



***Inocybe* (Agaricales, Basidiomycota) in Kharkiv forest-steppe, Eastern Ukraine**

Prylutskiy OV

Department of Mycology and Plant Resistance, School of Biology, V.N. Karazin Kharkiv National University, Kharkiv-61022, Ukraine

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Abstract

In this paper, the list of *Inocybe* of Kharkiv forest-steppe (Eastern Ukraine) is provided. A brief history of *Inocybe* investigations in North-Eastern Ukraine is described. Sixteen species and infraspecies taxa of *Inocybe* are reported in this territory based on own data and literature references. *Inocybe lacera* var. *helobia* Kuyper and *Inocybe langei* R. Heim are reported in the territory of Ukraine for the first time. Original descriptions, drawing of key microstructures, and data on the material examined of these species are given.

Key words – agarics – Basidiomycota – diversity – gilled fungi – micromorphology – mycobiota

Introduction

Inocybe (Fr.) Fr. (1863) is a genus of gilled fungi characterized by tobacco-brown spore-print, smooth, tobacco-, gray- or pale-brown, angular-nodulose, amygdaloid, ovoid or phaseoliform spores and presence of muscarine in fruit bodies of some species (Kobayashi 2002). The name “*Inocybe*” mean “fibrous head” on the score of the most species have a fibrillose, strigose or hairy cap surface. According to the latest edition of the “Ainsworth & Bisby’s Dictionary of the Fungi” *Inocybe* is a type genus for genera Inocybaceae Jillich and accounts more than 500 species on a global scale (Kirk et al. 2008). Most species of the genus occur in different forests, more rarely in grasslands, wetlands or farmlands. Most of them are ectomycorrhizal, but for a lot of species saprobic strategy is known (Kuyper 1986, Matheny 2009).

Kharkiv forest-steppe is a natural region situated in the North-East of Ukraine where the Ukrainian Plane contact with the Central-Russian Upland (Fig. 1). It characterizes by a temperate climate, with an average annual rainfall varies from 350 to 500 mm. Landscapes of Kharkiv forest-steppe are represented by mosaic of small and medium forests patches and deforested areas, – primary farmlands and much fewer natural grasslands (Barbarych 1977, Didukh et al. 2011, Onyschenko & Andriyenko 2012). Dominated forest tree species are pedunculate oak (*Quercus robur* L.), Scots pine (*Pinus sylvestris* L.), common ash (*Fraxinus excelsior* L.), maples (*Acer platanoides* L., *A. campestre* L., *A. tataricum* L. and *A. negundo* L.), birches (*Betula pendula* Roth and *B. pubescens* Ehrh.), lime (*Tilia cordata* Mill.), poplars (*Populus tremula* L. and *P. alba* L.) and black alder (*Alnus glutinosa* (L.) Gaertn.) (Ostapko et al. 2010). Basidial fungi of Kharkiv forest-steppe is still unevenly investigated. There are a comprehensive works deals with aphyllorphoid (Akulov et al. 2003) and boletoid (Akulov & Prydiuk 2007) fungi of North-Eastern Ukraine, whereas diversity and ecological traits of agarics in this region remain poorly revealed.

Investigations of fungi from the genus *Inocybe* in Ukraine started in the first half of the twentieth century. The first records belong to Z. Gizhytska (1929). Later M. Zerova, G. Rozhenko and R. Ganzha (in 1950th - 60th), as well S. Wasser (in 1960th -1970th) investigated *Inocybe* in Ukraine more detailed. As a result of this investigations, 43 species of *Inocybe* have been identified for the territory of Ukraine. These data have been summarized in the "Key to Ukrainian Fungi", where *Inocybe* species was split into the genus *Inocybe*, *Astrosporina* and *Inocybella* according to the system of agarics at that time (Zerova et al. 1979). In the 1990s, knowledges about *Inocybe* of Ukraine was updated by I. Besedina and E. Nezdoiminogo (Nezdoymynogo 1996, Besedina 1998). An important contribution to knowledge about *Inocybe* diversity in Left-Bank Ukraine at last twenty years was made by M. Prydiuk (Dudka et al. 2004, Dudka et al. 2009) and K. Karpenko (2009). Data on herbarium specimens of 36 species known in Ukraine cited in open access database "Fungi of Ukraine" (www.cybertruffle.org.uk/ukrafung/eng). In total about 82 names of *Inocybe* are known in Ukraine nowadays. On the other hand, a considerable part of these names are disputable or synonyms no longer in use. Whereas some vouch specimens damaged or lost a critical revision is not always possible. Thereby prolongation of investigations of *Inocybe* diversity in Ukraine is still currently important.

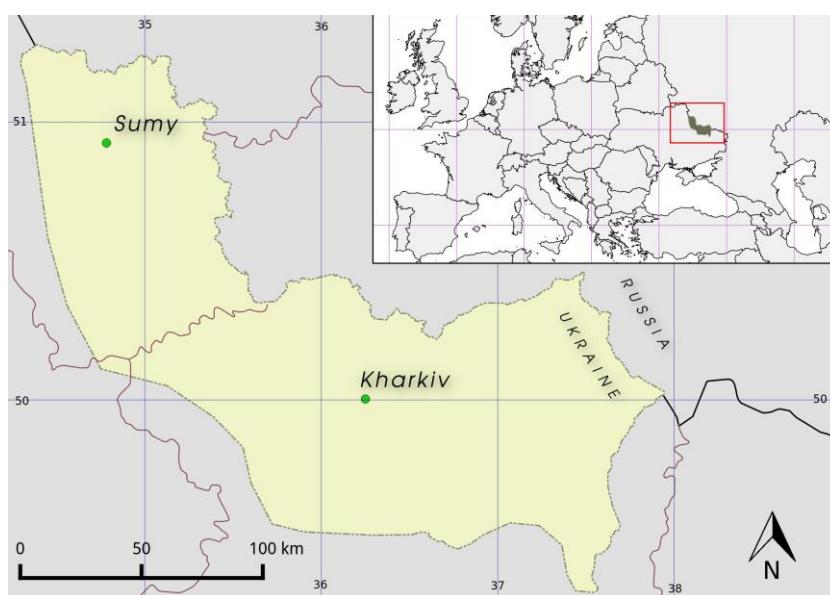


Fig. 1 – Area of the investigation.

Simultaneously, all studies of *Inocybe* in Ukraine were carried out mainly in the central, northern and southern parts of the country, whereas *Inocybe* of Eastern Ukraine is still almost unclear. Karpenko (2009) reports about 8 species of *Inocybe* to the north-western part of the Kharkiv forest-steppe. M. Prydiuk mentions one species (*Inocybe adaequata*) for National Nature Park "Gomilshansky lisy", which situated on the south part of investigated area. Therefore diversity of *Inocybe* of Kharkiv forest-steppe still remains patchy known.

The aim of this study is to present a first integrated annotated list of *Inocybe* that have been found on the territory of the Kharkiv forest-steppe.

Materials & Methods

Most materials examined here had been collected during an investigation of macrofungi in Kharkiv forest-steppe provided by the author for the last eight years. Additionally we had revised *Inocybe* collections of the mycological herbarium of the V. N. Karazin Kharkiv National University, Department of Mycology and Plant Resistance (CWU, Kharkiv, Ukraine). Besides the above, we had reviewed published data about *Inocybe* collected on the territory of the target region and partially stored in the herbarium of M.H. Kholodny Institute of Botany (KW, Kyiv, Ukraine).

The specimens were collected, documented and preserved using standard methods. All descriptions are based on the studied material entirely. Macroscopic descriptions are based on a study of the material in fresh and dried conditions as well as an analysis of the photos. Color notes from fresh material or photos were taken from Munsell book of color (Munsell Color 1976). The dried material was examined using standard microscopic techniques. Microscopic structures were observed in water (for examination of alkali-soluble encrustation of cystidia) and 5% KOH (for other microscopic structures). Microscopic measurements and drawings were made with MBI-3 light microscopes. Microscopic dimensions are based on observation of at least 10 structures. All the examined specimens are deposited in the Herbarium of V.N.Karazin Kharkiv National University, Department of Mycology and Plant Resistance (CWU). All *Inocybe* specimens from herbarium CWU are deposited in the PlutoF web workbench as well (<https://plutof.ut.ee/>).

During the research main attention was paid protected areas, primarily two National Nature Parks: “Gomilshansky lisy” (lat. 49.595030, lon. 36.305416) and “Slobozhansky” (lat. 50.071575, lon. 35.224491), where the most of specimens were collected. The following abbreviations are used: NNP GI = National Nature Park “Gomilshansky lisy”, NNP SI = National Nature Park “Slobozhansky”. The information on each species is structured as follows: 1) current name; 2) concise description; 3) list of all collections examined; 4) references (if it present). Sufficient data are only available for specimens collected and examined by the author. Descriptions of old herbarium specimens are given as far as possible. Data about taxa which referenced in literature and not processed by the author provides without descriptions and drawings.

Authors of fungal names are cited according to Index Fungorum (www.indexfungorum.org). The infrageneric system follows that by Kobayashi (2002).

Results

Totally fourteen species, two of which are represented by two varieties are reported for the territory of Kharkiv forest-steppe. The presence of 5 previously reported taxa were confirmed, 7 species and varieties are reported for the first time in Kharkiv forest-steppe in the present paper. Four names are reported exclusively based on references. Two taxa (*Inocybe lacera* var. *helobia* Kuyper and *Inocybe langei* R. Heim) are reported in the territory of Ukraine for the first time.

Subgenus *Inosperma* R. Kühner

Inocybe adaequata (Britzelm.) Sacc.

Reported by M. Prydiuk in (Dudka et al. 2009) for the territory of NNP GI (Ukraine, Kharkiv region, Zmijiv district) and by K. Karpenko (2009) for the territory of botanical reserve “Bannyi Yar” (Ukraine, Sumy region, Sumy district, near Myropillya village).

Inocybe maculata Boud.

Fig 2

Pileus 20–70 mm across, acutely conical with incurved margin when young, then convex to almost plane with subacute umbo, distinctly fibrillose-rimulose to cracked, chestnut- to brassy brown (2.5YR 3/8, 5YR 3/8) with lighter background after cracking. Lamellae free, 4–5 mm broad, initially almost white, later pale grayish brown, tobacco-brown (10YR 4/8) or rarely with slightly olive (2.5Y 5/8) tinge. Stipe 40–90 × 5–8 mm, initially pale to almost white, but with age becoming concolorous with pileus, especially in the median part. Odor unpleasant, radish-like.

Spores (8.1–)8.5–8.9(–9.7) × (4.9–)5.3–5.7 μm, smooth, ellipsoid, sometimes slightly amygdaloid to phaseoliform. Cheilocystidia 32–63 × 11–20 μm, numerous, clavate, thin-walled. Pleurocystidia not observed. Caulocystidia rare, in short chains, 38–45 × 6–9 μm.

Collections examined – Ukraine, Kharkiv region, Kharkiv district, near Petrivka village, forest outlier among grasslands and farmlands with *Quercus*, *Tilia*, *Acer* and *Betula*, on soil, 03.10.2010, collected and identified by O. Prylutskyi (CWU7220 and 7219); Ukraine, Kharkiv region, Kharkiv district, NNP GI, upland *Quercus* forest with *Acer* and *Populus tremula*, on soil, 28.09.2010 (CWU7225) and 19.09.2012 (CWU7222).

Inocybe rimosa (Bull.) P. Kumm.

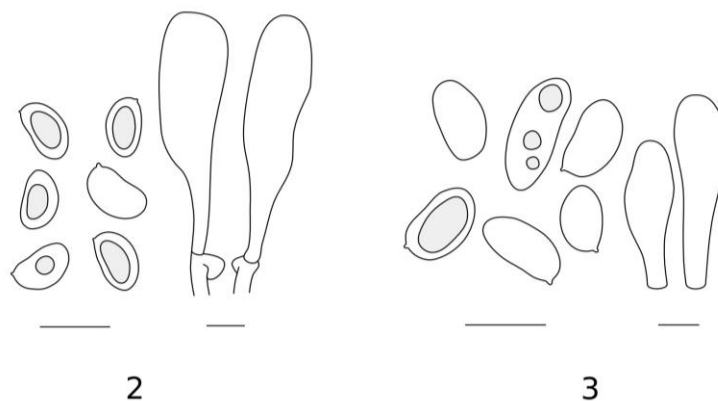
Fig 3

Pileus 30–65 mm across, conical or bell-shaped to low convex, generally with prominent obtuse or subacute umbo, strongly fibrillose-rimose with age, yellowish or ochraceous brown (7.5YR 7/6), sometimes with yellowish or greenish hue (7.5Y 8/8, 10Y 8/10). Lamellae narrowly adnate to almost free, 4–6 mm broad, brownish with a distinct olivaceous tinge (5Y 4.6 – 7.5Y 4/6), dirty brown in old specimens. Stipe 50–90 × 5–8 mm, equal, deeply rooted, flocculose at the top, shine below, whitish to yellowish (7.5Y 8/6 – 9/4). Odor unpleasant or absent.

Spores (9.7–) 11.3 – 13(–14.6) × 5.7–7.7 μm, ellipsoid to slightly phaseoliform. Cheilocystidia 32–45 × 10–17 μm, broadly cylindrical to clavate, thin-walled. Pleurocystidia absent. Caulocystidia thin-walled, 51–69 × 14–16 μm.

Collections examined – Ukraine, Kharkiv region, Zmijiv district, NNP Gl, upland *Quercus* forest, July 2003, collected and identified by D. Leontyev as *Inocybe fastigiata* (Schaeff.) Quél. (CWU7218); upland *Quercus* forest, on soil, collected and identified by O. Prylutskyi, 19.07.2011 (CWU7214).

Reported also by K. Karpenko (2009) for the territory of Trostyanets Park (Ukraine, Sumy region, Trostyanets district, near Trostyanets city) and natural reserve “Lytovskiy bir” (Ukraine, Sumy region, Trostyanets district, district, near Klymentove village).



Figs 2–3 – *Inocybe* subgenus *Inosperma* from Kharkiv forest-steppe. 2 *Inocybe maculata*, spores and cheilocystidia. 3 *Inocybe rimosa*, spores and cheilocystidia. – Bars = 10 μm.

Subgenus *Inocibium* (Earle) Singer

Inocybe geophylla var. *geophylla* (Bull.) P. Kumm.

Reported by K. Karpenko (2009) for the territory of Trostyanets Park (Ukraine, Sumy region, Trostyanets district, near Trostyanets city), Kyjanytsky Park (Ukraine, Sumy region, Sumy district, near Mohrytsya village).

Inocybe geophylla var. *lilacina* (Peck) Gillet

Fig 4, 14 A, B, C

Pileus 10–35 mm, bell-shaped to almost conical, then convex with an umbo or acute papilla, silky smooth, predominantly violaceous (10P 4/12–16), but sometimes with yellowish discoloring in umbo; old and dry specimens often almost yellowish-white (2.5Y 8/12, 7.5Y 9/12). Lamellae at first white, but soon grayish brown (2.5Y 3/6). Stipe 40–80 × 3–5 mm, equal or slightly widened toward the base, sometimes with distinct bulb, concolorous with pileus, tend to discoloring as well. Odor indistinct.

Spores 7.3–8.9 × 4.1–4.9 μm, ellipsoid. Cheilo- and pleurocystidia 54–60 × 14–20 μm, lageniform-subutriform, apically encrusted, thick-walled, walls up to 2.5 μm thick. Caulocystidia elongated, sometimes slightly curved or narrowed at middle part, apically encrusted, 76–78 × 14–21 μm.

Collections examined – NNP GI, *Quercus* forest with *Tilia*, *Acer* and *Populus tremula*, on soil, 23.10.2009, collected and identified by O. Prylutskyi (CWU7216, 7217); Ukraine, Kharkiv region, Kharkiv district, near Petrivka village, forest outlier among grasslands and farmlands with *Quercus*, *Acer*, *Tilia* and *Betula*, on soil, 03.10.2010, collected and identified by O. Prylutskyi (CWU7221).

Reported also by K. Karpenko (2009) for the territory of Trostyanets Park (Ukraine, Sumy region, Trostyanets district, near Trostyanets city).

According to some authors *I. geophylla* var. *lilacina* is less common than the white typical variety, but they sometimes occur together in the same habitat (Breitenbach 2000). However, old fruit bodies of both varieties tend to discoloring and may be confused (Kuyper 1986, Kobayashi 2002, Knudsen i Vesterholt 2012). We never collected typical *I. geophylla* var. *geophylla* during our investigation and cite it only by Karpenko's reference. However, varieties of *I. geophylla* which changes its colour from violaceous through yellowish to almost white were observed occasionally.

***Inocybe lacera* var. *helobia* Kuyper**

Fig 5

Pileus 10–40 mm across, at first obtusely conical, then convex, bell-shaped to plane with a broad obtuse umbo, coarsely fibrillose-tomentose to woolly-scaly all over, dark brown, paler toward margin, not hygrophanous (2.5YR 3/8–4/10). Lamellae narrowly adnate, 4–6 mm broad, have a colour of white coffee at first (10YR 8/6), then ochraceous brown (10YR 4/8). Stipe 25–40 × 2–5 mm, equal, fibrillose, shiny chestnut-brown, darkest and slightly scaly towards base, with distinct bronze luster all over (2.5YR 5/12, 10R 5/14). Odor weak, fungoid to slightly radish.

Spores 9.3–12.2 × 4.9–5.7 μm, cylindrical to ellipsoid, slightly amygdaloid, often wedge-shaped in front view, smooth, with 1 (rare 2) distinct oil drop. Cheilo- and pleurocystidia 49–55 × 14–20 μm, fusiform to ventricose or lageniform, with an acute apex, mostly apically encrusted, walls up to 2 μm thick. Caulocystidia not observed.

Collections examined – Ukraine, Kharkiv region, Krasnokutsk district, NNP SI, sandy terrace of Merla river, wet depression in pine forest with *Salix* sp. and *Populus tremula*, on sandy soil on walls of beaver ditch, 20.06.2012, collected and identified by O. Prylutskyi (CWU7208).

***Inocybe lacera* var. *lacera* (Fr.) P. Kumm.**

Fig 6

Pileus up to 30 mm across, convex to bell-shaped, with broad umbo and strongly incurved margin, dry, coarsely fibrillose to woolly or even fibrillose-scaly, even coloured, dirty tobacco brown (5YR 5/8; 7/5YR 5/8; 10YR 4/8). Lamellae narrowly adnate to almost free, 3–5 mm broad, dirty-cream, grayish to finally brownish. Stipe 20–30 × 2–5 mm, equal, with a small bulb, distinctly fibrillose over the whole length, concolorous with pileus.

Spores 13.4–14.6 × 4.8–5.1 μm, elongate to cylindrical-phaseoliform, often with prominent constriction near base. Cheilocystidia abundant, 36–65 × 12–14 μm, elongate-utriform or clavate, often with an apical neck. Pleurocystidia 58–70 × 14–17 μm narrowly fusiform, apex sometimes slightly widen, encrusted (fast dissolving in KOH 5%), walls up to 2 μm thick. Caulocystidia occasional, in group on upper part of stem, elongate to fusiform, 40–45 × 11–13 μm, walls 2–2.5 μm thick.

Collections examined – Ukraine, Kharkiv region, Zmijiv district, NNP GI, border between young *Pinus* and *Betula* forests in sandy terrace of Siversky Donets river, on sandy soil, 22.09.2007, collected and identified by O. Prylutskyi (CWU7226).

Reported also by K. Karpenko (2009) for the territory of the nature reserve "Lyтовський бір" (Ukraine, Sumy region, Trostyanets district, near Klymentove village).

***Inocybe langei* R. Heim**

Fig 7

Pileus 30–40(–50) mm, convex to bell-shaped, with broad obtuse umbo, silky-fibrillose, chestnut to brassy yellow at centre (5YR 5/8), paler toward margin (7.5YR 7/8). Lamellae adnate, 4–6 mm broad, gray to brownish with age (10YR 5/6). Stipe 20–40 × 4–7 mm, distinctly bulbous, white to pale ochraceous throughout with light pink hue (5YR 7/6), slightly darker in the lower part, but cover a light pruina in bulb. Odor indistinct.

Spores $7.5\text{--}8.5 \times 4\text{--}5 \mu\text{m}$, ovoid to subamygdaloid. Cheilo- and pleurocystidia $40\text{--}60 \times 16\text{--}20 \mu\text{m}$, broadly fusiform, irregularly encrusted, extremely thick-walled (wall up to $3.5 \mu\text{m}$ thick). Caulocystidia similar to cheilo- and pleurocystidia, $40\text{--}63 \times 12\text{--}15 \mu\text{m}$, walls up to $2 \mu\text{m}$ thick.

Collections examined – Ukraine, Kharkiv region, Zmijiv district, near Lyman village, artificial *Quercus* tree-line in farmlands, on rich soil, 22.09.2007, collected and identified by O. Prylutskiy (CWU7210).

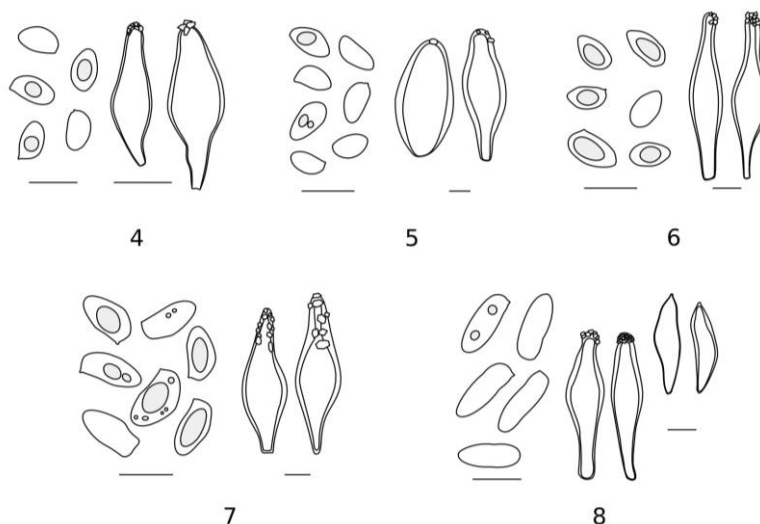
***Inocybe muricellata* Bres.**

Fig 8

Fruit bodies single or twice. Pileus $20\text{--}25 \text{ mm}$ across, convex with an incurved margin when young, then plane without an umbo, weakly woolly-felty, ochraceous yellow to brownish (7.5YR 6/10). Lamellae narrowly adnate, $3\text{--}5 \text{ mm}$ broad, yellow-brown (10YR 7/8). Stipe equal, at base somewhat inflated, $40\text{--}50 \times 2\text{--}3 \text{ mm}$, white to ochraceous, especially at the upper part (7.5YR 7/6), slightly pruinose all over. Odor indistinct.

Spores $(8.1\text{--})8.9\text{--}9.3 \times 4.8\text{--}5.3 \mu\text{m}$, ovoid to slightly amygdaloid. Cheilo- and pleurocystidia slender with a long neck, irregularly encrusted, $65\text{--}90 \times 12\text{--}18 \mu\text{m}$, walls up to $3 \mu\text{m}$ thick. Caulocystidia narrow, elongated, apically encrusted, $51\text{--}82 \times 10\text{--}14 \mu\text{m}$, walls up to $1 \mu\text{m}$.

Collections examined: Ukraine, Kharkiv region, Zmijiv district, near Haydary village, Zaytsiv Ravine, sparse deciduous forest, on soil, collected and identified by O. Prylutskiy 14.10.2007 (CWU7212).



Figs 4–8 – *Inocybe* subgenus *Inocibium* from Kharkiv forest-steppe. 4 *Inocybe geophylla* var. *lilacina*, spores and pleurocystidia. 5 *Inocybe langei*, spores and pleurocystidia. 6 *Inocybe muricellata*, spores and pleurocystidia. 7 *Inocybe lacera* var. *helobia*, spores and pleurocystidia. 8 *Inocybe lacera* var. *lacera*, spores, pleurocystidia and cheilocystidia. – Bars = $10 \mu\text{m}$.

Subgenus *Inocybe* (Fr.) Fr.

***Inocybe asterospora* Qué.**

Fig 9

We have re-examined of a single specimen collected and identified by Dmitry V. Leontyev in July 2003 on the territory of National Nature Park "Gomilshanski lisy". Therefore macroscopic characteristics mainly loss the description below restrict of available microscopic features and D. Leontyev's drawing.

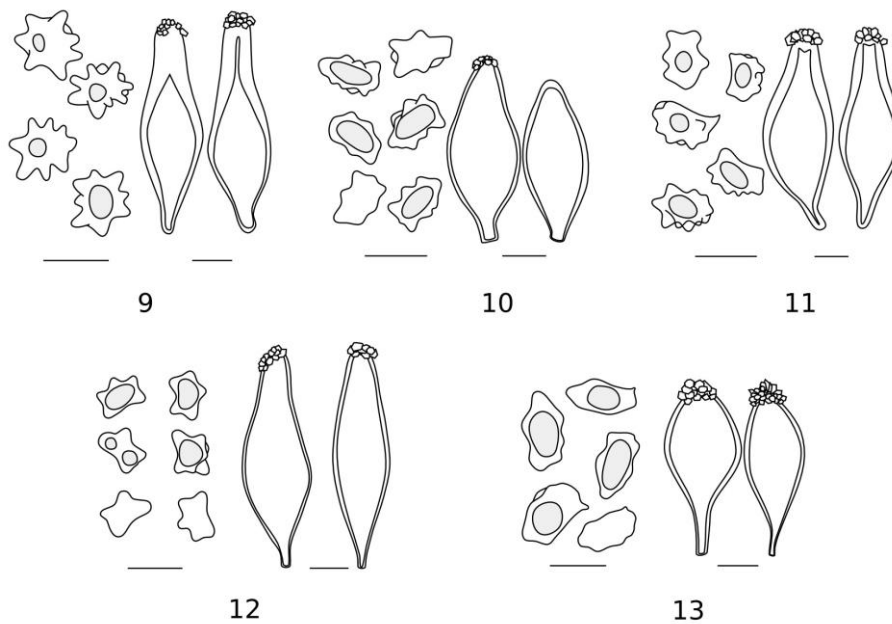
Pileus up to 40 cm across, convex to plane with distinct acute apex, fibrillose-rimose, quickly cracked on rough scales, leave a uncracked plate at centre, deep brownish with a yellowish background (7.5YR 3/6 at centre, 10YR 8/8 on background). Lamellae narrowly adnate, $4\text{--}6 \text{ mm}$ broad, brownish (7.5YR 7/10). Stipe equal with distinct bulb, chestnut-brown (2.5YR 4/10). Odor has not been registered.

Spores $9.7\text{--}11.3 \times (6.5\text{--})8.1\text{--}8.9(-9.7) \mu\text{m}$, strongly nodulose-angular, with 7–10 prominent excrescences. Cheilo- and pleurocystidia encrusted, elongate-fusiform, $47\text{--}63 \times 14\text{--}18 \mu\text{m}$, thick-walled (walls up to $3.5 \mu\text{m}$ thick). Caulocystidia was not observed (poorly preserved specimen, the main part of stem is absent).

Collections examined – Ukraine, Kharkiv region, Zmijiv district, NNP GI, July 2003, collected and identified by D. Leontyev, verified by O. Prylutskyi (CWU7211); reported also by K. Karpenko (2009) for the territory of Sumy Botanical Garden, Sumy, Sumy region, Ukraine.

***Inocybe bresadolae* Masee**

Reported by D. Leontyev in (Dudka et al. 2009) for the territory of NNP GI (Zmijiv district, Kharkiv region, Ukraine). Check specimen is missed.



Figs 9–13 – *Inocybe* subgenus *Inocybe* from Kharkiv forest-steppe. 9 *Inocybe asterospora*, spores and pleurocystidia. 10 *Inocybe curvipes*, spores and pleurocystidia. 11 *Inocybe mixtilis*, spores and pleurocystidia. 12 *Inocybe napipes*, spores and pleurocystidia. 13 *Inocybe rennyi*, spores and pleurocystidia. – Bars = $10 \mu\text{m}$.

***Inocybe curvipes* P. Karst.**

Fig 10, Fig. 14D

Pileus 10–40 mm across, convex to plane with a distinct obtuse umbo, velvety to woolly at centre, radially fibrillose-scaly on a half of ratio, tiny fibrillose near margin, ochraceous brown at centre (2.5YR 4/10) to light (5YR 9/3) near margin. Lamellae narrowly adnate, sometimes with a short tooth, with distinctly crenate margin, 3–4 mm broad, light to distinctly brown (7.5YR 7/10). Stipe 30–50 × 3–4 mm, fibrillose all over, slightly fibrillose-scaly near top, initially whitish, but soon becoming brown from the base (2.5YR 5/12), especially in damaged places. Odor indistinct.

Spores $8.1\text{--}9.7(-10.9) \times 5.7\text{--}6.9(-7.7) \mu\text{m}$, slightly elongate, irregularly nodulose-angular, with 6–9 short and 1 long excrescences. Cheilocystidia abundant, broadly fusiform, with distinct encrustation which slowly dissolving in KOH 5%, $38\text{--}40 \times 11\text{--}18 \mu\text{m}$ thick-walled (walls up to $4 \mu\text{m}$ thick). Pleurocystidia clavate to fusiform, mainly with lageniform with a short, subacute, sometimes papilliform apex, $55\text{--}60 \times 16\text{--}18 \mu\text{m}$, walls near $2 \mu\text{m}$ thick. Caulocystidia similar to cheilo- and pleurocystidia, but walls up to $1 \mu\text{m}$ thick.

Collections examined – Ukraine, Kharkiv region, Zmijiv district, NNP GI, floodplain deciduous forest, on rich soil, 23.08.2011, collected and identified by O.Prylutskyi (CWU7209); reported also by K. Karpenko (2009) as *Inocybe boltonii* R. Heim for the territory of Trostyanets Park (Ukraine, Sumy region, Trostyanets district, near Trostyanets city).

Inocybe lanuginosa (Bull.) P. Kumm.

Reported by K. Karpenko (2009) for the territory of the natural reserve "Lyтовський бір" (Ukraine, Sumy region, Trostyanets district, near Klymentove village).

Inocybe mixtilis (Britzelm.) Sacc.

Fig 11

Pileus 15–35 mm across, convex to plane with a pronounced umbo, finely radially fibrillose, margin sometimes fimbriate, pale ochraceous yellow to orange-yellow (7.5YR 7/12), darkest at centre (5YR 7/14). Cap cuticle tends to keep integrity for a long time at centre of pileus but quickly rip near margin. Lamellae free, 3–5 mm broad, white, cream to gray when young (2.5Y 9/3), then brown (7.5TR 3/6). Stipe 40–50 × 3–5 mm, equal, with a distinct marginal bulb, smooth, at first pure white, then cream (10Y 9/2), slightly pruinose all over. Odor indistinct.

Spores 8.1–10.5 × 5.7–7.3 μm, irregularly nodulose, with 9–14 nodules. Cheilo- and pleurocystidia 55–65 × 18.5–25 μm, fusiform to subutriform, with apical crystals, thick-walled, walls up to 3.5 μm thick. Caulocystidia looks like pleurocystidia, apically encrusted, 47–60 × 18–20 μm, walls up to 3.6 μm thick.

Collections examined – Ukraine, Kharkiv region, Zmijiv district, NNP GI, sandy terrace of Siversky Donets river, *Pinus* forest, on sandy soil, 05.10.2010, collected and identified by O.Prylutskyi (CWU7213).

Inocybe napipes J.E. Lange

Fig 12

Pileus 20–35 mm across, conical to bell-shaped at first, then plane with a distinct but low umbo, fibrillose-rimulose, glabrous at centre and split near margin, shine, hazel-brown (2.5YR 3/8). Lamellae narrowly adnate to almost free, 2–4 mm broad, initially pale grayish (2.5Y 9/4), later brownish (10YR 4/8). Stipe 30–50 × 3–5 mm, equal with a prominent bulb, cream to pale brown (10YR 8/6), slightly pruinose all over.

Spores 8–9 × 5.7–6.5 μm, with 5–10 prominent, irregular nodules. Cheilo- and pleurocystidia 50–60 × 16–20 μm, lageniform to almost utriform, apically encrusted, walls 1.5–2.5 μm thick (some up to 3 μm thick). Caulocystidia slightly fusiform to almost utriform, sometimes apically encrusted, 51–71 × 12.7–16.4 μm, walls up to 2.5 μm.

Collections examined – Ukraine, Kharkiv region, Zmijiv district, NNP GI, upland deciduous forest with *Quercus*, *Tilia*, *Fraxinus*, *Acer campestre*, *Ulmus* spp., on soil, 19.07.2011, collected and identified by O.Prylutskyi (CWU7224).

Inocybe rennyi (Berk. et Broome) Sacc.

Fig 13, Fig. 14E

Pileus 10–25 mm, convex or almost plane, radially uniformly fibrillose to fibrillose-scaly, chestnut-brown all over. Lamellae adnate with a short tooth, 3–4 mm broad, distinctly brown (7.5YR 7/10). Stipe 20–45 × 2–5 mm, equal, fibrillose, slightly striate, buff to brown (2.5YR 5/12). Flesh in upper part of stem distinctly reddening on air (7.5R 5/16).

Spores (9.7–)11.5–12.2(–14.1) × 6.1–7.7 μm, elongate, irregularly nodulose. Cheilo- and pleurocystidia broadly clavate with short obtuse neck, apically encrusted, 56–73 × 18–22 μm, walls about 2 μm thick. Caulocystidia thin-walled, elongate-ventricose, 51–69 × 20–27 μm.

Collections examined – Ukraine, Kharkiv region, Zmijiv district, near Haydary village, young *Pinus* plantation, on soil, 30.10.2008, collected and identified by O.Prylutskyi (CWU7215).

Taxonomic status of *I. rennyi* is still discussed. Some authors suppose *I. rennyi* could be a synonym of common *I. curvipes* (Esteve-Reventós 2001, Kropp & Matheny 2004). Comparison of descriptions of both species given in literature (Nezdoymynogo 1996, Kobayashi 2002, Kropp & Matheny 2004, Knudsen & Vesterholt 2012, Kokkonen & Vauras 2012) exposes only two reliable key differences between the taxa: a spore length (8–11(–12) μm for *I. curvipes* and 8–15(–20) μm for *I. rennyi*) and habitat (primary deciduous woods for *I. curvipes* and coniferous woods for *I. rennyi*).

Our specimens are similar in macromorphology, hymenial cystidia shape and size, but it have an obvious differences in spore length and size. Then, specimen CWU7209 had a curved, strongly nodulose spores without visible apiculus, 8.1–9.7(–10.9) μm long. At the same time, specimen

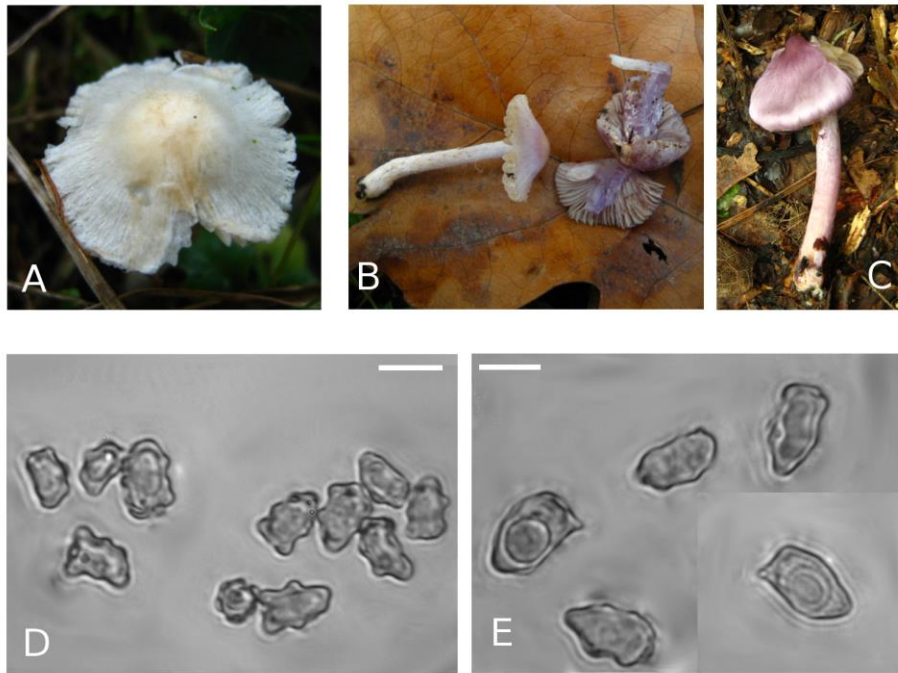


Fig. 14 – Some noteworthy *Inocybe* from Kharkiv forest-steppe. A, B, C *Inocybe geophylla* var. *lilacina*, varying of color of fruit body: from strongly discoloured (A), through medium discoloured (B) to typically coloured (C). D *Inocybe curvipes*, spores. E *Inocybe rennyi*, spores. – Bars = 10 μ m.

CWU7215 had more ellipsoidal, slightly smoother and in general bigger spores with prominent apiculus, (9.7–)11.5–12.2(–14.1) μ m long. Thereby we tend to consider this specimens as a representatives of two different species, one of them more likely to *I. curvipes*, but another one to *I. rennyi*.

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