

***Helvella monachella* (Scop.) Fr. (Helvellaceae, Pezizales) in Tunisia, a second report to the rare African Ascomycota**

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Helvella monachella (Scop.) Fr. (Helvellaceae, Pezizales) en Túnez, segunda cita para este raro ascomiceto en África.

Helvella monachella (Scop.) Fr. (Helvellaceae, subg. *Elasticae*) se cita aquí por segunda vez entre el grupo africano *Ascomycota* del noroeste de Túnez, basándose en estudios micológicos y análisis de la literatura pertinente. Se proporcionan las características generales, junto con fotografías originales, del material tunecino. Se presenta el hábitat y la distribución actual de este nuevo descubrimiento en Túnez. También se propone una clave discriminatoria para las especies del género *Helvella* conocidas en Túnez.

Palabras clave: Corología; Hongos; Nuevo registro; *Ascomycota*; *Helvella* subg. *Elasticae*; África.

Abstract

Helvella monachella (Scop.) Fr. (Helvellaceae, subg. *Elasticae*) is here reported for the second time among the African *Ascomycota* group from northwestern Tunisia, based on mycological surveys and analysis of relevant literature. General characteristics together with original photographs are here provided for Tunisian material. Habitat and current distribution of this new discovery in Tunisia are presented. A discriminating key to species of the genus *Helvella* known in Tunisia is also proposed.

Key words: Chorology; Fungi; New record; *Ascomycota*; *Helvella* subg. *Elasticae*; Africa.

Introduction

Helvella L. is a highly diverse genus that remains the largest genus in the family Helvellaceae with approximately 100 widely accepted species (see e.g. Kirk *et al.* 2008, Zhuang *et al.* 2018, Wang *et al.* 2019, Landeros *et al.* 2021, Xu

et al. 2022, Skrede *et al.* 2023 and literature therein). The taxon is distributed worldwide, and its members are mainly found in mountainous and forested regions in north-temperate Eurasia and North America (see e.g. Zhao *et al.* 2015, 2016, Skrede *et al.* 2017), and within Mediterranean region (see e.g. Calonge & Arroyo 1990, Dissing



1966, Van Vooren 2010, Løken *et al.* 2019, Skrede *et al.* 2017, 2020, 2023) including North Africa (El Mokni *et al.* 2013, Djelloul 2014, El Akil *et al.* 2014, Lachichi 2014, El Mokni & El Aouni 2019, Ben Hassine Ben Ali & Aschi-Smiti 2014; Ben Hassine Ben Ali & Stephenson, 2016, Ouali *et al.* 2016, 2020). In Tunisia, so far seven species of *Helvella* namely; *H. acetabulum* (L.) Quél., *H. atra* J. König, *H. costifera* Nannf., *H. crispa* (Scop.) Fr., *H. elastica* Bull., *H. lacunosa* Afzel., and *H. leucomelaena* (Pers.) Nannf. have previously been recorded (see e.g., El Mokni & El Aouni 2019, Ouali *et al.* 2020). As a part of our investigations and studies focusing on improving and updating knowledge (inventory and taxonomy) on the taxa of the Ascomycota in Tunisia (see e.g., El Mokni *et al.* 2013, El Mokni 2023), recent field explorations have allowed to discover a subpopulation of a typical *Helvella* which for the best of our knowledge is not reported yet at national level.

The present study aimed to provide data about the occurrence of this new discovery in the north-western Kroumirian oak forests and to update the list of *Helvella* species in Tunisia.

Materials and methods

Data presented in this study are based on specimens collected through fungal surveys and sampling performed between 2001 and 2024 in various localities and areas of the Tunisia's north-western Kroumirian oak forests (see El Mokni & El Aouni 2019, El Mokni 2023). Relevant notes were taken, at the sampling localities, mainly those related to fungi ecology, morphology, and geographic position, photographs of the habit using a Nikon COOLPIX P520 camera. For the taxonomic treatments and identification fresh material was used together with descriptions given by Abbott & Currah (1997), Dissing (1966) and van Vooren (2010) (sub *H. leucopus* Pers.). Infra-generic correspondence is following Landeros *et al.* (2015). The nomenclatural database *Index Fungorum* (2025) and the *Mycobank* database (2025) were used to find the most updated taxon names and its typification, lectotype and epitype. Chorology and eventual occurrences elsewhere in the world were checked in the online international network, Global Biodiversity Information Facility (GBIF 2025). Collected specimens are deposited at the Personnel Herbarium of the author (Herb.

El Mokni) housed at the Faculty of Pharmacy of Monastir (not yet listed in the *Index Herbariorum*).

Results

Helvella monachella (Scop.) Fr., *Systema Mycologicum* (Lundae) 2(1): 18 (1822)

Basionym. *Phallus monachella* Scop., *Flora carniolica* 2: 476 (1772)

Synonyms. *H. leucopus* Pers., *Mycol. Eur.* 1: 213. (1822), *H. albipes* Fuckel, *Jahrb. Nass. Ver. Naturk.* 23-24: 334 (1870), *H. spadicea* Schaeff., *Fung. Bav. Palat.* 4: 112 (1774).

Typification. Haller, *Hist. no.* 2246; Schaeffer, *Tab.* 159, 160, 161, 162; Micheli, *Tab.* 86, fig. 8; Lectotype. Battarra, *Fungorum Arimin.*: t. 2, f. H, sub 'Boletus albus pileolo complicatus nigro', 1759. *Mycobank* MBT375704; Epitype. Hungary, Szelid, Bacs-Kiskun, in populeto-saliceto, 14 May 1979, M. Babos, L. Albert, J. Bükei & A. Friesz (C-F-92121 'Helvella leucopus Pers.' ex Herb. Musei Hist. Nat. Hung. Budapest, dupl.). *Mycobank* MBT375409.

Description (Fig. 1). *Carpophore* (10-)25-35(-40) mm in diameter and 27-55(-65) mm high, saddle-shaped composed of two or three distinct irregular lobes, crimped or pleated lobes, partially welded together or on the stipe. *Hymenium* brown-black to black (black when dry). Outer surface white to pale grey, glabrous. *Ectal excipulum* (outer surface layer) 85-150 µm thick, composed of chains of angular hyaline cells, the outermost cells cylindrical to clavate, 20-60 x 6-20 µm in size. *Internal tissue* (below the hymenium) 200-300 µm thick, composed of interwoven hyphae 3-6 µm diam., interspersed with thicker-walled hyphae 6-10 µm diam. *Stipe* 20-55(-60) x 7-10(-20) mm, generally squat, often expanded at the base (to 15-20 mm), round in section, sometimes slightly furrowed below, hollow, white, glabrous, which may be partly buried. *Asci* 300-360x14-18 µm, cylindrical, fairly thick-walled, the apex rounded, operculate, 8-spored. *Paraphyses* with broadened apices to 7-9 µm in diameter, containing brown pigment. *Ascospores* ellipsoidal to broadly ellipsoidal, 20-24x13-15 (-16) µm, mean length/breadth ratio 1.5, fairly thin-walled, hyaline, smooth, containing a large central lipid droplet surrounded by smaller ones, without a gelatinous sheath or appendages.

Habitat in Tunisia. apothecia were discovered among grass on sandy to rocky/gravelly grounds within banks of a river on a mixed oak forest associated with ripicolous vegetation including mainly *Acanthus mollis* subsp. *platyphyllus* Murb. (Acanthaceae, a Moroccan-Algerian-Tunisian endemic taxon), *Alnus glutinosa* (L.) Gaertn., *Fraxinus angustifolia* Vahl, *Populus alba* L., *Populus nigra* L., and *Ulmus minor* Mill. Only one locality is known within Kroumirian oak forests (Jendouba, Tabarka, northwestern Tunisia).

Specimen examined (new records): Tunisia, Jendouba, Tabarka, on the banks of a river within Kroumirian mixed oak forests, 70-86 m.a.s.l., 36°57'52" N, 8°57'53" E, 26 February 2024, Collector *Ridha El Mokni* (REM).

Notes. *Helvella monachella* (Scop.) Fr. (sub *H. leucopus* Pers.), a species of sand dunes and sandy soil, fruiting in early spring. So far, it is known elsewhere from many parts of Europe (Portugal, Spain, France, Germany, Serbia, Italy, Ukraine, Poland, Slovakia, and Sweden), North Africa? (the species was reported only once from Morocco since 1961), Asia (Iran, Uzbekistan, Kyrgyzstan) and within the United States of America mainly in Chile and Mexico (Dissing 1966, Moravec 1980, Abbott & Currah 1997, GBIF 2025). The species is recognised from closer species of the genus mainly by the blackish hymenium, complex saddle-shaped cap and its robust, glabrous white stipe.

Till more mycological explorations in Tunisia reveal new eventual records of the genus *Helvella* in the nearer future, *H. monachella* can easily be distinguished from related species using the following key (adopted from Spooner 2003: 56-58):

Key to Tunisian species of *Helvella* L., with their related subgenera

1. Stipe ribbed and furrowed over entire length, internally solid or chambered, sometimes very short, ribs often present on cup underside.....2
 - Stipe not ribbed, except occasionally slightly grooved at base and/or apex, always well-developed [Subg. *Elasticae*].....6
2. Apothecium cupulate; stipe internally solid or chambered [Subg. *Leucomelaena*].....3
 - Apothecium saddle shaped or irregularly lobed and convex; stipe internally chambered [Subg. *Helvella*]..5
3. Ribs not or scarcely continuing on underside of apothecium.....*H. leucomelaena* (Pers.) Nannf
 - Ribs continuing markedly on underside of apothecium, usually to at least half way.....4

4. Fruiting in spring (April to June). Hymenium brown to dark brown, sometimes with a violet tinge. Externally dark brown above, paler below. Ribs branching, usually sharp-angled, rarely interconnected by cross-veins, not reaching the margin.....*H. acetabulum* (L.) Quéf.

- Fruiting in late summer and autumn (June to September). Hymenium grey-brown. Externally paler to margin. Ribs blunt, branching and often interconnected by cross-veins, often reaching the margin.....*H. costifera* Nannf.

5. Hymenium whitish to cream; outer surface villose; edge of cap free from stem.....*H. crispa* (Scop.) Fr.

- Hymenium grey-brown to blackish; outer surface smooth or at most finely pubescent; edge of cap free or in part fused with stem.....*H. lacunosa* Afzel

6. Stipe dark grey-brown to black; hymenium dark brown to black, underside grey or grey-brown.....*H. atra* J. König

- Stipe whitish to pale grey-brown; hymenium and underside whitish to grey, brown or blackish.....7

7. Hymenium pale brown to brown, darker when dry, campanulate to simple saddle-shaped. Stipe slender, whitish to cream, finely pubescent; in woodland, fruiting summer - autumn.....*H. elastica* Bull.

- Hymenium blackish, complex saddle-shaped. Stipe robust, white, glabrous; in sand dunes, fruiting in spring*H. monachella* (Scop.) Fr.

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Figura 1. *Helvella monachella* en Túnez. Ejemplares maduros con himenio típico de color marrón parduzco a marrón negruzco y estípite liso, subcilíndrico a comprimido, hueco y blanquecino. (Tabarka, noroeste de Túnez, 26.02.2024). Fotografías de R. El Mokni. Barras de escala: 25 mm.

Figure 1. *Helvella monachella* in Tunisia. Mature specimens with typical hymenium brownish-brown to blackish-brown and smooth, subcylindrical to compressed, hollow, whitish stipe. (Tabarka, NW Tunisia, 26.02.2024). Photographs R. El Mokni. Scale bars: 25 mm.

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