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***Inocybe sphagnophila* Bandini & B. Oertel (Agaricales, Inocybaceae): A new record for the Turkish mycota**

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Abstract: *Inocybe sphagnophila* Bandini & B. Oertel belonging to the nodulose-spored *Inocybe* subsection *Napipedinae* (Agaricales, Inocybaceae) is described as a new record for the Turkish mycota. Basidiomata were collected from Haçkalı Baba Plateau, Düzköy, Trabzon. This species obviously is not uncommon, but has hitherto probably been confused with another species of the same subsection, as for instance *Inocybe assimilata* (Britzelm.) Sacc. Identification of the collection was made according to the morphological findings and has been confirmed by the molecular analysis.

Key words: *Basidiomycota*, Fungal taxonomy, Trabzon, Turkey

***Inocybe sphagnophila* Bandini & B. Oertel (Agaricales, Inocybaceae): Türkiye mikotası için yeni bir kayıt**

Öz: *Inocybe* cinsinin sporları nodüllü olan alt seksiyonu *Napipedinae* (Agaricales, Inocybaceae) grubuna ait *Inocybe sphagnophila* Bandini & B. Oertel Türkiye mikotası için yeni kayıt olarak tanımlanmıştır. Bazidiyomalar Trabzon, Düzköy Haçkalı Baba yaylasından toplanmıştır. Bu tür ender rastlanan bir tür olmamakla birlikte, muhtemelen şimdiye kadar aynı alt seksiyonun türleri ile, örneğin *Inocybe assimilata* Britzelm. ile karıştırılmış olabilir. Koleksiyonun teşhisi morfolojik bulgulara göre yapılmış ve moleküler analizlerle doğrulanmıştır.

Anahtar kelimeler: *Basidiomycota*, Fungal taksonomi, Trabzon, Türkiye

Introduction

Inocybe (Fr.) Fr., the ectomycorrhizal large genus is represented with more than 2000 species worldwide and more than 80 in Turkey (Kirk et al., 2008; Akata et al., 2011; Keleş et al., 2014; Sesli and Denchev, 2014; Doğan and Kurt, 2016; Akata et al., 2018; Uzun and Acar, 2018). They can be seen almost all year round, especially during the autumn. Their basidiomata are similar to tricholomatoid, collybioid and mycenoid agarics and may be greyish, brownish, yellowish, whitish, greenish or violaceous. The pileus is usually of medium size, rimose to fibrillose or scaly and generally dry. The lamellae are adnexed to broadly adnate; at first often whitish, then greyish to brownish or slightly yellowish to olivaceous. The stipe is generally either only near the apex or entirely pruinose. The odor is mostly spermatic, and the taste is

usually indistinct or faintly bitter. Basidiospores are either smooth and (sub)amygdaloid, (sub)ellipsoid or (sub)ovoid in form, or angular-nodulose - and yellowish to pale brownish or grey-brownish in colour. Species of the subgenera *Malloocybe* and *Inosperma* have thin-walled cheilocystidia and no pleurocystidia, while species of the subgenus *Inocybe* mostly have thick-walled cheilocystidia and pleurocystidia (Knudsen and Vesterholt, 2008).

A revision of some Central European species of *Inocybe* (Fr.: Fr.) Fr. subgenus *Inocybe* was conducted by Bandini et al. (2018) with the description of five new species. Other recent studies show, that the *Inocybe praetervisa* group consists of several closely related species (Esteve-Raventós et al., 2015; Esteve-Raventós et al., 2016; Larsson et al., 2018). The aim of the present



study is to contribute to the Turkish mycota by introducing a new record.

Materials and Methods

Basidiomata were collected from Haçkalı Baba Plateau in *Picea orientalis* L. dominated forest of the Euro-Siberian Floristic Region of Turkey on 18.10.2015. Floristic elements, morphological structures and mycorrhizal relationships were noted in the field after taking photos of the basidiomata. Free hand sections from the pileus, lamellae and stipe were obtained under stereo binocular microscope, mounted in concentrated ammonia, subsequently stained with Congo red and later examined under Zeiss A2 Axio Imager trinocular research microscope equipped with an AxioCamERc5s camera. Micro-slides of the pileipellis, cystidia, basidia and the basidiospores were obtained and the measurements were made by using the Axio Imager software (Cléménçon, 2009). Morphological findings have been confirmed by the molecular analysis (ITS, GenBank code: 6874 MK431097) using standard methods.

The exsiccata are kept at a personal fungarium of the Fatih Faculty of Education in the Trabzon University, Trabzon, Turkey.

Taxonomy

Inocybe sphagnophila Bandini & B. Oertel, *Mycologia Bavarica* 18: 20 (2017) [Figures 1-3]

Pileus 20-50 mm, conical to campanulate; grey-brown, pale nut-brown, chestnut- or dark brown with a reddish hue, also almost blackish brown at the center; umbo very large, and pileus sometimes slightly depressed around the center when old; typically striate with darker fibers on lighter ground and therefore often with intense colour-contrast; margin involute or straight with whitish to greyish remnants of a cortina; somewhat hygrophanous; surface rimose, innately fibrillose and often verrucose at the center. Lamellae narrowly adnate to emarginate or subdistant with decurrent tooth; mostly irregular, moderately crowded ($L = 35-45$, $I = 1-3$); light greyish-brown, beige or slightly reddish brown. Stipe 40-70 × 5-10 mm, cylindrical, sometimes curved; generally widening towards the base. Stipe base usually thickened and covered typically with whitish mycelium; striate, glabrous; beige to pale brownish, light brown with a reddish hue; with whitish or reddish pruina towards apex. Context whitish to pale brownish; smell either none or subspermatocal when cut. Basidiospores angular-nodulose, sometimes (sub) isodiametric, with 8-11

irregular prominent mostly rounded nodules; 6.5-8.0 (9.7) × 4-5.5 (7) μm , on average 7.6 × 5.2 μm ($n = 50$). Basidia clavate, 27.6-34.9 × 9-10.9 μm , generally 4-spored, sometimes 2-spored. Paracystidia thin-walled, hyaline, clavate, subglobose or subcylindrical. Pleurocystidia (sub)fusiform, (sub)clavate, (sub)utriform or (sub)cylindrical with or without crystals, 50.9-70.4 × 15-18.6 μm . Cheilocystidia similar to pleurocystidia. Pileipellis consists of an epicutis made up of 4.5-10.8 μm wide parallel hyphae with encrusting, parietal brownish pigment. Caulocystidia only at the extreme apex of a stipe, sublageniform or subfusiform, in combination with many long and narrow, sometimes subcapitate and forked elements, 25-136 × 9.3-13.6 μm . Clamp-connections present at all tissues. Morphological findings are accordance with the ITS sequence (code: 6874 MK431097) submitted to the GenBank.

Specimen examined

Turkey, Trabzon, Düzköy, Haçkalı Baba Plateau on, 40°49'30.76" N, 39°26'42.78" E, 1924 m alt., under *Picea orientalis*, 18.10.2015, Sesli 3571.

Discussion

Inocybe sphagnophila is described by Bandini et al. (2017) from Germany under *Picea abies* Degen and *Alnus glutinosa* (L.) Gaertn. with *Sphagnum*. The Turkish collection was under *Picea orientalis* among mosses. Bandini et al. (2017) state that *I. sphagnophila* is not a rare species and up to now also recorded from Austria, France, Italy, and the USA. While the measurements given in Bandini et al. (2017) are 10-40 mm (pileus) and 20-60 × 3-5 mm (stipe), the pileus of the Turkish collection is slightly larger (20-50 mm) and the stipe is 40-70 × 5-10 mm. The spores of the holotype collection from Germany are on av. < 8 μm long, and the pleurocystidia are on av. < 55 μm long. The spores of the Turkish collection are of nearly the same size, on average 7.6 × 5.2 μm , while the pleurocystidia are slightly larger 50.9-70.4 × 15-18.6 μm . The basidia of the new record is 27.6-34.9 × 9-10.9 μm , while the measurements of the German collections are 9-31 × 8-12 μm . The differences between Turkish and German collections are thus rather negligible, and we think that they may be caused by different environmental conditions. However, colour and context of the pilei match those of the German collections and one crucial characteristic, the undate, often subcapitate and forked caulocystidia are to be observed in the Turkish collection as well.



Figure 1. *Inocybe sphagnophila*: a, b and c. basidiomata (scale bars: 20 mm).

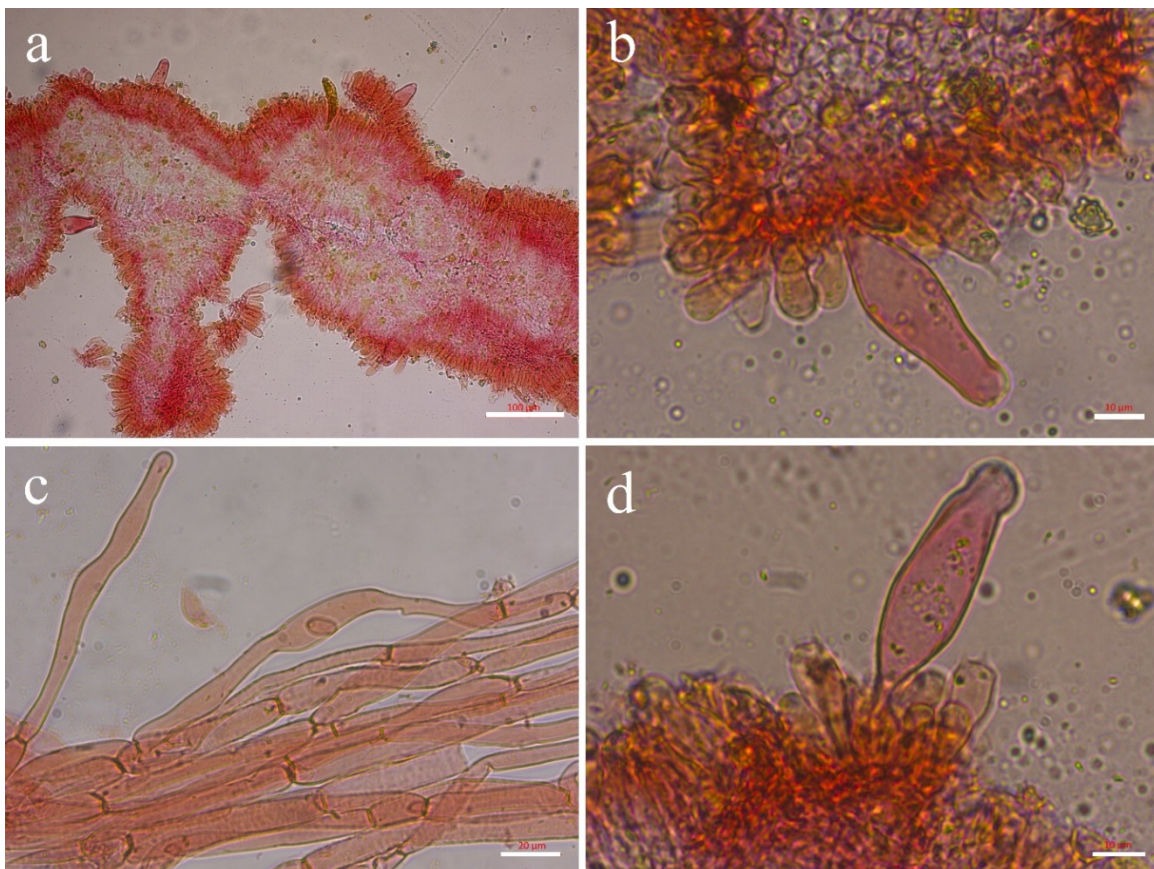


Figure 2. *Inocybe sphagnophila*: a. cross-sections through the lamella, b and d. pleurocystidia, c. pileipellis (scale bars: a= 100 µm, b and d= 10 µm, c= 20 µm).



On the whole thus both the macroscopical aspect as the microscopical details fit thus very well with the original description of *I. sphagnophila*. Furthermore, a genetical analysis (ITS= GenBank code: 6874 MK431097) shows molecular identity of the Turkish collection with the type collection. *I. sphagnophila* can mainly be distinguished from other species of the subsection *Napipedinae* such as *I. assimilata* (Britzelm.) Sacc., *I. napipes* J.E. Lange, or *I. acuta* Boud. by the combination of the often conspicuous whitish cortina, shape and/or size of spores and hymenial cystidia.

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