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First record of *Morchella esculenta* (L.) Pers. from Ras Al-Turab, Green Mountain, Northeastern Libya

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ABSTRACT

This study presents the first confirmed documentation of the presence of *Morchella esculenta* in Libya, specifically in the Ras Al-Turab area of the Green Mountain. A specimen collected from a grassy habitat was subjected to microscopic and macroscopic analyses. Morphological characteristics, such as the esculenta l cap shape and honeycomb-like pits, in addition to microscopic features like ellipsoid ascospores and cylindrical asci, matched the published description of *M. esculenta*. Due to limited access to molecular tools, identification was based solely on morphology. Samples were deposited in the Fungarium of Suez Canal University under accession number SCUF 00000289. This discovery expands the known geographical range of *Morchella* species in North Africa and highlights the region's underexplored fungal diversity. It also indicates the potential for ecological and economic research on this valuable edible and medicinal fungus.

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Introduction

The genus *Morchella* (true morels) is among the most remarkable groups of wild fungi, valued for their high nutritional content and bioactive compounds with recognized medicinal properties, including anti-inflammatory, immunomodulatory, and radioprotective effects (Liu et al. 2020, Heleno et al. 2013, Tietel & Masaphy 2018). Their ecological plasticity allows them to thrive in diverse habitats ranging from fire-disturbed forests to grasslands and orchards, reflecting versatile trophic strategies that are still not fully understood (Du et al. 2015).

Despite this importance, the taxonomy of Morchella remains challenging due to the wide diversity of species and the limitations of morphology-based identification. Molecular studies have revealed more than 60 species distributed across distinct clades, while earlier morphology-only records have often led to misidentifications in genetic databases (O'Donnell et al., 2011; Petrželová & Sochor, 2019).

Taxonomy requires continual updates and checklists are important tools in taxonomy, systematics and conservation (Söderström et al. 2007, 2008; Abdel-Azeem & El-Fallal 2012, Abdel-Azeem & Salem 2013, Salem et al. 2015, Nafady et al. 2016, Amrani & Abdel-Azeem 2018a, b, 2019, Amrani et al. 2019, 2021, Abdel-Azeem et al. 2020).

Regionally, the Middle East and North Africa (MENA) remain insufficiently explored from a mycological perspective despite their biogeographical significance. Recent studies have reported new fungal taxa in Iraq, Pakistan, and Egypt, highlighting hidden fungal diversity across the region (Al-Khesraji, 2016; Ali et al., 2021; Blanchette et al. 2017), Abdel-Azeem & Nafady,

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2019). However, no confirmed records of this genus have been published from this region in Libya until now (El-Buni & Rattan 1981).

Therefore, the present study provides the first confirmed documentation of *Morchella esculenta* in Northeastern Libya, based on detailed morphological analysis. This finding expands the known geographical distribution of the genus in North Africa and emphasizes the importance of further regional surveys to better understand its ecological and economic value

Materials and Methods

Collection of the samples

The specimens were collected from the Ras Al-Turab area (32.78476°N, 21.82510°E) during the summer growing season on grass. The fungus was documented photographically in its natural location and after drying. Samples were deposited in the Fungarium of Suez Canal University hosted by the Arab Society for Fungal Conservation under accession number SCUF000000289 (https://ccinfo.wdcm.org/details?regnum=1180).

Morphological and Microscopic Analysis

Macroscopic characteristics were described from fresh and dried specimens. Microscopic examination was performed using a light microscope at 400× magnification after preparing slides with distilled water. Seventeen mature ascospores were measured using ImageJ–Fiji software. The diagnosis was based on the relevant taxonomic keys.

Results

The fruiting bodies showed a esculenta l, dark brown, hollow cap with prominent pits. The stipe was cylindrical, hollow, smooth, and light-colored. Spore dimensions ranged from 20.5–24.1 × 13.0–16.5 micrometers, with an average of 22.3 ±1.2 × 14.7 ±0.9. The spores were oval, transparent, and had smooth walls. The asci were cylindrical and contained eight spores (Fig. 1). These characteristics match *Morchella esculenta* as reported in recent literature.

Approved taxonomic keys such as those provided by Kuo et al. (2012) were used to confirm the taxonomic identity of the specimen. The studied specimen was distinguished by characteristics that were fully compatible with the species included in the Elata group (black morels), including the *esculenta* l cap shape, honeycomb-like pits, and elliptical spores.

These results support the first documentation of the species in the region and confirm the importance of using approved taxonomic keys in the absence of genetic analysis. and taxonomic assignments of the taxon reported in this work were checked against the Index Fungorum database (www.indexfungorum.org (accessed on 22 May 2025).

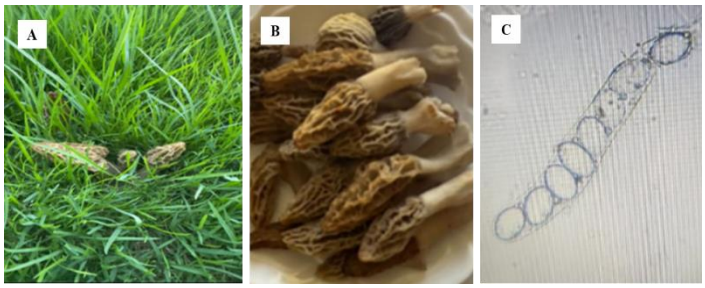

Fig 1. *Morchella esculenta* (*M. conica*) and its morphological characteristics. A. Specimen in its natural habitat in the Ras Al-Turab area, Al Bayda, Jabal al Akhdar District, Libya. B. Air-dried fruiting bodies. C. Ascus showing eight mature ascospores inside.

Conclusions

These findings clearly support the identification of the specimen studied as *Morchella esculenta* (*M. conica*). While certain macroscopic traits may vary with environmental conditions, microscopic characters. This study provides the first confirmed record of *Morchella* esculenta in the Green Mountain in Libya based on morphological analysis. The discovery expands the known distribution of the genus in North Africa and opens new opportunities for research on unexplored fungal diversity, emphasizing the need for future molecular studies and investigations into its ecological and economic significance.

Conservation of fungi in Libya and worldwide remains very low, and more education on fungal conservation is urgently needed. Although the species distribution is restricted only in Green Mountain, Libya, and in this state, data deficient (DD) is the conservation status of this fungal species according to the IUCN criteria (2008).

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Conflict of interest

The author have no conflicts of interest to declare.

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