

## New records of *Conocybe* species from Ukraine. I. The sections *Mixtae* and *Pilosellae*

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Data about new records of representatives of the genus *Conocybe* (sections *Mixtae* and *Pilosellae*) on the territory of Ukraine are cited. Information about the habitats of 7 species (*C. macrospora*, *C. microrrhiza*, *C. moseri*, *C. pulchella*, *C. siliginea*, *C. subpubescens* and *C. velutipes*) new for Ukraine is added. For all the species descriptions and drawings are provided.

**Key words:** Basidiomycetes, Agaricales, *Conocybe*, *Mixtae*, *Pilosellae*

Prydiuk M. P. (2007): Nové nálezy druhů z rodu *Conocybe* na Ukrajině. I. Sekce *Mixtae* a *Pilosellae*. – Czech Mycol. 59(1): 25–38.

V článku jsou publikovány údaje o nálezích zástupců rodu *Conocybe* Fayod (sekce *Mixtae* a *Pilosellae*), které jsou nové pro Ukrajinu. Jde o *C. macrospora*, *C. microrrhiza*, *C. moseri*, *C. pulchella*, *C. siliginea*, *C. subpubescens* a *C. velutipes*, u nichž jsou doplněny údaje o stanovištích a publikovány popisy a perokresby důležitých znaků.

### INTRODUCTION

In this article new records of the genus *Conocybe* Fayod in Ukraine are described. The genus is treated here in a narrow concept, excluding the genus *Pholiotina* Fayod (Arnolds 2005). Previously, representatives of the genus *Conocybe* and the family *Bolbitiaceae* practically did not attract special attention of scientists in this country. As a rule species of this family were mentioned only in general floristic lists of mushrooms of various regions of Ukraine. Until recently only 6 species of *Conocybe* were known from the territory of Ukraine: *Conocybe albipes* (Oth) Hauskn., *C. pilosella* (Pers.: Fr.) Kühner, *C. pubescens* (Gillet) Kühner, *C. rickeniana* P.D. Orton, *C. semiglobata* Kühner et Watling and *C. tenera* (Schaeff.: Fr.) Fayod (Bobyak 1907; Gizhytska 1929; Pilát 1940; Ganzha 1960a, 1960b; Wasser 1973, 1974; Wasser and Soldatova 1977, Zerova et al. 1979; Karpenko 1980; Besedina 1998; Prydiuk 2003, 2004; Sarkina 2004). Three of them (*C. rickeniana*, *C. semiglobata* and *C. tenera*) belong to the section *Conocybe*, the

other one to the sections *Candidae* (Kühner) Singer (*C. albipes*), *Mixtae* (Kühner) Singer (*C. pubescens*) and *Pilosellae* (Kühner) Singer (*C. pilosella*). During the past five years, as result of my investigations, 13 more species of this genus were collected. Six of them belong to the section *Conocybe* (to be treated in the next article) and 7 other ones are representatives of the sections *Mixtae* [*C. macrospora* (G. F. Atk.) Hauskn., *C. pulchella* (Velen.) Hauskn. et Svrček and *C. subpubescens* P. D. Orton] and *Pilosellae* [*C. microrrhiza* Hauskn., *C. moseri* Watling, *C. siliginea* (Fr.: Fr.) Kühner and *C. velutipes* (Velen.) Hauskn. et Svrček]. They are treated in this article.

#### MATERIALS AND METHODS

Microscopic structures were observed in dried material. Microscopic sections of lamellae and pileipellis were made at about 1/2 radius of pileus and examined in 3 % KOH. The spores were studied in water and 3 % KOH separately.

Data on spore size are based on 20 spore measurements per fruit-body from one habitat. For basidia and cystidia the mean of the smallest and the largest element per fruit-body is given with 10 measurements in each case.

All the collections are results of a special search for *Conocybe* and *Pholiotina* species in Ukraine and deposited in the National Herbarium of the M. G. Kholodny Institute of Botany, National Academy of Sciences of Ukraine, Kiev, Ukraine (KW).

In the descriptions following abbreviations are used: B = average width of the spores in front view; Ls = average length of the spores; L = number of lamellae reaching stipe; l = number of short lamellae (not reaching stipe) between two long ones; n = general number of measured spores; Q = length divided by width; av. Q = average Q.

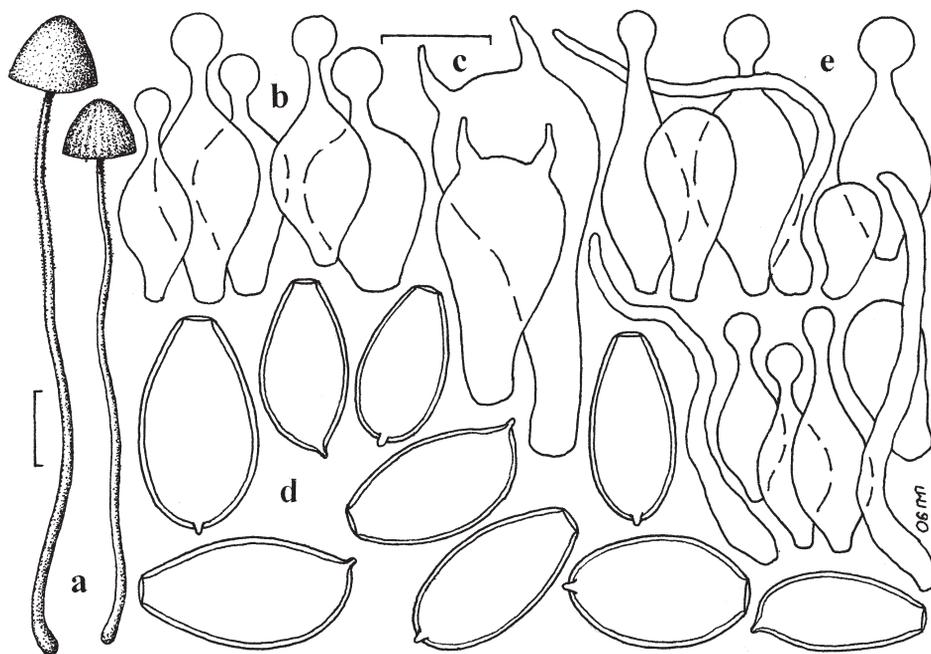
#### RESULTS AND DISCUSSION

***Conocybe macrospora*** (G.F. Atk.) Hauskn., Österr. Z. Pilzk. 12: 64, 2003.

Figs. 1, 8

*Galerula macrospora* G.F. Atk., Proc. Amer. Phil. Society 57: 371, 1918. – *Galera megalospora* J. Schaeff., Zeitschr. Pilzk. 9: 170, 1930 (p. p.). – *Conocybe rubiginosa* Watling, Notes Roy. Bot. Gard. Edinb. 38: 353, 1980.

Pileus 10–12 mm, campanulate, slightly expanding, smooth, hygrophanous, rust-brown, light brown, on drying orange-brown, light clay-brown, striate nearly to centre when fresh. Lamellae narrowly adnate, ventricose, to 2 mm broad, fairly crowded (L = 20–25, l = 1–3), rust-brown with yellowish tinge, then rust brown, with paler flocculose margin. Stem 50–85 × 1–1.2 mm, cylindrical, slightly attenu-



**Fig. 1.** *Conocybe macrospora* (G.F. Atk.) Hauskn.: a – fruit-bodies, b – cheilocystidia, c – basidia, d – spores, e – caulocystidia and hairs. Bars = 1 cm for fruit-bodies and 10  $\mu\text{m}$  for microscopic structures.

ated upwards, with slightly bulbous basis up to 2.5 mm broad, orange-brown, paler than pileus, slightly brown, darkening downwards, pruinose-striate, hollow. Flesh thin, whitish brown. Taste and smell indistinct. Spore print not recorded.

Spores 16.8–19.2(–20.4)  $\times$  9.6–10.8(–11.3)  $\mu\text{m}$ , Ls = 18.43  $\pm$  0.97  $\mu\text{m}$ , B = 10.4  $\pm$  0.43  $\mu\text{m}$ , Q = 1.6–1.9, av. Q = 1.78  $\pm$  0.08, n = 20; ovate-elliptic in face-view, sometimes slightly limoniform, somewhat flattened on one side in profile, thick-walled, light brown in water, reddish brown in alkali, germ-pore central, large, 3–3.5  $\mu\text{m}$  broad. Basidia 24–34  $\times$  13–14.5  $\mu\text{m}$ , 2-spored, clavate. Cheilocystidia lecythiform, 19–26  $\times$  7–10  $\mu\text{m}$ , head 3.5–5  $\mu\text{m}$  broad. Pleurocystidia absent. Pileipellis a hymeniform layer of pyriform cells 14–24  $\mu\text{m}$  broad intermixed with a few flexuous, filamentous hairs up to 2.5  $\mu\text{m}$  broad. Stipitipellis made up of hyaline parallel hyphae 4–12  $\mu\text{m}$  broad, covered with clusters of a mixture of lecythiform caulocystidia 18–22  $\times$  7–9.5  $\mu\text{m}$  with head 3–5  $\mu\text{m}$ , non-lecythiform elements and long flexuous, filamentous hairs to 2.5  $\mu\text{m}$  broad. Veil absent. Clamp-connections present.

**Habitat and distribution.** On burnt ground in a pine forest. Fairly widespread in Europe, known also from Africa and South America (Hausknecht 2003). In Ukraine apparently rare.

Notes. This species can be confused with *C. ambigua* Watling or *C. pubescens* (Gillet) Kühner. However, the first of them has slightly smaller, in side view amygdaliform spores, and the second one has 4-spored basidia and grows on dung (Arnolds 2005). The spores of our specimen are broader than those indicated by Watling (1982) for this species ((14–)15–19 × (7.5–)8–9(–9.5) µm) and on average slightly larger than Arnolds (2005) mentioned (13–18(–21) × 7.5–10.5(–11) µm) but they fit fairly well to the range of spore sizes indicated by Hausknecht (2003, 2005) for *C. macrospora* (16–19 × 8–10.5 µm), and also the appearance of fruit-bodies of our specimen fits rather well to that cited by Hausknecht.

Specimens examined. Ukraine: Volyns'ka region, Manevychi district, Cheremsky Nature Reserve, 51°30' N, 25°30' E, 9 September 2004, leg. M. P. Prydiuk (KW 27077).

***Conocybe microrrhiza* Hauskn. var. *microrrhiza*, Czech Mycol. 51: 55, 1999.**

Figs. 2, 8

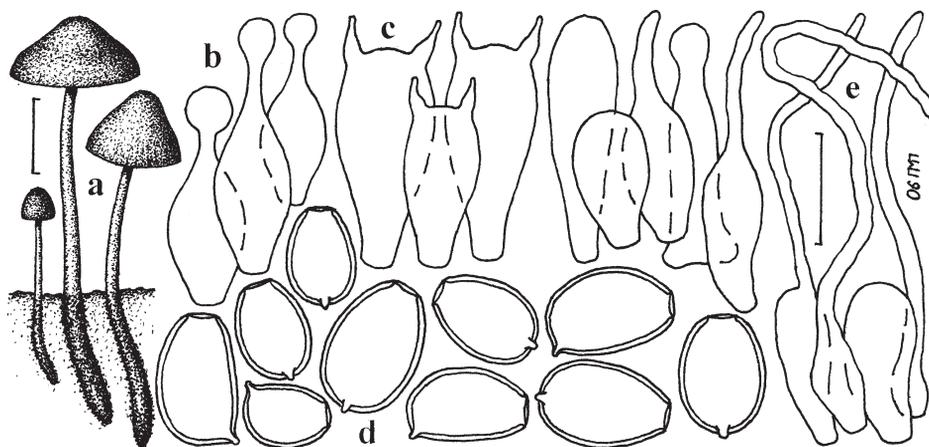
*Conocybe leporina* var. *leporina* sensu Singer et Hauskn., Pl. Syst. Evol. 159: 111, 1988; sensu Krisai, Libri Bot. 6: 113, 1992; sensu Hauskn., Österr. Z. Pilzk. 5: 187, 1996.

Pileus 5–18 mm, conical-campanulate, then convex-umbonate, slightly expanding, smooth, hygrophanous, brown, on drying honey-brown with slight grey hue, indistinctly striate at margin when moist, soon non-striate. Lamellae narrowly adnate, nearly free, ventricose, up to 4 mm broad, not crowded (L = 25–30, l = 1–3), yellowish brown, then rust-brown, with paler margin. Stipe 25–52 × 1–2 mm, attenuated upwards, half buried in sand, with root-like basis, exposed part pale brown, pruinose-striate; hollow. Flesh thin, white with yellow-brown hue. Taste and smell indistinct. Spore print light rust-brown.

Spores (8–)9–12(–13.2) × 6–8.5(–9) µm, Ls = 10.5 ± 1.35 µm, B = 7.6 ± 0.95 µm, Q = 1.3–1.5, av. Q = 1.38 ± 0.08, n = 20; short-elliptic in face-view, elliptic and slightly flattened in profile, fairly thick-walled, pale-brown in water, rust-brown in alkali, germ-pore large, up to 2.5 µm broad. Basidia 14–19 × 7–9 µm, 2-spored, clavate. Marginal cystidia lecythiform, 17–23 × 6–7 µm, head 3–5 µm broad. Facial cystidia absent. Cap-cuticle made up of pyriform and sphaeropedunculate cells 12–23 µm broad. Stem-cuticle consisting of parallel, filamentous hyphae covered with a mixture of clavate, cylindrical and lageniform caulocystidia 12–22 × 4.5–7 µm and long flexuous, filamentous hairs of up to 2 µm broad. Veil absent. Clamp-connections present.

Habitat and distribution. On sand among *Artemisia* sp. on sandy river-terrace partly planted with *Pinus sylvestris* L. Very rare in Europe (Arnolds 2005). This variety was earlier known only from Austria and Hungary (Hausknecht 2005), so it is the first record of this taxon in Eastern Europe. It is apparently very rare in Ukraine, too.

Notes. Other varieties of this taxon, *C. microrrhiza* var. *tetraspora* (Singer et Hauskn.) Hauskn. and *C. microrrhiza* var. *parvispora* (Hauskn.) Hauskn. have 4-



**Fig. 2.** *Conocybe microrrhiza* Hauskn. var. *microrrhiza*: a – fruit-bodies, b – cheilocystidia, c – basidia, d – spores, e – caulocystidia and hairs. Bars = 1 cm for fruit-bodies and 10 µm for microscopic structures.

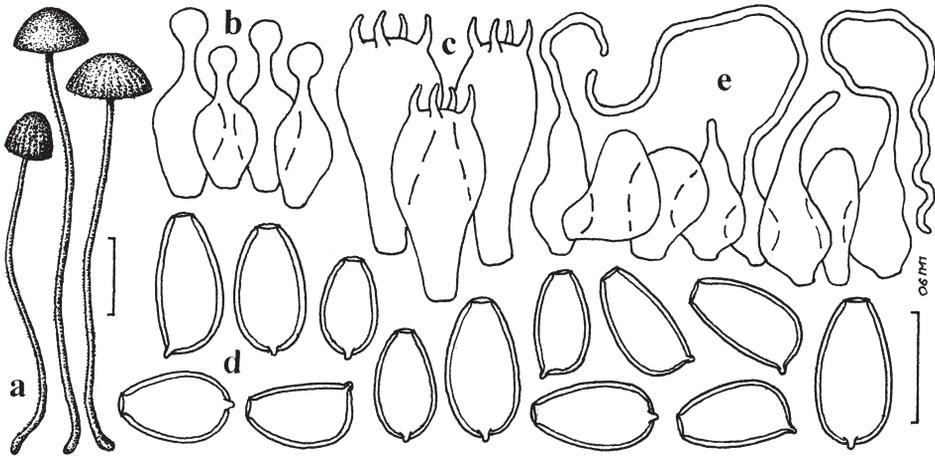
spored basidia and smaller spores. They have not yet been found in Ukraine. Among representatives of the section *Pilosellae* only *C. leporina* (Velen.) Singer et Hauskn. combines 2-spored basidia and a rooting stipe, but this species differs in habitat (among shrubs in forests) and has somewhat different (limoniform in profile) and narrower (5–6.5(–8.5) µm) spores (Arnolds 2005, Hausknecht 2005). Our specimens have slightly wider (6–8.5(–9) µm) spores than Hausknecht (1999, 2005) or Arnolds (2005) indicated for this taxon, but other features fit well.

Specimen examined. Ukraine, Luhans'k region, Stanychno-Luhans'ke district, about 3 km north-east of the village of Pan'kivka, 48°42' N, 39°22' E, 18 September 2004, leg. M. P. Prydiuk (KW 28827).

***Conocybe moseri*** Watling, Notes Roy. Bot. Gard. Edinb. 38: 342, 1980. Figs. 3, 8

*Conocybe kuehneri* Singer, Collect. Bot. 1: 236, 1947. – *Conocybe sienophylla* f. *cinerascens* Singer, Mycologia 51: 397, 1959. – *Conocybe siliginea* sensu Kühner (f. *typica*, 'récoltes tétrasporiques'), Le genre *Galera*: 108, 1935; ('f. tétrasporique') sensu Kühner et Romagnesi, Fl. anal. champ. sup.: 345, 1953; sensu Moser, Blätter-Bauchpilze, 2 Aufl.: 220, 1955. – *Galera siliginea* sensu Ricken, Blätterpilze: 224, 1915. – *Conocybe plumbeitincta* sensu Singer, Sydowia 51: 137, 1950; sensu Dennis et al., Trans. Br. Mycol. Soc. 43 (suppl.): 35, 1960; sensu Moser, Die Röhrlinge und Blätterpilze, 3. Aufl.: 229, 1967, 4. Aufl.: 282, 1978; sensu auct. eur. p. p. maj.

Pileus 5–10 mm, campanulate, convex-campanulate, smooth, hygrophanous, dark brown, on drying light grey-brown or pale ochraceous with grey hue, striate to disc when fresh, soon non-striate. Lamellae narrowly adnate, nearly free, up to 1.5 mm broad, fairly crowded (L = 20–27, l = 1–3), light ochraceous, then pale brown to rust-brown, margin slightly paler, flocculose. Stipe 30–70 × 0.5–1 mm, equal, slightly attenuated upwards, basis clavate, whitish, ochraceous, becoming



**Fig. 3.** *Conocybe moseri* Watling: a – fruit-bodies, b – cheilocystidia, c – basidia, d – spores, e – caulocystidia and hairs. Bars = 1 cm for fruit-bodies and 10 µm for microscopic structures.

brownish in lower part, in exsiccate becoming reddish brown, pruinose-striate, hollow. Flesh in pileus brownish, in stipe whitish. Taste and smell indistinct. Spore-print not recorded.

Spores (8.5–)9.5–12(–12.7) × 5.5–7.5(–8.2) µm; Ls = 10.7 ± 0.95 µm; B= 6.5 ± 0.65 µm; Q= 1.5–1.86; av. Q= 1.66 ± 0.01, n = 40; elliptic in face-view, slightly flattened on one side in profile, thick-walled, light honey-brown in water, darkening to reddish-brown in alkali, germ-pore large, 1.5–1.8 µm broad. Basidia 17–30 × 8–11.5 µm, 4-spored, clavate. Cheilocystidia lecythiform, 12–24 × 5.5–9.5 µm, head 2.5–5 µm broad. Pleurocystidia absent. Pileipellis a hymeniform layer of pyriform cells 10–30 µm broad, intermixed with a few flexuous, filamentous hairs 0.5–1.5 µm broad. Stipitipellis made up of hyaline parallel hyphae 5–12 µm broad, covered with clusters of a mixture of utriform, clavate and lageniform caulocystidia 9.5–24 × 5–11 µm and long flexuous, filamentous hairs 0.5–1 µm broad. Veil absent. Clamp-connections present.

**Habitat and distribution.** On soil among grass at woodland margin. This species is widespread but uncommon in Europe (Arnolds 2005). In Ukraine it is rather rare.

**Notes.** Macroscopically *Conocybe moseri* is characterised by the dull and dark colours of its fruit-bodies, microscopically it is mainly characterised by its 4-spored basidia and medium-sized spores (Arnolds 2005). The fresh fruit-bodies of our specimens were not sepia or dark grey-brown coloured, and their spores were somewhat broader (5.5–7.5(–8.2) µm) than Watling (1982) and Hausknecht (2005) indicated, but all their microscopical features fairly well fit those given by Arnolds

(2005). On the other hand, one of our specimens (KW 27144) possesses a feature characteristic of this species, namely a red-brown stipe colour in the exsiccate (Hausknecht & Krisai 1992).

*Specimens examined.* Ukraine, Chernihiv region, Korop district, Mezyns'kij National Nature Park, 51°39' N, 33°05' E, 18 August 2004, leg. M. P. Prydiuk (KW 27144); Luhans'k region, Stanychno-Luhans'ke district, Luhans'k Nature Reserve, Stanychno-Luhans'ke department, about 2 km south-west of the village of Pishchane, 48°45' N, 39°21' E, 16 September 2005, leg. M. P. Prydiuk (KW 30593).

***Conocybe pulchella*** (Velen.) Hauskn. et Svrček in Hauskn., Czech Mycol. 51: 58, 1999. Figs. 4, 8

*Galera pulchella* Velen., České Houby 3: 543, 1921. – *Conocybe pubescens* var. *pseudopilosella* Kühner, Le genre *Galera*: 89, 1935; *Conocybe pseudopilosella* (Kühner) Kühner et Romagn., Fl. anal. champ. sup.: 346, 1953; *Conocybe pseudopilosella* (Kühner) Kühner et Watling in Watling, Notes Roy. Bot. Gard. Edinb. 38: 336, 1980. – *Conocybe digitalina* (Velen.) Singer, Fieldiana Bot. N. S. 21: 103, 1989.

Pileus 5–15 mm, campanulate to conic-convex, smooth, hygrophanous, brown, drying pale brownish, yellowish brownish, striate to disc when fresh. Lamellae narrowly adnate, nearly free, to 1 mm broad, not crowded (L = 20–25, l = 1–3), ochraceous, then rust, margin paler, flocculose. Stipe 35–80 × 1–2.5 mm, equal, slightly attenuated upwards, hollow, basis clavate, slightly swollen, ochraceous, pale yellowish-brown, pruinose-striate. Flesh pale brownish. Taste and smell indistinct. Spore-print light rust-coloured.

Spores 12–16(–17) × 8–9.5(–10.5) µm, Ls = 14.6 ± 1.16 µm, B = 8.6 ± 0.58 µm, Q = 1.5–1.9, av. Q = 1.7 ± 0.11, n = 60; elliptic in face-view, slightly flattened on one side in profile, thick-walled, light brown in water, darkening to reddish-brown in alkali, germ-pore large. Basidia 17–31 × 10–16 µm, 4-spored, clavate. Cheilocystidia lecythiform, 14–34 × 6–10 µm, head 3–5 µm broad. Pleurocystidia absent. Pileipellis a hymeniform layer of pyriform cells 10–24 µm broad, intermixed with a few flexuous, filamentous hairs 1–1.5 µm broad. Stipitipellis made up of hyaline parallel hyphae 4–12 µm broad, covered with clusters of a mixture of lecythiform caulocystidia 12–27 × 5–10 µm, with head 2.5–4.5 µm broad and indistinct neck, clavate and lageniform ones, and long flexuous, filamentous hairs 1.5–2.5 µm broad. Clamp-connections present.

*Habitat and distribution.* On soil among grass in roadsides, meadows and lawns. Widespread in Europe (Arnolds 2005) also known from Africa (Tanzania) (Hausknecht 2003), in Ukraine apparently rare.

*Notes.* *Conocybe pulchella* is recognised by its small fruit-bodies with hardly expanding pileus and slender stipe, 4-spored basidia and fairly large spores. The closely related species *C. pubescens* has larger spores and usually grows on dung. *C. subpubescens* differs by larger basidiocarps with thicker stipe and smaller spores (Arnolds 2005). Our specimens have somewhat larger spores than Kühner and Romagnesi (1953), Watling (1982, 1992) or Arnolds (2005) indicated for this species. On the other hand, they are shorter than Hausknecht (2003, 2005) indi-

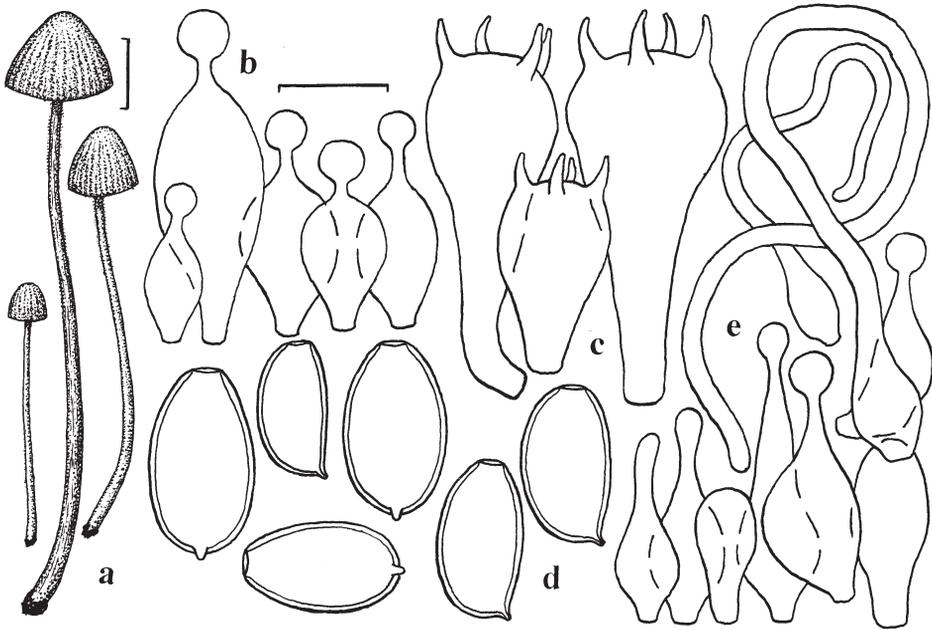


Fig. 4. *Conocybe pulchella* (Velen.) Hauskn. et Svrček: a – fruit-bodies, b – cheilocystidia, c – basidia, d – spores, e – caulocystidia and hairs. Bars = 1 cm for fruit-bodies and 10  $\mu$ m for microscopic structures.

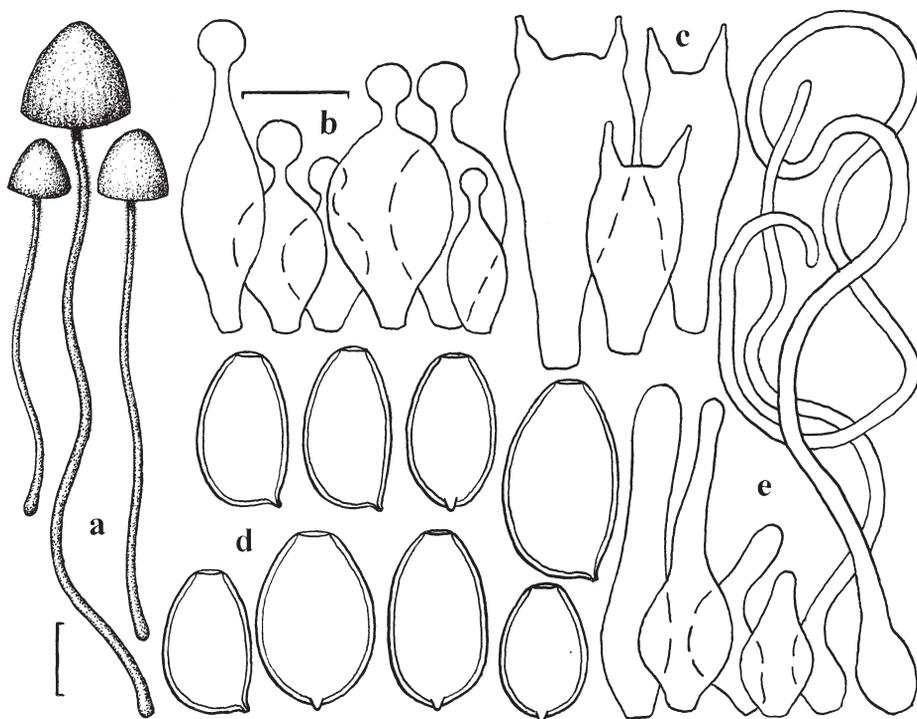
cated (12–18.5  $\times$  6.5–9.5  $\mu$ m) for it. The stipe covering is also somewhat aberrant (Hausknecht, pers. comm.): it consists of predominantly lecythiform elements and non-lecythiform ones are comparatively rare.

Specimens examined. Ukraine: Rivne region, Dubrovytsia district, village of Krupove, 51°33' N, 26°29' E, 27 October 2002, leg. M. P. Prydiuk (KW 23851); Sumy region, Seredyna-Buda district, village of Stara Huta, 52°18' N, 33°47' E, 16 August 2003, leg. M. P. Prydiuk (KW 27076); Donetsk region, Sloviansk district, Sviati Gory National Nature Park, 49°01' N, 37°32' E, 28 September 2004, leg. M. P. Prydiuk (KW 27151).

***Conocybe siliginea* (Fr.: Fr.) Kühner, Le genre *Galera*: 96, 1935. Figs. 5, 8**

*Agaricus siligineus* Fr., *Observ. Mycol.* 2: 168, 1818; *Agaricus tener* (“var”) *siligineus* Fr.: Fr., *Syst. Mycol.* 1: 266, 1821; *Galera tenera* var. *siliginea* (Fr.) P. Kumm. [as ‘*salignea*’], *Führer Pilzk.*: 75, 1871; *Galera siliginea* (Fr.) Quél., *Mém. Soc. Émul. Montbéliard*, Sér. 2, 5: 136, 1872.

Pileus 3–17 mm, obtusely conical, campanulate, smooth, hygrophanous, pale brown, pale brownish to ochraceous, on drying pale ochraceous, pale cream to white, with ochraceous tinge at centre of older specimens, nearly non-striate. Lamellae narrowly adnate, nearly free, to 2 mm broad, not crowded (L = 20–30, l = 1–3), pale ochraceous, light yellowish brown then orange-brown, margin pale, flocculose. Stipe 20–95  $\times$  0.5–1.5 mm, equal or slightly attenuated upwards, base



**Fig. 5.** *Conocybe siliginea* (Fr.: Fr.) Kühner: a – fruit-bodies, b – cheilocystidia, c – basidia, d – spores, e – caulocystidia and hairs. Bars = 1 cm for fruit-bodies and 10  $\mu$ m for microscopic structures.

slightly swollen, clavate, at first white, then with brownish tinge, finally light brown, pruinose-striate, hollow. Flesh white with brownish tinge, in stipe hollow. Taste and smell indistinct. Spore-print light rust-brown.

Spores (10–)12–16.5(–18.5)  $\times$  (6.5–)8–10.5(–11.5)  $\mu$ m,  $L_s = 14.4 \pm 1.21 \mu$ m,  $B = 9 \pm 0.72 \mu$ m,  $Q = 1.4–1.8$ , av.  $Q = 1.6 \pm 0.09$ ,  $n = 180$ ; elliptic in face-view, slightly flattened on one side in profile, thick-walled, light honey-brown in water, darkening to reddish brown in alkali, germ-pore large, 2–3.5  $\mu$ m broad. Basidia 14–27  $\times$  8–12  $\mu$ m, 2-spored, clavate. Cheilocystidia lecythiform, 14–31  $\times$  6–12  $\mu$ m, head 2.5–4.5  $\mu$ m, brown. Pleurocystidia absent. Pileipellis a hymeniform layer of pyriform and sphaeropedunculate cells 12–31  $\mu$ m broad intermixed with a few flexuous, filamentous hairs 1–2  $\mu$ m broad. Stipitipellis made up of pale brownish parallel hyphae 3–17  $\mu$ m broad, covered with clusters of a mixture of rounded, cylindrical, obclavate and lageniform caulocystidia 7–31  $\times$  6–10  $\mu$ m with apex 2.5–3  $\mu$ m broad, and long flexuous, filamentous hairs 1–2  $\mu$ m broad. Veil absent. Clamp-connections present.

**Habitat and distribution.** On soil among grass in roadsides, pastures, meadows, woodland margins and woodlands. Widespread in Europe (Arnolds 2005), not uncommon in Ukraine.

**Notes.** This representative of the section *Pilosellae* is recognised by 2-spored basidia, large thick-walled spores (>12 µm) and light-coloured fruit-bodies (Watling 1982, Hausknecht 2005). The closest species *C. rickenii* (J. Schaeff.) Kühner has somewhat larger and darker fruit-bodies with olivaceous hue when fresh and grows on dung and manured soil (Watling 1992, Hausknecht 2005). Arnolds (2005) regards this species a form of *C. siliginea*. Our specimens have slightly shorter spores than Arnolds (2005) indicated [(10.5–)12–19(–22.5) µm], and some of them (for example KW 29801 and KW 29802) have almost pure white fruit-bodies.

**Specimens examined.** Ukraine: Sumy region, Lebedyn district, Ukrainian Steppe Nature Reserve, department “Mykhailivs’ka tsilyna”, 50°39' N, 34°25' E, 2 September 1957, leg. Z. A. Saricheva (KW 27092); Kiev region, Obukhiv district, near the village of Kopachiv, 50°07' N, 30°29' E, 16 September 2002, leg. M. P. Prydiuk (KW 27079); Rivne region, Dubrovytsia district, near the village of Krupove, 51°33' N, 26°29' E, 21 June 2000, leg. M. P. Prydiuk (KW 30075), 13 July 2003, leg. M. P. Prydiuk (KW 27080), 16 July 2003, leg. M. P. Prydiuk (KW 27081); Donetsk region, Sloviansk district, Sviati Gory National Nature Park, near Sviatogirs’k, 49°01' N, 37°32' E, 28 September 2004, leg. M. P. Prydiuk (KW 27152); Kiev region, Pereyaslav-Khmelnytskij district, Pereyaslav-Khmelnytskij, 50°04' N, 31°28' E, 26 May 2005, leg. M. P. Prydiuk (KW 29801); Kharkiv region, Zolochivs’k district, near the village of Mala Rogozyanka, 50°11' N, 35°49' E, 25 June 2005, leg. M. P. Prydiuk (KW 29802).

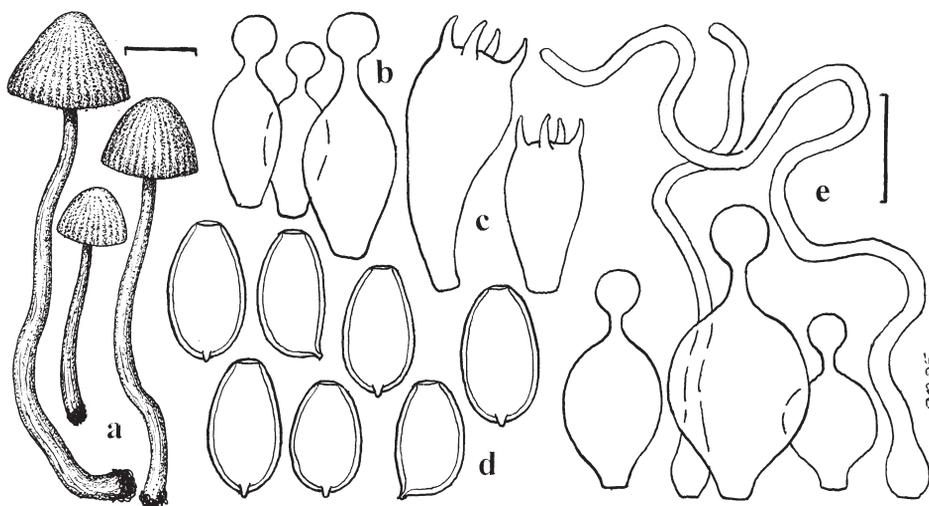
*Conocybe subpubescens* P.D. Orton, Trans. Br. Mycol. Soc. 43: 195, 1960.

Fig. 6, 8

*Conocybe subpubescens* Kühner, Botaniste 34: 275, 1949. – *Galera digitalina* Velen., Novit. mycol. nov.: 70, 1947; *Conocybe digitalina* (Velen.) Singer, sensu auct. eur., non Singer. – *Conocybe tetraspora* Singer, Beih. Nova Hedwigia 29: 209, 1969. – *Conocybe pubescens* sensu J.E. Lange, Fl. agar. dan. 4: 34, 1939. – *Conocybe pubescens* f. *typica* sensu Kühner, Le genre *Galera*: 86, 1935. – *Conocybe cryptocystis* sensu Moser, Die Röhrlinge und Blätterpilze, 4. Aufl.: 281, 1978; sensu auct. eur. – *Conocybe tenera* sensu Ricken, Blätterpilze: 225, 1915.

**Pileus** 10–17 mm, campanulate, obtusely conical, convex-campanulate, smooth, hygrophanous, light rust-brown, on drying light yellowish brown, striate to disc when fresh. Lamellae narrowly adnate, nearly free, to 1.5 mm broad, fairly crowded (L = 20–35, l = 3–7), margin paler, flocculose. Stipe 30–65 × 2–2.5 mm, equal, slightly attenuated upwards, base somewhat swollen, up to 3 mm broad, pale-brown, pruinose-striate, hollow. Flesh pale brownish. Taste and smell indistinct. Spore-print rust-brown.

**Spores** 10.5–12(–12.5) × 6–7.2 µm, Ls = 11.5 ± 0.51 µm, B = 6.8 ± 0.35 µm, Q = 1.6–1.9, av. Q = 1.7 ± 0.09, n = 20; elliptic in face-view, slightly flattened on one side in profile, thick-walled, pale rust in water, slightly darkening in alkali, germ-pore large, 1.5–2 µm broad. Basidia 14–22 × 7–10 µm, 4-spored, clavate. Cheilocystidia lecythiform, 16–22 × 6–9 µm, head 3.5–5 µm broad. Pleurocystidia absent. Pileipellis a hymeniform layer of pyriform cells 12–24 µm broad intermixed with



**Fig. 6.** *Conocybe subpubescens* P.D. Orton: a – fruit-bodies, b – cheilocystidia, c – basidia, d – spores, e – caulocystidia and hairs. Bars = 1 cm for fruit-bodies and 10  $\mu$ m for microscopic structures.

a few flexuous, filamentous hairs 1–2  $\mu$ m broad. Stipitipellis made up of hyaline parallel hyphae 5.5–10  $\mu$ m broad covered with clusters of a mixture of numerous lecythiform caulocystidia 16–27  $\times$  10–13  $\mu$ m with head 3.5–6  $\mu$ m broad and long flexuous hairs 1–2  $\mu$ m broad. Veil absent. Clamp-connections present.

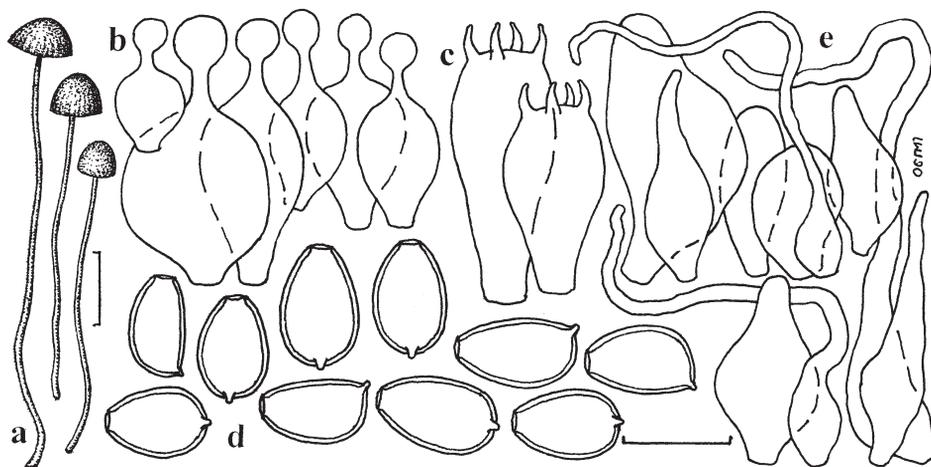
**Habitat and distribution.** On soil among grass on roadside. Widespread in Europe (Arnolds 2005) but in Ukraine apparently rare.

**Notes.** This species is similar to *C. pulchella* and *C. pubescens* (Gillet) Kühner but has considerably smaller spores. Besides, *C. pulchella* has a slender stature, and *C. pubescens* grows mainly on dung (Arnolds 2005; Hausknecht 2003, 2005). Our specimen has smaller spores than Watling (1982), Moser (1983), Hausknecht (2003, 2005) and Arnolds (2005) indicated for this species. They were closer in size to those indicated by Kühner and Romagnesi (1953), Svrček (1983) and Watling (1992). Its fruit-body features fit fairly well.

**Specimen examined.** Ukraine: Donetsk region, Slovians'k district, Sviati Gory National Nature Park, near the village of Bogorodychne, 49°01' N, 37°30' E, 28 September 2004, leg. M. P. Prydiuk (KW 27156).

***Conocybe velutipes*** (Velen.) Hauskn. et Svrček in Hauskn., Czech Mycol. 51: 66, 1999. Fig. 7, 8

*Galera velutipes* Velen., Novit. mycol.: 128, ('1939') 1940. – *Conocybe siliginea* var. *ochracea* Kühner, 'récoltes macrospores', Le genre *Galera*: 104, 1935. – *Conocybe kuehneriana* Singer, Beih. Nova Hedwigia 29: 212, 1969.



**Fig. 7.** *Conocybe velutipes* (Velen.) Hauskn. et Svrček: a – fruit-bodies, b – cheilocystidia, c – basidia, d – spores, e – caulocystidia and hairs. Bars = 1 cm for fruit-bodies and 10  $\mu\text{m}$  for microscopic structures.

Pileus 5–20 mm, campanulate, then convex, smooth, hygrophanous, pale avellaneous, grayish cinnamon, light brown, on drying ochraceous, pale brownish, striate to disc when fresh. Lamellae narrowly adnate, nearly free, 1–1.5 mm broad, fairly crowded ( $L = 15\text{--}30$ ,  $l = 1\text{--}3$ ), pale ochraceous with rust tinge, clay-brown, margin flocculose. Stipe 20–90  $\times$  0.3–1.5 mm, equal, basis slightly swollen, clavate, pale brown, pruinose, hollow. Flesh pale brown to light brown. Taste and smell indistinct. Veil absent. Spore-print not recorded.

Spores (9–)9.5–11.5(–13.5)  $\times$  6–8  $\times$  6–7.5  $\mu\text{m}$ ,  $L_s = 10.5 \pm 0.83 \mu\text{m}$ ,  $B = 6.8 \pm 0.44 \mu\text{m}$ ,  $Q = 1.4\text{--}1.7$ , av.  $Q = 1.54 \pm 0.09$ ,  $n = 60$ ; ovate-elliptic, broadly elliptic in face-view, slightly flattened in profile (lentiform), thick-walled, honey-brown in water, reddish brown in alkali, germ-pore fairly large, 1.5–1.7  $\mu\text{m}$  broad. Basidia 17–23  $\times$  8–10  $\mu\text{m}$ , 4-spored, clavate. Cheilocystidia lecythiform, 12–24  $\times$  7–14.5  $\mu\text{m}$ , head 3–5.5  $\mu\text{m}$  broad. Pleurocystidia absent. Pileipellis a hymeniform layer of clavate, pyriform and sphaeropedunculate cells 14–29  $\mu\text{m}$  broad intermixed with a few flexuous, filamentous hairs 1.5–2.5  $\mu\text{m}$  broad. Stipitipellis made up of pale parallel hyphae 3–10  $\mu\text{m}$  broad, covered with clusters of a mixture of clavate, utriform, lageniform and oblong-lageniform caulocystidia 10–24  $\times$  6–12  $\mu\text{m}$  with apex 2.5–3  $\mu\text{m}$  broad, and long, flexuous, filamentous hairs 1–2.5  $\mu\text{m}$  broad. Veil absent. Clamp-connections present.

**Habitat and distribution.** On soil (sometimes burnt) in mixed and deciduous forest (*Pinus*, *Quercus*, *Betula*, *Alnus*). Widespread in West and Central Europe (Arnolds 2005), fairly rare in Ukraine.

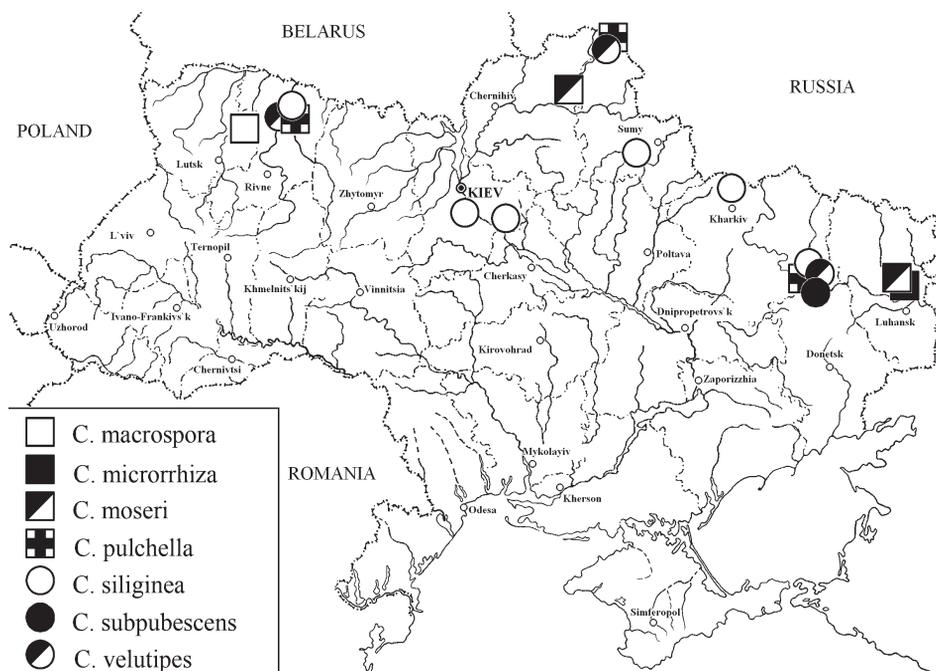


Fig. 8. Distribution of species of *Conocybe* found in Ukraine.

Notes. This species comes close to *C. sienophylla* (Berk. et Broome) Singer but has broader, slightly to distinctly lentiform spores, which are darker in alkali (Arnolds 2005, Hausknecht 2005). Our specimens have smaller spores, than Svrček (1983) and Hausknecht (2005) indicated, closer to the size mentioned by Watling (1982, 1992).

Specimens examined. Ukraine: Rivne region, Dubrovytsia district, near the village of Krupove, 51°34' N, 26°25' E, 21 July 2000, leg. M. P. Prydiuk (KW 27078); Sumy region, Seredyno-Buda district, Desnians'ko-Starohutskij National Nature Park, 52°19' N, 33°48' E, 16 September 2003, leg. M. P. Prydiuk (KW 27071); Donetsk region, Slovians'k district, Sviati Gory National Nature Park, near Sviatogir's'k, 49°01' N, 37°32' E, 29 September 2004, leg. M. P. Prydiuk (KW 27154).

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## REFERENCES

- ARNOLDS E. (2005): *Conocybe* Fay. – In: Noordeloos M. E., Kuyper T. W. and Vellinga E. C. (eds.), *Flora Agaricina Neerlandica*, Vol. 6, p. 120–179, Boca Raton etc.
- BESEDINA I. S. (1998): [Summary of the species composition of agaricoid basidiomycetes of the Pridneprovskoj lowland (in the Left-Bank Forest-Steppe of Ukraine)]. – 41 p. Poltava. (In Russian)
- BOBYAK H. (1907): [Additions to the mycology of eastern Halychyna. Fungi of surroundings of Berezhany]. – *Zbirn. Mat.-Prir.-Lik. Sekts. Nauk. Tov. Shevchenka* 11: 1–40. (In Ukrainian)
- GANZHA R. V. (1960a): [Mushrooms of the order *Agaricales* of the mixed forests over the Vorskla]. – *Ukr. Bot. Zh.* [Ukrainian Journal of Botany] 27(5): 72–84. (In Ukrainian)
- GANZHA R. V. (1960b): [Cap mushrooms of oak forests of the valley of the river Vorskla]. – *Bot. Zh.* [Journal of Botany] 45(5): 758–764. (In Russian)
- GIZHYTSKA Z. G. (1929): [Material to the mycological flora of the Ukraine]. – *Bulletin of Kiev Botanical Garden* 10: 4–41. (In Ukrainian)
- HAUSKNECHT A. (2003): Beiträge zur Kenntnis der *Bolbitiaceae* 9. *Conocybe* Sekt. *Mixtae*. – *Österr. Z. Pilzk.* 12: 41–83.
- HAUSKNECHT A. (2005): Fam. *Bolbitiaceae*. – In: Horak E., Röhrlinge und Blätterpilze in Europa, p. 303–326, Heidelberg.
- HAUSKNECHT A. and KRISAI I. (1992): Schwarzhütige *Conocybe*-Arten. – *Persoonia* 14(4): 655–661.
- KARPENKO K. K. (1980): [Macromycetes of the Mykhailivs'ka tsilyna Reserve]. – *Ukr. Bot. Zh.* [Ukrainian Journal of Botany] 37(3): 73–78. (In Ukrainian)
- KÜHNER R. and ROMAGNESI H. (1953): Flore analytique des champignons supérieurs (Agarics, Bolets, Chanterelles). – 557 p. Paris.
- MOSER M. (1983): Die Röhrlinge und Blätterpilze (*Polyporales*, *Boletales*, *Agaricales*, *Russulales*). – In: Gams H. (ed.), *Kleine Kryptogamenflora*, Band 2B (2), 533 p. Stuttgart, New York.
- PILÁT A. (1940): Hymenomycetes Carpatorum orientaliu. – *Sborn. Nár. Mus. Praha* 2B(3): 37–80.
- PRYDIUK M. P. (2003): [Rare macromycetes (*Agaricaceae*, *Bolbitiaceae*) from the Crimean nature reserve]. – *Ukr. Bot. Zh.* [Ukrainian Journal of Botany] 60(3): 305–313. (In Ukrainian)
- PRYDIUK M. P. (2004): [Basidial mushrooms of the Crimea]. – In: Dudka I. O. (ed.), [Fungi of the Crimean peninsula], p. 174–213, Kiev. (In Ukrainian)
- SARKINA I. S. (2004): [Basidial macromycetes of the Steppe Crimea: the Kerchenski peninsula and Prisivassie]. – *Trans. of the Nikita Bot. Gard.* 123: 49–58. (In Russian)
- SVRČEK M. (1983): Nové a vzácnější *Agaricales* z Čech. – *Čes. Mykol.* 37(4): 212–236.
- WASSER S. P. (1973): [The flora of *Agaricales* of virgin steppe of the Ukraine]. – *Ukr. Bot. Zh.* [Ukrainian Journal of Botany] 30(4): 457–467. (In Ukrainian)
- WASSER S. P. (1974): [Cap mushrooms (orders *Boletales*, *Agaricales*, *Russulales*) of the natural forests of the Ukraine. II. Mushrooms of the long- and short-flooded forests]. – *Ukr. Bot. Zh.* [Ukrainian Journal of Botany] 31(4): 440–445. (In Ukrainian)
- WASSER S. P. and SOLDATOVA I. M. (1977): [Higher Basidiomycetes of steppe zone of Ukraine]. – 355 p. Kiev. (In Russian)
- WATLING R. (1982): British Fungus Flora. Agarics and Boleti 3. *Bolbitiaceae*: *Agrocybe*, *Bolbitius* & *Conocybe*. – 139 p. Edinburgh.
- WATLING R. (1992): *Conocybe* Fayod. – In: Hansen L. and Knudsen H. (eds.), *Nordic Macromycetes*, Vol. 2, p. 272–277, Copenhagen.
- ZEROVA M. Ya., SOSIN P. Ye. and ROZHENKO G. L. (1979): [Handbook of the fungi of Ukraine], Vol. 5 (2). – 565 p. Kiev. (In Ukrainian)