



New provincial record and habitat characterization of the endangered Morel *Morchella steppicola* Zerova (Ascomycota) in Çankırı, Turkey¹

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ABSTRACT

Background and Aims Thirty species within the genus *Morchella* have been documented in Türkiye. This study reports the fourth national record of *Morchella steppicola* Zerova, a species classified as Endangered (EN) on the global Red List, and the first occurrence from Çankırı province. Additionally, the study aims to characterize the fundamental habitat features associated with this species.

Methods Specimens were collected during field surveys conducted in Çankırı province between 6 and 14 April 2024. Identification was performed using both macroscopic and microscopic features, supplemented by field-emission scanning electron microscopy (FE-SEM) imaging, as well as stereo and light microscopy. Soil samples from the collection sites were analysed for basic physical (texture) and chemical properties, such as texture, and chemical properties, including pH, CaCO₃, soil organic matter (SOM), electrical conductivity (EC), total salt, and total nitrogen content.

Results The specimens were identified as *M. steppicola* and this is the first record of the species in Çankırı province. In Türkiye, this species was previously known only from Afyonkarahisar, Kırşehir, and Edirne provinces. Soil analyses indicated the following properties: clay 59%, sand 23%, silt 18%; pH 7.55 (slightly alkaline); CaCO₃ 32.25% (very calcareous); organic matter 4.65%; EC 0.083 dS/m; total salt 0.04%; and total nitrogen 0.23%. The collection sites were situated at an elevation of approximately 948 meters.

Conclusions The presence of *M. steppicola* in Çankırı province is confirmed for the first time. Given the species' rarity and the distinctive characteristics of its habitat, continued monitoring of comparable steppe and meadow ecosystems is recommended, along with conservation measures for the species and its environment.

Key Words: Çankırı, *Morchella steppicola* Zerova, new locality, Türkiye

Research Article

Türkiye, Çankırı'da tehlike altındaki Kuzugöbeği *Morchella steppicola* Zerova'nın (Ascomycota) yeni il kaydı ve habitat karakterizasyonu

ÖZ

Giriş ve Hedefler *Morchella* cinsine ait otuz takson Türkiye'de belgelenmiştir. Bu çalışma, küresel kırmızı listede Tehlike Altında (EN) olarak sınıflandırılan *Morchella steppicola* Zerova türünün ulusal düzeydeki dördüncü örneğini ve Çankırı ilinden ilk kaydı bildirmektedir. Ayrıca, çalışma bu türle ilişkili temel habitat özelliklerini karakterize etmeyi amaçlamaktadır.

Yöntemler Örnekler, 6-14 Nisan 2024 tarihleri arasında Çankırı ilinde yürütülen arazi çalışmaları sırasında toplanmıştır. Tanımlama hem makroskobik hem de mikroskobik özelliklere dayandırılmış ve stereo ve saha emisyon taramalı elektron mikroskobu (FE-SEM), stereo ve ışık mikroskobu ile desteklenmiştir. Toplama alanlarından alınan toprak örnekleri, tekstür gibi temel fiziksel ve pH, CaCO₃, toprak organik maddesi (TOM), elektriksel iletkenlik (EC), toplam tuz ve toplam azot içeriği gibi kimyasal özellikler açısından analiz edilmiştir.

Bulgular Örnekler, *M. steppicola* olarak tanımlanmıştır ve bu, türün Çankırı ilindeki ilk kayıdır. Türkiye'de bu tür daha önce sadece Afyonkarahisar, Kırşehir ve Edirne illerinden bilinmekteydi. Toprak analizleri şu özellikleri göstermiştir: kil %59, kum %23, silt %18; pH 7,55 (hafif alkali); CaCO₃ %32,25 (çok kireçli); TOM %4,65; EC 0,083 dS/m; toplam tuz %0,04; ve toplam azot %0,23. Toplama alanları yaklaşık 948 metre rakımda yer almaktadır.

Sonuçlar *M. steppicola*'nın Çankırı ilindeki varlığı ilk kez doğrulanmıştır. Türün nadirliği ve habitatının kendine özgü özellikleri göz önüne alındığında, tür ve çevresi için koruma önlemlerinin yanı sıra benzer bozkır ve çayır ekosistemlerinin sürekli izlenmesi önerilmektedir.

Anahtar Kelimeler: Çankırı, *Morchella steppicola* Zerova, yeni lokalite, Türkiye

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1. Introduction

Fungi are crucial organisms for forest tree species and forest ecosystems. In forest ecosystems, the role of fungi in decomposing plant structures is particularly significant due to their ability to utilize cellulose, hemicellulose, pectin, and lignin. Biomass production in forest ecosystems is controlled by wood-decaying fungi. As a result of these fungal activities, CO₂ used by green plants is released into the atmosphere. Humus, formed by the breakdown of organic matter by fungi, alters the physical, chemical, and biological properties of the soil, providing better nutrition for plants. Although small in quantity, they provide nitrogen, an essential nutrient for plants (Montecchi and Sarasini 2000). Furthermore, through mycorrhizae, a prime example of symbiotic partnerships between fungi and plants, fungal hyphae increase the contact surface of the absorbent hairs on tree roots, thereby transporting water much faster than the roots themselves. They capture water molecules attached to even the smallest particles in the soil and make them available to the trees. This increases the host plant's resistance to adverse soil conditions, such as drought, by increasing the surface area of the plant roots. It also increases the uptake of certain nutrients, which constitute an important functional group of the soil biota. It also protects plant roots against rhizosphere pathogens and stress factors such as extreme heat, drought, heavy metal toxicity, and salinity (Lehmann et al., 2017). For all these reasons, mushrooms, especially mycorrhizal fungi like morels, are of great importance to the forest ecosystem.

Fungi play a vital functional role in forest ecosystems, contributing to the decomposition of organic matter, nutrient cycling, the formation of soil structure, and plant-microbial interactions. Beyond these functions, fungi also play key roles in ecosystem recovery after disturbances caused by wildfires or anthropogenic impacts. In particular, *Morchella* species frequently emerge in post-fire environments, aiding in soil transformation and ecosystem restoration while providing substantial economic benefits to local communities (Larson et al., 2016).

Many regions in our country experience wildfires on an annual basis. It is documented that after forest fires, a variety of new plant and animal species, as well as numerous fungi species especially morel mushrooms, appear in affected areas. Morel mushrooms function as pioneer species in the post-fire ecosystem, rapidly colonizing the disturbed environment. This rapid growth occurs because fires consume organic matter in the soil, such as decomposing wood, leaf litter, branches, and dead grasses, releasing carbon and nitrogen compounds through combustion. Morel mushrooms efficiently utilize these nutrients in the enriched soil to grow quickly. Another reason for the abundant growth of morels in post-fire areas is that fire temporarily removes other microorganisms and fungal species from the soil, allowing morel mushrooms to grow more abundantly and freely (Duchesne and Weber, 1993, Kuo, 2005). The heat generated by fire generally stimulates fungal spores and scleroids, triggering germination. Furthermore, ash and various chemical changes following the fire encourage the growth of some *Morchella* species (*M. importuna*, *M. eximia*, *M. dunensis*) (Taşkın et al., 2010, 2012; Loizides, 2017).

The mycelia of morels and other fungi appearing in burned areas help improve soil structure, contribute to organic matter cycling, and enhance water retention capacity through mechanisms such as humus formation and soil particle aggregation. Ultimately, these processes make the soil more functional and resilient (Li et al., 2022; Lazarević et al., 2024; Sağlam et al., 2021). Consequently, morels are of interest not only as edible fungi but also in the contexts of forest management, landscape restoration, and sustainable utilization of non-wood forest products.

Generally, morels thrive in coniferous forests with calcareous soils, environments that have supported the discovery of several new species described in global literature (İşiloğlu et al., 2010; Taşkın et al., 2016). However, species like *M. steppicola* have also been found in areas with different soil structures (Güngör & Solak, 2015).

The genus *Morchella* (morel mushrooms) is a group of fungi with species known for their rich nutritional content and medicinal properties. For centuries, these mushrooms have been treasured both as a natural delicacy and for their cultural significance (Dissanayake et al., 2021). Due to their nutritional and medicinal benefits as well as delicate flavours and unique appearances, they hold a significant place in global trade, with thousands of tons exported annually (Larson et al., 2016). Thereby, morels are highly prized both in Türkiye and across much of the world. In particular, they serve as an important source of income for people living in rural and forested areas of Türkiye. In recent years, environmental changes caused by global warming, intense human impact on forest ecosystems and recurring forest fires have led to the degradation of these habitats. Interestingly, while fires can severely damage forests, the subsequent ecological changes can often lead to the abundant emergence of certain morel mushroom species (Taşkın and Büyükalaca, 2012).

Türkiye's diverse climatic and biogeographic conditions provide a highly suitable environment for morel mushrooms. As a result, they typically grow abundantly during the rainy spring months (except *M. galilaea*) (Bozok et al., 2020). In Türkiye, morels (commonly referred to as "kuzugöbeği") serve as an important seasonal income source for residents of forested and semi-natural regions (Allı, 2022). The biggest problem in morphological identification of morel species is that morel mushrooms are extremely polymorphic, and their morphological characteristics are significantly affected by environmental conditions (Taşkın and Büyükalaca, 2012). *M. steppicola* is the earliest-diverging species in the *Esculenta* group (Loizides, 2017). Recently, Yatisuk et al. (2016) conducted molecular studies based on ITS gene regions using *M. steppicola* samples collected from Ukraine, Kazakhstan, and Uzbekistan. In a study by Keskinçalış and Taşkın (2019), the presence of *M. steppicola* in Turkey was confirmed for the first time using DNA sequence analysis.

Morchella steppicola, commonly referred to as the "steppe morel," is both morphologically and ecologically distinct from most other morel species. This species, not well known in Western Europe, was first identified by Ukrainian mycologist Mariya Yakovlevna Zerova in the Poltava region of Ukraine (Zerova, 1941). It is typically found in temperate grasslands and steppes of Eastern Europe and Central Eurasia, thriving in calcareous and clay-rich soils, especially in fallow lands

(Clowez, 2012; Yatisuk et al., 2016). Unlike other morels, the alveoles on its ascocarp are deep and irregular. Its stem is thicker and features a densely packed labyrinth of irregular ridges, making it morphologically distinguishable (Güngör & Solak, 2015; Alkan et al., 2019; Keskinçilic & Taşkın, 2019). In Türkiye, the species has been reported from only a few localities, and information regarding its habitat characteristics, associated soils, and potential relationships with land use and steppe or forest-edge management remains limited.

Thirty species within the genus *Morchella* have been documented in Türkiye (Sesli et al. 2020, Uzun, 2023). This study aims to describe the key characteristics of *M. steppicola*, a globally endangered species (Helute, 2017; Alkan et al. 2019), and to document a new occurrence for this taxon in Türkiye.

This aim is to document the basic morphological and ecological production characteristics of *M. steppicola*, a globally threatened (Helute, 2017; Alkan et al. 2019) morel species, and to document a new specimen of this taxon from Türkiye. Specifically, we report the first record of *M. steppicola* from Çankırı Province and provide a detailed description of its habitat and soil properties within a Central Anatolian steppe-agricultural mosaic. By characterizing the ecological conditions in which this species is found, it is aimed to contribute to a better understanding of its distribution, conservation status, and its relationship to the sustainable management of steppe and steppe-forest transition areas.

2. Materials and Methods

2.1 Study area

The research was conducted in the southeastern section of Hasakça village, located approximately 16 km from the central district of Çankırı Province (Figure 1). The study area is positioned on the outer perimeter of the village settlement at an elevation of 940 to 950 m, with center coordinates at 40°38'51"N, 33°47'09"E. The site comprises a narrow mosaic of agricultural parcels southeast of the village, as well as adjacent ruderal and border strips. The topography is gently undulating, with slopes ranging from 2% to 8%.

Çankırı exhibits a continental climate typical of Central Anatolia. According to Thorntwaite (1948), the region is classified as semiarid. Meteorological data for Çankırı Province (Anonymous, 2024) report an average temperature of 11.2 °C, with observed temperatures ranging from -4 °C to 31.2 °C. The mean annual precipitation is 405.6 mm, with the lowest monthly precipitation in September (16.3 mm) and the highest in May (53.6 mm).

2.2 Specimen collection, preservation and taxonomic evaluation

The main material of this study, *Morchella* sp. specimens, was collected during field study on April 6 and April 14, 2024, coinciding with the transition to active vegetation growth and increased soil moisture. During the field study, detailed photographs of the taxon were taken using a digital camera (Nikon CoolPix P610), and several ecological characteristics of its natural habitat were recorded. The specimen was then prepared under appropriate conditions for preservation and is

currently stored in the Fungarium of Muğla Sıtkı Koçman University (MSKU).



Figure 1. The locality where the species *Morchella steppicola* Zerova was detected in Çankırı province

The data obtained from the examination of the *Morchella* taxon were compared and evaluated. Based on all findings, the collected mushroom was identified as *M. steppicola*. This specimen was collected for the first time from the province of Çankırı, located in the northern part of the Central Anatolia Region (Figure 2).



Figure 2. Natural distribution localities of samples of *Morchella steppicola* species in Çankırı province and images from field study

The mushroom specimens collected from Çankırı in April 2024 and photographed in their natural habitat (Figure 3) were brought to the laboratory under suitable conditions. After being dried, preparations were made (Figure 4), and diagnostic photographs were taken using a stereo microscope (Leica EZ4D), a light microscope (Leica DM500 with ICC50 HD integrated camera) (Figures 5 and 6), and a field emission scanning electron microscope (FE-SEM) (Carl Zeiss Sigma 300 VP) (Figure 7). The identification was then confirmed with the help of relevant literature (flora books, articles, and theses containing identification keys and descriptions of macrofungi, etc.).

2.3 Soil sampling and analysis

Soil sampling was conducted simultaneously with *Morchella* sampling in April 2024. At each fungal sampling site within the study area, disturbed soil samples were collected from 0–30 cm depth to represent the surface soil layer. This procedure facilitated correlating soil properties with fungal data from the exact locations. The collected soil sample was placed in labelled

bags and promptly transported to the Department of Soil Science and Ecology laboratory at the Faculty of Forestry, Çankırı Karatekin University.



Figure 3. Images of Çankırı specimens of the *Morchella steppicola* species in their natural environment



Figure 4. Preparation of preparations for examination, diagnosis and photography under light microscopy

Upon arrival at the laboratory, the disturbed soil sample was spread in crates and air-dried in the shade. The sample was then crushed and passed through a 2-mm mesh sieve to prepare them for analysis. Root fragments, large organic debris, and stones were removed during this process.

The proportions of clay, sand, and silt in the prepared soil sample was determined using the hydrometer method (Gee and Bauder, 1986). Soil pH and electrical conductivity (EC) were measured in a 1:5 soil-to-water mixture according to the protocols of McLean (1982) and Pansu and Gautheyrou (2006). Soil organic matter content was determined using the modified Walkley–Black method (Nelson and Sommers, 1982). Bulk density was measured using a 100 cm³ steel cylinder as described by Blake and Hartge (1986).

3. Results

As a result of field and diagnostic studies, *Morchella steppicola*, a species considered rare both in Türkiye and globally, has been identified in a new locality, Çankırı Province, following previous records from Afyon (Güngör & Solak, 2015), Kırşehir (Alkan et al., 2019), and Edirne (Keskinılıç & Taşkın, 2019). Based on field observations, laboratory analyses, and a thorough examination of identification keys and species descriptions in diagnostic literature, the examined taxon was confirmed to be *Morchella steppicola*.

3.1 Systematics, taxonomic characteristics, and description of the species

The systematics and both macroscopic and microscopic features of the species were determined as follows (Index Fungorum, 2025):

Division: *Ascomycota*

Order: *Pezizomycetes*

Class: *Pezizales*

Family: *Morchellaceae*

Species: *Morchella steppicola* Zerova

Cap: 2.5–6 cm in height and 2–8 cm in width; bell-shaped or more commonly spherical. In early stages, it is slightly gray, then quickly turns dirty cream, and finally becomes dark yellow or light brown. In youth, the alveoli are narrow and closed; as the mushroom ages, they widen and open.

Alveoles: Very deep and irregularly arranged, forming a labyrinth-like appearance.

Stipe (Stem): 2.5–4 cm in height and 1.5–3 cm in width; generally, widens toward the base, cylindrical and bulbous in shape. Solid and firm when young, hollow spaces form as it matures. The surface is filled with numerous cracks, protrusions, and folds. Both the cap and stem turn noticeably reddish when touched or injured. The mushroom has a pleasant and appealing taste.

Asci: Measuring 240–380 × 5–14 μm; the lower sterile portion is highly curved and irregular. Each ascus is cylindrical, hyaline, and contains eight spores.

Paraphyses: Measuring 120–200 × 6–9 μm; typically cylindrical, hyaline, branched at the tip, septate, and shorter than the asci.

Spores: 18–24 × 10–14 μm; elliptical in shape, hyaline in color, and with a smooth surface.

Collection locality: Southeastern parts of Hasakça village, Çankırı Province, coordinates 40°38'51"N, 33°47'09"E, at approximately 948 meters elevation.

Collection dates: April 6, 2024, and April 14, 2024.



Figure 5. Light microscopic images of asci and ascospores in preparations from Çankırı specimens of *Morchella steppicola* species

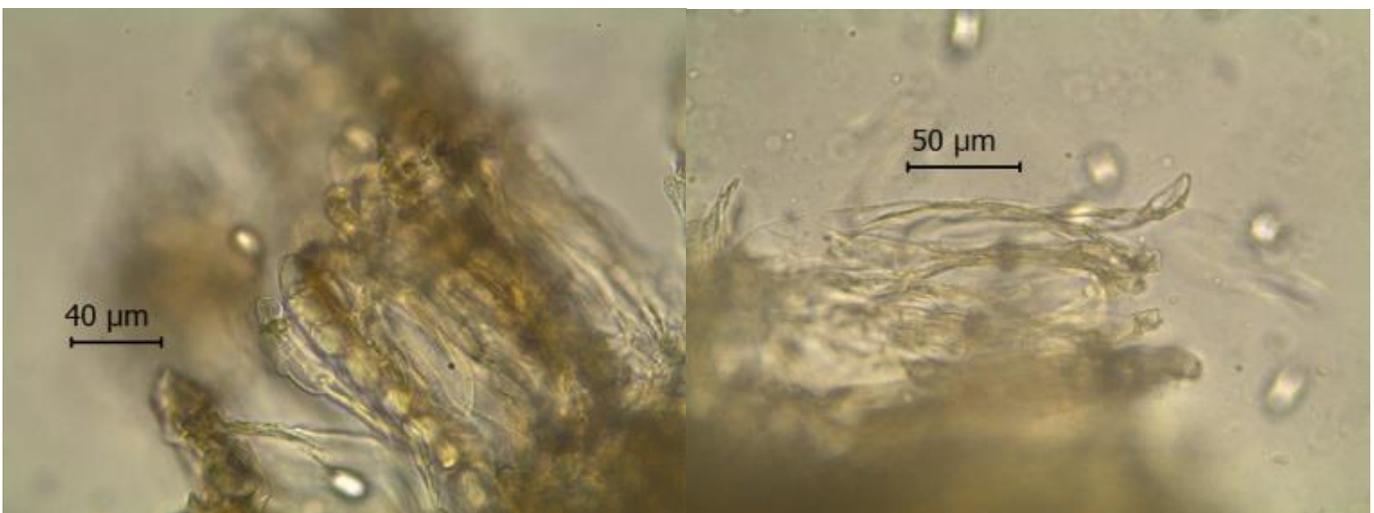


Figure 6. Light microscopic images of asci, ascospores and paraphyses in preparations from Çankırı samples of *Morchella steppicola* species

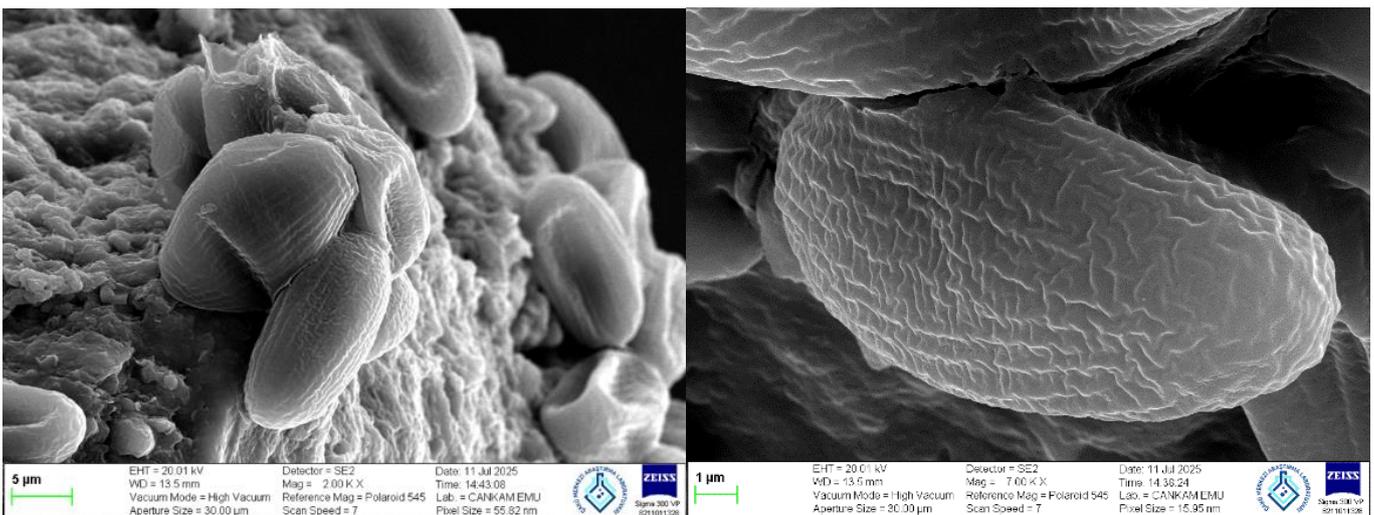


Figure 7. SEM images of ascospore preparations prepared from Çankırı specimens of the *Morchella steppicola* species

3.2 Soil structure where *Morchella steppicola* grows

The soil exhibited a heavy texture (Table 1), comprising 59% clay, 23% sand, and 18% silt. The high clay content increases water-holding and cation exchange capacities but restricts drainage and aeration, which elevates the risk of compaction. Although the sand fraction can partially enhance permeability and aeration, the soil remains primarily clay-rich and structurally dense (Brady & Weil, 2008).

The soil had a pH of 7.55, which is slightly alkaline. Although this pH supports many crop and wild plant species, it

can decrease the availability of micronutrients such as iron and zinc (Havlin et al., 1999). The high CaCO₃ content (32.25%) classifies the soil as very calcareous, which further increases the risk of micronutrient deficiencies typically found in calcareous soils (Lal, 2006).

The total soil organic matter (SOM) content was relatively high (4.65%), which improves soil structure, water retention, and nutrient supply (Jenny, 2012). The total nitrogen content was 0.23%, a level sufficient for plants with moderate nitrogen needs but likely insufficient for crops with high nitrogen demand without supplemental fertilization (Fageria et al., 2010).

Table 1. Some physical and chemical properties of the surface soil sample taken from the study area

Sample No	Depth(cm)	PHYSICAL ANALYSIS				CHEMICAL ANALYSIS									
		Texture (%)				pH 1/5 Soil/Water	Class	CaCO ₃ (%)	CaCO ₃ Class	SOM (%)	SOM Class	Total Nitrogen (%)	EC (dS/m)	Total Salt (%)	Class
1	0–30	23	59	18	C	7.55	Slightly alkaline	32.25	Very Calcareous	4.65	High	0.23	0.083	0.04	Non-Salt

C: Clay soil; pH: Power of hydrogen (soil reaction); CaCO₃: Lime content; SOM: Soil organic matter; EC: Electrical conductivity

Electrical conductivity (EC) was low (0.083 dS m⁻¹), and the total soluble salt content was 0.04%, indicating non-saline conditions. These values demonstrate that salinity is not currently a limiting factor for plant growth (Richards, 1954). It is potentially productive due to its relatively high SOM content and low salinity. However, the combination of high clay content, elevated CaCO₃ levels, and slightly alkaline pH may limit nutrient availability and root development. Therefore, appropriate species selection and targeted soil management practices, such as organic amendments, careful tillage, and micronutrient supplementation where necessary, are essential to optimise plant growth and soil productivity (Brady & Weil, 2008; Havlin et al., 1999).

4. Discussion and Conclusion

Morchella steppicola is a morphologically distinctive morel that can be reliably distinguished from other *Morchella* species by its characteristic structure and shape. In Türkiye, the species was first reported from Afyonkarahisar Province by Güngör and Solak (2015) and later from Kırşehir Province by Alkan et al. (2019), both based solely on morphological characters. A third Turkish locality was documented by Keskinçılıç and Taşkın (2019) from a field margin in the İpsala District of Edirne Province, where molecular data were also used to corroborate the morphological identification.

One species of the genus *Morchella* has been recorded from Çankırı province so far. This species is *M. esculenta* (Birben et al., 2008; Öztürk et al., 2010; Uzun, 2023). The locality record of *M. esculenta* species in Çankırı was given from black pine forests in Eldivan district (Öztürk et al., 2010). With the addition of *M. steppicola* to the list, the number of species of the genus *Morchella* in the Çankırı mycobiota has reached two.

This study presents the first confirmed record of *M. steppicola* from Çankırı Province, thereby extending the known distribution of the species in Türkiye toward the north-central steppe zone. The record is supported by detailed morphological

examination and ecological and edaphic characterization of the habitat. Fungal and soil samples were collected in April 2024, enabling a direct association between the presence of *M. steppicola* and prevailing soil conditions during the fruiting period. Informal interviews with village headmen, shepherds, local residents, and hunters indicated that the species may also occur in neighboring villages with similar land-use patterns. However, additional surveys conducted in April–May 2025 in nearby steppe-like habitats did not yield further collections. These findings suggest that *M. steppicola* may have a patchy and locally rare distribution in the region, or that its fruiting is highly irregular and sensitive to inter-annual climatic variability.

Unlike the majority of morel species, which are predominantly associated with forested habitats, *M. steppicola* exhibits a distinct ecological specialization, being confined to temperate grasslands and steppe ecosystems (Yatsiuk et al., 2016). On a global scale, documented occurrences of *M. steppicola* are largely concentrated within steppe meadows of Central Eurasia and Eastern Europe, with notable records from Ukraine, Serbia, Slovakia, Hungary, Kazakhstan, Turkmenistan, Tajikistan, Uzbekistan, Azerbaijan, Moldova, and Russia (Arhipova et al., 2006; Yatsiuk et al., 2016). The Çankırı locality aligns with this distribution pattern, as it is situated within a degraded steppe-agricultural mosaic. Soil analyses indicate that the species occurs in heavy-textured, clay-dominated surface soil (59% clay, 23% sand, 18% silt) with a slightly alkaline reaction (pH 7.55), very high CaCO₃ content (32.25%), and relatively high organic matter (4.65%), under non-saline conditions (EC 0.083 dS m⁻¹; total salts 0.04%). These properties are characteristic of Central Anatolian steppe environments and likely serve as ecological filters favoring fungal taxa adapted to open, seasonally dry grasslands and calcareous, clay-rich soils rather than to acidic or forest soils.

The combination of high clay content, elevated CaCO₃, and slightly alkaline pH may contribute to the observed rarity and patchy distribution of *M. steppicola* at the local scale. Such soils can impose physical constraints on root growth and water

movement while also limiting the availability of certain micronutrients, such as iron and zinc. Under these conditions, only a subset of plant and fungal taxa may persist. The reproduction and growth of *M. steppicola* may depend on a narrow window of favorable moisture and temperature conditions in spring. The relatively high organic matter content at the collection site indicates that sufficient substrate is available for saprotrophic and facultatively symbiotic fungi, potentially supporting sporadic but locally abundant fruiting events when climatic conditions are optimal.

From a conservation perspective, *M. steppicola* is recognized as a Eurasian endemic (Lozides et al., 2021) and is listed on national Red Lists in both Russia and Ukraine (Dunaev et al., 2020), reflecting its restricted distribution and apparent vulnerability. In Türkiye, occurrences remain limited and fragmented, with only a few confirmed localities to date. The new record from Çankırı helps close the geographic gap between previously known Turkish localities and the broader Eurasian steppe range of the species, while also highlighting the scattered and seemingly rare nature of its populations in Anatolia. In addition to its conservation significance, recent studies have shown that fruiting bodies of *M. steppicola* may accumulate high levels of certain biogenic elements. Based on iron and cobalt concentrations and associated health risk indices, Sarıkürkçü et al. (2022) recommended that this mushroom be consumed only occasionally rather than regularly. Therefore, the species is of dual interest, both as a rare steppe morel and as a wild edible fungus with potential health implications.

Several limitations should be noted. The data are derived from a single province and a small number of confirmed fruiting sites, with both fungal and soil sampling restricted to a single fruiting season. Consequently, inter-annual variation in fruiting intensity and potential shifts in soil moisture and nutrient dynamics could not be assessed. Nevertheless, the combined evidence from distribution records, habitat observations, and soil analyses provides a coherent understanding of the ecological niche of *M. steppicola* in the Central Anatolian steppe.

In 2017, Türkiye's fresh mushroom exports amounted to approximately USD 6.2 million, of which morels accounted for 34.5% (Öztürk et al., 2019). *M. steppicola* represents a rare species of considerable economic value at both national and international levels. Should its habitat and true potential within Türkiye be systematically investigated, and cultivation and breeding initiatives be advanced, *M. steppicola* could emerge as a strong candidate for inclusion among the country's exported morel species. In this context, its commercialization is anticipated to contribute positively to the national economy.

The known distribution localities of *M. steppicola* are predominantly situated in habitats subject to anthropogenic pressures and at risk of degradation. Consequently, further research is warranted to ascertain the occurrence of *M. steppicola* in ecologically analogous habitats across Türkiye, encompassing both experimental cultivation of the species and its habitat, as well as the implementation of targeted conservation measures.

In summary, this study documents the first confirmed record of *M. steppicola* from Çankırı Province and provides a detailed ecological and edaphic description of its habitat within a Central Anatolian steppe-agricultural mosaic. The species was

identified in heavy, clay-dominated, highly calcareous, and slightly alkaline soils that are relatively rich in organic matter and non-saline conditions, consistent with its known preference for temperate grasslands and steppe ecosystems across Eurasia. Future research should prioritize systematic surveys within steppe and steppe-like grasslands characterized by comparable soil properties, alongside rigorous assessments of population size and demographic trends. Equally important is the formulation of conservation and sustainable-use strategies in collaboration with the Çankırı Branch Directorate of Nature Conservation and National Parks, as well as other relevant authorities. Such efforts are indispensable for elucidating the actual distribution and conservation status of *M. steppicola* in Türkiye and for safeguarding the long-term persistence of both the species and its associated steppe ecosystems.

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