



## A Hypogeous *Lactarius* sp., New to Turkish Mycobiota

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**Abstract:** The hypogeous and angiocarpic *Lactarius* Pers species, *Lactarius stephensii* (Berk.) Verbeken & Walley (Russulaceae) is recorded for the first time from Turkey. The taxon is described briefly and photographs related to macro and micromorphologies are provided.

**Key words:** New record, *Lactarius*, hypogeous fungi, Turkey

### Türkiye Mikobiyotası İçin Yeni Bir Toprakaltı *Lactarius* Türü

**Öz:** Toprak altında gelişim gösteren ve angiokarpi bir *Lactarius* Pers türü olan *Lactarius stephensii* (Berk.) Verbeken & Walley (Russulaceae) Türkiye'den ilk kez kaydedilmiştir. Takson kısaca betimlenerek makro ve mikro morfolojilerine ilişkin fotoğrafları verilmiştir.

**Anahtar kelimeler:** Yeni kayıt, *Lactarius*, toprakaltı mantarları, Türkiye

#### Introduction

*Lactarius* Pers is a large and widely distributed genus of the family Russulaceae with more than 450 species (Kirk et al., 2008). The members of the genus are well characterized by unique ability to exude a milky fluid, generally named as milk or latex, when injured, especially from the gills. Though almost all known species have a cap on a stem and expose the hymenium on vertically arranged gills underneath the cap (Heilmann-Clausen et al., 1998). Phylogenetic analyses have revealed that *Lactarius* contains some species with closed (angiocarpous) fruitbodies (Eberhardt and Verbeken, 2004). A number of genera were erected and included to sequestrate species before the acception of the inclusion of angiocarpous Russulales in agaricoid genera. The species which exude milk were often included in *Arcangeliella* Cavara or *Zelleromyces* Singer & A.H. Sm. (Verbeken et al., 2014). But molecular phylogenetic studies have indicated that they represent artificial genera for sequestrate *Lactarius* species, and may be better subsumed in the amplified genus *Lactarius* (Beenken et al., 2016) During our routine field trips in Tonya (Trabzon) district,

some hypogeous gasteroid fungi samples were collected and identified as *Lactarius stephensii* (Berk.) Verbeken & Walley. Tracing the current checklists (Sesli and Denchev, 2014; Solak et al., 2015) and the latest basidiomycetous records (Acar et al., 2015; Doğan and Öztürk, 2015; Sesli and Moreau, 2015; Sesli et al., 2015; Uzun et al., 2015; Akata et al., 2016; Dengiz and Demirel, 2016; Güngör et al., 2016; Öztürk et al., 2016; Sesli et al., 2016; Uzun et al., 2017) on the macromycota of Turkey, it is found that it was not recorded previously from Turkey.

The study aims to make a contribution to the macrofungi of Turkey by adding a new record.

#### Materials and Methods

*Lactarius* samples were collected from Tonya (Trabzon) district in 2017. Before collection necessary ecological and morphological characteristics of the samples were recorded and they were photographed in their natural habitat. The collected specimens were transferred to the laboratory within paper bags.



Macroscopic features are based on fresh material while microscopic characters were obtained from dried material in Congo Red and Melzer's reagent under Nikon Eclipse Ci trinocular light microscope. Photographs related to micromorphology were taken by DS-Fi2 digital camera. Identification was performed with the help of Pegler et al. (1993), Nuytinck et al. (2003), Vidal (2004), Fraiture and Derboven (2009) and Nedelin et al. (2016). The samples are kept at Karamanoğlu Mehmetbey University, Kamil Özdağ Science Faculty, Department of Biology.

### Results and Discussion

**Basidiomycota** R.T. Moore

**Agaricomycetes** Doweld

**Russulales** Kreisel ex P.M. Kirk

**Russulaceae** Lotsy

**Lactarius stephensii** (Berk.) Verbeken & Walley

Synonym: *Arcangeliella stephensii* (Berk.) Zeller & C.W. Dodge, *Arcangeliella stephensii* (Berk.) Zeller & C.W. Dodge, var. *stephensii*, *Hydnangium stephensii* Berk., *Hydnangium stephensii* var. *ravenelii* Berk., *Hydnangium stephensii*, Berk., var. *stephensii*, *Hysterangium stephensii* (Berk.) Vittad., *Martellia stephensii* (Berk.) K. Mader & A. Mader, *Octaviania stephensii* (Berk.) Tul. & C. Tul., *Octaviania stephensii* (Berk.) Tul. & C. Tul., var. *stephensii*, *Zelleromyces stephensii* (Berk.) A.H. Sm.

**Macroscopic features:** Basidiomata 10-40 mm in diameter, hypogeous or semihypogeous, irregularly globose to oblong or slightly reniform, attached to thin roots of the substrate with a small protruding sterile base. Peridium 0.3-0.5 mm thick, smooth, viscid, at first whitish, ochraceous to orange red and finally reddish brown to dark reddish-brown (Figure 1a). Gleba loculated, labyrinthic, with irregularly elongated chambers, white or ochraceous when young, pale orange, pinkish orange to brownish when mature (Figure 1a), taste fruity, odor pleasant and fruity.

**Microscopic features:** Peridiopellis 170-260 µm thick (Figure 1b). Basidia cylindrical to clavate, straight or sinuose, 35-75 × 6-11 µm, generally monosporic, rarely 2, 3 or 4 spored (Figure 1c), hyaline and with oil drops when young, later become darker due to dark orange substances. Cystidia and macrocystidia absent. Pseudocystidia very scarce, up to 30 µm long and 5-7 µm broad. Basidiospores 11-14.5 × 10.5-13 µm, broadly ellipsoidal, subglobose to globular, ornamented with conical spines rounded apically with length 1.2-2 µm, initially translucent, yellow-ochre to brownish at maturity (Figure 1d).

**Habitat:** *Lactarius stephensii* grows usually gregariously, under humus, with ectomycorrhizal hosts from genera *Corylus* L., *Carpinus* L., *Fagus* L., *Populus* L., *Quercus* L., *Tilia* L. (Vidal 2004; Nedelin et al., 2016).

### Specimen examined:

TURKEY—Trabzon: Tonya, Çay içi village, in soil under beech-spruce mixed forest, 40°49'N-39°17'E, 1300 m, 11.04.2017, Yuzun 5519.

*Lactarius stephensii* (Berk.) Verbeken & Walley (Russulaceae) is given as new record for Turkish mycobiota. Before this study, 51 hypogeous basidiomycetous taxa, seven of which belong to *Russulales*, had been recorded from Turkey. Likewise 56 *Lactarius* species have so far been reported from Turkey. Compared to more than 450 species of *Lactarius* species existing worldwide (Kirk et al., 2008), it could easily be estimated that a significant number of *Lactarius* species remain to be described in Turkey. Though some hypogeous members of *Russulales*, within the genera *Gymnomyces* Masee & Rodway, *Leucogaster* R. Hesse and *Leucophleps* Harkn. have so far been reported from Turkey (Pilát, 1937; Türkoğlu and Castellano 2013; Doğan and Akata, 2015; Elliot et al., 2016), *Lactarius stephensii* is the first sequestrate truffle-like *Lactarius* species to be recorded from Turkey.

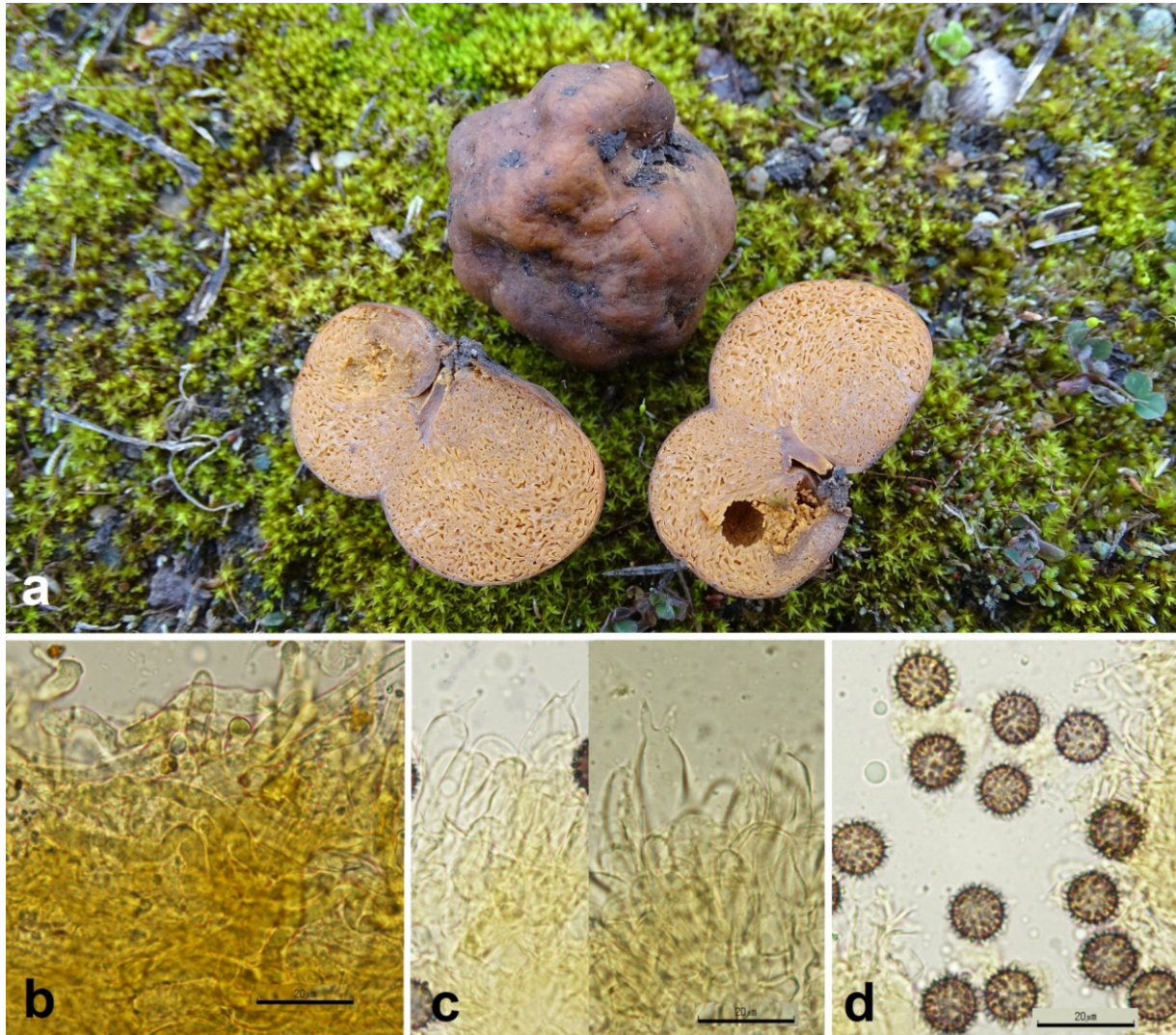


Figure 1. *Lactarius stephensii*: a. basidiocarps, b. peridiopellis, c. basidia, d. basidiospores.

Nuytinck et al. (2003), Vidal (2004), Fraiture and Derboven (2009) and Nedelin et al. (2016) reported the diameter of fruiting bodies as to reach 15, 35, 20 and 25 mm respectively. The size of the basidiomata of our samples seem to be larger with a diameter of reaching up to 40 mm. Most of other macro and micromorphological characters of the studied samples agree with those given in literature.

During identification, *Lactarius stephensii* may be confused with *Lactarius borzianus* (Cavara) Verbeken & Nuytinck. But the presence of a vestigial foot and a columella, and the incomplete peridium cover especially at

the extreme base of the carpophore of the latter species are distinguishing characters between the two taxa (Fraiture and Derboven, 2009). Their ecology seems also different. While *Lactarius borzianus* can form ectomycorrhiza with both spruce and fir trees, *Lactarius stephensii* seems restricted to deciduous forests (Vidal 2004).

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