**Pronectria gromakovae**, a new lichenicolous fungus on *Lecanora populicola* and notes on other records from Kharkiv region (Ukraine)

Valerii Darmostuk

V. Darmostuk (valeriidarmostuk@gmail.com), Kherson State Univ., Kherson, Ukraine.

Recent records of lichenicolous fungi from the Kharkiv region are provided. Twenty species were reported as new to the region. *Pronectria gromakovae* is described as a new species on *Lecanora populicola*. *Didymocyrtis cladoniicola*, *D. epiphyscia*, *Epicladonia sandstedei*, *Katherinomyces cetrariae* and *Lichenoconium lichenicola* are new to the forest-steppe zone of Ukraine. *Physcia stellaris* is reported as a new host species for *Cladosporium licheniphilum*. Notes on the currently known distribution of selected species in other Ukrainian regions are provided.

Keywords: biodiversity, *Didymocyrtis*, forest-steppe zone, *Pronectria*, *Trichoconis*

In recent years the interest in lichenicolous fungi in Ukraine is increasing (Darmostuk and Khodosovtsev 2017). The lichenicolous flora in southern Ukraine and the Carpathians is well studied, and there has also been new findings from the Zhytomyr and Ternopil regions (Kapets and Kondratyuk 2019, Darmostuk and Sira 2020).

Kharkiv is one of the most important mycology historical centers in Ukraine. The research of fungi diversity in general as well as lichenicolous diversity has a long history. In early times, only isolated findings of lichenicolous fungi were presented. *Opegrapha physciaria* (= *Celidium varium* (Tul.) Körb.) is one of the few records of lichenicolous fungi which was recorded in Ukraine in the 19th century (Chernov 1895). A new era in research of lichenicolous fungi was started at the end of last century with one report of *Arthonia parietinaria* (as *Arthonia destruens* sensu ukr. auct.) from Gaidary village (Kondratyuk and Khodosovtsev 1997). Currently, only 17 species of lichenicolous fungi were reported from the Kharkiv region (Darmostuk and Khodosovtsev 2017, Gromakova 2018). Currently, 277 species of lichenicolous fungi were reported from Ukraine (Darmostuk unpubl.) instead more than 1600 species of lichens were contributed to Ukraine (Kondratyuk et al. 2010).

It is therefore useful to report lichenicolous fungi new for the region to level biodiversity knowledge gaps and understand how lichenicolous fungi are distributed in Ukraine. In this paper, I contribute twenty species as new to the region, among them *Pronectria gromakovae* described as new for science.

**Material and methods**

Specimens were examined by lens (×10) in situ and by standard microscope techniques using LOMO microscopes Optica and MICROMED-2. Microscopical examination was done in water, 10% KOH and Lugol’s iodine solution, directly or after pre-treatment with KOH or Brilliant Cresyl Blue. Measurements were made in water with an accuracy of 0.5 µm for ascospores, asci, conidia, conidiogenous cells, conidiophores, ascomatal and pycnidial wall cells, and 5 µm for ascostroma and pycnidia. They were made in magnifications × 640 and × 1600. Sizes are given as (min.) x − SD – x+SD (max.), where x is the average and SD is the standard deviation. All examined specimens are deposited in the lichenological herbarium of Kherson State University (KHER), N.V. Karazin Kharkiv National University (CWU) and author’s personal herbarium (herb. VD). Non-collected material is marked as ‘non coll.’

Lichenicolous fungi were collected during field trips in 2018–2020 to Kharkiv region. Field surveys were carried out at the following locations (Fig. 1):

1. Ukraine, Kharkiv region, Zmiivs’kyi district, N of Chernihivka village, 49°71’20.2”N, 36°34’33.2”E, alt. 102 m a.s.l., *Pinus* forest, 10 Apr 2020, coll. V. Darmostuk.
Results and discussion

*Arthonia apotheciorum* (A. Massal.) Almq.

Site 8: on *Polyozosia albescens* on concrete (non coll.).

*Cladosporium licheniphilum* Heuchert & U. Braun

Specimens examined: Site 3: on *Physcia stellaris* on *Quercus robur* bark (herb. VD 778); Site 12: on *Xanthoria parietina* on *Pyrus* bark (herb. VD 768).

This species was reported from a few localities, but is probably overlooked elsewhere. It was known from Mykolayiv, Kherson and Ternopil region (Khodosovtsev and Darmostuk 2016, Khodosovtsev et al. 2019a, Darmostuk and Sira 2020).

*Physcia stellaris* is a new host species.

*Didymocryptis cladoniicola* (Diederich, Kocourk. & Etayo) Ertz & Diederich

Specimens examined: Site 1: on *Cladonia uncialis* on sand (herb. VD 460); Site 13: on *Cladonia sp.* on soil (herb. VD 775).
This species was reported only from the steppe zone of Ukraine (Darmostuk and Khodosovtsev 2017, Khodosovtsev et al. 2019b). This record is new for the forest-steppe zone.

**Didymocyrtis epiphyscia** Ertz & Diederich

Specimens examined: Site 2: on Physcia aipolia on Quercus robur (CWU 202971), on Xanthoria parietina on Salix (CWU 202975); Site 4: X. parietina on Pyrus twig (CWU 203005).

This lichenicolous fungus is a poorly known species in Ukraine. It was reported only from Kherson region and Autonomous Republic Crimea (Darmostuk and Khodosovtsev 2017). Probably, *Didymocyrtis epiphyscia* is a common but rarely collected species in Ukraine.

**Didymocyrtis foliaceiphila** (Diederich, Kocourk. & Etayo) Ertz & Diederich

Specimen examined: Site 3: on Cladonia mitis on sand (herb. VD 497).

Recently, *Didymocyrtis foliaceiphila* was reported from Ternopil region on *Punctelia subrudecta* (Darmostuk and Sira 2020).

**Epicladonia sandstedei** (Zopf) D. Hawksw.

Specimens examined: Site 1: on Cladonia rangiformis on sand (herb. VD 769); Site 13: on sand (herb. VD 773).

In Ukraine, *Epicladonia sandstedei* was known from Kherson and Zakarpattia regions (Khodosovtsev and Darmostuk 2016, Khodosovtsev et al. 2018, Darmostuk et al. 2020).

**Homostegia piggotii** (Berk. & Broome) P. Karst.

Specimen examined: Site 5: on Parmelia sulcata on Quercus robur (herb. VD 366).

This species was reported from a few localities in different regions of Ukraine. In the forest-steppe zone, *Homostegia piggotii* was found in Poltava region (Darmostuk et al. 2017).

**Katherinomyces cetariae** Khodos.

Specimen examined: Site 1: on Cetraria aculeata on sand (herb. VD 461).

*Katherinomyces cetariae* was described on *Cetraria aculeata* from Kherson region (Khodosovtsev et al. 2016). Further research has shown that the species is not host specific and can infect other Parmeliaceae species as well as Lecidea fuscoatra and Rhizoplaca chrysoleuca (Darmostuk and Khodosovtsev 2019, Zhurbenko et al. 2020).

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

Specimens examined: Site 2: on Physcia tenella on Quercus robur (CWU 202969), on P. sulcata on Q. robur (CWU 202973); Site 3: on Physcia adscendens on Acer (non coll.); Site 6: on P. adscendens on Acer (non coll.); Site 7: on P. adscendens on Fraxinus (non coll.); Site 8: on P. adscendens on Fraxinus (non coll.).

*Illosporiopsis christiansenii* is a common species in Ukraine, but there is no previous report from Kharkiv region (Darmostuk and Khodosovtsev 2017, Khodosovtsev and Darmostuk 2017b, Darmostuk and Sira 2020).

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

Specimen examined: Site 8: on Physcia adscendens on Quercus robur (non coll.).

This species is rarely collected but probably overlooked (Darmostuk and Khodosovtsev 2017, Khodosovtsev and Darmostuk 2017b, Darmostuk and Sira 2020).

**Lichenochora obscuroides** (Linds.) Triebel & Rambold

Specimens examined (all on Phaeophyscia orbicularis): Site 2: on *Populus* (CWU 202841); Site 3: on *Acer* (herb. VD 476); Site 6: on *Populus* (non coll.); Site 9: on *Fraxinus* (herb. VD 119); Site 11: on *Populus* (herb. VD 767).

*Lichenochora obscuroides* probably is a common species within the forest-steppe zone of Ukraine (Darmostuk and Khodosovtsev 2017, Pleskach and Kondratyuk 2019).

**Lichenoconium erodens** M. S. Christ. & D. Hawksw

Specimen examined: Site 6: on Lecanora carpinea on Q. robur (herb. VD 200).

**Lichenoconium lichenicola** (P. Karst.) Petr. & Syd.

Specimen examined: Site 2: on Physcia tenella on Q. robur twig (herb. VD 118).

This coelomycetes fungus may be overlooked and not frequently collected. Confirmed records are known only from Kherson and Mykolaiv region (Darmostuk 2019).

**Lichenoconium lecanorae** (Jaap) D. Hawksw.

Specimen examined: Site 6: on Lecanora carpinea on Q. robur (herb. VD 200).

**Lichenoconium lichenicola** (P. Karst.) Petr. & Syd.

Specimen examined: Site 2: on *Physcia tenella* on *Q. robur* twig (herb. VD 118).

This coelomycetes fungus may be overlooked and not frequently collected. Confirmed records are known only from Kherson and Mykolaiv region (Darmostuk 2019).

**Lichenoconium xanthoriae** M.S. Christ.

Specimens examined (all on Massuikiella polycarpa): Site 2: on *Prunus* (CWU 202981); Site 3: on *Pyrus* (herb. VD 776); Site 5: on *P. sulcata* on *Q. robur* (herb. VD 361); Site 13: on *P. sulcata* on *Q. robur* (herb. VD 777).

**Lichenoconium xanthoriae** M.S. Christ.

Specimens examined (all on *Massuikiella polycarpa*): Site 2: on *Prunus* (CWU 202981); Site 3: on *Pyrus* (herb. VD 776); Site 5: on *P. sulcata* on *Q. robur* (herb. VD 361); Site 13: on *Xanthoria parietina* on *Acer* twig (herb. VD 777).

This is a common species in Ukraine (Darmostuk 2019).

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

Specimens examined: Site 12: on *Enchylium tenax* on soil (herb. VD 676); Site 13: on *Enchylium* sp. on soil (herb. VD 774).

This rarely collected species was described on *Collema* sp. from southern Ukraine (Khodosovtsev et al. 2012).
In forest-steppe zone this species was reported only from Poltava region (Darmostuk et al. 2017).

**Pronectria gromakovae** Darmostuk sp. nov. (Fig. 2)

MycoBank MB 838716

**Type:** Ukraine, Kharkiv region, Bohodukhivskyi district, near Zariabene village, small *Populus* forest, 50°23′12.7″N, 35°53′16.9″E, alt. 195 m a.s.l., on thallus and apothecia margins of *Lecanora populicola*, on *Populus tremula* bark, 8 Jul 2019, V. Darmostuk (Holotypus KHER 14203, Isotypus herb. VD 195).

**Diagnosis**

Morphologically similar to *Pronectria leptaleae*, but differing in the larger asci (60–)65–75(–80) × (11.4–)11.8–13.2(–14.0) μm, larger ascospores (10.4–)11.5–15.0(–18.2) × (5.8–)7.4–10.2(–12.6) μm and different host (*Lecanora* versus *Physcia*).

**Description**

Ascomata perithecia, numerous, immersed in discoloured host thallus and apothecia, globose to pyriform, 180–200 μm in diam, orange-brown to reddish-brown. Perithecial apex distinctly visible on host surface, ± reddish-brown, urceolate to flat, (30–)40–50(–65) μm diam. [n = 20]. Perithecial wall (14.2–)15.6–18.2(–19.6) μm wide [n = 15] in its medium and lower part, up to 30 μm in the upper part, rose to light orange to almost colourless, homogeneous, composed typically of 6–8 rows of cells, K–, with scattered orange oil droplets. Cells fusiform, thin-walled, rectangular, (3.6–)6.2–8.8(–11.2) × (1.6–)2.4–2.8(–3.2) μm [n = 20]. Paraphyses absent. Periphyses (8–)10–12(–14) long [n = 10] and ca 1.5 μm wide. Asci unitunicate, 8-spored, cylindrical to subclavate, (60.0–)65.0–75.0(–80.0) × (11.4–)11.8–13.2(–14.0) μm [n = 15], with apical ring. Ascospores uniseriate to biseriate, hyaline, (0)–1 septate, broadly ellipsoid to subglobose, slightly constricted at septa, with rounded apex, mostly smooth, only a few observed ascospores were slightly verrucose, with one oil drop, (10.4–)11.5–15.0(–18.2) × (5.8–)7.4–10.2(–12.6) μm [n = 50], the ratio of ascospore length/width (1.2–)1.3–1.7(–2.0). Conidiomata not observed.

**Etymology**

The epithet honours the Ukrainian lichenologist Dr Alla Gromakova at the occasion of her 55th birthday.

**Ecology and distribution**

The new species is known from two localities in Kharkiv region, where it grows on the thalli of *Lecanora populicola* on *Populus tremula*. The infection does not induce gall formation, but causes a discoloration of the host thallus and apothecia.

**Notes**

The genus *Pronectria* in strict sense is characterized by orange, immersed perithecia without setae, mostly 1-septate ascospores and K– perithecium wall (Rossman et al. 1999, Diederich 2003). Including 44 species, *Pronectria* is one of the genera with the largest number of described lichenico-
lous fungi (Diederich et al. 2018). All Pronectria species are more or less specific to one host species or genus. No Pronectria species has been described on Lecanoraceae. Several Pronectria species with broadly ellipsoid to subglobose ascospor have to be compared with the new species. Pronectria diplococca has similar ascomata size and ascospor shape, but differs in having much smaller asci ((30.0–)34.0 ± 2.0(–37.0) × (4.0–)6.0 ± 1.6(–9.0) μm versus (60–)65–75(–80) × (11.4–)11.8–13.2(–14.0) μm in P. gromakovae), smaller disintegrating ascospores [(8.75–)10.95 ± 1.39(–13.50) × (4.75–)6.66 ± 0.90(–8.75) μm versus (10.4–)11.5–15.0(–18.2) × (5.8–)7.4–10.2(–12.6) μm in P. gromakovae] and different host (Collemataceae versus Lecanoraceae) (Khoodosovtsev et al. 2012). The new species is also closely related to Pronectria leptaleae has similar ascomata and asci, but can be distinguished by smaller ascospores (6.0–11.5 × 5.5–6.5 μm in type description versus (10.4–)11.5–15.0(–18.2) × (5.8–)7.4–10.2(–12.6) μm in P. gromakovae), narrower ascis (8.0–11.5 μm versus (11.4–)11.8–13.2(–14.0) μm in Pronectria gromakovae) and Physcia as the host (Steiner 1900, Rossman et al. 1999, Berger et al. 2020). Within this study, we compare the ascospor length of two Pronectria gromakovae specimens (KHER 14192, herb. VD 766) with three specimens of P. leptaleae (KHER 10280, 10322, herb. VD 700). All three specimens of P. leptaleae had significantly shorter ascospores than both specimens of P. gromakovae (Fig. 3).

Pronectria biglobosa Etayo has smaller ascomata (100–150 μm versus 180–200 μm in diam in Pronectria gromakovae), slightly narrower ascospore strongly constricted at the septa ((5.0–)6.0–6.5(–7.5) μm versus (5.8–)7.4–10.2(–12.6) μm in Pronectria gromakovae and a different host (Hypotrachyna versus Lecanora) (Etayo 2017)). Lastly, the new species is similar to the recently described Pronectria etayoi E. Zimm. & F. Berger which differs in the larger ascomata (200–300 μm versus 180–200 μm in diam in Pronectria gromakovae), distinctly echinulate and larger ascospor that are not constricted at the septum (versus mostly smooth, constricted at the septum in P. gromakovae) and the different host (Physcia versus Lecanora) (Berger et al. 2020).

Additional examined specimens
Pronectria gromakovii (paratype): Ukraine, Kharkiv region, Zmiiv’skyi district, near Konstantynivka village, 49°75’59.2”N, 36°26’03.3”E, 13 May 2020, coll. V. Darmostuk (herb. VD 766).

Pronectria leptaleae s.s. (all on Physcia stellaris): Ukraine, Mykolaiv region, Vozneseni’skyi district, near Trykryati village, 47°70’65.5”N, 31°40’90.3”E, on Quercus robur twig, 21 Oct 2016, V. Darmostuk, A. Khodosovtsev (KHER 10322); Brats’kyi district, near Vysoka Hora village, Dubova Balka Lendmark, 47°88’95.5”N, 31°61’29.8”E, on Acer campestre twig, 21 Oct 2020, V. Darmostuk (herb. VD 700); Sumy region, Seredyno-Buds’kyi district, Desiansko-Starogutsky National Nature Park, near Ochkino village, 52°36’22.5”N, 53°38’92.7”E, on Salix twig, 1 Aug 2016, V. Darmostuk, A. Khodosovtsev (KHER 10280).

Figure 3. Differences in ascospores length of Pronectria gromakovii and P. leptaleae specimens.
**Pyrenocheata xanthoriae** Diederich,

Specimens examined: Site 2: on Xanthoria parietina on Populus tremula bark (CWU 202848, 203002).

*Pyrenocheata xanthoriae* is a common fungus dwelling on *Xanthoria*, which was reported from a few localities in Ukraine (Darmostuk and Khodosovtsev 2017, Kapets and Kondratyuk 2019, Khodosovtsev et al. 2019a).

**Refractohilum intermedium** Cl. Roux & Etayo

Specimen examined: Site 2: on *Gyalectia fagicola* on Populus tremula bark (CWU 203446).

*Refractohilum intermedium* is a rare species growing on *Pachyphiale* species (Roux et al. 1997). In the forest-steppe zone of Ukraine it was reported from Sumy and Ternopil regions (Khodosovtsev and Darmostuk 2017a, Darmostuk and Sira 2020).

**Taeniolella phaeophysciae** D. Hawksw.

Specimen examined: Site 2: on *Phaeophyscia orbicularis* on *Acer* bark (CWU 2028486).

**Trichoconis hafellneri** U. Braun, Khodos., Darmostuk & Diederich

Specimen examined: Site 2: on *Xanthoria parietina* on *Q. robur* bark (CWU 2028481).

*Trichoconis hafellneri* was described from Kherson and Poltava region on thallus and apothecia of *Athallia pyracea* and *Xanthoria parietina* (Braun et al. 2016). Currently, only records from Austria are known in addition to the type localities (Berger 2019).

**Conclusion**

Including the 21 species presented in this study, in total 38 species of lichenicolous fungi are currently known in the Kharkiv region. *Proneckria* gromakovae is described as new for science on thallus and apothecia margin of *Lecanora papulicola*. It is the first *Proneckria* species described from Lecanoraceae. *Didymocyrtis cladoniicola*, *D. epiphys*, *Epibryon kondra* and *Katherinomyces cetrariae* are new to the lichenicolous fungi collected in Southern Ukraine. – Folia Cryptogam. Eston. 58: 19–24.

**Acknowledgements** – I express my gratitude to Javier Etayo and Franz Berger for a discussion on the new species and linguistic corrections. Alla Gromakova and Olha Sira were of indispensable assistance during fieldwork excursions.

**References**

Berger, F. 2019. Über die Diversität lichenicoler Pilze in einem Innviertler Hausgarten (Oberösterreich, Österreich). – Herzogia 32: 81–93.

Berger, F., Zimmermann, E. and Brackel, W. V. 2020. Species of *Proneckria* (Bionectriaceae) and *Xenoneckria* (Nectricaceae) growing on foliose Physciaceae, with a key of the Central European species. – Herzogia 33: 473–493.

Braun, U., Khodosovtsev, A. Y., Darmostuk, V. V. et al. 2016. *Trichoconis hafellneri* sp. nov. on *Athallia pyracea* and *Xanthoria parietina*, a generic discussion of *Trichoconis* and keys to the species of this genus. – Herzogia 29: 307–314.

Chernov, V. K. 1895. About lichens of the city of Kharkov and its environs. – Proc. Soc. Nat. Kharkov Univ. 28: 209–249.

Darmostuk, V. V., Khodosovtsev, A. Y., Vondrask, J. et al. 2020. New and noteworthy lichenicolous and bryophylous fungi from the Ukrainian Carpathians. – Folia Cryptogam. Eston. 58: 19–24.

Darmostuk, V. V. 2019. The genus *Lichenoconium* (Lichenoconiaceae, Ascomycota) in Ukraine. – Ukrainian Bot. J. 76: 101–113.

Darmostuk, V. V. and Khodosovtsev, A. Y. 2017. Lichenicolous fungi of Ukraine: an annotated checklist. – Stud. Fungi 2: 138–156.

Darmostuk, V. V. and Khodosovtsev, A. Y. 2019. *Epibryon kondratyukii* sp. nov., a new algicolous fungus and notes on rare lichenicolous fungi collected in Western Ukraine. – Folia Cryptogam. Eston. 56: 109–116.

Darmostuk, V. V. and Sira, O. Y. 2020. New and remarkable records of lichenicolous fungi from Ternopil Oblast (Ukraine). – Czech Mycol. 72: 33–41.

Darmostuk, V. V., Khodosovtsev, A. and Khodosovtseva, Y. A. 2017. Lichens and lichenicolous fungi from eastern Ukraine. – Chornomors’k. Bot. z. 14: 69–90.

Diederich, P. 2003. New species and new records of American lichenicolous fungi. – Herizogia 16: 41–90.

Diederich, P., Lawrey, J. D. and Ertz, D. 2018. The 2018 classification and checklist of lichenicolous fungi, with 2000 non-lichenized, obligately lichenicolous taxa. – Bryologist 121: 340–425.

Etayo, J. 2017. Hongos lichenicolos de Ecuador – San Miguel de Tucumán: Opera lilloana 50. – Fundación Miguel Lillo.

Gromakova, A. B. 2018. New records of lichens and lichenicolous fungi from eastern Ukraine. – Chornomors’k. Bot. z. 14: 269–278.

Kapets, N. V. and Kondratyuk, S. Y. 2019. New data on lichenicolous fungi of the Teteriv River Basin (Ukraine). – Acta Bot. Hung. 61: 45–54.

Khodosovtsev, A. Y. and Darmostuk, V. V. 2016. New species of lichenicolous fungi for Ukraine. – Folia Cryptogam. Eston. 53: 93–99.

Khodosovtsev, A. Y. and Darmostuk, V. V. 2017a. New for Ukraine records of lichenicolous fungi. – Ukrainian Bot. J. 74: 177–183.

Khodosovtsev, A. Y. and Darmostuk, V. V. 2017b. *Zwackhiomyces polischukii* sp. nov., and other noteworthy lichenicolous fungi from Ukraine. – Polish Bot. J. 62: 27–35.

Khodosovtsev, A. Y., Darmostuk, V. V., Khodosovtseva, Y. A. et al. 2018. The lichens and lichenicolous fungi of the Chalbasy arena in Lower Dnipro sand dunes (Kherson region). – Chornomors’k. Bot. z. 14: 69–90.

Khodosovtsev, A. Y., Darmostuk, V. V., Khodosovtseva, Y. A. et al. 2019a. The lichens and lichenicolous fungi of Trykraty granite massive (Ukraine). – Chornomors’k. Bot. z. 15: 54–68.
Khodosovtsev, A. Y., Darmostuk, V. V., Moysiyenko, I. I. et al. 2019b. Fulgensia desertorum (Teloschistales, Ascomycota) and other rare species in the association Toninio-Psoretum decipiens. – Ukrain. Bot. J. 76: 236–242.

Khodosovtsev, A. Y., Gavrylenko, L. M. and Klymenko, V. M. 2016. Katherinomyces cetrariae gen. et sp. nov. (Asexual Ascomycota) and Sphaerellothecium aculeatae sp. nov. (Mycosphaerellaceae), new lichenicolous fungi on Cetraria aculeata in Ukraine. – Nova Hedwigia 103: 47–55.

Khodosovtsev, A., Vondrák, J., Naumovich, A. et al. 2012. Three new Pronectria species in terricolous and saxicolous microlichen communities (Bionectriaceae, Ascomycota). – Nova Hedwigia 95: 211–220.

Kondratyuk, S. Y. and Khodosovtsev, A. Y. 1997. New for Ukraine species of lichenicolous fungi. – Ukrain. Bota. J. 54: 564–569.

Kondratyuk, S. Y., Dymytrova, L. V. and Nadyeina, O. V. 2010. The third checklist of lichen-forming and allied fungi of Ukraine (state at 2010). – In: Oxner, A. N. (ed.), The lichen flora of Ukraine, Vol. 2(3). Naukova Dumka, Kyiv, pp. 446–486.

Pleskach, L. and Kondratyuk, S. Y. 2019. Species biodiversity of epiphytic lichens of ‘Alexandria’ Dendrological Park. – Rev. Bot. 2: 53–58.

Rouxi, A. Y., Samuels, G. J., Rogerson, C. T. et al. 1999. Genera of Bionectriaceae, Hypocreaceae and Nectriaceae (Hypocreales, Ascomycetes). – Stud. Mycol. 42: 1–248.

Roux, C., Etayo, J., Bricaud, O. et al. 1997. Les Refractobilum (Hyphomycètes, Moliniacés) à conidies pluriseptés en Europe et au Canada. – Can. J. Bot. 75: 1592–1600.

Steiner, J. 1900. Lichenes. – In: Fritsch, K. v. (ed.), Beitrag zur Flora von Konstantinopel. Bearbeitung der von J. Nemetz in den Jahren 1894 bis 1897 in den Umgebungen von Konstantinopel gesammelten Pflanzen. I. Kryptogamen. Denkschrift der Österreichischen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Klasse 68: pp. 222–238.

Zhurbenko, M. P., Enkhtuya, O. and Javkhlan, S. 2020. Additions to the checklist of lichenicolous fungi of Mongolia. – Folia Cryptogam. Eston. 58: 9–20.