998) did report *C. cuspidata* from Ethiopia but the material was correctly determined.

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