

## **ZWACKHIOMYCES POLISCHUKII SP. NOV., AND OTHER NOTEWORTHY LICHENICOLOUS FUNGI FROM UKRAINE**

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**Abstract.** The new lichenicolous fungus *Zwackhiomyces polischukii* Darmostuk & Khodos. is described from *Bacidia fraxinea* Lönnr. and *B. rubella* (Hoffm.) A. Massal. in Ukraine. *Cercidospora caudata* Kernst., *Cladophialophora parmeliae* (Etayo & Diederich) Diederich & Untereiner, *Epicladonia simplex* D. Hawksw., *Laetisaria lichenicola* Diederich, Lawrey & Van den Broeck, *Lichenochora caloplacae* Zhurb., *L. weillii* (Werner) Hafellner & R. Sant., *Microsphaeropsis caloplacae* Etayo & Yazıcı, *Pronectria casaresii* Etayo and *P. cf. dillmaniae* Zhurb. are new for Ukraine. Seven species are new for the plains of Ukraine and four species are new for the steppe zone. *Pronectria diplococca*, *P. cf. dillmaniae*, *Lichenochora caloplacae* and *Microsphaeropsis caloplacae* were previously known only from their original descriptions.

**Key words:** *Cercidospora*, *Pronectria*, *Lichenochora*, *Zwackhiomyces*, distribution, new species, steppe zone

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### INTRODUCTION

The lichenicolous fungi of Ukraine are still poorly known, although research on them has increased recently (e.g., Braun *et al.* 2016; Darmostuk 2016; Darmostuk & Naumovich 2016; Kapets 2016; Khodosovtsev & Darmostuk 2016; Khodosovtsev *et al.* 2016a, b). Last year we organized several excursions to forests in northern and southern Ukraine, to granitic canyons along small steppe rivers and to loess outcrops in the Dnieper-Bug estuary. Lichenicolous fungi recorded during our excursions and some older herbarium collections are presented in this paper.

### MATERIALS AND METHODS

Specimens were examined using standard light microscopy techniques and LOMO microscopes (MBS–1, Micromed–2). Specimens were examined in water, 10% KOH (K), Lugol’s iodine, directly (I) or after KOH pretreatment (K/I) or with Brilliant Cresyl blue (BCr). We measured specimens in water to 0.25 µm accuracy for ascospores, asci, conidia, conidiogenous cells, conidiophores, and ascomal and pycnidial wall

cells, and to 5 µm accuracy for ascomata, basidiomata and pycnidia. Measurements are given as (min)–mean–SD–mean+SD(–max). Photographs were taken with a Levenhuk C510 NG camera. All examined specimens are deposited in the lichenological herbarium of Kherson State University (KHER).

### RESULTS AND DISCUSSION

***Briancoppinsia cytospora*** (Vouaux) Diederich, Ertz, Lawrey & van den Boom

SPECIMENS EXAMINED (all on thalli of *Parmelia sulcata* s.l.). UKRAINE. KHERSON REGION. Oleshkiivskiy district, near Burkuty village, 46°23'38.6"N, 32°48'35.7"E, alt. 13 m, on *Quercus robur*, 18 Nov. 2016, A. Khodosovtsev & V. Darmostuk (KHER 10316). SUMY REGION. Sereдино-Budskiy district, Desniansko-Starogutskiy National Nature Park, Uborok, 52°15'12.7"N, 33°35'5.2"E, alt. 130 m, on *Q. robur*, 5 Aug. 2016, A. Khodosovtsev & V. Darmostuk (KHER 10178).

NOTES. This lichenicolous fungus was recently reported from the Carpathian Mts (Kondratyuk *et al.* 2003). New for the plains of Ukraine.

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***Cercidospora caudata* Kernst. s.l.**

SPECIMENS EXAMINED. UKRAINE. AUTONOMOUS REPUBLIC OF CRIMEA. Cape Plaka, 44°35'30.7"N, 34°22'12.9"E, alt. 90 m, on thalli of *Olegblumia demissa*, on porphyrite outcrops, 13 Nov. 1999, *A. Khodosovtsev & O. Redchenko* (KHER 10323).

NOTES. Our specimen has immersed ascomata (145–)150–170(–185)  $\mu\text{m}$  diam., a blue-green peridial wall around the ostiole, (6-)8-spored asci, and colorless, 1-septate, heteropolar ascospores (16.5–)17.0–18.5(–20.0)  $\times$  (4.0–)4.5–6.0(–6.3)  $\mu\text{m}$ . These characters fit the concept of *Cercidospora caudata* s.l. (Navarro-Rosinés *et al.* 2004). The taxonomy of this group is in need of a thorough revision. *Cercidospora caudata* s.l. is known from Europe: Austria (Hafellner 1987), Germany (Brackel 2007), Italy (Kernstock 1896), Spain (Etayo & Pérez-Ortega 2016), Switzerland (Groner 2009); Asia: India (Joshi *et al.* 2016), South Korea (Joshi *et al.* 2015), Turkey (Halici *et al.* 2007); Africa: Morocco (Brackel 2014); North America: USA (Triebel *et al.* 1991); South America: Guatemala (Etayo & van den Boom 2006). Originally *Cercidospora caudata* was described on *Xanthocarpia lactea* (A. Massal.) A. Massal. but our specimen was collected on *Olegblumia demissa* (Flot.) S. Y. Kondr., L. Lökös, J. Kim, A. S. Kondr., S. O. Oh & J. S. Hur.

***Cercidospora xanthoriae* (Wedd.) R. Sant. s.l.**

SPECIMENS EXAMINED. UKRAINE. MYKOLAYIV REGION. Voznesenskiy district, near Trykraty village, Buzky Gard National Nature Park, Arbuzinskiy Canyon, 47°42'24.9"N, 31°25'56.9"E, alt. 42 m, on apothecia of *Rufoplaca subpallida*, on granite outcrops, 20 Oct. 2016, *A. Khodosovtsev & V. Darmostuk* (KHER 10320).

NOTES. In contrast to *Cercidospora caudata* s.l., this species has more or less unequal ascospore cells. Although previously known from Ukraine from the Crimean peninsula (Kondratyuk *et al.* 1999; Darmostuk 2016), it is new for the plains of Ukraine.

***Cladophialophora parmeliae* (Etayo & Diederich) Diederich & Untereiner**

SPECIMEN EXAMINED. UKRAINE. MYKOLAYIV REGION. Voznesenskiy district, near Trykraty village,

Buzky Gard National Nature Park, Arbuzinskiy Canyon, 47°42'24.9"N, 31°25'56.9"E, alt. 42 m, on thalli of *Xanthoparmelia conspersa* which was also infected by *Lichenocodium erodens*, on granite outcrops, 20 Oct. 2016, *A. Khodosovtsev & V. Darmostuk* (KHER 10312).

NOTES. The species is characterized by sporodochia-like conidiomata and slightly to distinctly verrucose, ellipsoid 1-septate brownish conidia (Diederich *et al.* 2013). It is known from Europe: Austria, the Azores, France, United Kingdom (Etayo & Diederich 1996; Diederich *et al.* 2013); Asia (Zhurbenko *et al.* 2015). New for Ukraine.

***Clypeococcum cetrariae* Hafellner**

SPECIMENS EXAMINED. UKRAINE. MYKOLAYIV REGION. Ochakovskiy district, near Pokrovka village, Kinburnska Kosa Regional Landscape Park, 46°28'48.4"N, 31°39'55.9"E, alt. 2 m, on thalli of *Cetraria aculeata* above sand dunes, 18 July 2016, *V. Darmostuk* (KHER 10134). SUMY REGION. Seredyno-Budskiy district, Desniansko Starogutsky National Nature Park, near Ulytsa village, 52°18'39.6"N, 33°36'57.4"E, alt. 132 m, on thalli of *Cetraria islandica*, 5 Aug. 2016, *A. Khodosovtsev & V. Darmostuk* (KHER 10182, 10184, 10187).

NOTES. In Ukraine the species was collected in the Carpathian Mts (Pirogov 2015). New for the plains of Ukraine.

***Clypeococcum hypocenomycis* D. Hawksw.**

SPECIMEN EXAMINED. UKRAINE. KHERSON REGION. Oleshkivskiy district, near Radensk village, 46°33'57.1"N, 32°52'40.2"E, alt., 32 m, on thalli of *Hypocenomyce scalaris*, on *Pinus nigra*, 20 Nov. 2016, *V. Darmostuk* (KHER 10317).

NOTES. Although this species was recently found in the Lviv region (Pirogov 2010), it is new for the steppe zone of Ukraine.

***Epicleadonia simplex* D. Hawksw.**

SPECIMEN EXAMINED. UKRAINE. KHERSON REGION. Oleshkivskiy district, Sagi Landscape Reserve, 46°37'04.03"N, 32°50'03.13"E, alt. 15 m, on *Cladonia rangiformis*, on sand dunes, 4 Oct. 2016, *G. Naumovich* (KHER 10156).

NOTES. This is a widespread lichenicolous fungus known from Europe: Denmark (Alstrup 1994), Finland (Hawksworth 1981), Iceland

(Heidmarsson *et al.* 2009), Lithuania (Motiejūnaitė 2011), Poland (Kukwa *et al.* 2013), Sweden (Ihlen & Wedin 2006); Asia: Russia (Zhurbenko 2004), South Korea (Joshi *et al.* 2015); North America: Canada (Alstrup & Cole 1998), USA (Esslinger & Egan 1995). New for Ukraine.

***Heterocephalacria bachmannii*** (Diederich & M. S. Christ.) Millanes & Wedin

SPECIMEN EXAMINED. UKRAINE. KHERSON REGION. Oleshkiivskiy district, near Radensk village, 46°33'57.1"N, 32°52'40.2"E, alt., 32 m, on *Cladonia rangiformis*, on sand dunes, 20 Nov. 2016, *V. Darmostuk* (KHER 10324).

NOTES. This lichenicolous fungus was recently reported from the Crimean peninsula (Khodosovtsev 2013). New for the plains of Ukraine.

***Illosporiopsis christiansenii*** (B. L. Brady & D. Hawksw.) D. Hawksw.

SPECIMENS EXAMINED (all on thalli of *Physcia adscendens*). UKRAINE. KHERSON REGION. Velyko-oleksandrivkiy district, Mala Oleksandrivka village, Rusova balka, 47°16'15.93"N, 33°14'05.43"E, alt. 37 m, on *Quercus robur*, 9 Jan. 2016, *V. Darmostuk* (KHER 9652); Oleshkiivskiy district, near Burkutiy village, 46°23'38.6"N, 32°48'35.7"E, alt. 13 m, on *Q. robur*, 21 Nov. 2015, *A. Khodosovtsev* & *V. Darmostuk* (KHER 9550, 9574). MYKOLAYIV REGION. Voznesenskiy district, near Trykraty village, Buzky Gard National Nature Park, Labirynt, 47°42'24.9"N, 31°25'56.9"E, alt. 42 m, on *Fraxinus excelsior*, 21 Oct. 2016, *A. Khodosovtsev* & *V. Darmostuk* (KHER 10319). SUMY REGION. Seredyno-Budskiy district, Desniansko-Starogutskiy National Nature Park, near Ochkino village, 52°15'44.1"N, 33°23'21.4"E, alt. 131 m, on *Salix* sp., 1 Aug. 2016, *A. Khodosovtsev* & *V. Darmostuk* (KHER 10325).

NOTES. Previously known only from the Carpathian Mts (Hawksworth 1992). New for the plains of Ukraine.

***Laetisaria lichenicola*** Diederich, Lawrey & Van den Broeck

SPECIMENS EXAMINED (all on *Physcia adscendens*). UKRAINE. KHERSON REGION. Belozerskiy district, Sofievka village, Sofiyevska Balka Botanical Reserve, 46°36'03.93"N, 32°15'41.13"E, alt. 13 m, on *Robinia*

*pseudoacacia*, 14 Dec. 2016, *A. Khodosovtsev* & *V. Darmostuk* (KHER 10318); Velykooleksandrivkiy district, Mala Oleksandrivka village, right bank of river Ingulets, 47°17'38.47"N, 33°16'24.21"E, alt. 21 m, on *Populus nigra*, 27 Nov. 2016, *V. Darmostuk* (KHER 10313).

NOTES. *Laetisaria lichenicola* grows on *Physcia* together with *Erythricium aurantiacum* (Lasch) D. Hawksw. & A. Henrici, but the former differs in the rose color of infected thalli. This is the second member of the genus *Laetisaria* in Ukraine, the other being *L. fuciformis* (Akulov *et al.* 2010). It is known from Belgium, Germany and Luxembourg (Diederich *et al.* 2011). New for Eastern Europe.

***Lichenochora caloplacae*** Zhurb.

SPECIMENS EXAMINED. UKRAINE. KHERSON REGION. Belozerskiy district, Sofievka Balka Botanical Reserve, 46°36'03.93"N, 32°15'41.13"E, alt. 13 m, on thalli of *Athallia skii*, on plant debris, 14 Feb. 2009, *A. Khodosovtsev* & *L. Gavrylenko* (KHER 7574); near Alexandrovka village, 46°36'23.7"N, 32°15'54.3"E, alt. 17 m, on thalli of *A. skii*, on plant debris, 14 Dec. 2016, *A. Khodosovtsev* & *V. Darmostuk* (KHER 10326).

NOTES. The specimens of *Lichenochora caloplacae* from Ukraine are mostly consistent with the protologue (Zhurbenko & Brackel 2013), but differ slightly in having shorter ascospores 18–23 × 3.0–4.5 μm (14–27 × 3.5–6.0 in original description) and in the host. This recently described species was known from polar desert biomes of Svalbard and Central Siberia (Zhurbenko & Brackel 2013), growing on thalli of terricolous caloplacoid species. *Athallia skii* (Khodos., Vondrák & Šoun) Arup, Frödén & Søchting is a new host species and it is the first record of any lichenicolous fungus on this lichen. New for Ukraine.

***Lichenochora weilii*** (Werner) Hafellner & R. Sant.

SPECIMEN EXAMINED. UKRAINE. KHERSON REGION. Oleshkiivskiy district, near Burkutiy village, 46°23'38.6"N, 32°48'35.7"E, alt. 13 m, on thalli of *Physconia grisea*, on *Quercus robur*, 18 Nov. 2016, *A. Khodosovtsev* & *V. Darmostuk* (KHER 10311).

NOTES. The species is known from Europe: Belgium (van den Boom & Brand 2008), France

(Diederich *et al.* 2012), Germany (Kocourková & von Brackel 2005), Italy (van den Boom & Brand 2008), Latvia (Motiejūnaitė *et al.* 2016), Svalbard (Zhurbenko & Brackel 2013), Spain (Werner 1937), Sweden (Hafellner 1989), the Netherlands (van den Boom & Brand 2008); Asia: Russia (Zhurbenko & Santesson 1996); North America: Canada (Hafellner 1989); Macaronesian islands (Hafellner 2002). New for Ukraine.

### *Lichenostigma maureri* Hafellner

**SPECIMENS EXAMINED.** UKRAINE. KHERSON REGION. Oleshkiivskiy district, near Burkuty village, 46°23'38.6"N, 32°48'35.7"E, alt. 13 m, on thalli of *Pseudoevernia furfuracea*, on *Quercus robur*, 21 Nov. 2015, *A. Khodosovtsev & V. Darmostuk* (KHER 9548); SUMY REGION. Seredyno-Budskiy district, Desniansko-Starogutsky National Nature Park, near Stara Guta village, 52°18'39.6"N, 33°36'57.4"E, alt. 132 m, on thalli of *P. furfuracea*, on *Q. robur*, 5 Aug. 2016, *A. Khodosovtsev & V. Darmostuk* (KHER 10254).

**NOTES.** In Ukraine this species was found on the Crimean peninsula and in the Carpathian Mts (Hawksworth 1992; Khodosovtsev *et al.* 2013, 2016c). New for the plains of Ukraine.

### *Microsphaeropsis caloplacae* Etayo & Yazıcı

**SPECIMEN EXAMINED.** UKRAINE. KHERSON REGION. Bilozerskiy district, near Alexandrovka village, 46°36'23.7"N, 32°15'54.3"E, alt. 17 m, on thalli of *Calogaya lobulata*, on plant debris, 14 Dec. 2016, *A. Khodosovtsev & V. Darmostuk* (KHER 10326).

**NOTES.** This recently described species has small pycnidia 30–50 µm diam. and hyaline to brown aseptate conidia 7.2–8.3 × 4–6 µm. Our specimen has few pycnidia and differs by having slightly smaller conidia, 6.5–7.5 × 3–5 µm. It was known only from the type locality in Turkey on *Calogaya persica* (J. Steiner) Arup, Frödén & Söchting (Etayo & Yazıcı 2009). *Calogaya lobulata* (Flörke) Arup, Frödén & Söchting is a new host species. New for Ukraine.

### *Nectriopsis rubefaciens* (Ellis & Everh.)

M. S. Cole & D. Hawksw.

**SPECIMEN EXAMINED.** UKRAINE. KHERSON REGION. Oleshkiivskiy district, near Burkuty village,

46°23'38.6"N, 32°48'35.7"E, alt. 13 m, on thalli of *Parmelia sulcata* above wood, 8 July 2015, *A. Khodosovtsev* (KHER 9269).

**NOTES.** Although previously known from the Lviv region (Pirogov 2011), it is new for the steppe zone of Ukraine.

### *Pronectria casaresii* Etayo

**SPECIMEN EXAMINED.** UKRAINE. KHERSON REGION. Oleshkiivskiy district, near Burkuty village, 46°23'38.6"N, 32°48'35.7"E, alt. 13 m, on thalli of *Evernia prunastri*, on *Prunus spinosa*, 18 Nov. 2016, *A. Khodosovtsev & V. Darmostuk* (KHER 10314).

**NOTES.** This lichenicolous fungus was known from Spain (Etayo 1998; van den Boom & Etayo 2014). New for Eastern Europe.

### *Pronectria* cf. *dillmaniae* Zhurb.

**SPECIMEN EXAMINED.** UKRAINE. KHERSON REGION. Belozerskiy district, near Vysunci village, 46°43'23.8"N, 32°35'26.0"E, alt. 15 m, on thalli of *Placidium squamulosum* above soil, 8 May 2016, *I. Moysiyyenko* (KHER 10315).

**NOTES.** The specimen is poorly developed, with three perithecia only, but we identified it as *Pronectria* cf. *dillmaniae*: ascospores 8.5–10.5 × 5.2–6.3 µm (vs 6–12 × 4–7 µm in original description) and perithecia ca 120 µm diam. (vs. 100–200 µm). Our material was found on *Placidium squamulosum* (Ach.) Breuss, whereas the original host in the type locality in the USA is *Catapyrenium cinereum* (Pers.) Körb. (Zhurbenko *et al.* 2005). *Pronectria dillmaniae* is not known otherwise from Europe.

### *Pronectria diplococca* Kocourk., Khodos., Naumovich, Vondrák & Motiej.

**SPECIMEN EXAMINED.** UKRAINE. POLTAVA REGION. Semenivsky district, near Obolon village, saline soil, on *Enchylium tenax*, 49°33'2"N, 32°51'35.8"E, 3 May 2016, *A. Khodosovtsev & V. Darmostuk* (KHER 9866).

**NOTES.** A recently described species (Khodosovtsev *et al.* 2012) based on material from Ukraine, Lithuania and the Czech Republic. Here we provide a further locality in the forest-steppe zone of Ukraine.

***Stigmidium squamariae*** (B. de Lesd.) Cl. Roux & Triebel

SPECIMEN EXAMINED. UKRAINE. MYKOLAYIV REGION. Voznesenskiy district, near Trykraty village, Buzky Gard National Nature Park, Arbuzinskiy Canyon, 47°42'24.9"N, 31°25'56.9"E, alt. 42 m, on apothecia of *Protoparmeliopsis muralis*, on granite outcrops, 20 Oct. 2016, A. Khodosovtsev & V. Darmostuk (KHER 10321).

NOTES. In Ukraine it was known from the Lviv region (Pirogov 2012a). New for the steppe zone of Ukraine.

***Tremella phaeophysciae*** Diederich & M. S. Christ.

SPECIMEN EXAMINED. UKRAINE. MYKOLAYIV REGION. Voznesenskiy district, near Trykraty village, Buzky Gard National Nature Park, Labirynt, 47°42'24.9"N, 31°25'56.9"E, alt. 42 m, on thalli of *Physconia grisea*, on *Fraxinus excelsior*, 21 Oct. 2016, A. Khodosovtsev & V. Darmostuk (KHER 10310).

NOTES. In Ukraine it was known from the Carpathian Mts (Kondratyuk 2012). New for the plains of Ukraine.

***Xenonectriella leptaleae*** (J. Steiner) Rossman & Lowen

SPECIMENS EXAMINED (all on apothecia of *Physcia stellaris*). UKRAINE. MYKOLAYIV REGION. Voznesenskiy district, near Trykraty village, Buzky Gard National Nature Park, Labirynt, 47°42'24.9"N, 31°25'56.9"E, alt. 42 m, on *Fraxinus excelsior*, 21 Oct. 2016, A. Khodosovtsev & V. Darmostuk (KHER 10322). SUMY REGION. Seredyno-Budskiy district, Desniansko-Starogutsky National Nature Park, near Ochkino village, 52°15'44.1"N, 33°23'21.4"E, alt. 131 m, on *Salix* sp., 1 Aug. 2016, A. Khodosovtsev & V. Darmostuk (KHER 10280).

NOTES. In Ukraine it was known from the Lviv region (Pirogov 2012b). New for the steppe zone of Ukraine.

***Zwackhiomyces polischukii*** Darmostuk & Khodos., sp. nov. Fig. 1

MYCOBANK MB 820101

DIAGNOSIS. Morphologically similar to the lichenicolous *Zwackhiomyces socialis*, but differs

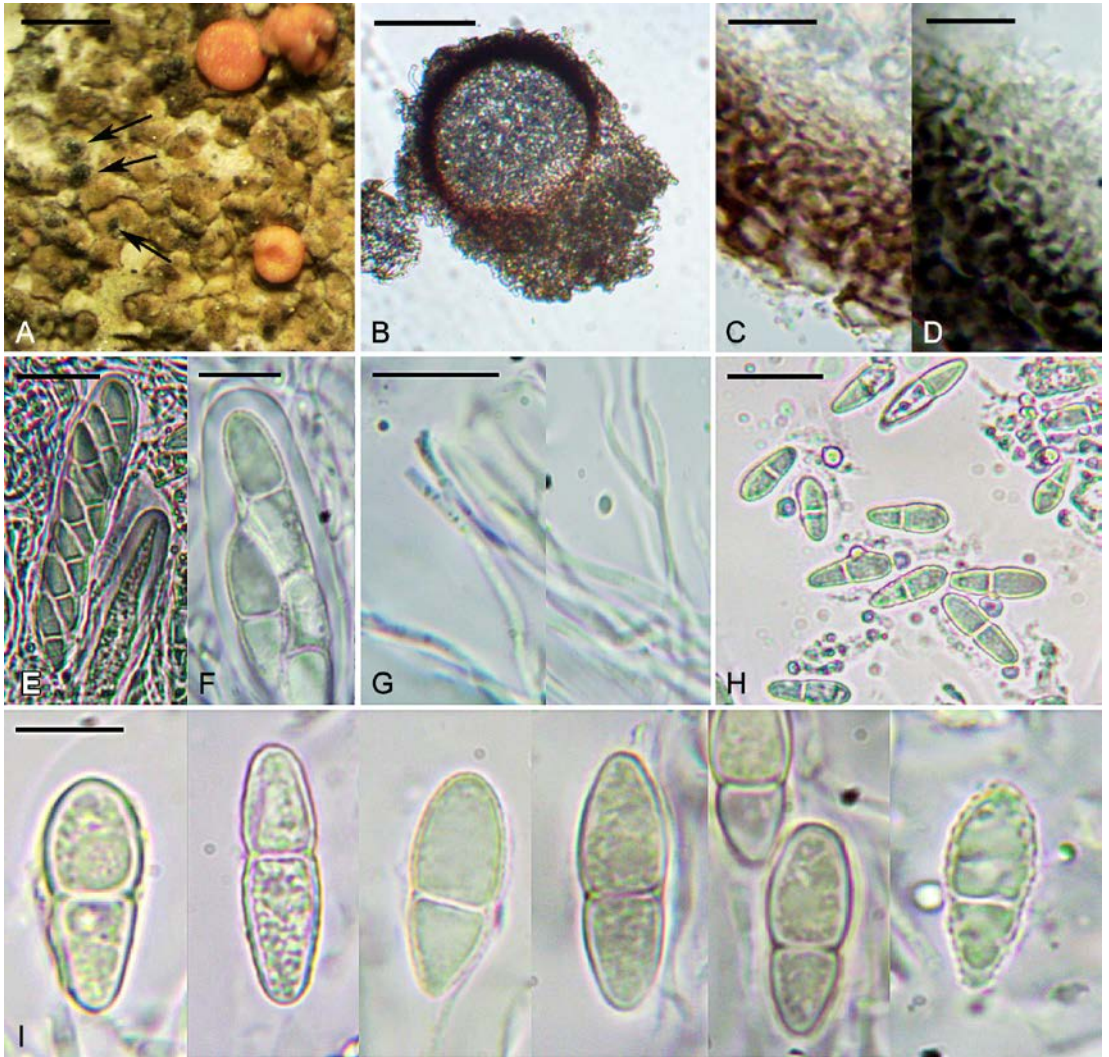
by its ascospores (17.0–)18.0–21.6(–23.0) × (5.0–)6.0–7.6(–8.3) μm, ascomata (160–)170–190(–230) μm diam., ascomatal wall ca 15–35 μm wide, and *Bacidia* hosts.

TYPE: UKRAINE. AUTONOMOUS REPUBLIC OF CRIMEA. Livadia, 44°27'50.9"N, 34°08'26.6"E, alt. 102 m, on *Bacidia fraxinea*, on *Carpinus betulis*, 6 May 2006, A. Khodosovtsev & Yu. Khodosovtseva (HOLOTYPE – KHER 7208, ISOTYPE – KHER 7401).

PARATYPES (both on thalli of *Bacidia rubella*). UKRAINE. AUTONOMOUS REPUBLIC OF CRIMEA. Mount Castel, western slope, 44°43'360.6"N, 34°19'42.8"E, alt. 110 m, on *Carpinus betulis*, 15 November 2001, A. Khodosovtsev, S. Zelenko & O. Bogdan (KHER 2106); Bakhchysarayskiy district, near Manhup-Kale, on *Quercus* sp., 8 March 1991, A. Khodosovtsev (KHER 10360). KHMELNYTSKIY REGION. Kamenetz-Podilskiy district, Podilski Yovtry National Nature Park, 48°40'35.2"N, 26°34'28.6"E, alt. 193 m, on *Acer* sp., 25 June 2003, O. Bogdan (KHER 7442).

DESCRIPTION. Vegetative hyphae not observed. Ascomata perithecioid, immersed in initial states, semi-immersed at maturity, scattered or in groups of 3–5 pseudothecia, black, subglobose, (160–)170–190(–230) μm diam. (n = 20); ascomatal wall pseudoparenchymatous, dark brown in outer part, brown in middle, and hyaline in inner part; (15–)25–30(–35) μm wide (n = 20), with 5–8 layers of cells; cells rounded in outer parts and ± radially compressed in inner part, (4.3–)7.3 ± 0.5(–8.8) (n = 25) μm wide; granular brown pigments extracellular, turning black or olive-black in K. Hymenial gel I–, K/I–. Paraphysoids abundant, branched and anastomosing, 1.5–2.5 μm thick. Asci clavate, uniseriate to biseriate, (4–)8-spored, (60–)65–70(–75) × (12–)13.5–15.0(–16) μm (n = 15), endoascus I–, BCr–. Ascospores ellipsoid, 1-septate, hyaline, verrucose, markedly constricted at septum, slightly heteropolar, (17.0–)18.0–21.6(–23.0) × (5.0–)6.0–7.6(–8.3) μm, upper cell ± rounded, lower cell narrower than upper and slightly attenuated, sometimes upper cells with oil droplets; ascospore length/breadth ratio: (1.7–)2.0–2.7(–3.1) (n = 30), halo indistinct, 0.5 μm thick in water. Conidiomata not observed.

HOST, ECOLOGY AND DISTRIBUTION. The species grows on the thallus of *Bacidia fraxinea* Lönnr.



**Fig. 1.** Morphology of *Zwackhiomyces polischukii* (all from holotype): A – ascomata (arrows) on thallus of *Bacidia fraxinea*; B – section through ascoma; C – ascomatal wall (in water); D – ascomatal wall (in KOH); E – asci (in water); F – ascus (in KOH); G – paraphysoids (in KOH); H – ascospores (in water); I – ascospores (in water). Scale bars: A = 500  $\mu$ m; B = 100  $\mu$ m; C, D, F, I = 10  $\mu$ m; E, G, H = 20  $\mu$ m.

and *B. rubella* (Hoffm.) A. Massal. on *Acer* and *Carpinus* bark. Probably parasymbiotic or weakly parasitic, causing slight deformation of the upper thallus cortex. In one specimen (KHER 2106), apothecia of *Bacidia rubella* were also infected by *Muellerella hospitans* Stizenb. The new species is known from four localities in Ukraine.

**ETYMOLOGY.** The epithet “polischukii” honors the eminent Ukrainian virologist Professor Valeriy

Polischuk, who actively takes part in our lichenological excursions and discussions.

**NOTES.** Morphologically, *Zwackhiomyces polischukii* is similar to *Z. socialis* (Körb.) Cl. Roux (= *Z. immersae* Arn.) Grube & Triebel) described from *Clauzadea monticola* (Ach. ex Schaer.) Hafellner & Bellem. (original host) and *C. metzleri* (Körb.) Clauzade & Roux (Grube & Hafellner 1990; Roux 2009). Records of *Z. socialis* from

terricolous *Bacidia baggiettoana* (A. Massal. & De Not.) Jatta (Vouaux 1913) need confirmation. *Zwackhiomyces socialis* differs from the new species by its smaller ascomata (120–150 µm diam. vs. 160–230 in *Z. polischukii*), smaller ascospores (15.7–18.0 × 5.0–5.8 µm vs. 18.0–21.6 × 6.0–7.6 µm in *Z. polischukii*) and thinner perithecial wall (up to 20 µm vs. up to 35 µm in *Z. polischukii*). *Zwackhiomyces berengerianus* (Arnold) Grube & Triebel has pale brown overmature ascospores (hyaline in *Z. polischukii*), longer asci (70–95 vs. 60–75 in *Z. polischukii*), slightly larger ascospores (17–27 × 5–10 µm vs. 17–23 × 5.0–8.3 µm in *Z. polischukii*), and having *Mycobilimbia berengeriana* (A. Massal.) Hafellner & V. Wirth as the host (Grube & Hafellner 1990). Few *Zwackhiomyces* species have ascospores similar in size to those of *Z. polischukii*. *Zwackhiomyces dispersus* (J. Lahm ex Körb.) Triebel & Grube differs from *Z. polischukii* by having smaller pyriform ascomata (100–170 µm diam. vs. 160–230 µm diam. in *Z. polischukii*), and occurs on *Protoblastenia rupestris*. The recently described *Zwackhiomyces solenopsorae* van den Boom differs in having smaller ascomata (70–150 µm diam. vs. 160–230 µm diam. in *Z. polischukii*), wider asci (17–20 µm wide vs. 12–16 µm wide in *Z. polischukii*), and occurs on the thallus of *Solenospora holophaea* (Mont.) G. Samp. (van den Boom 2010). *Zwackhiomyces turcicus* Kocakaya, Halıcı & A. Aksoy has distinctly larger ascomata (200–450 µm diam. vs. 160–230 µm diam. in *Z. polischukii*), a wider perithecial wall (30–60 µm wide vs. 15–35 µm wide), mostly 6-spored asci (8-spored in *Z. polischukii*), and *Physcia* as host (Kocakaya *et al.* 2011).

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