

Some *Conocybe* species rare or new for Ukraine. 2. Sections *Mixtae* and *Pilosellae*

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Abstract: Detailed descriptions and further data about some interesting species of *Conocybe* sect. *Mixtae* and *Pilosellae* found in Ukraine are presented. *Conocybe farinacea*, *C. fimetaria*, *C. hexagonospora*, *C. lobauensis*, *C. ochrostriata* and *C. rostellata* are new for the Ukraine. New localities are reported for *C. macrospora*, *C. subpubescens* and *C. velutipes*. Besides, *Conocybe farinacea* and *C. lobauensis* are found for the first time in Eastern Europe.

Zusammenfassung: Detaillierte Beschreibungen und weitere Angaben zu einigen interessanten Arten der Gattung *Conocybe* sectt. *Mixtae* und *Pilosellae* aus der Ukraine werden gegeben. *Conocybe farinacea*, *C. fimetaria*, *C. hexagonospora*, *C. lobauensis*, *C. ochrostriata* und *C. rostellata* sind neu für die Ukraine. Neue Fundorte werden für *C. macrospora*, *C. subpubescens* und *C. velutipes* gemeldet. Zudem wurden *Conocybe farinacea* und *C. lobauensis* zum ersten Mal in Osteuropa gefunden.

This paper continues the publication of data about some rare or new species of the genus *Conocybe* for Ukraine. Previously information about findings of some interesting taxa of sect. *Conocybe* was presented by PRYDIUK (2014) and this article contains further data about species of sectt. *Mixtae* SINGER and *Pilosellae* SINGER. These sections are considered here in accordance with the infrageneric system of HAUSKNECHT & KRISAI-GREILHUBER (2006). According to that system sect. *Mixtae* comprises species with stipitipellis consisting of mixture of lecythiform and non-lecythiform elements with relation of both types fluctuating from 1:5 to 5:1. The species revealing different ratio of stipitipellis elements are attributed to sect. *Conocybe* or *Pilosellae*, respectively (WATLING 1986, HAUSKNECHT 2003). Thus most of representatives of sect. *Pilosellae* have no lecythiform caulocystidia though some species can possess few ones at stipe apex (HAUSKNECHT & KRISAI-GREILHUBER 2006).

Materials and methods

The microscopic structures were observed in dried material. Microscopic sections of lamellae and pileipellis were made at about $\frac{1}{2}$ radius of the 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 ones per

fruit body is given based on 10 measurements in each case. Ammoniacal reaction was investigated according to instructions of HAUSKNECHT (1999, 2009).

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

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

Results

On the whole nine species of sect. *Mixtae* and *Pilosellae* were collected in Ukraine during 2007–2013. For the first time on its territory were registered *Conocybe farinacea* WATLING, *C. fimetaria* WATLING, *C. hexagonospora* HAUSKN. & ENDERLE, *C. lobauensis* SINGER & HAUSKN., *C. ochrostriata* HAUSKN., and *C. rostellata* (VELEN.) HAUSKN. & SVRČEK. Three other species, *C. macrospora* (G. F. ATK.) HAUSKN., *C. subpubescens* P. D. ORTON, and *C. velutipes* (VELEN.) HAUSKN. & SVRČEK, were known in Ukraine only from few locations and are apparently rare (PRYDIUK 2007). Some of the above mentioned species are rather rare in Europe and two, *C. farinacea* and *C. lobauensis*, are found for the first time in East Europe. Below more detailed information about all the species is given. The species are arranged according to the infrageneric system of HAUSKNECHT & KRISAI-GREILHUBER (2006).

Conocybe FAYOD

Section *Mixtae* SINGER

Subsection *Ambiguae* HAUSKN. & KRISAI

Series *Fragilis* HAUSKN. & KRISAI

***Conocybe lobauensis* SINGER & HAUSKN., Pl. Syst. Evol. 159: 107. 1988. (Fig. 1)**

Pileus: 5–10 mm, at first hemispheric, later campanulate-convex to plano-convex or plano-conical, smooth to slightly radially rugulose, hygrophanous, not striate when fresh, reddish-brown, brown-orange, at margin paler, yellowish-brown, on drying pale yellowish-brown or ochraceous, with darker centre.

Lamellae: narrowly-adnate to almost free, rather distant (L = 15–20, l = 0–1(–3)), ventricose, up to 1 mm wide, at first yellow-brown, later rust-brown, with concolorous finely flocculose lamellar edge.

Stipe: 15–25 × 0.3–0.5 mm, cylindrical with clavate basis, hollow, pruinose to longitudinally pruinose-striate, whitish with pale ochraceous or pale yellowish-brown tinge, later darkening from basis upwards to pale brown or honey-brown.

Context: in pileus up to 0.5 mm wide, whitish to pale brownish yellow, in stipe darker, up to light brown. Taste and smell indistinct.

Spore-print: not recorded.

Spores: (8.0–)8.5–11.0(–12.5) × 6.0–7.5 μm, Q = 1.29–1.72; av. L = 9.9±1.13 μm, av. B = 6.7±0.44 μm, av. Q = 1.47±0.11; in face view ovate, broadly-ellipsoid and ellipsoid, in profile ellipsoid, slightly flattened ventrally, germ-pore absent, rather thin-walled to slightly thick-walled, in water light yellow, in alkali light orange-brown.

Basidia: 14.0–21.0 × 6.0–9.0 μm, clavate, 2-spored.

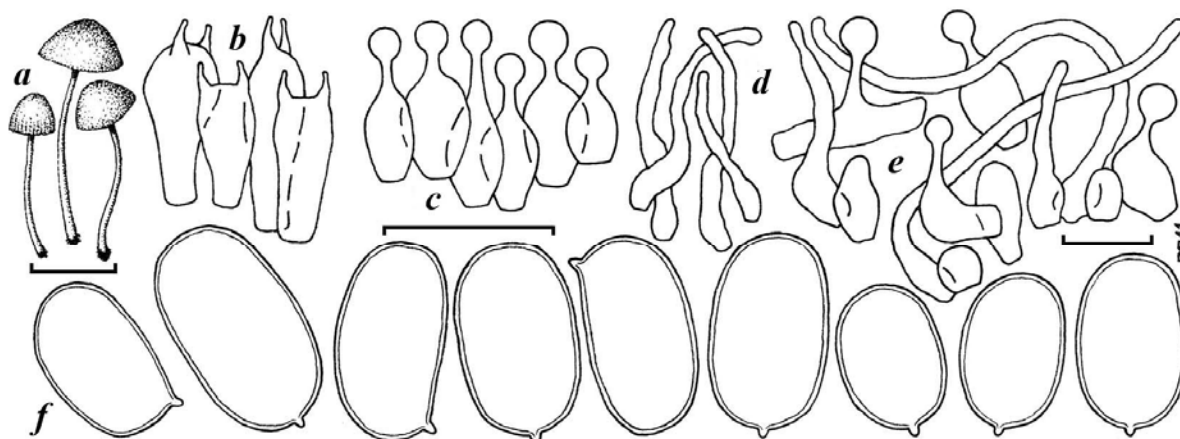


Fig. 1. *Conocybe lobauensis*: a basidiomata, b basidia, c cheilocystidia, d pileocystidia, e caulocystidia, f spores. Bar: 10 mm for basidiomata, 10 µm for microstructures.

Cheilocystidia: 13.0–18.0 × 6.0–8.0 µm, lecythiform, neck often fairly long, up to 4.5 × 1.5 µm, head 3.5–4.0 µm wide.

Pleurocystidia: absent.

Pileocystidia: hair-like, up to 2.0 µm wide, scattered.

Caulocystidia: a) lecythiform, 14.0–17.0 × 6.5–7.0 µm, neck up to 5.0 × 1.5 µm, head 3.0–4.5 µm wide; b) ellipsoid, globose-clavate, clavate and utri-form, 6.0–10.0 × 4.0–5.0 µm; c) hairs up to 100.0 × 2.0 µm.

Pileipellis: hymeniform, consisting of spheropedunculate and pyriform elements 12.0–26.0 µm wide.

Clamp connections: present.

Chemical reaction: ammoniacal reaction negative.

Habitat and distribution: Solitary or in small groups on soil, in rather dry grasslands (steppes, dry meadows), in June. Apparently rare in Ukraine, the first find in East Europe. Known only in Europe, rare, found up to now from Austria, Italy and Spain (HAUSKNECHT 2009).

Specimens examined: Ukraine: Kiev region, Obukhiv district, northern margin of the village Trypillia, 50° 07' 38" N, 30° 45' 58" E, 19. June 2008, leg. M. P. PRYDIUK (KW 40145).

Conocybe lobauensis is characterised by its small fruit bodies, 2-spored basidia and rather small spores without germ-pore. Another taxon possessing 2-spored basidia and spores of similar size and form (without germ-pore, too) is *C. enderlei* HAUSKN. var. *variispora* HAUSKN. belonging to sect. *Conocybe*. It has no hair-like caulocystidia and its fruit bodies are essentially larger (HAUSKNECHT 2009).

Subsection *Pubescens* HAUSKN. & KRISAI

***Conocybe macrospora* (G. F. ATK.) HAUSKN.,** Österr. Z. Pilzk. 12: 64. 2003. (Fig. 2)

Galerula macrospora G. F. ATK., Genus *Galerula* in North America: 371. 1918. – *Conocybe pubescens* (GILLET) Kühner var. *macrospora* (G. F. ATK.) E. LUDW., Pilzkompodium 2: 135. 2007. – *Galera megalospora* JUL. SCHÄFF., Z. Pilzk. 9: 170. 1930 (p.p.), non *Conocybe megalospora* SINGER, Lilloa 25: 297. 1953 (= *C. pubescens*). – *Conocybe megalospora* SINGER ssp. *nivalis* SINGER, Rev. Mycol. Paris 18:

18. 1953. – *Conocybe rubiginosa* WATLING, Notes. Roy. Bot. Garden Edinburgh 38: 353. 1980.

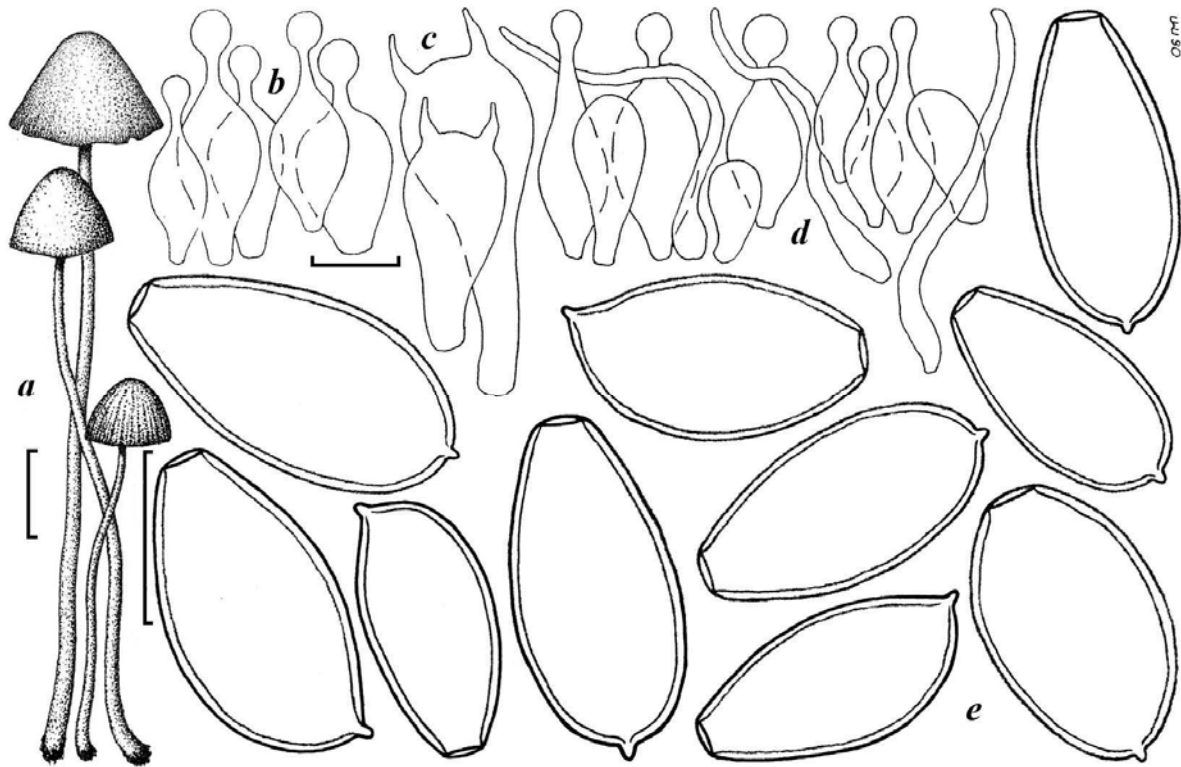


Fig. 2. *Conocybe macrospora*: a basidiomata, b basidia, c cheilocystidia, d caulocystidia, e spores. Bar: 10 mm for basidiomata, 10 μm for microstructures.

Pileus: 5–25 mm, at first campanulate, later conical-campanulate to campanulate-convex, slightly pubescent, soon glabrous, hygrophanous, striate almost to centre, brown, rust-brown, light brown to orange-brown, at margin slightly paler, on drying pale brownish-orange, orange-yellow to ochraceous-yellow, with paler margin.

Lamellae: narrowly-adnate to almost free, rather crowded ($L = 15\text{--}25$, $l = 1\text{--}3(-7)$), ventricose, up to 3 mm wide, at first pale brown, later light rust-brown to rust-brown, with paler finely flocculose edge.

Stipe: $50\text{--}95 \times 1\text{--}3$ mm, cylindrical with slightly or clearly bulbous basis (up to 4 mm wide), hollow, longitudinally pruinose-striate, up to pubescent-pruinose at apex, at first pale yellow in upper part, below darker, pale orange, up to reddish-brown at basis, later light brownish-orange, honey-brown, up to reddish-brown at basis.

Context: in pileus up to 1.5 mm broad, whitish to pale yellowish, in stipe darker, up to orange-yellow. Taste and smell indistinct, sometimes with slight radish odour.

Spore-print: rust-brown.

Spores: $(13.5\text{--})16.0\text{--}19.0(-20.5) \times (7.0\text{--})8.0\text{--}10.5(-11.5)$ μm , $Q = 1.62\text{--}2.0$; av. $L = 18.0 \pm 1.28$ μm , av. $B = 10.0 \pm 0.82$ μm , av. $Q = 1.81 \pm 0.09$; in face view ellipsoid to slightly limoniform-ellipsoid, in profile slightly flattened ventrally, ellipsoid to rather amygdaliform, germ-pore central, up to 3 μm wide, thick-walled, in water yellow-brown, in alkali reddish-brown.

Basidia: 17.0–23.0 × 11.0–12.0 µm, clavate, 2-spored.

Cheilocystidia: 15.0–26.0 × 5.5–10.0 µm, lecythiform, neck up to 3.5 × 2.5 µm, head 3.0–5.0 µm wide.

Pleurocystidia: absent.

Pileocystidia: cylindrical and hair-like, up to 85.0 × 2.5 µm, scattered or rather numerous.

Caulocystidia: a) lecythiform, 15.0–22.0 × 6.0–10.0 µm, neck up to 4.0 × 1.5 µm, head 3.0–5.0 µm wide; b) ellipsoid, globose-clavate and clavate, 9.0–16.0 × 6.0–8.5 µm; c) hair-like, up to 100.0 × 2.0 µm.

Pileipellis: hymeniform, consisting of spheropedunculate and pyriform elements 15.0–25.0 µm wide.

Clamp connections: present.

Chemical reaction: ammoniacal reaction negative.

Habitat and distribution: Solitary or in scattered groups on soil, sometimes on dung, manured soil, compost or burnt places, in frondose, coniferous and mixed forests, as well as in grasslands (meadows, pastures, roadsides), in summer and autumn. In Ukraine apparently rather rare, earlier known from one location (PRYDIUK 2007). In Europe rather widespread, known also from Asia, Africa, North and South America, and New Zealand (HAUSKNECHT 2009).

Specimens examined: Ukraine: Volyn region, Lubeshiv district, National nature park «Prypiat-Stokhid», 51° 50' 54" N, 25° 35' 42" E, 19. July 2010, leg. M. P. PRYDIUK (KW 40146); Chernivtsi region, Vyzhnytsia district, National nature park «Vyzhnytskyj», 48° 10' 31" N, 25° 17' 03" E, 06. September 2013 (KW 50740), 48° 07' 18" N, 25° 16' 05" E, 07. September 2009 (KW 50727), 48° 10' 23" N, 25° 16' 49" E, 08. September 2013, leg. M. P. PRYDIUK (KW 50728).

Conocybe macrospora is rather easily identifiable due to its 2-spored basidia and very large thick-walled spores. Other similar representatives of subsect. *Pubescens* have a number of differences. For example, *C. pubescens* has similar fruit bodies but differs by slightly smaller spores developing on 4-spored basidia. *Conocybe pulchella* (VELEN.) HAUSKN. & SVRČEK has smaller fruit bodies growing only on soil, as well as noticeably smaller spores and 4-spored basidia. *Conocybe merdaria* ARNOLDS & HAUSKN. has similar carpophores growing on dung and possesses 2-spored basidia, but differs by considerably smaller spores (HAUSKNECHT 2009).

Conocybe subpubescens P.D. ORTON, Trans. Brit. Mycol. Soc. 43: 195. 1960. (Fig. 3)

Galera tenera sensu RICKEN, Blätterpilze: 225. 1915. – *Conocybe pubescens* f. *typica* (GILLET.) KÜHNER sensu KÜHNER, Genre Galera: 86. 1935. – *Conocybe pubescens* sensu J. E. LANGE, Fl. agar. dan. 4: 34. 1939. – *Conocybe cryptocystis* (G. F. ATK.) SINGER sensu auct. eur. – *Conocybe tetraspora* SINGER, Beih. Nova Hedwigia 29: 209. 1969. – *Conocybe digitalina* (VELEN.) SINGER sensu auct. eur.

Pileus: 7–25 mm, at first hemispherical to campanulate-conical, later conical-convex, often with low umbo in centre, slightly pubescent, later glabrous, hygrophalous, striate almost to centre, dark clay-brown, light reddish brown, brown to yellowish brown, later light yellowish brown, on drying greyish orange or honey-yellow.

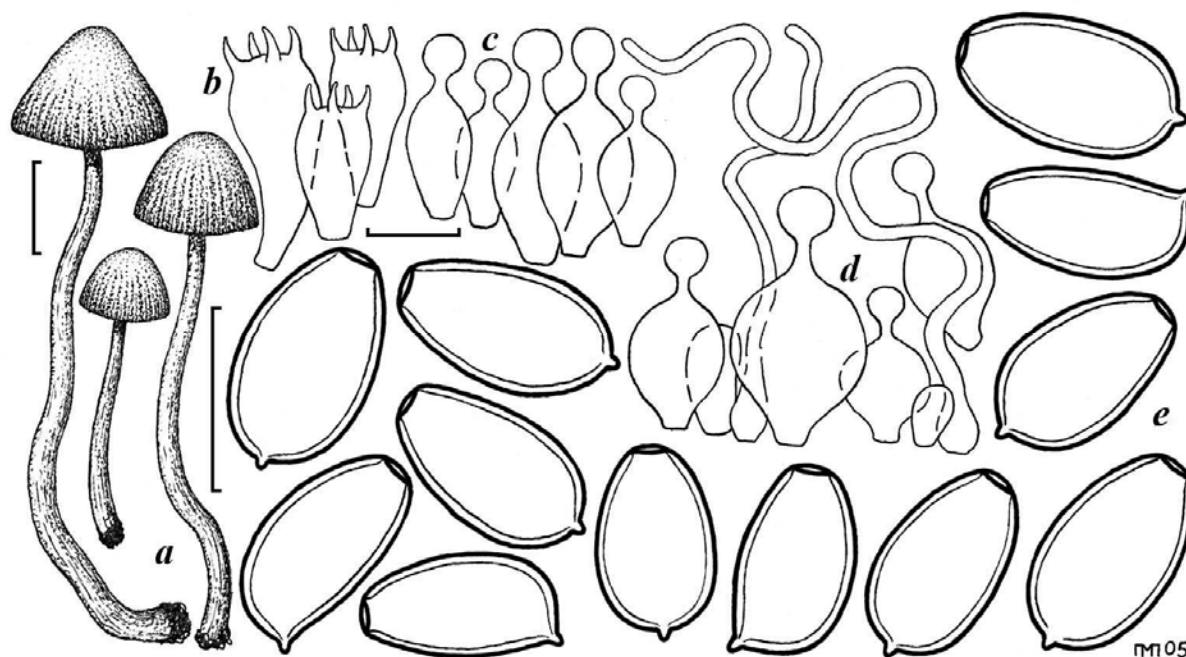


Fig. 3. *Conocybe subpubescens*: a basidiomata, b basidia, c cheilocystidia, d caulocystidia, e spores. Bar: 10 mm for basidiomata, 10 µm for microstructures.

L a m e l l a e : narrowly-adnate to nearly free, rather crowded ($L = 20-35$, $l = 3-7$), ventricose, up to 2 mm wide, at first pale ochraceous, later light orange-brown to light rust-brown, with paler finely flocculose edge.

S t i p e : $30-80 \times 1.5-3.0$ mm, cylindrical with clavate swollen to rather distinctly bulbous basis (up to 5 mm wide), hollow, longitudinally pruinose-striate, at first whitish, pale yellowish to yellowish ochraceous, later darkening from basis upwards up to orange-yellow, yellow-brown, honey-brown, at basis dark brownish.

C o n t e x t : in pileus up to 2 mm wide, whitish to pale orange, in stipe light yellowish brown, at basis up to dark brownish. Taste and smell indistinct.

S p o r e - p r i n t : rust-brown.

S p o r e s : $10.5-12.5(-13.0) \times 6.0-7.0$ µm, $Q = 1.50-1.94$; av. $L = 11.7 \pm 0.59$ µm, av. $B = 6.6 \pm 0.36$ µm, av. $Q = 1.77 \pm 0.11$; in face view ellipsoid and ovate-ellipsoid, in profile ellipsoid, slightly flattened ventrally, sometimes nearly amygdaloid, germ-pore central, up to 1.8 µm wide, fairly thick-walled, in water light brownish yellow, in alkali light reddish brown.

B a s i d i a : $14.0-22.0 \times 9.0-11.0$ µm, clavate, 4-spored, also some 2-spored present.

C h e i l o c y s t i d i a : $16.0-26.0 \times 6.0-9.0$ µm, lecythiform, neck up to 3.5×2.0 µm, head $3.5-5.0$ µm wide.

P l e u r o c y s t i d i a : absent.

P i l e o c y s t i d i a : hair-like, up to 75.0×2.5 µm, scattered.

C a u l o c y s t i d i a : a) lecythiform, $13.0-27.0 \times 7.0-13.0$ µm, neck up to 4.0×2.5 µm, head $3.5-7.0$ µm wide; b) ellipsoid, globose-clavate, clavate and utri-form, $8.0-23.0 \times 5.5-16.0$ µm; c) hair-like, up to 200.0×2.5 µm.

P i l e i p e l l i s : hymeniform, consisting of spheropedunculate and pyriform elements $10.0-24.0$ µm wide.

C l a m p c o n n e c t i o n s : present.

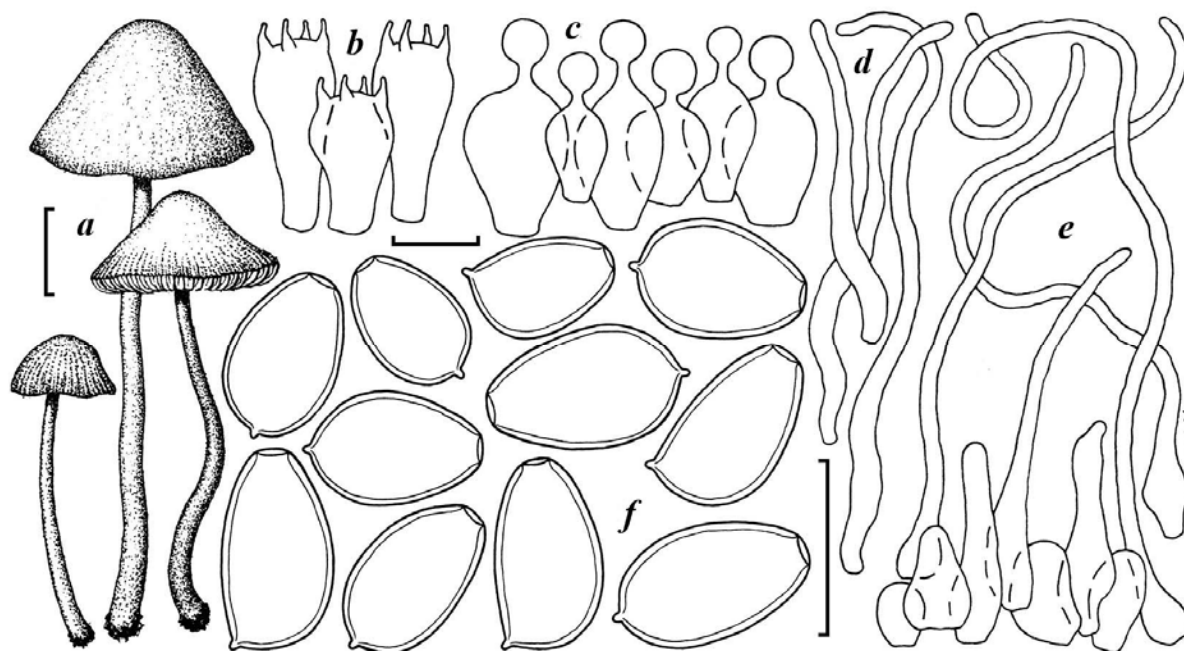


Fig. 4. *Conocybe ochrostriata*: a basidiomata, b basidia, c cheilocystidia, d pileocystidia, e caulocystidia, f spores. Bar: 10 mm for basidiomata, 10 µm for microstructures.

C h e m i c a l r e a c t i o n : ammoniacal reaction negative.

Habitat and distribution: Solitary or in small groups on soil, in frondose forests, sometimes in grasslands (meadows, pastures, roadsides), in autumn. Apparently rare in Ukraine, earlier known from one location (PRYDIUK 2007). Rather common in Europe, known also from North Africa, Asia, North and South America (HAUSKNECHT 2009).

Specimens examined: Ukraine: Lviv region, Skole district, National nature park «Skolivski Beskydy», 49° 02' 34" N, 23° 11' 56" E, 21. September 2010, leg. M. P. PRYDIUK (KW 40161).

Conocybe subpubescens is close to *C. pulchella*, but differs by somewhat more robust fruit bodies, more applanate pileus, more crowded lamellae and smaller spores. It must be mentioned, that the specimens of *C. subpubescens*, collected in Ukraine, have even slightly smaller spores, than some European authors indicated (ARNOLDS 2005, HAUSKNECHT 2003). It is noticed, that *C. subpubescens* prefers forest habitats, while *C. pulchella* as a rule grows in grasslands (ARNOLDS 2005; HAUSKNECHT 2003, 2009).

Section *Pilosellae* SINGER

Subsection *Pilosellae*

Series *Sienophylla* HAUSKN. & KRISAI

***Conocybe ochrostriata* HAUSKN., Österr. Z. Pilzk. 14: 246. 2005. (Fig. 4)**

Conocybe siliginea f. *ochracea*, 'récoltes macrospores' p.p., KÜHNER, Genre Galera: 104. 1935. – *Conocybe ochracea* (KÜHNER) SINGER, Mycologia 51: 395. 1959. – *Conocybe sienophylla* (BERK. & BROOME) SINGER sensu auct.; non sensu ARNOLDS, Ecol. Coenol. Macrofungi Grassl. Heathl. Drenthe, Netherlands 2: 308. ('1982') 1982 (= *C. velutipes*); non sensu Chrispijn, Champ. Jordaan: 67. 1999 (= *C. rostellata*).

Pileus: 10–40 mm, at first convex-campanulate, later campanulate-conical, conical-convex, conical-applanate to plano-convex, often slightly umbonate, somewhat pubescent, later smooth, hygrophane, striate nearly to centre, pale brown, light yellowish brown to light rust-brown, paler towards margin, on drying pale ochraceous to whitish with ochraceous-brown tinge.

Lamellae: narrowly-adnate to almost free, rather distant ($L = 18\text{--}25$, $l = 1\text{--}3$), ventricose, up to 4 mm wide, at first pale ochraceous, later yellowish-brown to rust-brown, with paler finely flocculose edge.

Stipe: $30\text{--}75 \times 1.5\text{--}3.0$ mm, cylindrical with clavate or slightly swollen (up to 4 mm) basis, hollow, longitudinally pubescent-striate, at first whitish with yellowish ochraceous tinge, later darkening from base upwards to pale brown, yellowish brown or light-brown, at basis up to reddish brown.

Context: in pileus up to 2 mm broad, whitish with yellowish brown hue, in stipe darker, light brown, up to reddish brown at basis. Taste and smell indistinct.

Spore-print: rust-brown.

Spores: $(7.0\text{--})8.5\text{--}11.5(12.0) \times (5.0\text{--})5.5\text{--}7.0$ μm , $Q = 1.42\text{--}1.96$; av. $L = 10.3 \pm 0.86$ μm , av. $B = 6.3 \pm 0.45$ μm , av. $Q = 1.64 \pm 0.13$; in face view narrowly-ovate, ovate-ellipsoid and ellipsoid, in profile ellipsoid, slightly flattened ventrally, often somewhat amygdaloid, germ-pore central, $1.5\text{--}1.8$ μm wide, slightly thick-walled, in water pale brown-yellow, in alkali honey-brown.

Basidia: $17.0\text{--}24.0 \times 8.0\text{--}11.5$ μm , clavate, 4-spored.

Cheilocystidia: $17.0\text{--}27.0 \times 7.0\text{--}12.0$ μm , lecythiform, neck up to 3.5×2.0 μm , head $4.0\text{--}5.5$ μm broad.

Pleurocystidia: absent.

Pileocystidia: hair-like, up to 100.0×1.5 μm , scattered.

Caulocystidia: a) ellipsoid, globose-clavate, clavate, utriform, lageniform, narrowly-lageniform and cylindrical, $6.0\text{--}30.0 \times 6.0\text{--}9.5$ μm ; b) hair-like, up to $100.0 \times 1.5\text{--}2.0$ μm .

Pileipellis: hymeniform, consisting of spheropedunculate and pyriform elements $18.0\text{--}45.0$ μm wide.

Clamp connections: present.

Chemical reaction: ammoniacal reaction negative.

Habitat and distribution: Solitary or in small groups on soil, in frondose forests including flood-land ones, from May to October. In Ukraine apparently rare. In Europe rather frequent, known also from Africa, Asia and South America (HAUSKNECHT 2009).

Specimens examined: Ukraine: Ternopil region, Gusiatoryn district, nature reserve «Medobory», $49^\circ 21' 33''$ N, $26^\circ 07' 17''$ E, 16. May 2007, leg. M. P. PRYDIUK (KW 35055); Odessa region, Kiliya district, biosphere reserve «Dunayski Plavni», the Yermakov island, $45^\circ 24' 15''$ N, $29^\circ 33' 53''$ E, 27. October 2009 p., leg. M. P. PRYDIUK (KW 40148, 40149).

This species is most similar to *C. rostellata* and *C. velutipes*, however, both species have more subtle basidiomata (pilei up to 25 mm in diam.). Besides, features of their spores are different: spores of *C. rostellata* are smaller and *C. velutipes* has larger and distinctly lentiform ones (HAUSKNECHT 2009). It must be marked, that the specimens collected in Ukraine have smaller spores than HAUSKNECHT (2009) indicated for that species. On the other hand their spores are larger than those of *C. rostellata*, and

fruit bodies more robust (diameter of pileus up to 40 mm). Thus, these specimens were identified as *C. ochrostriata*.

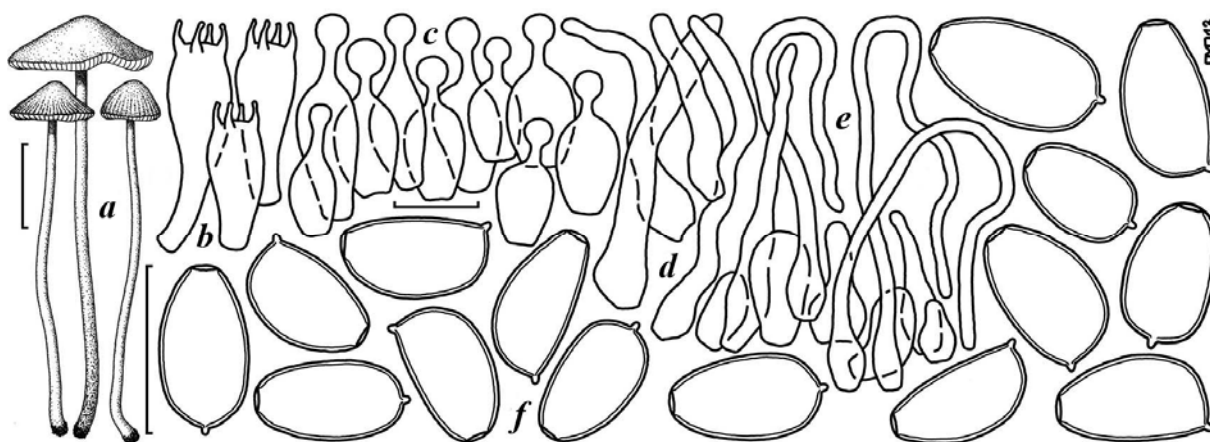


Fig. 5. *Conocybe rostellata*: a basidiomata, b basidia, c cheilocystidia, d pileocystidia, e caulocystidia, f spores. Bar: 10 mm for basidiomata, 10 μm for microstructures.

***Conocybe rostellata* (VELEN.) HAUSKN. et SVRČEK in HAUSKN.**, Czech Mycol. 51: 61. 1999. (Fig. 5)

Galera rostellata VELEN., Novit. mycol.: 129. ('1939') 1940. – *Conocybe siliginea* var. *ochracea* 'récoltes microspores' KÜHNER, Genre *Galera*: 101. 1935. – *Conocybe siliginea* sensu CHRISPIJN, Champ. Joraaan: 67. 1999.

Pileus: 5–20 mm, at first conical-campanulate to almost hemispheric, later conical-convex, conical-applanate to plano-convex, sometimes slightly umbonate, smooth, hygrophanous, striate up to $\frac{1}{2}$ radius and more, ochraceous-brown, yellowish brown to light brown, paler at margin, on drying light ochraceous to greyish ochraceous.

Lamellae: narrowly-adnate to almost free, rather distant ($L = 17\text{--}20$, $l = 1\text{--}3$), ventricose, up to 2 mm wide, at first pale ochraceous, later ochraceous-brown to rust-brown, with concolorous finely flocculose edge.

Stipe: $30\text{--}55 \times 1\text{--}2$ mm, cylindrical with clavate, often slightly swollen (up to 3 mm) basis, hollow, longitudinally pubescent-striate, at first whitish or pale ochraceous, later darkening from basis upwards to pale brown or light brown, at basis up to reddish brown.

Context: in pileus up to 1.5 mm broad, whitish with ochraceous-brown tinge, in stipe darker, up to light reddish-brown at basis. Taste and smell indistinct.

Spore-print: rust-brown.

Spores: $7.0\text{--}9.0 \times 4.5\text{--}5.5$ μm , $Q = 1.44\text{--}1.70$; av. $L = 8.2 \pm 0.59$ μm , av. $B = 5.2 \pm 0.32$ μm , av. $Q = 1.57 \pm 0.06$; in face view ellipsoid-ovate, narrowly-ellipsoid and ellipsoid, in profile ellipsoid, slightly flattened ventrally, sometimes nearly amygdaloid, germ-pore central, up to $1.0\text{--}1.5$ μm wide, rather thin-walled, in water pale brownish-yellow, in alkali yellow-brown.

Basidia: $15.0\text{--}24.0 \times 6.0\text{--}8.0$ μm , clavate, 4-spored.

Cheilocystidia: $17.0\text{--}21.0 \times 6.5\text{--}7.5$ μm , lecythiform, neck up to 3.5×2.0 μm , head $3.5\text{--}4.5$ μm wide.

Pleurocystidia: absent.

Pileocystidia: hair-like, up to $36.0 \times 2.5\text{--}4.0 \mu\text{m}$, rather numerous.

Caulocystidia: a) ellipsoid, globose-clavate, clavate, utriform and lageniform, $7.0\text{--}36.0 \times 5.0\text{--}7.0 \mu\text{m}$; b) hair-like, up to $50.0 \times 1.5\text{--}2.0 \mu\text{m}$.

Pileipellis: hymeniform, consisting of spheropedunculate and pyriform elements $10.0\text{--}35.0 \mu\text{m}$ wide.

Clamp connections: present.

Chemical reaction: ammoniacal reaction negative.

Habitat and distribution: Solitary or in small groups on soil, mainly in grasslands (meadows, pastures), from spring to autumn. In Ukraine apparently rare. In Central Europe rather common, known also from Africa, Asia, North and South America (HAUSKNECHT & KRISAI-GREILHUBER 2006, HAUSKNECHT 2009).

Specimens examined: Ukraine: Ternopil region, Gusiatoryn district, nature reserve «Medobory», environs of the village Sadzhivka, $49^\circ 17' 19'' \text{N}$, $26^\circ 09' 53'' \text{E}$, 27. May 2010, leg. M. P. PRYDIUK (KW 40153); Odessa region, Kiliya district, biosphere reserve «Dunajski plavni», about 1 km eastwards from the village Lisky, $45^\circ 27' 50'' \text{N}$, $29^\circ 27' 21'' \text{E}$, 25. October 2009, leg. M. P. PRYDIUK (KW 40152); Chernivtsi region, Vyzhnytsia district, national nature park «Vyzhnytskyj», $48^\circ 07' 08'' \text{N}$, $25^\circ 16' 13'' \text{E}$, 07. September 2013, leg. M. P. PRYDIUK (KW 50731, 50732).

Conocybe rostellata is rather close to *C. ochrostriata* and *C. velutipes* but differing from the both species by smaller and more thin-walled spores (moreover, spores of *C. velutipes* are rather distinctly lentiform). Besides, *C. ochrostriata* has larger and more robust fruit bodies (HAUSKNECHT 2009). Spores of the collected in Ukraine specimens are smaller than it is indicated for *C. rostellata*, being closer to *C. pallidospora* KÜHNER & WATLING and *C. pilosella* (PERS.: FR.) KÜHNER by this feature (HAUSKNECHT 2009). However, the spores of two latter species are distinctly paler, more thin-walled and without germ-pore (or with a very weakly developed one). The spores of the specimens described above have a rather distinct germ-pore and thicker walls. So, we prefer to identify them as *C. rostellata*.

Series *Anthracophila* HAUSKN. & KRISAI

***Conocybe velutipes* (VELEN.) HAUSKN. & SVRČEK**, Czech Mycol. 51: 66. 1999. (Fig. 6)

Galera velutipes VELEN., Novit. mycol.: 128. ('1939') 1940. – *Conocybe siliginea* var. *ochracea* 'récoltes macrospores' KÜHNER, Genre *Galera*: 104. 1935. – *Conocybe kuhneriana* SINGER, Beih. Nova Hedw. 29: 212. 1969.

Pileus: 5–20 mm, at first campanulate to campanulate-convex, later conical-convex, at first slightly pubescent, soon glabrous, hygrophanous, striate to $\frac{1}{2}$ radius and more, ochraceous-brown, light reddish brown to light yellowish brown, at margin paler, orange-brown to light ochraceous-brown, on drying pale brownish ochraceous to ochraceous-yellow.

Lamellae: narrowly-adnate to almost free, moderately distant ($L = 16\text{--}25$, $l = 1\text{--}3$), ventricose, up to 2 mm wide, at first ochraceous, later light clay-brown to rust-brown, with concolorous finely flocculose edge.

Stipe: $25\text{--}90 \times 0.5\text{--}1.5$ mm, cylindrical with clavate or slightly swollen (up to 3 mm) basis, hollow, slightly longitudinally pubescent-striate, at first whitish or pale

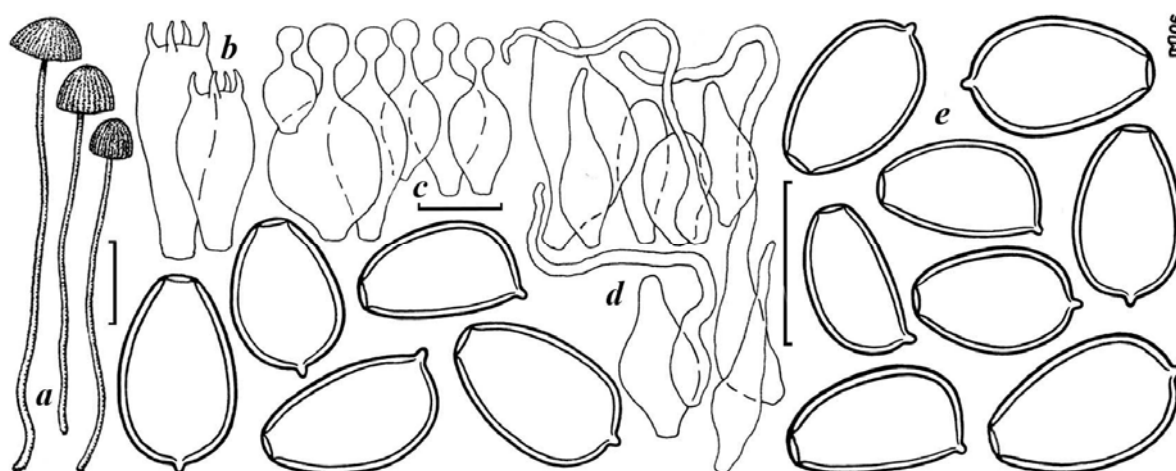


Fig. 6. *Conocybe velutipes*: a basidiomata, b basidia, c cheilocystidia, d caulocystidia, e spores. Bar: 10 mm for basidiomata, 10 µm for microstructures.

brown, later darkening from base upwards up to light brown or light reddish brown or reddish brown.

C o n t e x t : in pileus up to 1.5 mm broad, whitish with ochraceous-brown hue, in stipe darker, up to light reddish brown at basis. Taste and smell indistinct.

S p o r e - p r i n t : light rust-brown.

S p o r e s : 9.0–13.5 × (6.0–)6.5–8.0 × 6.0–7.0 µm, Q = 1.33–2.0; av. L = 11.0±1.18 µm, av. B = 6.9±0.34 µm, av. Q = 1.58±0.15; lentiform, in face view ovate-ellipsoid, narrowly-ovate and broadly-ellipsoid, in profile ellipsoid, slightly flattened ventrally to slightly amygdaloid, germ-pore central, up to 1.5–2.0 µm wide, thick-walled, in water pale honey-brown, in alkali rust-brown.

B a s i d i a : 17.0–29.0 × 8.5–13.0 µm, clavate, 4-spored.

C h e i l o c y s t i d i a : 12.0–24.0 × 7.0–14.5 µm, lecythiform, neck up to 4.0 × 2.5 µm, head 3.0–4.5(–5.3) µm wide.

P l e u r o c y s t i d i a : absent.

P i l e o c y s t i d i a : hair-like, up to 50.0 × 2.5–4.0 µm, fairly numerous.

C a u l o c y s t i d i a : a) ellipsoid, globose-clavate, clavate, utriform and lageniform, 7.0–24.0 × 5.5–12.0 µm; b) hair-like, up to 100.0 × 1.5–2.5 µm.

P i l e i p e l l i s : hymeniform, consisting of spheropedunculate and pyriform elements 14.0–30.0 µm wide.

C l a m p c o n n e c t i o n s : present.

C h e m i c a l r e a c t i o n : ammoniacal reaction negative.

Habitat and distribution: Solitary or in small groups on soil, sometimes on burnt places, as a rule in grasslands (meadows, pastures), sometimes in forest edges and clearings, as well as in frondose and mixed forests, in summer and autumn. In Ukraine rather rare, previously known from three locations (PRYDIUK 2007). In Europe wide-spread, known also from Africa, Asia, and South America (HAUSKNECHT 2009).

Specimens examined: Ukraine: Ternopil region, Gusiатыn district, nature reserve «Medobory», грабовий ліс, 49° 18' 47" N, 26° 10' 17" E, 28. September 2007 p., leg. M. P. PRYDIUK (KW 35057).

The rather large thick-walled lentiform spores of *Conocybe velutipes* are one of its most characteristic features. Other taxa of the section *Pilosellae* possessing similar

spores can be distinguished thanks to some of their peculiarities. Thus, *C. velutipes* var. *nitrophila* HAUSKN. (still unknown in Ukraine) grows on dung and manured soil and has slightly larger spores than ones of *C. velutipes* var. *velutipes*. Also developing on dung *C. brunneidisca* (MURRILL) HAUSKN. has duller coloured fruit bodies and spores of different form: in face view slightly angular, subhexagonal or submitriform. Still one dung-inhabiting species with lentiform spores is *C. fimetaria*, possessing root-like stipe base (HAUSKNECHT 2009). It must be mentioned, however, that some specimens of *C. velutipes* collected in Ukraine have rather slightly lentiform spores and that feature is detectable only at careful investigation.

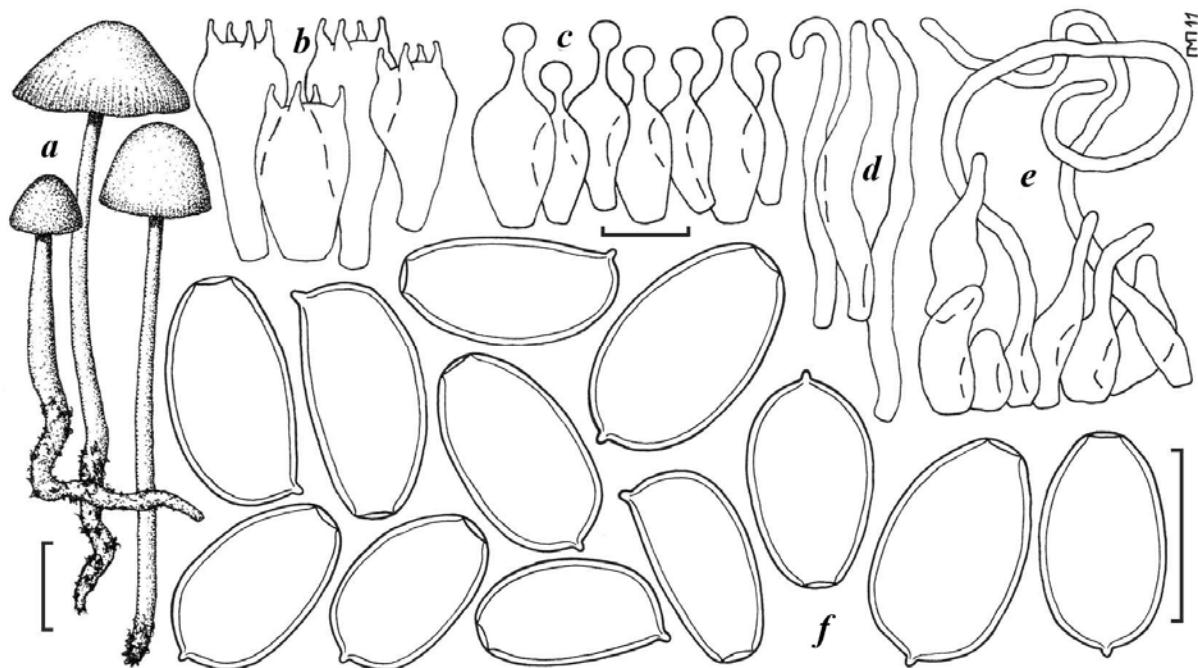


Fig. 7. *Conocybe fimetaria*: a basidiomata, b basidia, c cheilocystidia, d pileocystidia, e caulocystidia, f spores. Bar: 10 mm for basidiomata, 10 μ m for microstructures.

Subsection *Siligineae* HAUSKN. & KRISAI
Series *Fimetaria* HAUSKN. & KRISAI

***Conocybe fimetaria* WATLING**, Bol. Soc. micol. Madrid 11: 92. 1986. (Fig. 7)

Conocybe siliginea var. *neoantipus* sensu KÜHNER, Genre *Galera*: 98. 1935. – *Conocybe neoantipus* sensu M.M. MOSER, Röhrlinge Blätterpilze 2/b 2: 281. 1978; sensu auct. eur.

Pileus: 4–20 mm, at first campanulate, later campanulate-conical, campanulate-convex, conical-convex, often slightly umbonate, smooth or slightly pubescent, hygrophanous, striate to 1/3 radius and more, orange brownish, light ochraceous-brown, light yellowish brown, honey-brown, darker at centre, up to rust-brown, on drying pale yellow or pale yellowish ochraceous.

Lamellae: narrowly-adnate or almost free, rather distant (L = 20–27, l = 1–3(–7)), ventricose, up to 3 mm wide, at first pale brown, later light brown to rust-brown, with pale finely flocculose edge.

Stipe: 30–75 × 1.0–2.5 mm, cylindrical or slightly attenuated upwards, with root-like basis (up to 10–35 mm long), hollow, slightly longitudinally pubescent-striate, at first white with brownish tinge, later darkening from basis upwards up to cream, ochraceous or pale brown.

Context: in pileus up to 1.5 mm wide, whitish with ochraceous-brown tinge, in stipe slightly darker, up to brownish at base. Taste and smell indistinct.

Spore-print: rust-brown.

Spores: 10.5–13.5(–14.0) × (6.0–)6.5–8.0 × 6.0–7.0 μm, Q = 1.50–1.87; av. L = 12.3±0.91 μm, av. B = 7.2±0.47 μm, av. Q = 1.72±0.1; slightly lentiform, in face view ovate-ellipsoid, narrowly-ovate and ellipsoid, sometimes slightly angular, in profile ellipsoid, slightly flattened ventrally, germ-pore central, up to 1.7–2.0 μm wide, thick-walled, in water light honey-brown, in alkali rust- or reddish brown.

Basidia: 19.0–26.0 × 9.5–11.5 μm, clavate, 4-spored.

Cheilocystidia: 17.0–29.0 × 5.0–7.5 μm, lecythiform, neck up to 3.5 × 1.5 μm, head 2.5–3.5 μm wide.

Pleurocystidia: absent.

Pileocystidia: hair-like, up to 45.0 × 2.5–5.5 μm, rather numerous.

Caulocystidia: a) globose-clavate, utriform and lageniform, 5.0–22.0 × 3.5–7.0 μm; b) hair-like, up to 100.0 × 1.5–2.5 μm.

Pileipellis: hymeniform, consisting of spheropedunculate and pyriform elements 13.0–30.0 μm wide.

Clamp connections: present.

Chemical reaction: ammoniacal reaction negative.

Habitat and distribution: Solitary or in small groups on dung (cow, horse), sometimes on manured soil, as a rule in grasslands (meadows and pastures), in summer. In Ukraine apparently rare. In Europe rare, known also from Africa and North America (HAUSKNECHT 2009).

Specimens examined: Ukraine: Rivne region, Dubrovytsia district, about 1.5 km south-eastwards from the village Mochulyshche, 51° 34' 49" N, 26° 29' 60" E, 03. August 2006, leg. M. P. PRYDIUK (KW 35047).

Conocybe fimetaria can rather easily be identified thanks to its growth on dung, presence of root-like stipe basis, stipitipellis consisting only of non-lecythiform elements and rather large slightly lentiform thick-walled spores (HAUSKNECHT 1996). The very similar species is *C. watlingii* HAUSKN. also growing on dung and possessing rooting stipe basis, it differs by darker coloured fruit bodies, larger not lentiform spores and presence of some lecythiform caulocystidia at stipe apex (ARNOLDS 2005, HAUSKNECHT 2009).

Series *Murinacea* HAUSKN. & KRISAI

Conocybe farinacea WATLING, Notes Royal Bot. Garden Edinb. 25: 309. 1964. (Fig. 8)

Pileus: 10–30 mm, at first campanulate or conical-campanulate, later hemispheric, slightly pubescent, soon smooth or slightly radial-rugulose, hygrophorous, striate to 1/3 radius, rust-brown or ochraceous-brown, towards margin paler, orange-brown, on drying pale orange-brown or pale greyish orange.

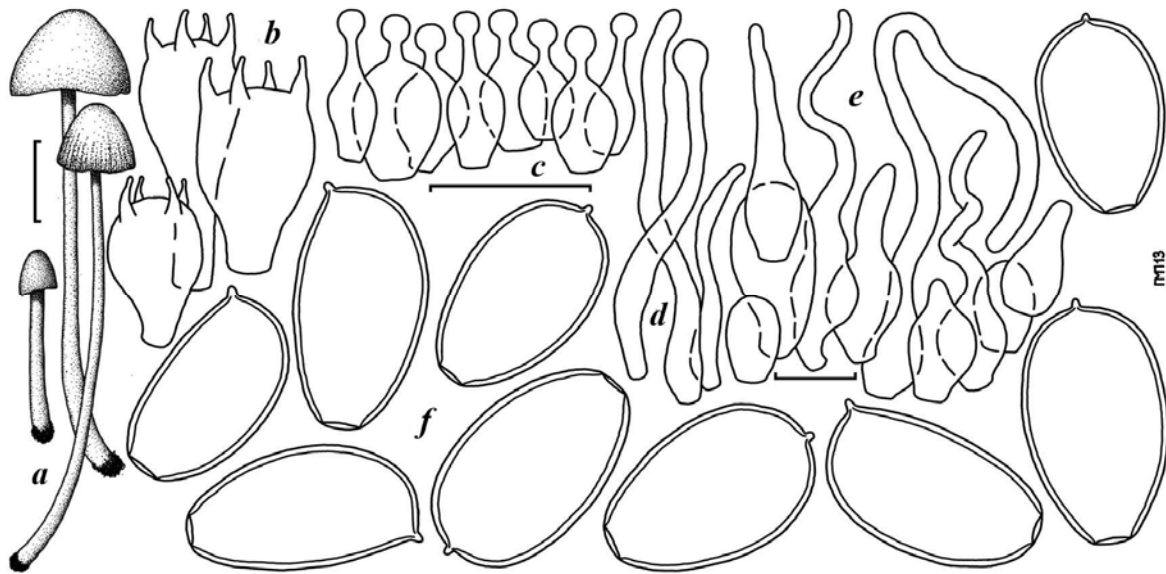


Fig. 8. *Conocybe farinacea*: a basidiomata, b basidia, c cheilocystidia, d pileocystidia, e caulocystidia, f spores. Bar: 10 mm for basidiomata, 10 µm for microstructures.

L a m e l l a e : narrowly-adnate to almost free, rather crowded ($L = 25\text{--}32$, $l = 1\text{--}3$), ventricose, up to 3 mm broad, at first yellow-brown, later orange-brown, with paler finely flocculose edge.

S t i p e : $35\text{--}65 \times 1.5\text{--}3.0$ mm, cylindrical with clavate or slightly bulbous (up to 4 mm broad) basis, hollow, slightly longitudinally pubescent-striate, soon practically smooth, pale orange, soon darkening from basis upwards up to orange-brown, at basis brown.

C o n t e x t : in pileus up to 1.5 mm wide, pale orange, in stipe slightly darker, pale brownish, at basis brown. Smell of intact fruit bodies indistinct but distinctly farinaceous when they are bruised, taste farinaceous.

S p o r e - p r i n t : rust-brown.

S p o r e s : $12.0\text{--}15.5 \times 8.0\text{--}9.5$ µm, $Q = 1.41\text{--}1.73$; av. $L = 14.0 \pm 0.97$ µm, av. $B = 8.7 \pm 0.43$ µm, av. $Q = 1.61 \pm 0.09$; in face view narrowly-ovate, ovate-ellipsoid and ellipsoid, in profile ellipsoid, slightly flattened ventrally, germ-pore central, up to 2.5 µm wide, thick-walled, in water light honey-brown, in alkali orange- or rust-brown.

B a s i d i a : $17.0\text{--}31.0 \times 12.0\text{--}15.5$ µm, clavate, 4-spored.

C h e i l o c y s t i d i a : $15.0\text{--}19.0 \times 6.5\text{--}9.5$ µm, lecythiform, neck up to 4.0×1.5 µm, head 3.0–4.0 µm wide.

P l e u r o c y s t i d i a : absent.

P i l e o c y s t i d i a : hair-like, up to $35.0 \times 2.5\text{--}3.5$ µm, moderately numerous.

C a u l o c y s t i d i a : a) globose-clavate, utriform and broadly-lageniform, $10.0\text{--}24.0 \times 5.5\text{--}9.5$ µm; b) hair-like, up to $100.0 \times 1.5\text{--}2.5$ µm.

P i l e i p e l l i s : hymeniform, consisting of spheropedunculate and pyriform elements 12.0–20.0 µm wide.

C l a m p c o n n e c t i o n s : present.

C h e m i c a l r e a c t i o n : ammoniacal reaction negative.

Habitat and distribution: Solitary or in small groups on horse dung, in forests, in summer. In Ukraine apparently rare, the first find in East Europe. In Europe rare (HAUSKNECHT 2009).

Specimens examined: Ukraine: Rivne region, Volodymyrets region, nature reserve «Rivneskyi», department «Bile Ozero», 51° 28' 29" N, 25° 46' 51" E, 21. June 2011, leg. M. P. PRYDIUK (KW 40141).

The most characteristic feature of *C. farinacea* is its distinctly farinaceous smell being unique within the genus. This smell, however, is noticeable only at bruised fruit bodies. By many microscopical features *C. farinacea* is similar to *C. singeriana* HAUSKN., which is also dung-inhabiting but has more robust carpophores with distinctly bulbous stipe basis (5–12 mm broad) and larger spores. Other species being close in some aspects to *C. farinacea* is *C. pubescens* (GILLET) KÜHNER: it grows on dung but possesses larger spores and stipitipellis with considerable admixture of lecythiform cystidia (being the representative of sect. *Mixtae*) (ARNOLDS 2005).

It must be mentioned that WATLING (1964) indicated presence of some lecythiform caulocystidia at *C. farinacea* attributing it to the section *Mixtae*. But later investigations of the type material of this species did not reveal presence of any lecythiform elements in its stipitipellis (ARNOLDS & HAUSKNECHT 2003). Later HAUSKNECHT (2009) found scattered lecythiform caulocystidia at stipe apex of some specimens of this species but they were so scarce that no essential reasons of including of *C. farinacea* in the section *Pilosellae* were found (ARNOLDS 2005, HAUSKNECHT 2009). Investigation of the specimens of this species collected in Ukraine revealed no lecythiform caulocystidia.

Series *Lenticulospora* HAUSKN. & KRISAI

***Conocybe hexagonospora* HAUSKN. & ENDERLE in HAUSKN., Österr. Z. Pilzk. 2: 40. 1993. (Fig. 9)**

Conocybe hexagonospora MÉTROD, Bull. trimest. Soc. mycol. Fr. 56: 48. 1940.

Pileus: 4–20 mm, at first campanulate, later conical-campanulate, campanulate-convex, conical-convex to convex, slightly umbonate, smooth or slightly pubescent, hygrophanous, striate up to 1/3 radius and more, orange brownish, light ochraceous-brown, light yellowish brown or honey-brown, in centre darker, up to rust-brown, on drying pale yellow or pale yellowish ochraceous.

Lamellae: narrowly-adnate to almost free, moderately crowded to rather distant ($L = 20\text{--}27$, $l = 1\text{--}3(-7)$), ventricose, up to 3 mm wide, at first pale brown, later light brown to rust-brown, with pale finely flocculose edge.

Stipe: 30–75 × 1–2 mm, cylindrical with clavate basis, hollow, slightly longitudinally pubescent-striate, at first white with brownish hue, later darkening from basis upwards up to cream, ochraceous or pale brown.

Context: in pileus, up to 1.5 mm wide, whitish with ochraceous-brown tinge, in stipe darker, pale brownish, light brownish in basis. Smell and taste indistinct.

Spore-print: rust-brown.

Spores: 8.5–11.0(–12.0) × 5.5–7.5 × 5.0–6.5 μm, $Q = 1.38\text{--}1.57$; av. $L = 9.7 \pm 1.04$ μm, av. $B = 6.6 \pm 0.55$ μm, av. $Q = 1.48 \pm 0.06$; lentiform, in face view

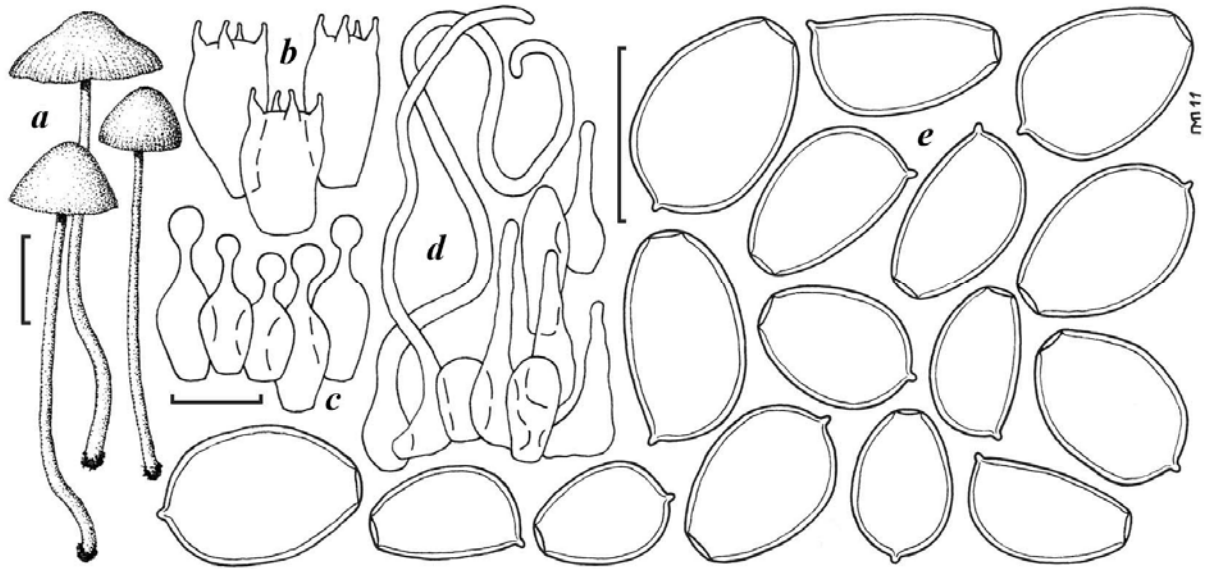


Fig. 9. *Conocybe hexagonospora*: a basidiomata, b basidia, c cheilocystidia, d caulocystidia, e spores. Bar: 10 mm for basidiomata, 10 μ m for microstructures.

ovate, broadly-ellipsoid, submitriform to slightly angulate, in profile ellipsoid, flattened ventrally to nearly amygdaloid, germ-pore central, up to 1.0–1.5 μ m wide, rather thick-walled, in water light honey-brown, in alkali rust- or reddish brown.

Basidia: 14.5–19.0 \times 7.0–9.5 μ m, clavate, 4-spored.

Cheilocystidia: 14.5–20.0 \times 6.0–7.5 μ m, lecythiform, neck up to 3.0 \times 1.5 μ m, head 3.0–4.0 μ m wide.

Pleurocystidia: absent.

Pileocystidia: not observed.

Caulocystidia: a) globose-clavate, clavate and lageniform, 9.5–22.0 \times 5.5–7.0 μ m; b) hair-like, up to 85.0 \times 1.5–2.0 μ m.

Pileipellis: hymeniform, consisting of spheropedunculate and pyriform elements 12.0–29.0 μ m wide.

Clamp connections: present.

Chemical reaction: ammoniacal reaction negative.

Habitat and distribution: Solitary or in small groups on soil among moss in frondose and mixed forests, in autumn. In Ukraine apparently rare. In Europe widespread in mountainous regions, known also from Asia (HAUSKNECHT 2009).

Specimens examined: Ukraine: Ternopil region, Gusiатыn district, nature reserve «Medobory», 49° 16' 34" N, 26° 10' 30" E, 25. September 2007, leg. M. P. PRYDIUK (KW 35048); Chernivtsi region, Vyzhnytsia district, National nature park «Vyzhnytskyj», 48° 10' 19" N, 25° 17' 05" E, 08. September 2013, leg. M. P. PRYDIUK (KW 50724).

According to indications of HAUSKNECHT (1993) the characteristic feature of *C. hexagonospora* is presence of distinctly lentiform and slightly hexagonal in face view spores. Spores of similar shape are also known at *C. lenticulospora* WATLING, which, however, grows on dung or manured soil and has much larger spores. Other species with subhexagonal spores is *C. brunneidisca* (MURRILL) HAUSKN. growing on dung and manured soil and possessing larger spores (9.0–13.0 \times 6.5–9.0 μ m) (ENDERLE 1999, HAUSKNECHT 2009). Also *C. rostellata* is similar in some aspects to *C. hexagonospora*, differing by not lentiform and not angulate spores of smaller size. It must

be mentioned that spores of the collected in Ukraine specimens of *C. hexagonospora* are somewhat larger than indicated for this species (ENDERLE 1999; HAUSKNECHT 1993, 2009). Moreover, one of the collections (KW 35048) has many practically not angulate spores. They are rather similar in size to spores of *C. ochrostriata* which, nevertheless, are not lentiform. That fact allows, according to A. HAUSKNECHT'S personal commentary, to identify that specimen as *C. hexagonospora*.

Up to now 29 species of the genus *Conocybe* (including those mentioned in this paper) are known in Ukraine. Taking into account, that in Europe about 100 species of the genus are known, one can expect some more interesting finds on the territory of Ukraine in future.

I am very thankful to ANTON HAUSKNECHT (Maissau, Austria) for help in identification of many specimens as well as many useful personal advices and commentaries.

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