Botanica Pacifica. A journal of plant science and conservation. 2022. 11(2): 169–173
DOI: 10.17581/bp.2022.11204

Studies on lichenicolous fungi in the Uppsala (UPS) collection curated by the late Rolf Santesson. Part II

Mikhail P. Zhurbenko*

Mikhail P. Zhurbenko*
e-mail: zhurb58@gmail.com

V.L. Komarov Botanical Institute RAS,
St. Petersburg, Russia

* corresponding authors

Manuscript received: 20.05.2022
Review completed: 21.06.2022
Accepted for publication: 22.06.2022
Published online: 23.06.2022

ABSTRACT

Taxonomical notes on *Capronia leopoldiana* s.l., *Niesslia globispora*, *Opegrapha foreaui*, *Scutula miliaris*, and *Stictographa dirinariicola* are provided. *Opegrapha foreaui* is reported as new to China, *Stictographa dirinariicola* new to Tanzania and continental Africa, and *Xenonectriella physciacearum* new to China, which is the first confirmed report for Asia. *Phaeophyscia melanchra* is reported as new host species for *Xenonectriella physciacearum*.

Keywords: biodiversity discovery, biogeography, lichen-dwelling fungi, taxonomy

РЕЗЮМЕ

Журбенко М.П. Исследования коллекции лихенофильных грибов покойного Рольфа Сантессона, хранящейся в Уппсале (UPS). Часть II. Приведены таксономические сведения о *Capronia leopoldiana* s.l., *Niesslia globispora*, *Opegrapha foreaui*, *Scutula miliaris* и *Stictographa dirinariicola*. *Opegrapha foreaui* впервые отмечена в Китае, *Stictographa dirinariicola* – в Танзании и континентальной Африке, а *Xenonectriella physciacearum* – в Китае, что также является ее первой подтвержденной находкой в Азии. *Phaeophyscia melanchra* – новый вид хозяина для *Xenonectriella physciacearum*.

Ключевые слова: биоразнообразие, биогеография, лихенофильные грибы, таксономия

Lichenicolous fungi represent a specialized group of organisms that obligately or facultatively live on lichens and currently number more than 2000 accepted species from different classes of Ascomycota and Basidiomycota (Diederich et al. 2018). One of the 'founding fathers' of the modern generation of lichenicolous fungi researchers can be considered the late Rolf Santesson, after whom more than 20 species of these fungi are named (Tibell & Moberg 2014, Index Fungorum 2022). Professor Santesson's professional career was largely associated with the University of Uppsala, where he left a vast collection of lichenicolous fungi, both those he collected himself in various parts of the world and those he discovered in lichen specimens from other collectors. A large part of this collection was left unidentified and so I, as one of his students, was invited in 2017 to the herbarium of the Museum of Evolution of Uppsala University (UPS) to revise these materials. This paper continues the publication of the results of that revision (Zhurbenko 2021, 2022) and aims to present new information on the taxonomy, geographical distribution and hosts of seven species of lichenicolous fungi collected in Asia, Africa and South America, mainly by Rolf Santesson.

MATERIAL AND METHODS

Microscopy was carried out, and images were captured, using a Zeiss Axio Zoom.V16 microscope and a Zeiss Axio Imager.A1 microscope equipped with Nomarski differential interference contrast optics and fitted with a Zeiss AxioCam MRc5 digital camera. Microscopic characters were studied using sections hand-cut with a razor blade and mounted in water, 10 % potassium hydroxide (K), phloxine, and Lugol's iodine directly (I) or after a K pretreatment (K/I). Measurements were taken from water mounts and rounded to the nearest 0.5 um. The length, width and length/width ratio (l/w) of the ascospores and conidia are given as (min –)(x − SD) – (x + SD)(– max), where 'min' and 'max' are the extreme values observed, x the arithmetic mean and SD the corresponding standard deviation. Colours were named according to Kornerup & Wanscher (1978). Voucher specimens are held at UPS.

RESULTS

Capronia leopoldiana Etayo s.l.

According to Diederich et al. (2018) 18 of the 21 known lichenicolous species of *Capronia* are confined to a single host lichen genus. On lichens of the genus *Leptogium*, two species of *Capronia* have been known to date that differ well in the number of ascospore septa, *C. leopoldiana* Etayo with 3–5 transverse and 0(–1) longitudinal or oblique septum in central segments, and *C. leptogii* Etayo & Diederich with one transverse septum (Etayo 2002, Etayo & Sancho 2008). In the material I examined, two specimens of *Capronia* on *Leptogium* were found one of which (R. Santesson S449) corresponds well to the protologue of *C. leopoldiana* (Etayo & Sancho 2008) and represents the first find of this species from Argentina, while the other (R. Santesson 22065) differs from the protologue in its larger perithecia and lack of hymenium reaction with K/I (Table 1). *Capronia leopoldiana* was previously only reliably known from Chile (Etayo & Sancho 2008) and Ecuador (Etayo 2017). Additionally, Brackel (2009) reported *Capronia* aff. *leopoldiana* from Germany. The question remains whether the specimens from Africa and Europe (Table 1) should be considered within the broader concept of *Capronia leopoldiana* or whether they belong to morphologically similar but different species.

Table 1. Comparison of *Capronia leopoldiana* and *C.* cf. *leopoldiana*.

Species compared	*Capronia leopoldiana*		*Capronia* cf. *leopoldiana*	
Data sources	Etayo & Sancho (2008), Etayo (2017)	the R. Santesson S449 specimen examined	Brackel (2009)	the R. Santesson 22065 specimen examined
Location of finds	South America (Chile, Ecuador)	South America (Argentina)	Europe (Germany)	Africa (Kenya)
Perithecia, diam. (µm)	70–100	75–125	120–160	130–260
Setae, length (µm)	15–40	25–65 (n = 29)	15–55	35–75 (n = 19)
Hymenium, staining in K/I	blue	blue	no data	absent
Ascospores, number of transverse septa	(0–)3–5(–6)	(0–)2–5(–8)	1–3	(0–)2–6(–7)
Ascospores, longitudinal or oblique septum in central segments	occasionally present	occasionally present	not observed	occasionally present
Ascospores, dimensions (µm)	(15–)17–22(–24) × 4–5.5	(17.5–)19–23(–26.5) × (4–)5–6(–6.5) (n = 64)	(14–)15–19.5(–21) × (4.5–)5–6(–6.5)	(13–)15.5–21(–25.5) × (4.5–)5–6 (n = 22)

Specimens examined: KENYA, Central province, Nanyuki District, W slope of Mt. Kenya, National Park Road (Naro Moru Track), 0°10'S 37°14–15'E, elev. 3300–3450 m, in the ericaceous belt, on *Leptogium* sp. (upper and lower sides of thallus, thalline margin of apothecia), growing on a decaying stump, 23.01.1970, R. Santesson 22065 (UPS F-892301); ARGENTINA, Tierra del Fuego, Ushuaia, elev. 450 m, *Nothofagus pumilo* forest, on *Leptogium* sp. (thallus) growing on the ground, 29.01.1940, R. Santesson S449 (UPS F-896261).

Merismatium coccotremicola Etayo

The species is known only from Chile (Etayo & Sancho 2008).

Specimen examined: CHILE, Valdivia Province, Lago Panguipulli, volcano Choshuenco (Shoshuenco), elev. 1200 m, rather dense forest, on *Coccotrema cucurbitula* (thallus) growing on *Nothofagus pumilo*, 14.10.1940, R. Santesson S417, UPS F-858751.

Niesslia globispora Etayo

Ascospores hyaline, oblong, with rounded ends, (6–)6.5(–7) × 2.5–3.5 µm, l/w = (1.8–)1.9–2.5(–2.6) (n = 11), 1-septate, slightly constricted at the septum, easily splitting into equal semi-spores, initially smooth, becoming granulate, arranged diagonally uniseriate to biseriate in the ascus. It is noteworthy that in *Niesslia* species, ascospores are usually smooth-walled and do not disintegrate into semispores (Gams et al. 2019). The examined material fits well the species protologue (Etayo 2002) emended by Etayo et al. (2013), except for the asci, which were observed by the above authors to contain four 2-celled spores easily broken up into semi-spores, while I observed at least part of the asci with eight 2-celled spores (Fig. 1), which is typical of the genus (Gams et al. 2019).

This species is known from Colombia, Ecuador, and Venezuela (Etayo 2002, 2017).

Specimen examined: VENEZUELA, Bolívar, NW slopes of Mount Venamo, SE of road camp 125, NE-facing line of sandstone bluffs, elev. 1100–1400 m, on *Cora glabrata* (discoloured parts of thallus), 27.04.1960, J. Steyermark & S. Nilsson 419 (UPS F-892298).

Opegrapha foreaui (Moreau) Hafellner & R. Sant.

Coppins & Kondratyk (1998) provided a detailed description of this species (as *Opegrapha trassii* S.Y. Kondr. & Coppins) based on a wealth of studied material from various parts of the world. The studied specimens from China generally correspond well to this description, but have some minor differences: ascomata (140–)170–250 (–520) × (100–)110–180 (–220) µm (n = 37) vs 200–300 (–400) µm long, exciple is sometimes (in Moberg & Santesson 7713b) violet brown vs dark brown to blackish brown, sometimes with reddish tinge, 15–50 µm vs 18–27 (–33) µm wide laterally; epihymenium is sometimes distinct, pale orange; ascospores are (1–)3-septate vs 3(–5)-septate, somewhat shorter and broader, (12–)13.5–15.5(–16.5) × (4–)4.5–5.5(–6.5) µm (n = 52) vs 12.5–17.5(–19) × (3.5–)4.5–5(–5.5) µm. I confirm that there can be 2, 4, 6 or 8 spores in the asci, as noted by the aforementioned authors. Ascomata surrounded by brown zone with darker marginal rim, suggesting pathogenic effect on the host.

This widely distributed species confined to *Heterodermia* spp. was previously known from Angola, Columbia, Costa Rica, Dominikan Republic, Ecuador, India, Japan, Malawi, Mauritius, New Zealand, Sierra Leone, Peru, Portugal (Azores), South Africa, Spain (Canary Islands), Surinam, Uganda, USA (continental part, Hawaii, Purto-Rico), and Zambia (Moreau 1951, Coppins & Kondratyk 1998, Etayo 2002, 2010, 2017, Hafellner 2002, Diederich 2003, Hafellner & Mayrhofer 2007, Etayo & Van Den Boom 2013, Joshi et al. 2016, van den Boom 2021) and is reported here for the first time for China.

Specimens examined: CHINA, Yunnan Province: Simao District, Mojiang Co., along the road just E of the river Babian Jiang (km-post 433 from Kunming), 23°16'N 101°16'E, elev. 1100 m, on *Heterodermia obscurata* (thallus) growing on wayside trees, 13.09.1987, R. Moberg & R. Santesson 7713b (UPS 53054, L-19082); Xishuangbanna District, Jinghong Co., Menglun, near the top of Shihui Shan Mt. (limestone hill), 21°56'N 101°16'E, elev. 650 m, on *Heterodermia diademata* (thallus) growing on twigs and small trees in open situation, 14.09.1987, R. Moberg & R. Santesson 7754b (UPS 53055, L-19083).

Scutula miliaris (Wallr.) Trevis.

The material examined represents the macroconidial state of this species previously known as *Karsteniomyces peltigerae* (P. Karst.) D. Hawksw. It differs slightly from the description given by Hawksworth (1981) in its semi-immersed, dark brown to blackish vs almost superficial, pale orange to dark orange red pycnidia. Conidia are (13–)18–22(–23.5) × (3.5–)4.5–5(–6) µm, l/w = (2.8–)3.7–4.7(–5.3) (n = 44) as compared to (12–)15–22(–24) × 3.5–5(–6) µm (Hawksworth 1981) or (8–)13.5–19(–26) × (3–)4–5(–5.5) µm (Triebel et al. 1997).

This species is known from many finds on *Peltigera* spp. from Africa (only from Kenya), Asia, Australasia, Europe, North America and South America (Hawksworth 1981, Triebel et al. 1997, Diederich 2003, Triebel & Kainz 2004, Zhurbenko 2007, Etayo & Sancho 2008, Brackel 2014).

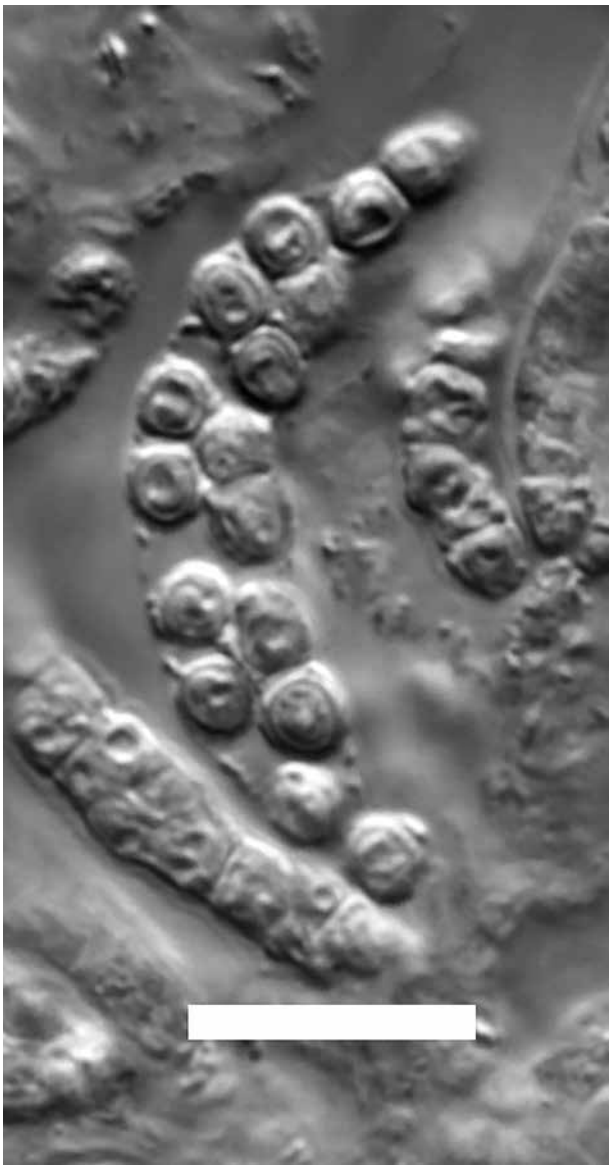

Figure 1 *Niesslia globispora* Etayo (J. Steyermark & S. Nilsson 419). Ascus with eight 2-celled spores, in water. Scale bar: 10 μm

Specimen examined: KENYA, Nanyuki District, W slope of Mt. Kenya, National Park Road (Naro Moru Track), 0°10'S 37°11–13'E, elev. 2900 m, bamboo zone, on *Peltigera* cf. *rufescens* (thallus) growing on the base of *Podocarpus milanjinus*, 23.01.1970, R. Santesson 22166 (UPS F-896313).

Stictographa dirinariicola Diederich & Ertz

The examined material fits well the species protologue (Diederich et al. 2017), however, here I provide a few additional details. Vegetative hyphae poorly developed, pale brown, 3–3.5 μm diam. Ascomata irregularly orbicular or elongated, sometimes angular to shortly branched in surface view, 100–240 μm in length, 113–186 μm tall, cupulate to somewhat ampulliform, sometimes with flattened base in cross-section. Disc greyish brown, glossy, flat or slightly concave, initially more or less closed by the prominent black exciple, becoming widely exposed and surrounded by a slightly elevated exciple (Fig. 2A–C). Basal exciple brown, 12–32 μm wide, sometimes forming root-like outgrowths up to 80 μm wide (Fig. 2D–E), paraplectenhymatous in cross-section, composed of cells with walls 0.5–1 μm wide. Lateral exciple dark brown to blackish, 11–44 μm wide, usually widened above, similar in structure, but composed of cells with thicker walls, sometimes making cell lumen difficult to discern. Exciple and surrounding tissues often contain conspicuous refractive granules. Hymenium hyaline, except for the light brown to brownish orange, partly slightly granulose epihymenium 11–17 μm tall. Hamathecial hyphae are somewhat confusing and seem to include: 1) the most common type of hyphae originating from the basal and lateral exciple, that are frequently septate, markedly constricted at the septa, not widened above, without acuminate apex (Fig. 2F–G); 2) rare type of hyphae originating from the basal exciple, that are scarcely septate, not markedly constricted at the septa, widened above to 5.5 μm, acuminate at the apex 1.5–2.5 μm wide (narrowly ventricose; Fig. 2H). Hypothecium hyaline, 20–25 μm tall. Ascospores (14–)14.5–18(–22) × (4.5–)5.5–7.5(–8) μm, l/w = (2.0–)2.3–2.9(–3.2) (n = 42), almost always 1-septate, but one 3-septate overmature ascospore was also observed.

This recently described species was previously known only from a type locality in the Seychelles (Diederich et al. 2017). Here it is reported for the first time for Tanzania and continental Africa.

Specimen examined: TANZANIA, Tanga Region, 3 km NE of Pangani, 5°25'S 38°59'E, at the seashore, on *Dirinaria* sp. (thallus) growing on *Adansonia digitata*, 12.01.1971, R. Santesson 23508 (UPS F-892305).

Xenonectriella physciacearum F. Berger, E. Zimm. & Brackel

Ascomata red with distinctly darker red papilla, 150–250 μm diam., mostly protrude in the papilla area, scattered to loosely aggregated, mostly associated with somewhat discoloured parts of the host lobes. Ascomatal wall K+ violet. Asci 90–110 × 10–12 μm. Mature ascospores greyish orange, with similarly coloured tubercles 1–2 μm diam., broadly oblong/ellipsoid, with broadly rounded ends, (9–)10.5–13.5(–16.5) × (7–)8–9(–9.5) μm, l/w = (1.1–)1.2–1.6(–2.3) (n = 50), (0–)1-septate, slightly constricted at the septum, uniseriate in the ascus. Examined material fits well the species protologue including the range of variation of ascoma wall response with K (Berger et al. 2020).

This recently described species has so far been reliably known from Europe and presumably from Asia, from the Caucasus (Berger et al. 2020). First confirmed find for Asia. New to China. *Phaeophyscia melanchra* is a new host species.

Specimen examined: CHINA, Yunnan Province, Kunming District, Anning Ca., ca 30 km SW of Kunming, Hot Springs, along the road to the Caoxi Temple, 24°48'N 102°27'E, elev. 1800 m, on *Phaeophyscia melanchra* (thallus), 28.09.1987, R. Santesson 32293 (UPS F-857566).

DISCUSSION

Herbarium collections are an important source of new knowledge about various organisms, in some cases not even the objects of collection. For example, a two-month inspection by the author of the lichen herbarium of the National Museum of Nature and Science of Japan (TNS) found hundreds of lichenicolous fungal species, including one genus and eight species described as new to science (Zhurbenko & Ohmura 2018a, b, 2019, 2020, Zhurbenko et al. 2018, Motiejūnaitė et al. 2019).

Especially valuable are collections assembled by experts in a particular group of organisms, as in the case of Rolf Santesson's collection of lichenicolous fungi, which is

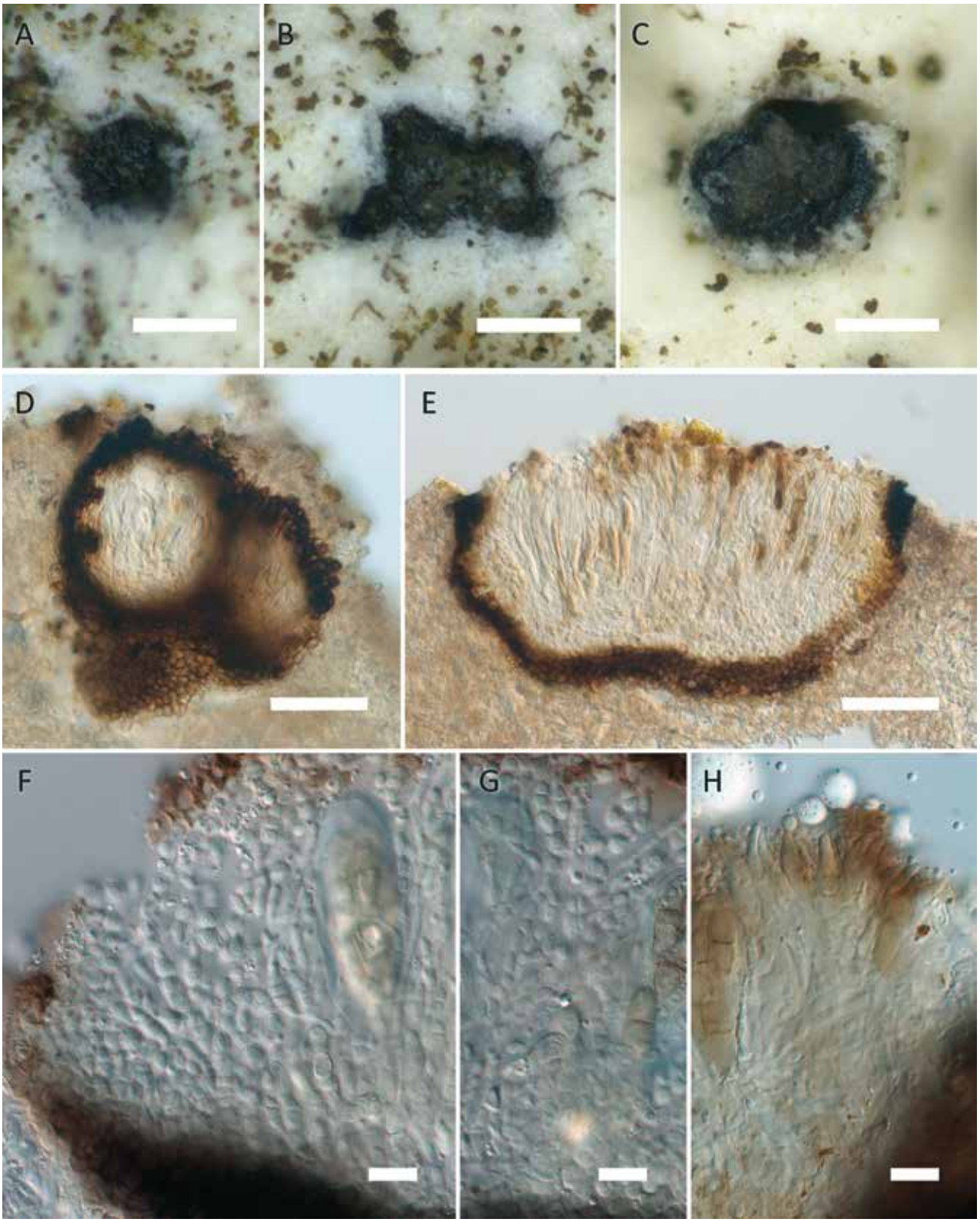

Figure 2 *Stictographa dirinariicola* Diederich & Ertz (R. Santesson 23508). A–C – habitus of ascomata on the thallus of *Dirinaria* sp.; D–E – ascomata in cross-section. Note the root-like outgrowth of the basal exciple at the ascoma on the left; F–G – hamathecial hyphae type 1; H – hamathecial hyphae type 2 (narrowly ventricose). D–H – in water. Scales: A–C = 100 μm, D–E = 50 μm, F–H = 10 μm.

a 'Klondike' for subsequent research in the field. For example, a revision of the material in this collection from Peru led to the description of two genera and 17 species of these fungi new to science (Etayo 2010). Two other genera and six species new to science have recently been described following an audit of this collection (Motiejūnaitė et al. 2019, Zhurbenko 2021, 2022). Notably, of the seven lichenicolous fungal species discussed in this paper, five were not described until 33–68 years after the date of collection of the specimens revisited here.

ACKNOWLEDGEMENTS

This study was carried out within the framework of the research project of the V.L. Komarov Botanical Institute RAS 'Biodiversity, ecology, structural and functional features of fungi and fungus-like protists' (122011900033-4) using the equipment of its Core Facility Center 'Cell and Molecular Technologies in Plant Science'. The author's visit to UPS herbarium was financially supported by the Rolf Santesson foundation. Roland Moberg, Stefan Ekman and Martin Westberg are thanked for various kinds of help and support during my stay in Uppsala. Paul Diederich and Javier Etayo provided valuable comments on the manuscript.

LITERATURE CITED

Berger, F., E. Zimmermann & W. v. Brackel 2020. Species of *Pronectria* (Bionectriaceae) and *Xenonectriella* (Nectriaceae) growing on foliose Physciaceae, with a key of the European species. *Herzogia* 33:473–493.

Brackel, W. v. 2009. Weitere Funde von flechtenbewohnenden Pilzen in Bayern – Beitrag zu einer Checkliste IV. *Berichte der Bayerischen Botanischen Gesellschaft* 79:5–55.

Brackel, W. v. 2014. Kommentierter Katalog der flechtenbewohnenden Pilze Bayerns. *Bibliotheca Lichenologica* 109:1–476.

Coppins, B.J. & S.Y. Kondratyuk 1998. *Opegrapha trassii* sp. nov., a new lichenicolous fungus on *Heterodermia*. *Folia Cryptogamica Estonica* 32:9–14.

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

Diederich, P., R. Lücking, A. Aptroot, H.J.M. Sipman, U. Braun, T. Ahti & D. Ertz 2017. New species and new records of lichens and lichenicolous fungi from the Seychelles. *Herzogia* 30:182–236.

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

Etayo, J. 2002. Aportación al conocimiento de los hongos liquenícolas de Colombia. *Bibliotheca Lichenologica* 84:1–154.

Etayo, J. 2010. Hongos liquenícolas de Perú. Homenaje a Rolf Santesson. *Bulletin de la Société linnéenne de Provence* 61:83–128.

Etayo, J. 2017. Hongos liquenícolas de Ecuador. *Opera Lilloana* 50:1–535.

Etayo, J. & L.G. Sancho 2008. Hongos liquenícolas del sur de Sudamérica, especialmente de Isla Navarino (Chile). *Bibliotheca Lichenologica* 98:1–302.

Etayo, J. & P.P.G. Van den Boom 2013. A first checklist of lichenicolous fungi from the Dominican Republic, including the description of a new species of *Xenonectriella*. *Opuscula Philolichenum* 12:142–150.

Etayo, J., A. Flakus & M. Kukwa 2013. *Niesslia echinoides* (Niessliaceae, Ascomycota), a new lichenicolous fungus on *Erioderma* from Bolivia. *Lichenologist* 45:21–24.

Gams, W., B. Stielow, T. Gräfenhan & H.-J. Schroers 2019. The ascomycete genus *Niesslia* and associated monocillium-like anamorphs. *Mycological Progress* 18:5–76.

Hafellner, J. 2002. Bemerkenswerte Funde von Flechten und lichenicolen Pilzen auf makaronesischen Inseln VI. Über einige Neufunde. *Fritschiana* 36:11–17.

Hafellner, J. & H. Mayrhofer 2007. A contribution to the knowledge of lichenicolous fungi and lichens occurring in New Zealand. *Bibliotheca Lichenologica* 95:225–266.

Hawksworth, D.L. 1981. The lichenicolous Coelomycetes. *Bulletin of the British Museum (Natural History), Botany Series* 9:1–98.

Index Fungorum. Available from: http://www.indexfungorum.org. Last accessed 19.05.2022.

Joshi Y, A. Falswal, M. Tripathi, S. Upadhyay, A. Bisht, K. Chandra, R. Bajpai & D.K. Upreti 2016. One hundred and five species of lichenicolous biota from India: An updated checklist for the country. *Mycosphere* 7(3):268–294.

Kornerup, A. & J.H. Wanscher 1978. *Methuen handbook of colour. 3rd ed., reprinted.* Eyre Methuen Ltd., London, 252 pp.

Moreau, F. 1951. Sur une Dothideaceae parasite du lichen *Anaptychia speciosa* (Wulfen) Massalongo. *Bulletin de la Société botanique deFrance* 98(7–9):208–209.

Motiejūnaitė, J., M.P. Zhurbenko, A. Suija & G. Kantvilas 2019. Lichenicolous ascomycetes on *Siphula*-like lichens, with a key to the species. *Lichenologist* 51:45–73.

Tibell, L. & R. Moberg 2014. A tribute to Rolf Santesson (1916–2013). *Lichenologist* 46:135–139.

Triebel, D. & C. Kainz 2004. *Scutula*. In: *Lichen Flora of the Greater Sonoran Desert Region, vol. 2.* (Nash III, T.H., B.D. Ryan, P. Diederich, C. Gries & F. Bungartz, eds), pp. 692–693, Lichens Unlimited, Arizona State University, Tempe, Arizona.

Triebel, D, M. Wedin & G. Rambold 1997. The genus *Scutula* (lichenicolous ascomycetes, Lecanorales): species on the *Peltigera canina* and *P. horizontalis* groups. *Symbolae Botanicae Upsalienses* 32:323–337.

Van den Boom, P.P.G. 2021. Lichen and lichenicolous fungus records from Santa Maria, Azores archipelago. *Botanica* 27(1):34–43.

Zhurbenko, M.P. 2007. The lichenicolous fungi of Russia: geographical overview and a first checklist. *Mycologia Balcanica* 4:105–124.

Zhurbenko, M.P. 2021. Studies on lichenicolous fungi in the Uppsala (UPS) collection curated by the late Rolf Santesson. *Herzogia* 34:493–507.

Zhurbenko, M.P. 2022. Two new species of *Lichenotubeufia* (Dothideomycetes, Tubeufiales) from Chile and New Zealand, with a revised key to the genus. *Lichenologist* 54:117–122.

Zhurbenko, M.P. & Y. Ohmura 2018a. Contributions to the knowledge of lichenicolous fungi on *Thamnolia*. *Opuscula Philolichenum* 17:368−373.

Zhurbenko, M.P. & Y. Ohmura 2018b. *Perigrapha cetrariae*, a new lichenicolous ascomycete on *Cetraria* from Japan. *Folia Cryptogamica Estonica* 55:17−19.

Zhurbenko, M.P. & Y. Ohmura 2019. New and interesting records of lichenicolous fungi from the TNS herbarium: Part I. *Opuscula Philolichenum* 18:74−89.

Zhurbenko, M.P. & Y. Ohmura 2020. Contributions to the knowledge of lichenicolous fungi growing on baeomycetoid lichens and *Icmadophila*, with a key to the species. *Lichenologist* 52:437–453.

Zhurbenko, M.P., K. Tadome & Y. Ohmura 2018. *Pronectria japonica* species nova and a key to the lichenicolous fungi and lichens growing on *Ochrolechia*. *Herzogia* 31:494–504.