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First Record of *Inocybe nothomixtilis* (*Basidiomycota, Inocybaceae*) Outside Europe

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Abstract: *Inocybe nothomixtilis* Esteve-Rav., Bandini & V. González was recorded from France, Germany, Italy and Spain. In this study, it was collected and described first time outside Europe from Trabzon, Turkey. It is characterized by pale yellowish, ochraceous or brownish yellow to reddish yellow pileus; entirely pruinose stipe; metuloid, ventricose, often subutriform, short-necked pleurocystidia and nodulose basidiospores. The description and a short discussion are provided herein with microscopical and field illustrations.

Key words: Agaric, basidiomycota, taxonomy, Trabzon.

Inocybe nothomixtilis (*Basidiomycota, Inocybaceae*)'in Avrupa Dışındaki İlk Kaydı

Öz: *Inocybe nothomixtilis* Esteve-Rav., Bandini & V. González Fransa, Almanya, İtalya ve İspanya'da kaydedilmiştir. Bu çalışmada, Avrupa dışında Türkiye'den (Trabzon) ilk kez toplanmış ve tanımlanmıştır. Bu takson soluk sarımsı, toprak rengi veya kahverengimsi sarıdan, kırmızımsı sarıya doğru değişen şapkası; tümüyle beyazımsı tozlu sapı; şişe şeklinde ve kısa boyunlu pleurosistitleri ve nodüllü bazidiyosporları ile karakterize edilir. Burada açıklama ve kısa bir tartışma mikroskobik ve arazi resimleri ile birlikte sunulmaktadır.

Anahtar kelimeler: Agarik, bazidiyomikota, taksonomi, Trabzon

Introduction

The old genus *Inocybe* is recently splitted into four genera, as *Inocybe*, *Inosperma*, *Mallocybe* and *Pseudosperma*. So the family Inocybaceae now comprises seven genera worldwide with about 1050 species (Kirk et al., 2008; Matheny et al., 2019) of which about 90 are up to now recorded in Turkey (Sesli & Denchev, 2008). Yet there are still species to be described in Europe, especially in the Mediterranean region (Esteve-Raventós et al., 2018) and most probably in Turkey. Some *Inocybe* species have been

reported from Turkey recently (Uzun and Acar, 2018; Sesli, 2019; Sesli and Bandini, 2019). The family Inocybaceae is also one of the most common and abundant group of fungi in ectomycorrhizal communities (Jacobsson and Larsson, 2012; Sesli and Kobayashi, 2014; Bandini et al., 2019). The genus *Inocybe* sensu stricto, to which the species presented here belongs, is with only few exceptions characterized by the presence of mostly thick-walled pleurocystidia and cheilocystidia. *I. mixtilis* belongs to the section *Marginatae* (Kühner, 1993) which is characterized by nodulose basidiospores



and a more or less bulbous entirely pruinose stipe (Bon, 1998; Esteve-Raventós et al., 2018). Examination and sequencing of the material makes clear that *I. mixtilis* is a species complex including *I. ceskae* Bandini, Esteve-Rav. & B. Oertel, *I. johannis-stanglii* Bandini, Esteve-Rav. & G. Moreno, *I. nothomixtilis* Esteve-Rav., Bandini & V. González, *I. occulta* Esteve-Rav., Bandini, B. Oertel & G. Moreno and *I. subtrivialis* Esteve-Rav., M. Villarreal & Heykoop (Esteve-Raventós et al., 2018; Bandini et al., 2019).

The aim of the present study is to contribute to the Turkish Mycota with the description of *I. nothomixtilis* Esteve-Rav., Bandini & V. González collected from Trabzon, Turkey.

Materials and Methods

The collecting site has a very rich fungal diversity due to environmental conditions. We generally do our routine excursions in parks and gardens in the city center instead of high mountains due to rapid change in weather conditions towards the end of the collecting season. The basidiomata of this collection were determined at the campus area of Fatih Education Faculty in the Trabzon University. Fresh fruiting bodies were photographed, flora around were noted; latitude and longitude were recorded. 5–10 pieces of basidiomata were plucked with a spatula, carried to the Trabzon University Mycology Laboratory, dried and deposited at a personal fungarium. Microscopical structures such as basidiospores, basidia and cystidia were examined in concentrated ammonia solution and observed under a light microscope (Axio Imager A2) equipped with a macro objective. All examinations, measurements and producing of photomicrographs were performed under a Zeiss microscope (equipped with a Zeiss AxioCam 105 digital camera) in Trabzon University Mycology Laboratory. Identification of the samples were made according to current literature (Alessio and Rebaudengo, 1980; Cripps, 1997; Jacobsson and Larsson, 2012).

Results

Inocybaceae / Kümbetmantarigiller

Inocybe / *Kümbetmantarı* (gen. *Inocybe* sect. *Marginatae* Kühner)

Inocybe nothomixtilis Esteve-Rav., Bandini & V. González / *Çam kümbeti* (Figure 1)

Basidiomes gregarious; pileus broadly conical, campanulate, expanded to broadly convex, 25–35(–40)

mm, with a broad and low umbo; margin involute when young, then decurved to straight upon expansion; initially regular, then somewhat wavy to irregular in old specimens; pale yellowish, ochraceous to brownish yellow, orange-yellow or reddish yellow; surface woolly-fibrillose to felty; sometimes becoming glabrous towards the centre; lubricous and sticky; with adhered leaves and soil; whitish velipellis present in young fruiting bodies. Lamellae whitish, beige or pale grey, brownish grey or ochre-brown; ventricose to subventricose, nearly free or adnexed, moderately crowded (L = 40–55, l = 1–3); edge crenulate. Stipe whitish to cream color, sometimes light yellow tinges, sometimes covered with fibrils at the lower part, 30–50 × 3–5 mm, solid, smooth, cylindrical or slightly curved; base marginately bulbous. Context firm and whitish; smell spermatic when cut; taste mild. Basidiospores heterodiametric-nodulose, 7.4–10.2 × 4.5–6.5 µm, on average 8.7 × 5 µm, Q = 1.5–1.75 [n = 50], without germ pore. Basidia 25–35 × 8.5–10.5 µm, clavate, 4-spored; Pleurocystidia abundant to scattered, metuloid, ventricose (sub)fusiform or subutriform with broad and short neck, 45–58 × 15–22 µm [n = 20]. Cheilocystidia similar to pleurocystidia, 35–60 × 15–20 µm [n = 20]. Hymenophoral trama regular, cylindrical to fusiform parallel with 3–16 µm wide hyphae. Pileipellis consists of an gelatinized, 3–5 µm wide parallel hyphae. Clamp connections present in all tissues.

Specimens examined

Türkiye, Trabzon, Söğütlü, N 41°00'40.90" and E 39°36'39.52", 22 m, 27.10.2015, gregarious, under *Pinus silvestris* L, E. Sesli 3608.

Discussion

In this study, the basidiomata of *Inocybe nothomixtilis* (Inocybaceae, gen. *Inocybe*, sect. *Marginatae*) were studied morphologically and determined as the first record outside Europe (Sesli and Denchev, 2008; Akata and Sesli, 2017; Işık and Türkekul, 2018; Altuntaş et al., 2019). In most respects, our findings match well with the literature (Esteve-Raventós et al., 2018) and with the habitat with *Pinus* nearby, the often two-coloured aspect of the basidiomata, the whitish velipellis, the lanose-fibrillose texture and sticky surface of pileus, shape and size of hymenial cystidia, shape and length of the basidiospores. However the width of the basidiospores is on average smaller in comparison with those of the



collections measured in the original description. The species belongs to the *Inocybe mixtilis* complex, and genetically and morphologically closely related species are *I. ceskae*, *I. johannis-stanglii*, *I. mixtilis*, *I. occulta* and *I. subtrivialis*. *Inocybe ceskae* differs from Sesli 3608 by pale straw-colour, yellowish beige or pale ochre pileus with more glabrous texture and wider hymenial cystidia. *Inocybe johannis-stanglii* has a buff to greyish velipellis, slightly violet lamellae and pedicellate cystidia. Another close species is *Inocybe mixtilis*, which differs from our new record by remarkably lubricous and sticky, more glabrous texture of pileus, often (sub)isodiametrical basidiospores and (sub)lageniform

hymenial cystidia with clearly differentiated neck, while *I. occulta* often has a paler yellowish pileus with more glabrous texture. Another close, but different species, *Inocybe subtrivialis* has generally yellow-copperish to orange or brown copperish basidiomata and more or less rectangular heterodiametric basidiospores (Bon, 1998; Jacobsson and Larsson, 2012; Esteve-Raventós et al., 2018; Matheny et al., 2019).

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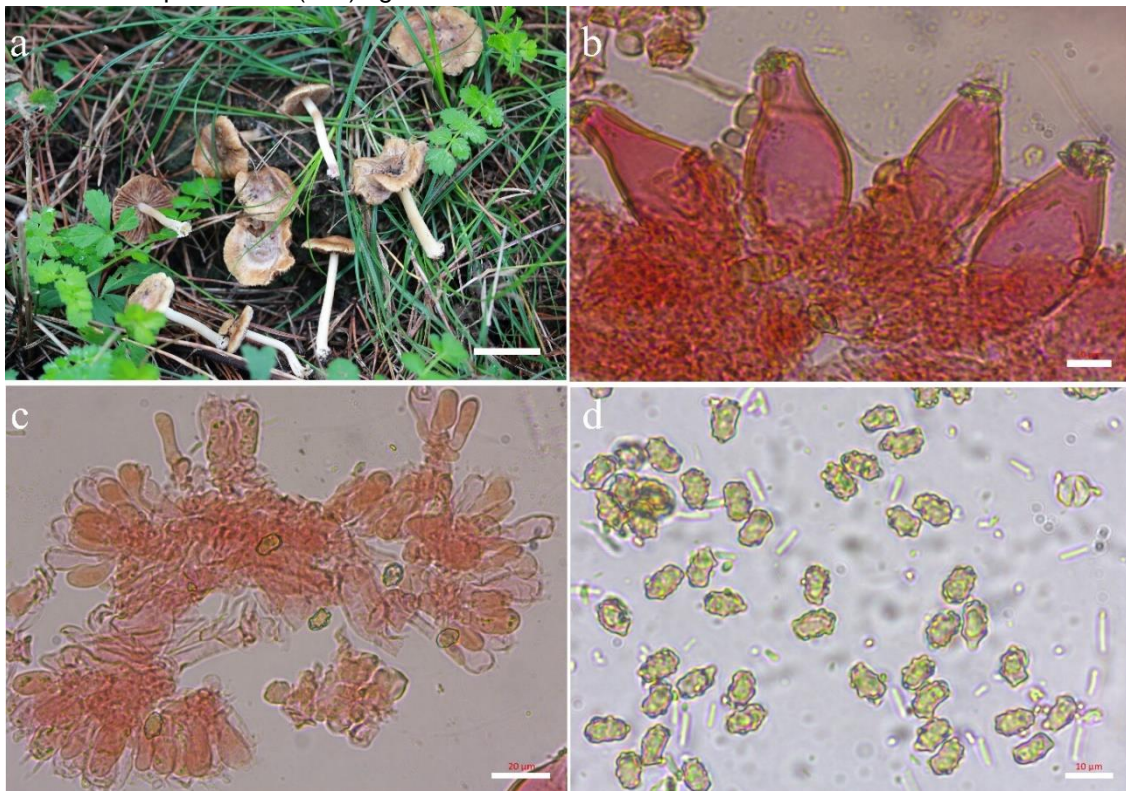


Figure 1. *Inocybe nothomixtilis*: a. basidiomata, b. hymenial cystidia, c. basidia, d. basidiospores (bars: a= 40 mm, b= 20 µm, c and d= 10 µm). Photos by E. Sesli.

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