Annals of Agrarian Science

Journal homepage: http://journals.org.ge/index.php

New localities of *Montagnea arenaria* (DC.) Zeller in Georgia

A. Jorjadze[1], A. Kvelashvili[1], K. Batsatsashvili[2]

[1] Department of Spore-producing Plants and Fungi, Institute of Botany, Ilia State University; 1, Botanikuri Str., Tbilisi, 0105, Georgia

[2] School of Natural Sciences and Medicine, Ilia State University; 3/5 K. Cholokashvili Ave., Tbilisi, 0162, Georgia

Received: 12 March, 2022; Accepted: 10 April, 2022

A B S T R A C T

Montagnea arenaria (DC.) Zeller one of the rare species in Georgia, was found in a new locality in semi-arid habitats of Kvernakebi low range (Eastern Georgia).The article provides a brief taxonomic description, habitat, ecology, geographic distribution and original illustrations.

***Key words*:** Agaricoid fungi, *Montagnea arenaria*, semi-arid habitats, distribution, Georgia.

* Corresponding author: Angelina Jorjadze, e-mail address: angelina.jorjadze@iliauni.edu.ge

Introduction

Montagnea arenaria (DC.) Zeller is a secutioid gastroid fungus adapted to arid, steppes, desert and semidesert regions and distributed worldwide [1-4]. It is a humus saprotroph, decomposer on organic matter, dead desert plants and grass, sometimes associated with juniper and shrubs [1].

According to Index Fungorum, the genus *Montagnea* belongs to the class Agaricomycetes, order Agaricales and family Agaricaceae. *Montagnea arenaria* (DC.) Zeller was first diagnosed in 1815 by Augustin Pyramus de Candolle, naming it *Agaricus arenarius*. Its current name, recognized by Index Fungorum, was given to it by S. M. Zeller in 1943 [5].

In Georgia, *Montagnea arenaria* was first found in 1955 by I. Nakhutsrishvili [6] in the Vashlovani State Reserve, where it grew in the steppe community, under juniper, in a form of scattered individual specimens. Later, in 1973 and 1988, I. Nakhutsrishvili found the species again in the Vashlovani State Reserve, in 1969, I. Nakhutsrishvili collected *M. arenaria* in Tusheti, on Mount Samekhe, at 2000 m a.s.l., in the *Artemisia-Bothriochloa* meadow. The species, was last seen in 2008 in the Gareji semi-desert, one carpophore [7]. Until 2021, all specimens were collected only in eastern Georgia, in the Kakheti region. All specimens except one were collected in typical arid and semiarid habitats, steppe formations, at the elevation of 300 - 600 m. Only one sample was taken in Tusheti, an atypical arid habitat, at the 2000 m. *M. arenaria* is recorded at 2000 m in Kazakhstan, on the stepped slopes [8].

The new specimen was found in the Shida Kartli region of eastern Georgia, on the Kvernakebi ridge. The Kvernakebi ridge is characterized by arid habitats, scrub constituted by various hemi-xerophilic species with predominance of *Paliurus spina-christi* Mill., various steppe communities mostly made up of *Botriochloa ischaemum* (L.) Keng, semi-desert vegetation dominated by *Artemisia lerchiana* Weber and a number of transitional and mixed communities [9].

Materials & Methods

The study materials were collected in 2021 during a field survey of the Kvernakebi low range. Carpophores and habitats were photographed using Nicon Coolpix L830. Geographic coordinates were recorded by Garmin Etrex 20. After collection, the fruit bodies were put in paper boxes and transferred to the Fungarium. Species were identified and stored at the Herbarium of the Department of spore-producing plants and fungi of the Institute of Botany of Ilia State University (at the Cryptogam Herbarium, which is a part of the National Herbarium of Georgia, TBI). Melzer's iodine reagent or 5% KOH was used for treatment of small sections of gleba for microscopical examination with Olympus CX31RBSF binocular microscope. Various keys were used for species identification [8, 10,11].

Fig. 1. *Distribution of Montagnea arenaria in Georgia*

Fig. 2. *Landscape images from Kvernakebi low range*

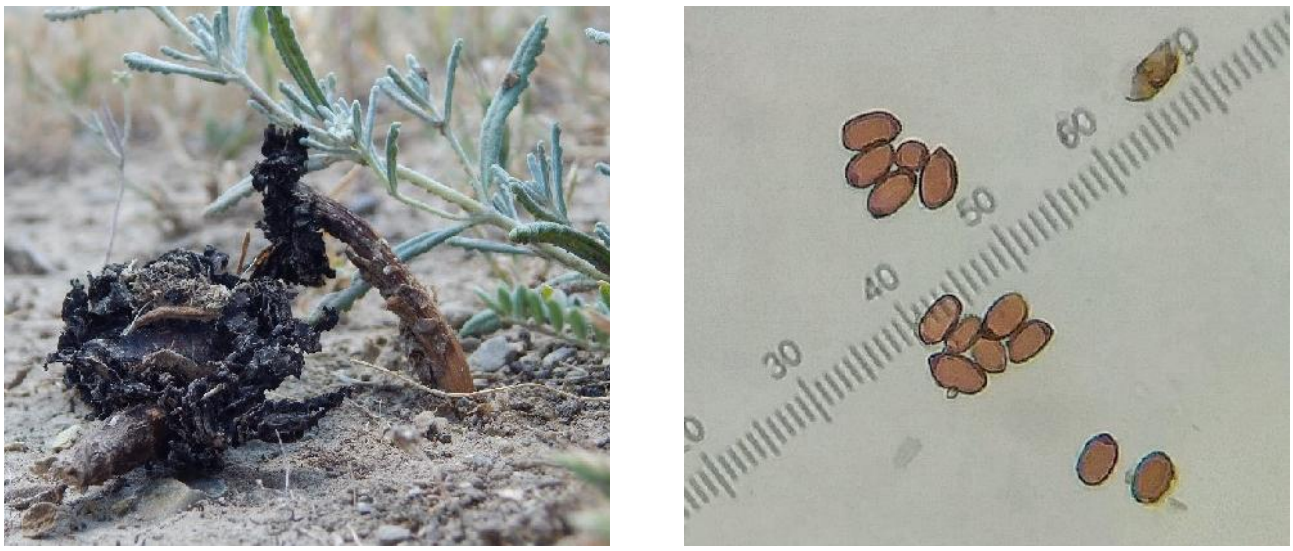

Fig. 3. *Basidiocarps and basidiospores of Montagnea arenaria*

Results & Discussion

The morphological description of *M. arenaria* is based on a recently collected specimens in Georgia.

***Montagnea arenaria* (DC.) Zeller,** Mycologia 35(4): 418 (1943). – Syn.: *Agaricus arenarius* DC., Flore Franc.6, 45, 1815. – *Montagnites arenarius* (DC.) Morse, Mycologia 40(2): 256 (1948). – *Montagnea delilei* Fr., Fl. Scan.: 339 (1836). – *Montagnites pallasii* Fr., Epicr. syst. mycol. (Upsaliae): 241 (1838). – *Montagnea pallasii* (Fr.) Mont., Annls Sci. Nat., Bot., sér. 2 20: 77 (1843); – *Montagnea arenaria* var. *macrospora* D.A. Reid &Eicker, S. Afr. J. Bot. 57(3): 166 (1991)

Fruiting body semi-subterranean at first, egg-shaped, up to 3 cm across. Mature basidiocarp coprinoid, with a woody stipe. **Stem** 4 – 8 x 0.4 – 0.6 cm, cylindrical, often tapering towards the base, at first whitish, fleshy, soft, full, smooth, later whitish-yellowish, hollow, woody, pitted, fibrous-scaly, at the base of the leg has an elongated whitish-yellowish volva, completely hidden in the substrate, which is often absent with age. Top of stem disc-like cap. **Pileus** 1– 3.5 cm across, grayish, yellowish-brown, slightly depressed, with a dry wrinkled surface, brittle, wavy edges, later the edges crack radially and pitch black plates appear. **Lamellae** free, frequent, wavy, blackish-brown to black, not deliquescent, fragile**. Spores** dark brown (spore powder black), oblong-ovoid, smooth, with a germinal pore, 16–17 x 8–10 µm. (Fig. 3)

Habitat. Humus saprotroph. Grows solitary, scattered, on dry sandy soil on pastures, steppe community. (Fig. 2)

New records. Georgia, Shida Kartli, Kaspi Municipality, Kavtiskhevi Railway Station, Farm, Kvernakebi low range, N41.914582 E44.466362, alt. 530 m, 10 June 2021, leg. Angelina Jorjadze (TBI50225282). (Fig. 1, 2)

Previous collections in Georgia. Kakheti: Akhmeta Municipality, Tusheti, Shenako, Samekhe Mountain, *Artemisia-Bothriochloa* meadow, soil, 07.09.1969, I. Nakhutsrishvili (TBI5009217); Dedoplistskaro Municipality, Vashlovani Strict Nature Reserve, Pantishara Canyon, Lekistskali, steppe community, under juniper,sandy soil,solitary, scattered, 26.04.1955, I. Nakhutsrishvili (TBI5009215); Vashlovani Strict Nature Reserve, Chigont-khevi, *Artemisia-Bothriochloa* meadow, soil, 04.11.1973, I. Nakhutsrishvili (TBI5009218); Vashlovani Strict Nature Reserve, soil, 14-16.04.1988, I. Nakhutsrishvili (TBI5009216; TBI5009219); Sagarejo Municipality, David Gareja, steppe community, sandy soil, 27.08.2008, A. Jorjadze (TBI5009220) [7]. (Fig. 3).

References

[1] Chang Ch., Genetical and molecular systematic study on the genus *Montagnea* Fr. a desert adapted Gasteromycete, M. Sc. Thesis, Virginia Polytechnic Institute and State University, Blacksburg, Virginia, (1999) 74.

[2] H. Kreisel, Checklist of the gasteral and secotioid

Basidiomycetes of Europe, Africa, and the Middle East, Österr. Z. Pilzk. 10 (2001) 213 –313.

[3] D. A. Reid, A. Eicker, A taxonomic survey of the genus *Montagnea* (Gasteromycetes) with special reference to South Africa, S. Afr. J. Bot. 57(3) (1991) 161-170.

[4] S. Malgorzata, P. Bozena, New record of *Montagnea arenaria* (Fungi, Agaricales) and its distribution in Poland, Polish Botanical Journal,. V. 47(2) (2002) 211–213.

[5] Index Fungorum. http://www.indexfungorum.org/Index.htm, 2023 (accessed 15.01.2023).

[6] I. G. Nakhutsrishvili, Flora of spore-producing plants of Georgia (A conspectus), Metsniereba, Tbilisi, (1986) 885, (in Russian).

[7] A. Jorjadze, K. Batsatsashvili, I. Kupradze, K. Tigishvili, Herbarium Catalogue of Georgian Fungi –Macromycetes, Ilia State University, Tbilisi, (2022) 175.

[8] S. R. Shvartsman, N.M. Filimonova, Flora of spore-producing plants of Kazakhstan, vol. 6: Gasteromycetes, Nauka, Alma-Ata, (1970) 317, (in Russian).

[9] A. Jorjadzea, K. Tigishvilia, I. Kupradzea, K. Batsatsashvilib, New species of gasteroid fungi for Georgia's mycobiota, Annals of Agrarian Science, 19 (2021) 68-76.

[10] P. E. Sossin, The Handbook of the Gasteromycetes of the USSR, Nauka, Leningrad, (1973) 162 (in Russian).

[11] O.K. Miller, H.H. Miller, Gasteromycetes: morphological and developmental features, with keys to the orders, families and genera, Mad River Press, Eureka, CA, (1988) 157.