

Macrofungi of Türkiye: Diversity, Distribution, and Conservation Priority



Buğra Bilginsoy

bilginsoyb@hotmail.com

Introduction

Türkiye's geographic position at the intersection of Europe, Asia, and the Middle East has created a mosaic of ecosystems that support remarkable macrofungal diversity. From the humid Black Sea forests to the dry steppes of Central Anatolia and the Mediterranean woodlands of the south, macrofungi thrive in a wide range of habitats. These fungi play essential ecological roles as decomposers, symbionts, and nutrient cyclers, and many are culturally significant as edible or medicinal species.

Over the past two decades, mycological research in Türkiye has accelerated, with numerous regional surveys, new species descriptions, and updated national checklists. However, macrofungi remain underrepresented in conservation planning and biodiversity assessments. While flora and fauna are often prioritized, fungal species are rarely included in protected area designations or legal frameworks.

This article aims to synthesize current knowledge on Türkiye's macrofungi, highlight regional hotspots of diversity, and identify key conservation gaps. By integrating field data, herbarium records, and recent molecular studies, we propose strategic priorities for fungal research and protection. In doing so, we hope to elevate the role of fungi in Türkiye's biodiversity discourse and encourage collaborative efforts to safeguard its mycological heritage.

Methods

This article synthesizes data from multiple sources to present a comprehensive overview of macrofungal diversity in Türkiye. Regional field surveys conducted between 2000 and 2025 were reviewed, including studies from the

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Kaçkar Mountains, Amanos Range, Western Anatolia, and Central Anatolian steppes. Specimen records were obtained from national herbaria, including the Ankara University Herbarium (ANK), Ege University (EGE), and the Turkish National Fungal Database.

Species identification was based on morphological characteristics and, where available, molecular data such as ITS sequencing. Taxonomic names were verified using Index Fungorum and MycoBank. Conservation status was assessed using IUCN Red List criteria and national Red Data lists, with emphasis on endemic and habitat-restricted taxa.

To evaluate conservation gaps, we analyzed the inclusion of fungal species in Türkiye's protected area network and biodiversity strategies, including the IDUSEP 2024–2030 Climate Adaptation Framework. Digitization efforts and herbarium infrastructure were also reviewed to assess data accessibility and long-term preservation capacity.

Results

Recent surveys and literature reveal that Türkiye hosts over 2,000 documented macrofungal species, with new taxa described annually. Field studies from regions such as the Kaçkar Mountains, Amanos Range, and Western Anatolia consistently report high species richness, including rare and endemic fungi. For example, *Inocybe ispartaensis*, *Cortinarius pamukkalensis*, and *Boletus amasianus* were described in the last decade, expanding Türkiye's known fungal flora.

Herbarium records confirm the presence of Mediterranean, temperate, and alpine fungal assemblages, reflecting Türkiye's ecological diversity. Mixed oak-pine forests in Muğla and Bolu yield abundant fruiting bodies of *Macrolepiota procera*, *Cantharellus cibarius*, and *Lactarius deliciosus*, while high-altitude meadows in Eastern Anatolia support species such as *Clavaria zeylanica* and *Hygrocybe coccinea*.

Despite this richness, macrofungi remain largely absent from national conservation lists. Endemic species are rarely assessed for extinction risk, and protected areas seldom include fungal inventories. Habitat degradation, urban expansion, and climate shifts threaten

fungal habitats, particularly in coastal and steppe regions. Digitization of fungal collections is uneven, with major herbaria lacking comprehensive online databases.

Discussion

The documented richness of macrofungi across Türkiye reflects the country's ecological complexity and biogeographic significance. However, this diversity remains underappreciated in national conservation planning. While flora and fauna are routinely assessed and protected, fungal species are rarely included in biodiversity inventories or legal frameworks. This omission limits the visibility of fungi in policy discussions and restricts funding for mycological research.

Endemic and habitat-restricted species, such as *Pleurotus nebrodensis* and *Boletus amasianus*, face increasing threats from habitat loss, overharvesting, and climate change. Yet few have been evaluated under IUCN criteria, and even fewer are listed in Türkiye's national Red Data books. The lack of standardized fungal monitoring protocols further complicates conservation efforts.

Digitization of herbarium collections and fungal databases remains uneven. While some institutions have initiated online platforms, many regional collections are still inaccessible to researchers. This limits collaboration and slows the integration of fungal data into broader ecological assessments.

Türkiye's Climate Change Adaptation Strategy (IDUSEP 2024–2030) emphasizes biodiversity monitoring, but fungi are not explicitly addressed. Incorporating macrofungi into national biodiversity strategies, protected area management, and environmental education would strengthen conservation outcomes and reflect the ecological importance of these organisms.

Conclusion

Türkiye's macrofungal diversity is both ecologically significant and culturally rich, yet remains underrepresented in national conservation efforts. The presence of endemic species, newly described taxa, and regionally distinct fungal communities underscores the country's importance as a mycological hotspot. However, habitat degradation, climate change, and institutional neglect continue to threaten fungal ecosystems.

To address these challenges, fungi must be integrated into Türkiye's biodiversity strategies, protected area planning, and environmental education. Digitization of herbarium records, regular field surveys, and inclusion of fungi in Red Data assessments are essential steps toward effective conservation. Collaborative efforts between academic institutions, citizen scientists, and policymakers will be key to safeguarding Türkiye's mycological heritage.

Recognizing fungi as vital components of ecosystems—not merely as background organisms—will ensure that their ecological roles and conservation needs are no longer overlooked. As Türkiye advances its environmental agenda, macrofungi deserve a central place in the narrative of biodiversity protection.

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