



This article is cited as: Acar, İ., Karabiyik, H., Yaren, Z. (2025). A Rarely Documented Forest Fungus: First Record of *Dendrodochium citrinum* from Çanakkale (Türkiye), *Mantar Dergisi*, 16(1)49-54

Geliş(Received) :16.02.2025
Kabul(Accepted) :07.03.2025

Research Article
Doi: 10.30708.mantar.1640753

A Rarely Documented Forest Fungus: First Record of *Dendrodochium citrinum* from Çanakkale (Türkiye)

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Abstract: Nectrioid fungi are important for natural and human life as decomposers of plant residues, plant, insect, and human pathogens, biological control agents, and producers of enzymes, mycotoxins, or food. In this paper, macro/micro photographs, microcharacter drawings, collection place, and date, and a brief description of *Dendrodochium citrinum*, which is a new record for the mycobiota of Türkiye and which has no record of any teleomorph stage so far, are presented and discussed.

Keywords: Ascomycota, Nectrioid fungi, Saprophyte, New record, Türkiye

Nadiren Kaydedilen Bir Orman Mantarı: *Dendrodochium citrinum*'un Çanakkale (Türkiye)'den İlk Kaydı

Öz: Nektroioid mantarlar bitki artıklarının ayrıştırıcıları, bitki, böcek ve insan patojenleri, biyolojik kontrol ajanları ve enzim, mikotoksin veya gıda üreticileri olmalarından dolayı doğal yaşam ve insan yaşamı için önem arz etmektedirler. Bu makalede Türkiye mikobiyotası için yeni kayıt olarak sunulan, nektroioid mantarlar içerisinde yer alan, şimdiye kadar hiçbir teleomorf evresi kaydı bulunmayan *Dendrodochium citrinum*'a ait makro/mikro fotoğraflar, mikro karakterlerin çizimi, toplanma yeri ve tarihi ve türün kısa tanımı verilerek, tartışılmıştır.

Anahtar kelimeler: Ascomycota, Nektroioid mantarlar, Saprofit, Yeni kayıt, Türkiye

Introduction

Sordariomycetes, one of the largest classes of *Ascomycota*, including six subclasses, 32 orders, 105 families, and 1331 genera, characterized by inoperculate unitunicate asci and mostly perithecial ascomata. The class has many habitats, including fresh and salt water, and usually contains plant pathogenic species. However, it also includes saprobes, epiphytes, endophytes, fungicol, and coprophilic, lichenised, or lichenicol taxa (Maharachchikumbura et al., 2016). *Hypocreomycetidae*, one of the six subclasses, includes *Coronophorales*,

Halosphaeriales, *Hypocreales* and *Microascales*. *Microascales* are paraphyletic, while the other three orders are monophyletic (Eriksson, 2006; Maharachchikumbura et al., 2016). *Hypocreales*, represented by the families *Bionectriaceae*, *Clavicipitaceae*, *Clavicipitaceae*, *Cordycipitaceae*, *Flammocladiaceae*, *Hypocreaceae*, *Nectriaceae*, *Niessliaceae*, *Ophiocordycipitaceae*, *Stachybotriaceae* and *Tilachlidiaceae*, are highly diverse in tropical and subtropical regions (Maharachchikumbura et al., 2016; Pöldmaa, 2011).



Bionectriaceae, which includes asexual morph taxa in *Hypocreales* and represented by 39 genera, was found to be monophyletic as a result of phylogenetic analyses (Rossman et al., 2001; Maharachchikumbura et al., 2015). The sexual stage of the family has uniloculate, perithecial, rarely cleistothecial, subglobose or pyriform ascomata in pale tan, white, yellow, orange, reddish brown, greenish or purple to violet, or brown colours, usually not changing colour in KOH or lactic acid (Maharachchikumbura et al., 2016; Rossman et al., 2001). In the asexual reproductive stage, they have gliocladium, acremonium or hypomycetous-like structure. Conidiophores are dimorphic or monomorphic and usually sporodococcal or synnematosus. Conidiophores are glassy, subhyaline, blackish brown, or brownish and may have thin echinulate or smooth walls. Conidiogenous cells are phialidic and mostly cylindrical or flask-shaped. Conidia are unicellular or multicompartmental and may be ellipsoidal, spindle-shaped, or semi-spindle-shaped. The tips are papillate or truncate, hyaline, greenish hyaline or olive-grey, with smooth or striated walls (Maharachchikumbura et al., 2016). Previously, the

teleomorph and anamorph stages of a fungus, both within the aforementioned order and others, had different names; however, according to the decision taken at the International Botanical Congress held in Melbourne

(Australia) in July 2011, it was decided to use only one scientific name regardless of the unique morphs of fungi (McNeill et al., 2012) and the single-name nomenclature system was explained in the declaration published under the title 'The Amsterdam Declaration on Fungal Nomenclature' (Hawksworth et al., 2011) published under the title 'The Amsterdam Declaration on Fungal Nomenclature' (Asan et al., 2019; Rossman et al., 2013).

When the fungal list of Turkey (Sesli et al., 2020) and some recent studies on *Ascomycota* (Acar, 2023; Acar et al., 2020; Acar & Karabıyık, 2024a,b; Berber et al., 2021; Dizkirici & Acar, 2022; Doğan et al., 2024; Kesici et al., 2024; Terman et al., 2024; Uzun & Kaya, 2021) were checked, it was determined that *Dendrodochium citrinum* Grove is a new record. This study aims to present *D. citrinum*, a nectrioid species with no teleomorph stage record so far, as a new record and to contribute to the distribution of *Bionectriaceae* in Türkiye and the mycobiota of the country.

Material and Method

The present study material was determined on a *Pinus brutia* L. branch fragment (Figure 1) near Serçiler (Çanakkale) village on 28.01.2025 and photographed from different angles in its natural habitat.

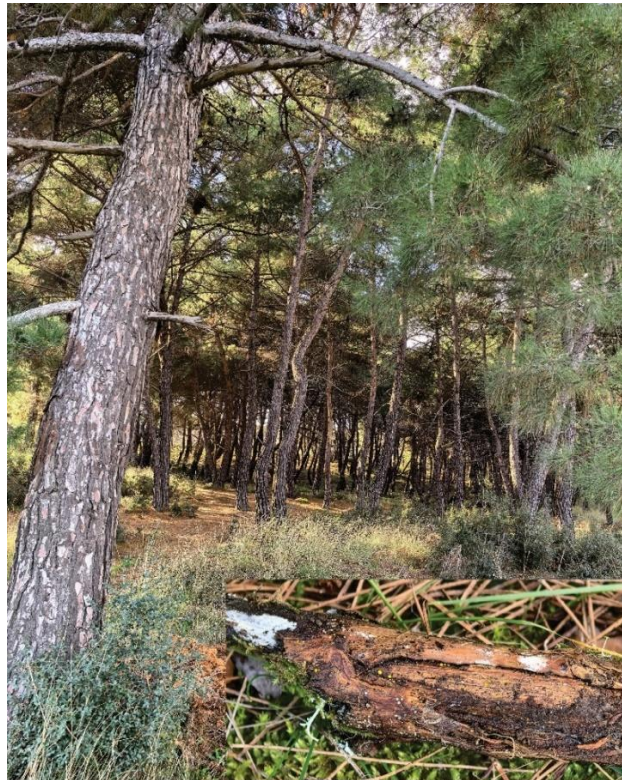


Figure 1. Research area (*Pinus brutia* L. trees)

The necessary information about the sample (date, place of collection, substrate, macroscopic characteristics) was recorded. The collected specimens were transported to the laboratory. The fruit bodies were removed from the substrate under the stereomicroscope, dried, placed in polyethylene bags, labelled, and then prepared as fungarium material for further examination. The Leica DM500 light microscope was used for the microscopic examinations to identify the fungus. Micromorphological characters such as conidiophores and conidia were photographed under the microscope, and after clarification, different photographs were taken for each character. The largest and smallest sizes of the photographed microstructures were measured at least 30 times using the Leica Application Suite (version 3.4.0) programme to ensure reliable ranges. *Dendrodochium citrinum* was identified following the methods described by Ellis & Ellis, 1997 and Torrejón, 2013. For clarity, the micromorphological characters of *D. citrinum* were drawn using CorelDRAW (64-bit) software. After the species identification process was completed, *D. citrinum* was preserved as fungarium material in Van Yüzüncü Yıl University, Faculty of Science, Department of Biology (VANF) fungarium under appropriate conditions.

Result

Examination of the samples obtained from the field revealed that the taxon is *Dendrodochium citrinum*, which is a new record for Türkiye. A brief description of the new record *Dendrodochium citrinum* (*Bionectriaceae*), photographs taken in its natural habitat, microscopic images, and drawings of microcharacters are presented.

Ascomycota Caval.-Sm.

Sordariomycetes O.E. Erikss. & Winka

Hypocreales Lindau

Bionectriaceae Samuels & Rossman

Dendrodochium Bonord.

Dendrodochium citrinum Grove (Figure 2–3)

Fructifications 0.4–1.5 mm, pustuliform, cupulate, then discoid, bright lemon yellow, some with a thin fringe of white hairs. **Conidia** 1.4–2.1 μ m, hyaline, arising from a conidiophore branched in a palisade.

Habitat: on dead branches and pine cones of *Pinus* spp. (Ellis and Ellis, 1997; Torrejón, 2013)

Specimens examined: Türkiye, Çanakkale, Around Serçiler village, 40° 03'02"N, 26° 35'35"E, 115 m, on branch of *Pinus brutia*, 28.01.2025, Acar 2054.



Figure 2. *Dendrodochium citrinum* a–b. Fructifications in natural habitat

Scale bar: 1 mm for (a)

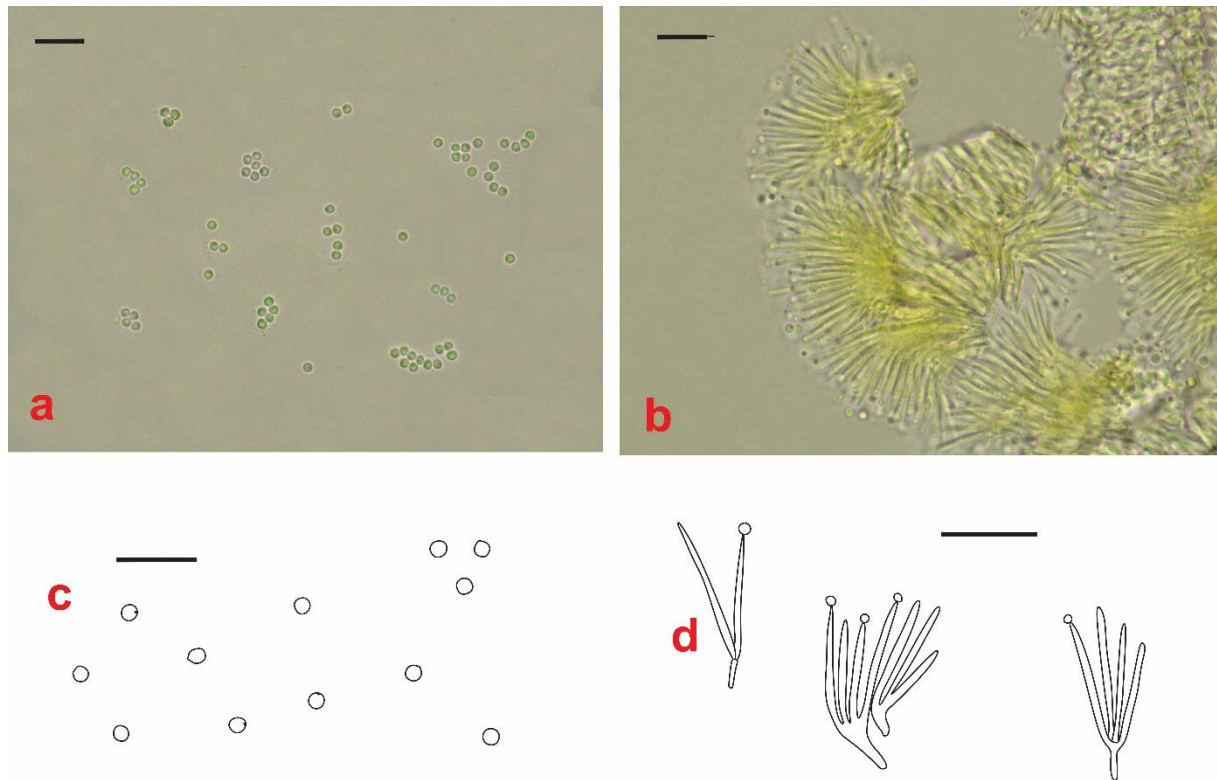


Figure 3. *Dendrodochium citrinum* **a–c**. Conidia, **b–d**. Conidiophore

Scale bar: 10 µm

Discussions

Dendrodochium citrinum, which has no known teleomorph stage, can rarely be confused with *Calycina claroflava* (Grev.) Kuntz and *C. citrina* (Hedw.) Gray in the field. *Calycina citrina* has larger fruiting body and differences in microscopic characters among the confusable species. When the micromorphological characters of both species are examined, they can easily be distinguished from *D. citrinum* (Beug et al., 2014; Kuo, 2021).

In previous studies, *Dendrodochium rubellum* Sacc. on dead and broken branches of *Castanea sativa* Mill. (chestnut) and *D. gelatinosum* (Fuckel) Höhn. on branches of *Juglans regia* L. (walnut) trees belonging to the genus *Dendrodochium* from our country (Selçuk et al., 2014; Selçuk and Cebeci, 2016).

This study determined that *D. citrinum*, identified through analyses using macro/micro characters, is a new

record for Türkiye. Thus, a new record belonging to the family Bionectriaceae, which is positioned within the Hypocreales order, was reported, contributing to the distribution of *Hypocreales* in Türkiye and to the country's mycobiota.

Author Contributions

All authors have equal contributions.

Conflicts of Interest

The authors declare no competing interests.

Ethical Statement: It is declared that scientific and ethical principles have been followed while carrying out and writing this study and that all the sources used have been properly cited (İsmail Acar, Halide Karabıyık, Zafer Yaren).

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