



<https://doi.org/10.15407/ukrbotj77.03.204>

## A new record of the rare fungus *Peziza saniosa* (Pezizales, Ascomycota) in Ukraine

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Dzhagan V.V., Shcherbakova Yu.V., Sniezhyk A.I. 2020. A new record of the rare fungus *Peziza saniosa* (Pezizales, Ascomycota) in Ukraine. *Ukrainian Botanical Journal*, 77(3): 204–209.

**Abstract.** A new locality of a rare species, *Peziza saniosa* (Pezizales, Ascomycota), is reported in Ukraine. The fungus was found in August 2016 in the Uholsko-Shyrokoluzhanskyi Mountain Range of Carpathian Biosphere Reserve (Transcarpathian Region, Ukraine). Earlier *P. saniosa* was registered in Ukraine only once, more than a hundred years ago in Ternopil Region. Thus, the current record from the Ukrainian Carpathians is the second one for Ukraine. A brief description of the species, information on its general distribution, and original illustrations are provided.

**Keywords:** biodiversity, Carpathian Biosphere Reserve, distribution, morphology, *Peziza*

Submitted 03 March 2020. Published 30 June 2020

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**Реферат.** Повідомляється про знахідку в Україні рідкісного дисконіцета *Peziza saniosa* (Pezizales, Ascomycota). Гриб був знайдений у серпні 2016 року в Угольсько-Широколузанському масиві Карпатського біосферного заповідника (Закарпатська область, Україна). До цього *P. saniosa* був виявлений на території України лише один раз понад сто років тому в Тернопільській області. Таким чином, знахідка даного виду з Українських Карпат є другою для України. Подано короткий опис, інформацію щодо загального поширення та оригінальні ілюстрації цього виду.

**Ключові слова:** *Peziza*, дисконіцети, Карпатський біосферний заповідник, морфологія, поширення

### Introduction

During a field trip to Carpathian Biosphere Reserve (Transcarpathian Region, Ukraine) in 2016, the second author of the present article found ascomata of an interesting fungus *Peziza saniosa* Schrad. ex J.F. Gmel. (Pezizales, Ascomycota). This operculate discomycete is known to occur in the Northern Hemisphere (Europe,

North America) as well as in Asia and Australasia (Barseghyan, Wasser, 2011). Despite its wide general distribution, the species has been rarely recorded throughout its range, and thus in most countries it is considered to be a rare or at least uncommon fungus. In Ukraine *P. saniosa* was first found in 1905 in Ternopil Region (Bobjak, 1907). Since that record, the species has not been reported again in Ukraine.

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*Peziza* Dill. ex Fr. is a large genus comprising approximately 112 confirmed taxa (Jaklitsch et al., 2016), with numerous synonymic names due to placement of some species in other genera. In the genus *Peziza*, it is sometimes hard to find reliable diagnostic characters of different species. One of the reasons is the lack of certain critical characters of apothecia, such as the hymenium and outer surface colour, production of coloured juice, etc., due to insufficient study of fresh material. The main morphological character of *P. saniosa* distinguishing it from other species of the genus is excretion of blue-violet or bluish coloured latex that appears in case of damage to the hymenial layer of the ascomata (Fig. 1). This kind of latex is not peculiar to the majority of other species of *Peziza* (Moser, 1963; Dennis, 1978; Breitenbach, Kränzlin, 1984; Moreno, Remondo, 2003). Thereby, this fungus can be easily recognized when the fresh material is available.

It should be noted that we have preliminarily reported this species (based on the same sample as presented here) in the list of fungal species in the recently published book *Fungi of Reserves and National Nature Parks of the Ukrainian Carpathians* (Dudka et al., 2019). However, in this article we provide a detailed description with the main diagnostic features, updated information about the general range, precise data on the locality in Ukraine, habitat, and original illustrations of the specimen of *P. saniosa* found in Ukraine (Figs 1–2).

## Materials and Methods

The fungus was collected in August 2016 during a field survey in Carpathian Biosphere Reserve (Transcarpathian Region, Ukraine). Macroscopic description of the collected specimen is based on fresh ascomata. Microscopic features are described from dried material mounted in tap water (H<sub>2</sub>O), 3% KOH, Congo Red solution (CR), Melzer's reagent (MLZ), IKI (iodine-potassium iodide) and Lactophenol Cotton Blue (LPCB), using an XY-B2T light microscope (Ulab, China) and a Primo Star light microscope (Carl Zeiss, Germany). Digital photomicrographs were made with a ScienceLab DCM 520 digital camera with Tsview 7 modular software (Fuzhou Tucsen Imaging Technology Co., Ltd., Fuzhou, Fujian, China).

Analysis of fungus' general distribution is based on the data from bibliographic sources listed in References and on critically revised open online resources, as well as the Global Biodiversity Information Facility (GBIF, [\[www.gbif.org/\]\(http://www.gbif.org/\)\). The collected specimen is deposited in the Herbarium of the Taras Shevchenko National University of Kyiv \(KWHU\).](http://</a></p></div><div data-bbox=)

## Results and Discussion

Since the diagnosis of the species is provided by many available and easily accessible resources, we restrict our report to a brief description of morphological features of *P. saniosa* based only on the specimen recently collected in Ukraine.

***Peziza saniosa* Schrad. ex J.F. Gmel.**, Systema Naturae 2(2): 1459 (1792). – Syn.: *Aleuria saniosa* (Schrad. ex J.F.Gmel.) Gillet, Champignons de France, les Discomycètes: 46 (1879). – *Galactinia saniosa* (Schrad. ex J.F.Gmel.) Sacc., Sylloge Fungorum 8: 106 (1889). – *Plicaria saniosa* (Schrad. ex J.F.Gmel.) Rehm, Rabenhorst's Kryptogamen-Flora, Pilze – Ascomyceten 1(3): 1004 (1894).

**Apothecia** discoid, about 1–1.5 (up to 2) cm in diameter. **Hymenium** smooth, from dark violet to dark brownish, almost black in old specimens, dark brown outside [some authors (Moser, 1963; Dennis, 1978) state the colour of the outer surface as being dark grayish brown or dark purple]. When hymenium is injured, bluish juice turning violaceous appears on the hymenial surface (Fig. 1). Medullary excipulum predominantly of *textura globulosa*, cells up to 60 µm in diameter, thin-walled. Ectal excipulum of *textura globulosa*, cells 19.0–42.5 µm in diameter, with gelled walls, intermixed with hyphae. **Asci** 360–400 × 14–15 µm, operculate, cylindrical, 8-spored, apex truncate-rounded, reacting positively with Melzer's reagent and IKI, turning blue at the apex (Fig. 2, A, B1–B2). **Ascospores** narrowly ellipsoid, slightly narrowed at the poles, 15.5–16.2 × 7.5–8.2 µm, uniseriate, hyaline, with two large guttules, sculpturing consists of small warts to extended ridges (Fig. 2, C1–C5). **Paraphyses** straight, cylindrical, simple, wider at the apex.

**Habitat.** Humus saprotroph. On wet soil, along the stream in a beech (*Fagus sylvatica*) forest.

**Specimen examined.** Ukraine, Transcarpathian Region, Tyachiv District, Uholsko-Shyrokoluzhanskyi Mountain Range of Carpathian Biosphere Reserve, Mala Uholka, 48.257523 N, 23.632278 E, 13 August 2016, leg. Yulia Scherbakova (KWHU 161308).

**General distribution.** Europe: Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Czech Republic, Denmark, Finland, France, Germany, Italy, Netherlands,



Fig. 1. *Peziza saniosa*. Fresh apothecium with blue latex. Scale bar: 2 mm

Norway, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Spain [including Canary Islands (Tenerife) and Balearic Islands (Mallorca)], Sweden, Switzerland, Ukraine, United Kingdom; Asia: Israel, China, Turkey; North America: Mexico, USA; Africa: Morocco; Australasia: New Zealand (Tabarés, Rocabrana, 1991; Zotti, Orsino, 2001; Moreno, Remondo, 2003; Tănase, Pop, 2005; Ribes, 2009; Pancorbo, Ribes, 2010; Barseghyan, Wasser, 2011; Mihál et al., 2011; Ciortan, 2013; Kholfy et al., 2014; Akata, Uzin, 2017; Gierczyk

et al., 2018; Savić et al., 2018; Jukić et al., 2019; GBIF, <http://www.gbif.org/>).

*Peziza saniosa* is considered to be a rare species occurring in broad-leaved forests, particularly those formed by beech and oak-hornbeam stands, also in coniferous forests, among mosses, on grassy and bare ground, on leaf or needle litter, rotting wood, usually from late spring to mid-autumn.

It is listed in the preliminary European Red List of the European Council for the Conservation of Fungi (<http://>

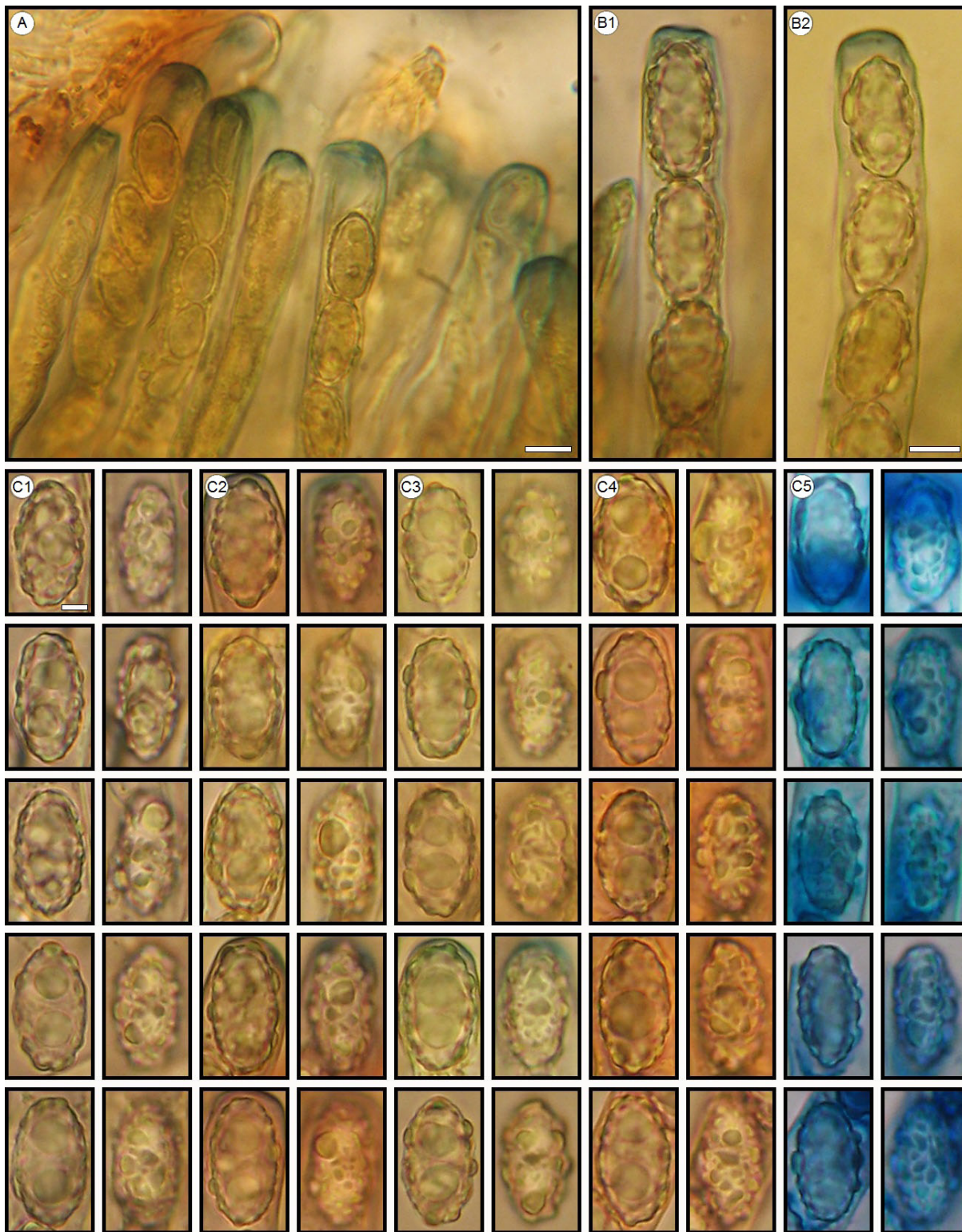


Fig. 2. *Peziza saniosa*. A: fragment of hymenial layer (IKI+); B1–B2: fragment of asci with ascospores (MLZ+); C1–C5: mature ascospores in different types of media (C1–H<sub>2</sub>O; C2 – IKI; C3 – MLZ; C4 – CR; C5 – LPCB). Bars: 10 μm (A, B1–B2); 5 μm (C1–C5)

www.wsl.ch/eccf/candlist-subtotals.xls) and is protected under various categories in some countries, such as the Czech Republic (Critically Endangered, CR), Finland and France (Endangered, EN), Germany (Vulnerable, VU), Norway and Sweden (Near Threatened, NT). In the Red List of Romanian Macrofungi, *P. saniosa* is considered as very rare and has the Near Threatened (NT) status (Tănase, Pop, 2005). In the Red List of Fungi in Bulgaria the fungus is categorized as Vulnerable (VU) (Gyosheva et al., 2006), while in Poland it is classified as rare or potentially Endangered species (Kujawa et al., 2016).

Although it is red-listed as a threatened species in several European countries and most authors describe this species as rare, the number of its finds has increased over the last years (Ševčíková, 2017). Only in the Czech Republic, 45 localities of the fungus have been recorded since 2006 (Egertová, 2015). Considering that *P. saniosa* is a thermophilic species, it may be due to mild winters and hot summers that were predominant during recent years.

At the same time, in Bosnia and Herzegovina it is a quite common and widespread species, inhabiting various types of habitats. Thus, in this country *P. saniosa* is recommended to be evaluated as a Least Concern (LC) species (Jukić et al., 2019).

In Ukraine, our collection from the Ukrainian Carpathians is the second record of *P. saniosa* in the country. The first find, from vicinity of the town of Berezhany, Ternopil Region, was reported by Bobjak (1907) more than a hundred years ago. Therefore, we can assume that *P. saniosa* is a rare species in Ukraine. For better understanding of its distribution, conservation status and possibility of including the species in the *Red Data Book of Ukraine*, further observations in the Carpathians and in Ukraine in general are required.

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Recommended for publication by V.P. Hayova