

## Two remarkable species of *Crepidotus* (Cortinariaceae) from the Crimean Mountains (Ukraine)

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**Abstract.** Two species of *Crepidotus* from the Crimean Mountain (Ukraine) are described and discussed, *C. malachius* var. *trichiferus* and *C. macedonicus*, both very rare in Europe.

**Key words:** Agaricales, basidiomycetes, *Crepidotus*, Crimea, Ukraine

### Introduction

Crimea is a region of the Ukraine with a high diversity of ecosystems (Didukh 1992). Plant communities common in temperate Eastern Europe occur as well as those of a Mediterranean type. The most common are the plant communities formed by *Fagus sylvatica* L. subsp. *moesiaca* (Maly) Hjelm., *Quercus petraea* (Mattuschka) Liebl., *Q. pubescens* Willd., *Pinus nigra* Arnold var. *pallasiana* (D. Don) Aschers. & Graebn.

A high tree host diversity would be expected to harbour many fungal decomposing species such as species of the genus *Crepidotus* (Fr.) Staude. However, until recently only four species of the genus *Crepidotus* were known (Léveillé 1842; Sredinsky 1873; Zerova 1962; Zerova *et al.* 1979; Sarkina 1987; Isikov & Yevmenenko 1991; Moser 1993). *Crepidotus applanatus* (Pers.) P. Kumm., *C. mollis* (Schaeff. : Fr.) P. Kumm., and *C. variabilis* (Fr.) P. Kumm. are quite common and widespread all over Europe. A fourth species, *C. sinuosus* Hesler et A.H. Sm., described from North America, is more interesting as it is only known within Europe from the Crimea region (Moser 1993). Between 2000 and 2003 more representatives of this genus were collected and identified. As a result, 10 species of *Crepidotus* are now known from the Crimea (Prydiuk 2003, *abstr.*). Among them two proved to be very common, i.e. *C. calolepis* (Fr.) P. Karst. and *C. cesatii* (Rabenh.) Sacc. var. *cesatii*. Rather rare are *C. autochtonus* J.E. Lange and *C. subverrucisporus* Pilát. Two species, *C. malachius*

(Berk. et M.A. Curtis) Sacc. var. *trichiferus* Hesler et A.H. Sm. and *C. macedonicus* Pilát are new for the country. We present these two species in detail.

### Materials and Methods

The microscopic structures were observed in dried material. The microscopic sections of lamellae and pileipellis were made on about ½ radius of pileus and examined in 3% KOH. The ornamentation and the colour of the spores were studied in 3% KOH.

The spore sizes are based on 20 spores measurements per fruit-body. For basidia and cystidia the mean of the smallest and the largest object per fruit-body is given with 10 measurements in each case.

The SEM investigations were carried out with a JSM-35C using accelerating voltage 16 kV. Air-dried spores were coated with gold for 5–6 minutes.

All collections are deposited in the Herbarium of M.G. Kholodny Institute of Botany, National Academy of Sciences of Ukraine, Kiev, Ukraine (KW).

In the descriptions such abbreviations are used: **B** = breadth of the spores in front view; **L** = length of the spores; **L** (relating to lamellae) = number of lamellae reaching pileus basis; **I** = number of short lamellae (not reaching pileus basis) between two long lamellae; **Q** = length divided by breadth.

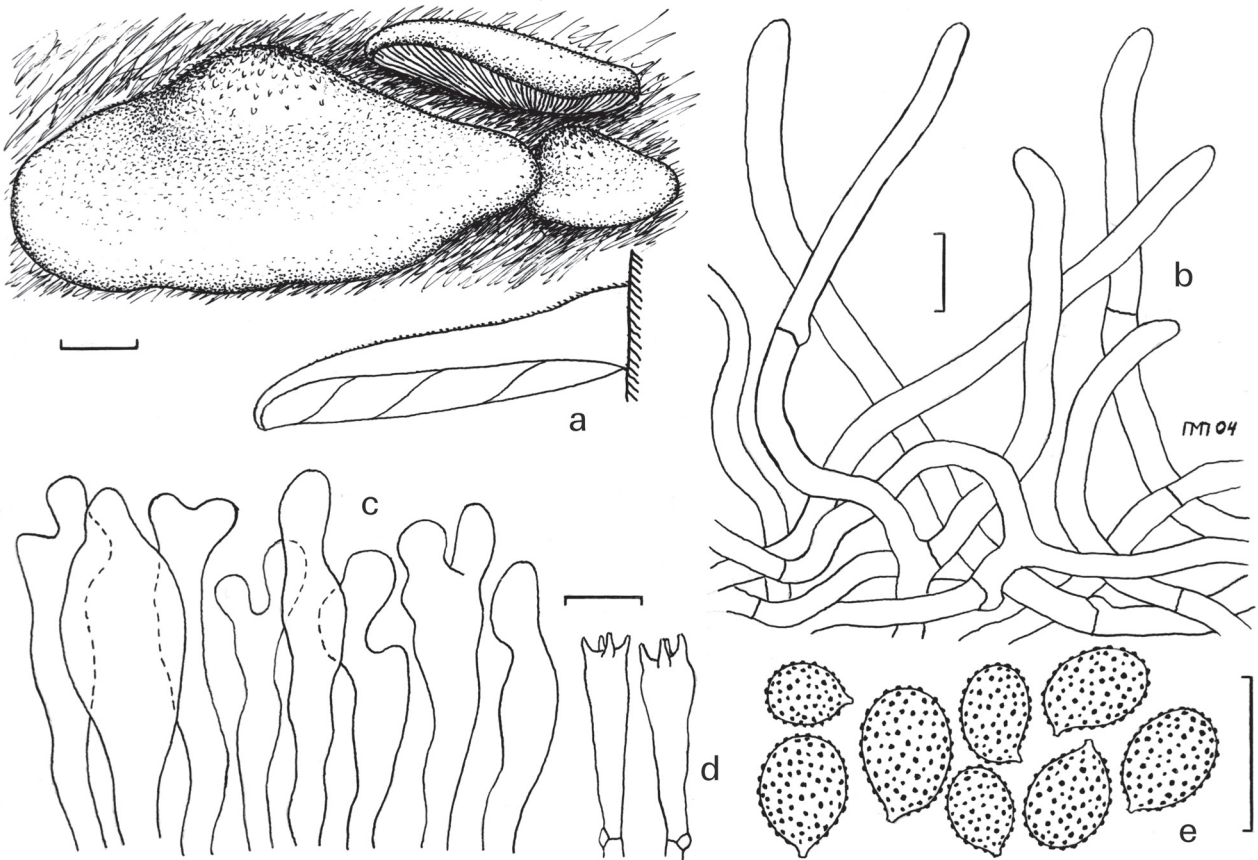


Fig. 1. *Crepidotus macedonicus*: a – fruit-bodies, b – pileipellis, c – cheilocystidia, d – basidia, e – spores. Bars = 1 cm for fruit-bodies, and 10  $\mu$ m for microstructures

## Results and Discussion

*Crepidotus macedonicus* Pilát, Stud. Bot. Cech. 10 (1949) 150. (Figs 1-2)

Holotype: Macedonia, Šar Planina – Crni Camen, Aug 1937, leg. Lindtner (PRM 489 031).

**Pileus** 10-70 mm, reniform to semicircular with strongly inflexed, undate margin, not striate, pubescent, at point of attachment tomentose, at margin in the course of time becoming almost glabrous, pallid to dirty cream, with yellowish shade, at point of attachment light nut-brown. **Lamellae** adnate, crowded, L = 15-30, l = 5-9, up to 5 mm broad, ventricose, narrowly adnate, pallid later orange-rufous, ochraceous-tawny, edge fimbriate, concolorous. **Stipe** absent. **Flesh** very thick (to 5 mm on  $\frac{1}{2}$  radius of pileus), white. Smell none, taste mild. **Spore print** snuff-brown. **Spores** 5.5-8.4  $\times$  (3.8-) 4.0-5.3 (-5.5)  $\mu$ m ( $n = 80$ ), Q = 1.2-1.7, av. Q = 1.43 $\pm$ 0.09, av. L = 6.9 $\pm$ 0.66, av. B = 4.8 $\pm$ 0.35  $\mu$ m, broadly oblong in frontal view, slightly inaequilateral in side view, with slight hilar depression, punctate-warty, verruculose, walls distinctly coloured. **Basidia** 19-26  $\times$  4.5-8.5  $\mu$ m, 4-spored, clamped. **Cheilocystidia** 22-46  $\times$  7-14 (-17)  $\mu$ m, clavate, rarely utriform, in upper part branched, flexuous, hyaline, thin-walled. **Gill trama** subparallel, hyphae 5-13 (-17)  $\mu$ m

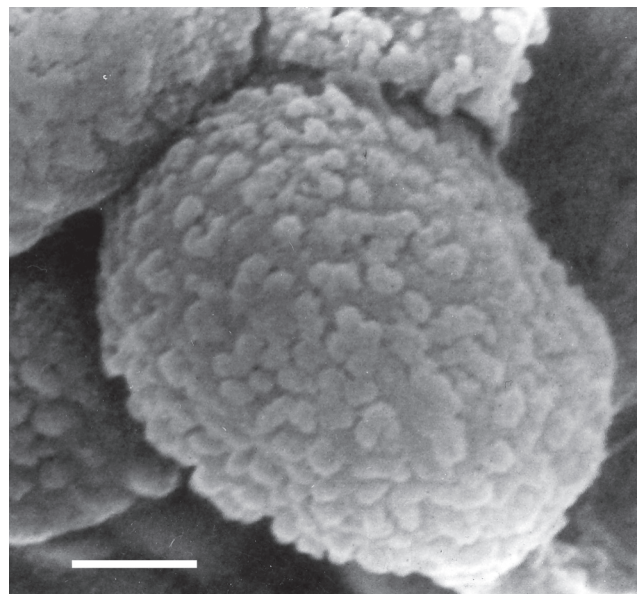
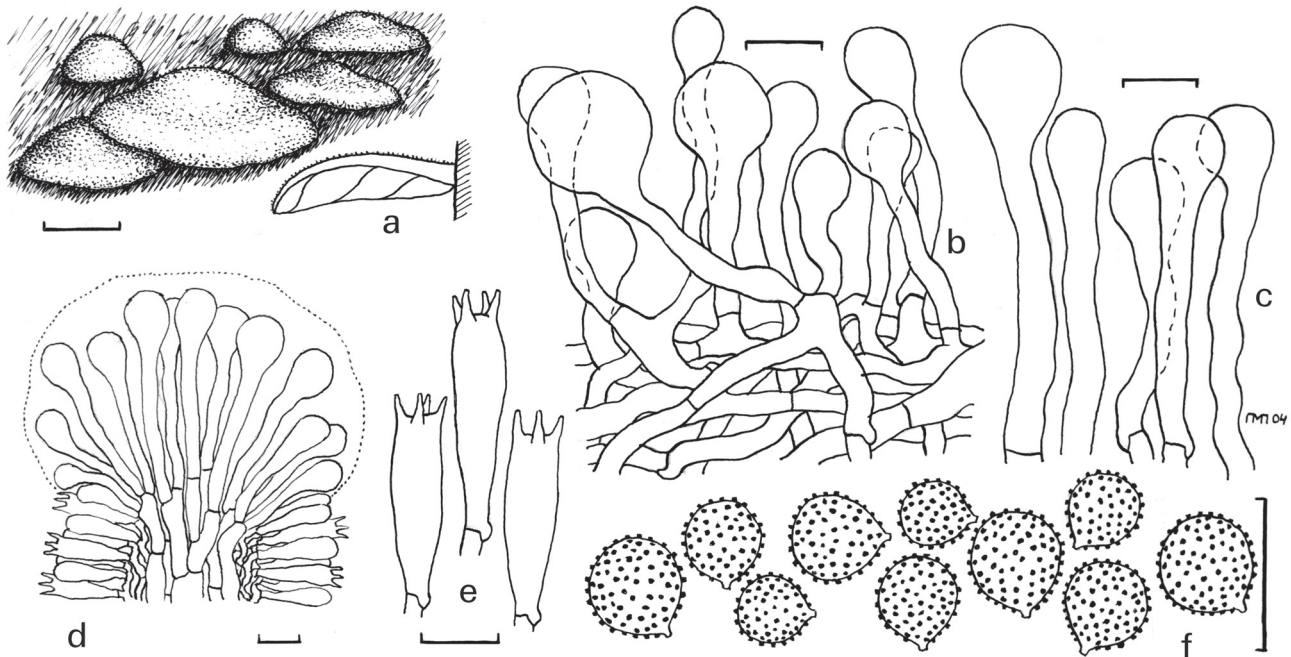


Fig. 2. Spores of *Crepidotus macedonicus* (KW 25 493) in SEM. Bar = 1  $\mu$ m



**Fig. 3.** *Crepidotus malachius* var. *trichiferus*: a – fruit-bodies, b – pileipellis, c – cheilocystidia, d – section across lamella edge (a mucus wrapping up the cheilocystidia is shown), e – basidia, f – spores. Bars = 1 cm for fruit-bodies, and 10  $\mu$ m for microstructures

broad. **Pileus trama** interwoven, hyphae 5-14  $\mu$ m broad. **Pileipellis** a transition between a cutis and a trichoderm with cylindrical hyphae 4-5 (–7)  $\mu$ m broad, terminal cells straight, undifferentiated. **Clamp-connections** present in all tissues.

**Habitat:** on hardwood (*Fagus*, *Quercus*) in the mountainous regions, August–October.

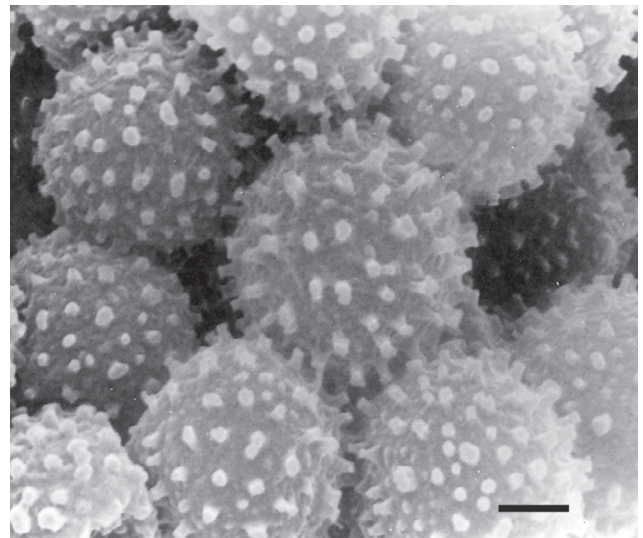
**Specimens examined:** UKRAINE: AR CRIMEA: Mountainous Crimea: Crimean Nature Reserve, 44°45' N, 34°14' E, alt. ca 800 m, 22 Sep 2000, M.P. Prydiuk (KW 25 493); 44°41' N, 34°07' E, alt. ca 600 m, 3 Oct 2001, M.P. Prydiuk (KW 25 494); Bolshoj Canyon of Crimea, 44°33' N, 34°00' E, alt. ca 700 m, 23 Sep 2003, H. Knudsen (KW 25 496). South coast of Crimea: Yalta Forest-Mountain Nature Reserve, 44°29' N, 34°06' E, alt. ca 500 m, 10 Oct 2001, M.P. Prydiuk (KW 25 495).

For a long time this remarkable species was known only from two habitats in the former Yugoslavia (Macedonia, Serbia) (Senn-Irlet 1992, 1995); recently *C. macedonicus* was also recorded in Slovakia (Ripková 2002). Thus our collections represent the fourth known site of this species in Europe and the first one in Eastern Europe. Because of its large, very fleshy carpophore *C. macedonicus* is macroscopically very distinctive but in many microscopic features it resembles *C. cesatii* (Rabenh.) Sacc., e.g. the shape of the cheilocystidia and the spores as seen in light microscope. However, the verruculose type of spore ornamentation as seen in SEM (see Fig. 2) distinguishes *C. macedonicus* from the latter species (Senn-Irlet 1995).

*Crepidotus malachius* (Berk. et M.A. Curtis) Sacc. var. *trichiferus* Hesler et A.H. Sm., North American Species of *Crepidotus* (1965) 58. (Figs 3-4)

**Holotype:** USA, Washington, Mt. Rainier Natl. Park, 17 Oct 1952, Smith (Smith 41123).

**Pileus** 10-30 mm, spathulate, reniform to semicircular, young convex, later plano-convex, with slightly inflexed, not striate margin, minutely pubescent, hygrophorous, ochraceous



**Fig. 4.** Spores of *Crepidotus malachius* var. *trichiferus* (KW 25 497) in SEM. Bar = 1  $\mu$ m

brown to light ferruginous; point of attachment lateral. **Lamellae** close, L = 10-20, l = 7-9, rather broad (to 3 mm), subventricose, narrowly adnate, pallid, ochraceous brown to cinnamon at maturity, edge fimbriate, whitish. **Stipe** absent. **Flesh** thin, grayish white. Smell none, taste bitterish. **Spore-print** ochraceous brown. **Spores** 4.8-6.5 × 4.6-5.8 (–6.2) μm (*n* = 60), *Q* = 1-1.1, av. *Q* = 1.06±0.06, av. *L* = 5.5±0.44, av. *B* = 5.2±0.40 μm, globose to subglobose, narrowed towards apiculus, warty-punctate, baculate, distinctly coloured. **Basidia** 19-26 × 7-8 μm, 4-spored, clamped. **Cheilocystidia** 34-55 × 4-5 × 7-14 (–17) μm, strongly capitate, rarely clavate, flexuous, hyaline, thin-walled, embedded in thick brownish mucus that does not dissolve in KOH and is well visible in exsiccates. **Pileocystidia** similar to cheilocystidia. **Gill trama** subparallel, hyphae 5-13 μm broad. **Pileus trama** interwoven, hyphae 4-14 μm broad. **Pileipellis** a cutis of repent hyphae 3-4 μm broad, bearing numerous, very dense, erect pileocystidia. **Clamp-connections** present in all tissues.

**Habitat:** on hardwood (*Fagus*) and conifer logs, September-October.

*Specimens examined:* UKRAINE: AR CRIMEA: Mountainous Crimea: Crimean Nature Reserve, 44°45' N, 34°15' E, alt. ca 300 m, 23 Sep 2000, M.P. Prydiuk (KW 25 497).

This specimen was previously identified as *Crepidotus crocophyllus* (Berk.) Sacc. (Prydiuk 2002) but the more careful investigation has showed a remarkable difference of a pileipellis structure of our collection (absence of incrustated, coloured hyphae and presence numerous, very dense pileocystidia). The further investigations have allowed to identify this specimen as *C. malachius* var. *trichiferus*.

While *C. malachius* var. *malachius* is described as devoid of pileocystidia and is only known from North America, *C. malachius* var. *trichiferus* was also found in Western Europe (the Netherlands) according to Hesler & Smith (1965), yet no recent record is known (Senn-Irlet 1995).

Hesler & Smith (1965) have attributed *C. malachius* to section *Sphaerula* and according to Senn-Irlet's infrageneric classification it must belong to section *Dochmiopus* (Senn-Irlet 1995). From the other representatives of this section with a baculate spore ornamentation (*C. applanatus*, *C. crocophyllus*, *C. ebrendorferi* Hauskn. et Krisai), *C. malachius* var. *trichiferus* is distinguished by the presence of very dense pileocystidia. Scattered pileocystidia are present also at *C. applanatus* but with a different shape. Besides, *C. applanatus* has the larger pileus with translucently striate margin (Senn-Irlet 1995).

Still, there are minor differences with the description of this species given by Hesler & Smith (1965). While the shape of the cystidia are described as 'cylindric, some subcapitate' our specimen have strongly capitate cystidia (see Fig. 3) and simple clavate forms are rare. Besides the cheilocystidia were wrapped up in a thick mucus, otherwise not known from *Crepidotus* species. Therefore it is possible that further investigations of additional collections will raise its rank.

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