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Capronia suijae (*Herpotrichiellaceae*, Eurotiomycetes), a new fungus on *Xanthoria parietina* from Belarus, with a key to the lichenicolous species growing on *Xanthoria* s. str.

Andrei TSURYKAU and Javier ETAYO

Abstract: The new lichenicolous fungus *Capronia suijae* growing on the thallus of corticolous *Xanthoria parietina* is described from Belarus and compared with similar species. In addition to its host selection, the species is characterized by comparatively small ascomata, 40–80 µm diam., and (0–1–)3-septate ascospores, 9·5–11·5 × 4·0–5·0 µm. A key to the lichenicolous fungi growing on *Xanthoria* s. str. is provided.

Key words: biodiversity, Europe, new records, new species

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Introduction

Xanthoria is a genus of lichenized fungi in the family *Teloschistaceae*, mostly distributed in the Northern Hemisphere. In modern classification, the genus comprises six species, namely *X. aureola*, *X. calcicola*, *X. mediterranea*, *X. parietina*, *X. resendei* and *X. stiligera* (Arup *et al*. 2013). Specific affiliations of recently described taxa (e.g. Kondratyuk *et al*. 2013) should be studied further. The generic type, *X. parietina*, is the most widely distributed species, being very common in the Northern Hemisphere, but also known in the Southern Hemisphere (Arup *et al*. 2013). To date, 41 species of lichenicolous fungi have been reported from *X. parietina* (Etayo 1998; Etayo & Diederich 1998; Kukwa 2004; Brackel & Kocourková 2006; Brackel 2009, 2010, 2011; Fleischhacker 2011; Lawrey & Diederich 2015; Khodosovtsev & Darmostuk 2016). Seven of these are facultatively lichenicolous, namely *Athelia arachnoidea*, *Catillaria nigroclavata*, *Cladosporium macrocarpum*, *Cosmospora flammea*, *Dinemasporium strigosum*, *Epicoccum nigrum* and *Periconia digitata* (Yurchenko & Golubkov 2003; Duan *et al*. 2007; Hertel *et al*. 2007; Etayo & Berger 2009; Fleischhacker 2011).

During an examination of lichens collected by students the first author found a lichenicolous pyrenocarpous fungus with brown 3-septate ascospores and setose ascomata growing on the thallus of corticolous *Xanthoria parietina*. The fungus appears to represent a new species of *Capronia* Sacc. (*Chaetothyriales*) and is described below. A key to the lichenicolous fungi occurring on *Xanthoria* s. str. is also presented.

Material and Methods

Morphology and anatomy were examined using Nikon SMZ 745 and Nikon Eclipse 80i microscopes. The anatomy was studied on material mounted in water, 10% KOH (K) and for ascus structure Lugol's iodine solution without (I) or with KOH pretreatment (K/I). Measurement of ascospores and other structures was made on material mounted in water. Ascospore measurements are given as (min–) $(\bar{x} - \mathrm{SD})$ – $(\bar{x} + \mathrm{SD})$(–max) where min. and max. are extreme values and $\bar{x}$ the arithmetic means and SD the corresponding standard deviation. Length/width ratios of ascospores are indicated as l/w followed by the number of measurements (*n*). All photographs were taken with a Nikon Eclipse 80i microscope. Material examined is deposited in GSU herbarium.

A. Tsurykau: Department of Biology, F. Skorina Gomel State University, Sovetskaja Str. 104, Gomel 246019, Belarus. Email: tsurykau@gmail.com
J. Etayo: Navarro Villoslada 16, 3° dcha, E–31003 Pamplona, Navarra, Spain.

The New Species

Capronia suijae Tsurykau & Etayo sp. nov.

MycoBank No.: MB 815580

Similar to *Capronia spinifera*, which differs mainly in its host selection (hymenium of basidiomycetes vs. lichen *Xanthoria*), and in having larger ascomata, 70–112 µm wide, and longer ascospores, (10·0–)12·0–15·5 × 3·5–4·5 µm.

Type: Belarus, Gomel region, Leltchitsy District, Ostrozhanka Village, 51°59'30"N, 28°33'32"E, on corticolous *Xanthoria parietina*, 8 November 2014, *V. Selenya* (GSU—holotype); accompanied by *Muellerella lichenicola*.

(Fig. 1)

Mycelium immersed in the host thallus, hyphae flexuous, septate, brown, smooth, 1·5–4·0 µm wide.

Ascomata perithecioid, ostiolate, scattered, initially partly immersed in the host thallus, later almost superficial, globose to subglobose, black, 40–80 µm wide (excluding setae). *Setae* arising from the upper part, dark brown, non-septate, unbranched, straight or curved, with an obtuse apex, thick-walled, smooth, 20–38 × 2–3 µm at half height, sometimes gradually tapering towards the apex. *Ascomatal wall* composed of brown to olivaceous brown, K−, thick-walled angular pseudoparenchymatous cells, 3·5–10·0 × 3·0–5·5 µm. *Hamathecium* gelatinized; centrum I−, pseudoparaphyses absent. *Periphyses* clavate, hyaline, aseptate, and sometimes difficult to observe, 4·5–7·5 × 2 µm. *Asci* clavate, 8-spored, bitunicate, initially with a thick endotunica, later entirely thin-walled, I−, 28·5–38·0 × 6·0–11·5 µm, ascospores overlapping within asci. *Ascospores* ellipsoid to fusiform, with obtuse ends, smooth, first hyaline then pale brown, (0–1–)3-septate, constricted at the septa, no longitudinal septa observed, some with a single oil drop in each cell, (9·5–)9·9–11·2(–11·5) × (4·0–)4·2–4·6(–5·0) µm, l/w = (2·1–)2·2–2·6(–2·8), $n = 32$.

Etymology. The new species is named after Dr Ave Suija (Tartu), an eminent Estonian lichenologist, in recognition of her important contribution to the knowledge of lichenicolous fungi.

Distribution and host. So far the species is known only from the type locality, growing on darkened lobes of healthy-looking *Xanthoria parietina*. As the darkened parts of the thallus were also infected with *Muellerella lichenicola*, we cannot confirm whether *C. suijae* is a pathogenic species. *Muellerella lichenicola* is a new species to Belarus.

Notes. The following non-lichenicolous *Capronia* species with 3-septate ascospores and 8-spored asci have been described: *C. commonsii* (Ellis & Everh.) M. E. Barr, *C. coronata* Samuels, *C. obesispora* Réblová, *C. parasitica* (Ellis & Everh.) E. Müll. *et al.*, *C. pilosella* (P. Carsten) E. Müll. *et al.*, *C. porothelia* (Berk. & M. A. Curtis) M. E. Barr, *C. proteae* Marincowitz *et al.*, *C. setosa* (M. E. Barr) E. Müll. *et al.* and *C. spinifera* (Ellis & Everh.) E. Müll. *et al.* All these species differ in having larger ascomata and different ascospore dimensions, as well as a different life habit (Ellis & Everhart 1890; Barr 1959, 1972, 1976; Bigelow & Barr 1963; Müller *et al.* 1987; Réblová 1997; Untereiner 1997; Marincowitz *et al.* 2008). The species mentioned above are compared in Table 1. Comparable lichenicolous species of *Capronia* are *C. andina* Etayo growing on *Placopsis* and *C. minutosetosa* Halici *et al.* growing on *Chromatochlamys muscorum*. The former differs from *C. suijae* in having (0–)3-septate setae and larger (13·0–19·0 × 4·5–6·0 µm) ascospores (Etayo 2003), and the latter in having some septate setae and 3–5-septate and larger ascospores, (19–)22–25(–28) × 6·5–7·0 µm (Halici *et al.* 2010). *Knufia peltigerae* (Fuckel) Réblová & Unter., formerly known as *Capronia peltigerae* (Fuckel) D. Hawksw. (see Untereiner *et al.* 2011; Réblová *et al.* 2013), grows on *Peltigera*, and has setose ascomata and similar 1–3-septate ascospores, but they are hyaline and larger, measuring 19–24 × 6–8 µm (Hawksworth 1980).

Macroscopically, *C. suijae* could be confused with the setose coelomycete

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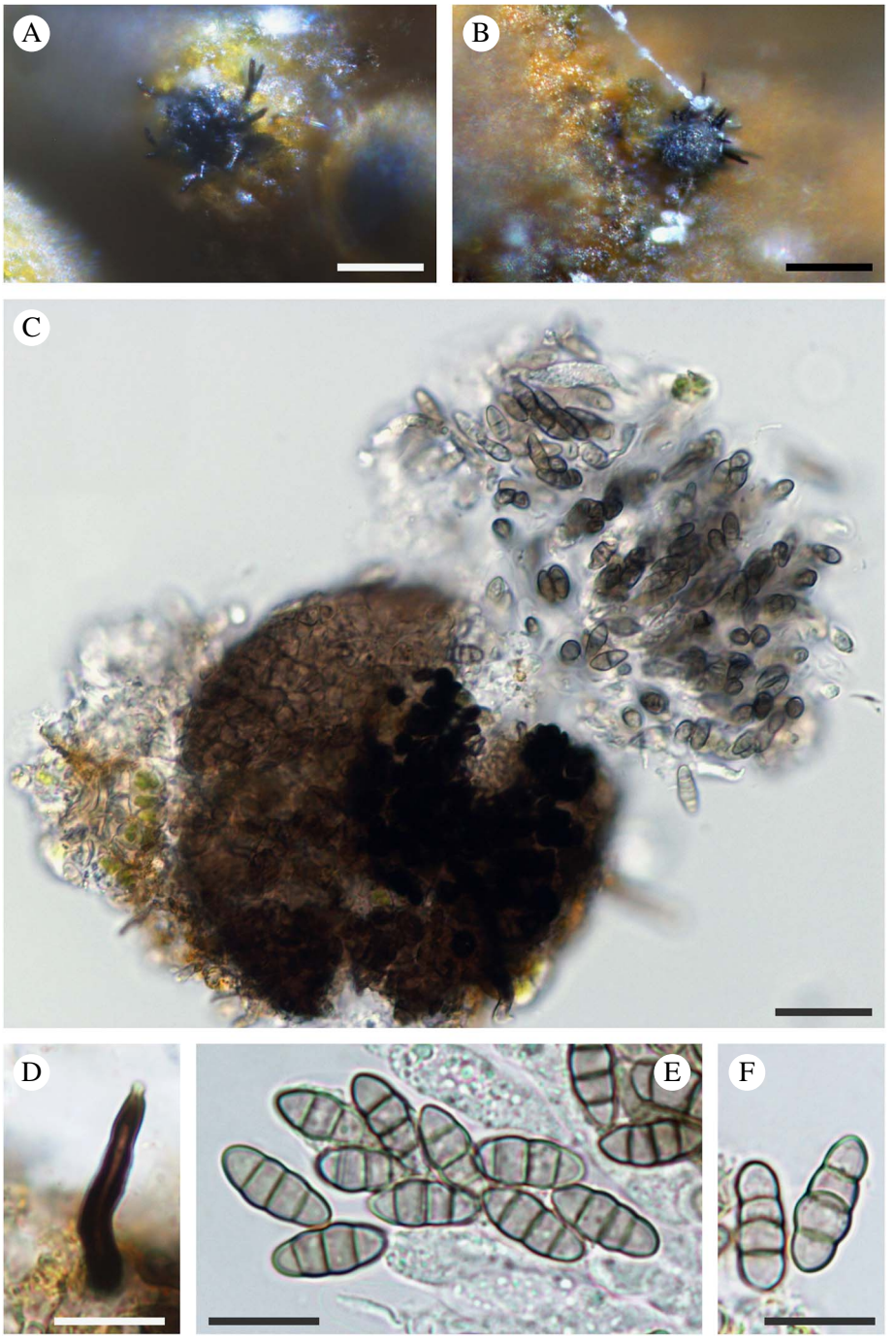

FIG. 1. *Capronia suijae* (holotype). A & B, habitus; C, squashed ascoma; D, seta; E & F, ascospores at different stages of maturity. C–F: in water. Scales: A & B = 50 µm; C = 20 µm; D–F = 10 µm. In colour online.

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TABLE 1. *Comparison of* Capronia suijae *characters with those of similar* Capronia *species.*

Species	Host/ substrate	Ascoma diameter(µm)	Ascus size (µm)	Ascospore size (µm)	Ascospore l/w ratio
C. suijae	lichen *Xanthoria parietina*	40–80	28·5–38·0 × 6·0–11·5	(9·5–)9·9–11·2(–11·5) × (4·0–)4·2–4·6(–5·0)	2·1–2·8
C. commonsii (Ellis & Everhart 1890)	pyrenomycete *Creosphaeria sassafras*	110–125	50–55 × 7–8	12–14 × 3·0–3·5	4
C. coronata (Müller *et al.* 1987)	wood	95*	47·5–55·5(–57·0) × (7·0–)7·6–9·6(–10·0)	(10·0–)11·5–13·5(–15·5) × (2·0–)3·6–4·7(–5·0)	3·1–5·0
C. obesispora (Réblová 1997)	wood	120–150	92·5–103·0 × 34·5–38·0	(29·5–)32·5–39·0(–42·0) × 10·5–12·5	2·8–3·4
C. parasitica (Ellis & Everhart 1890)	pyrenomycete *Diatrype stigma*	110–130	40–50 × 8–10	10–12 × 3–4	3·0–3·3
C. pilosella (Barr 1972)	wood	90–200	44·0–45·0 × 10·0–15·5	11·0–15·5 × 3·5–5·0(–6·0)	2·6–3·1
C. porothelia (Barr 1976)	basidiomycetes (*Stereum* spp.)	104–190(–220)	40–55(–60) × 7–9	10–14 × 3–4	3·3–3·5
C. proteae (Marincowitz *et al.* 2008)	twig of *Protea nitida*	90–130	39–52 × 6–7	(7–)8–10(–11) × 3–4	2·3–2·8
C. setosa (Barr 1959)	leaves and stalks of *Saxifraga oppositifolia*	150–195	68–81 × 9–11	18–21 × 3·5–5·0	4·2–5·1
C. spinifera (Bigelow & Barr 1963)	basidiomycetes (*Corticia* sp., *Poria* sp., *Stereum* sp.)	70–112	27–44 × 7·5–15·5	(10·0–)12·0–15·5 × 3·5–4·5	2·9–3·4

*calculated using the figure provided in Müller *et al.* (1987)

Pyrenochaeta xanthoriae, which grows mainly on the thallus and apothecia of *Xanthoria parietina* (Diederich 1990), but has also been reported from *X. calcicola* and weakened *Physcia* species adjacent to infected *Xanthoria* thalli (Brackel 2011). No *Capronia* species is known to have a *Pyrenochaeta*-type asexual stage (Müller *et al*. 1987; Untereiner 1997) and thus the two fungi are not expected to belong to the same holomorph. Furthermore, recent studies (Aveskamp *et al*. 2008; de Gruyter *et al*. 2009) revealed *Pyrenochaeta* as belonging to the *Pleosporales* (Dothideomycetes).

Key to the lichenicolous fungi occurring on *Xanthoria* s. str.

The report of *Discothecium gemmiferum* (Tayl.) Vouaux, a synonym of *Endococcus rugulosus* Nyl., growing on *Xanthoria parietina* (Vouaux 1913) seems to be erroneous, and therefore it can be assumed that the record most likely refers to *Sphaerellothecium parietinarium* (see also Sérusiaux *et al*. 1999; Kukwa & Czarnota 2006). The records of *Zwackhiomyces sphinctrinoides* (Zwackh) Grube & Hafellner on *Xanthoria* (e.g. Alstrup & Hawksworth 1990) prior to Grube & Hafellner (1990) probably do not belong to that species, but to *Z. coepulonus*. The material of *Stigmidium schaereri* (A. Massal.) Trevis. reported by Kondratyuk & Galloway (1994) on *X. parietina* should be reassessed, as *S. schaereri* is considered to be confined to *Solorina* (Roux & Triebel 1994). All known records of *Arthonia epiphyscia* Nyl. on *Xanthoria* almost certainly refer to other species, most likely to *A. molendoi*, as *A. epiphyscia* seems to be confined to *Physcia* species (Diederich 2003; Grube 2007). We also hesitate to consider the report of *Perigrapha superveniens* (Nyl.) Hafellner from *Xanthoria* (Clauzade *et al*. 1989), as no reference was provided, and the species exclusively grows on species of *Parmelia* s. str. (Hafellner 1996). The current taxonomic status of *Phoma epiphyscia* Vouaux is unknown, and literature reports on *X. parietina* may belong to either *Didymocyrtis epiphyscia* s. lat. or to *D. slaptoniensis* (Ertz *et al.* 2015). In temperate regions, *Licea parasitica* (Zukal) G. W. Martin often appears on bark and co-occurring epiphytic bryophytes and lichens (Stephenson 2003), including *Xanthoria* (Zukal 1893). However, the species belongs to Mycetozoa and thus is not a fungus, and it is not really lichenicolous; we therefore do not include it in the key. Finally, *Phyllactinia guttata* (Wallr.) Lév. is a plant pathogen causing a powdery mildew on a broad range of phanerogams (Erper *et al*. 2012). Its cleistothecia often fall off and attach to new growing surfaces, including lichens; therefore, its settlement on *X. parietina* (Brackel 2010) is casual.

1 Spores produced in asci 2
Spores not produced in asci 18

2(1) Ascomata apothecioid 3
Ascomata perithecioid 6

3(2) Ascomata rounded; ascospores 0–1-septate, hyaline 4
Ascomata lirellate, 200–300 µm wide; ascospores 3-septate, brown, 12–17 × 4–6 µm. Lit.: Hafellner (2009) . . . . . **Phacothecium varium** (Tul.) Trevis.

4(3) Ascomata arthonioid, immarginate, single or in fusing groups; ascospores halonate 5
Ascomata lecideoid, marginate, not forming fusing groups, 150–500 µm diam.; ascospores non-halonate, 8–12 × 2–4 µm. Lit.: Hertel *et al.* (2007) . . . . . **Catillaria nigroclavata** (Nyl.) Schuler

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5(4) Ascomata 100–240 µm wide, not inducing galls; hypothecium medium brown ascospores 11–14 × 5·0–6·5 µm. Lit.: Grube (2007). . . . . **Arthonia molendoi** (Heufl. ex Frauenf.) R. Sant.
Ascomata 150–450 µm wide, forms distinct, raised galls on lichen thallus; hypothecium hyaline; ascospores 8–13 × 3–5 µm. Lit.: Kondratyuk (1996) . . . . . **Arthonia sytnikii** S. Y. Kondr.

6(2) Asci (4−)8-spored 7
Asci more than 64-spored; perithecia black, 70–150 µm diam.; ascospores brown, (0–)1-septate, 4·5–7·0 × 2·0–3·5 µm. Lit.: Triebel & Kainz (2004). . . . . **Muellerella lichenicola** (Sommerf.) D. Hawksw.

7(6) Ascospores septate, hyaline or brown 8
Ascospores aseptate, hyaline, 14–28 × 4–8 µm; perithecia up to 230 µm; ascomatal wall hyaline except around the ostiole; inducing bullate galls. Lit.: Hoffmann & Hafellner (2000). . . . . **Telogalla olivieri** (Vouaux) Nik. Hoffm. & Hafellner

8(7) Ascospores brown at maturity 9
Ascospores colourless at maturity 12

9(8) Ascospores transversely septate. 10
Ascospores muriform, 20·5–27·0 × 9–13 µm, perithecia black, 90–220 µm diam. Lit.: Khodosovtsev & Darmostuk (2016) . . . . . **Pleospora xanthoriae** Khodos. & Darmostuk

10(9) Ascospores 1-septate; ascomata without setae 11
Ascospores (0–1–)3-septate, 9·5–11·5 × 4–5 µm; ascomata with setae, 40–80 µm wide . . . . . **Capronia suijae** Tsurykau & Etayo

11(10) Perithecia 150–300 µm diam., inducing formation of galls; ascospores 11–15 × 5·5–7·0 µm, verruculose. Lit.: Ertz *et al.* (2015) . . . . . **Didymocyrtis slaptoniensis** (D. Hawksw.) Hafellner & Ertz
Perithecia 25–80 µm diam., not gall inducing; ascospores 10·5–14·0 × 3·5–5·0 µm, smooth. Lit.: Hawksworth (1994). . . . . **Sphaerellothecium parietinarium** (Linds.) Hafellner & V. John

12(8) Ascospores transversely septate 13
Ascospores muriform, with appendages at both ends, 22–36 × 9–15 µm; perithecia orange to pink, 150–230 µm wide. Lit.: Ertz (2004) . . . . . **Paranectria oropensis** (Ces. ex Rabenh.) D. Hawksw. & Piroz.

13(12) Ascospores 1-septate 14
Ascospores 14–24-septate 17

14(13) Perithecia orange or pink; interascal filaments soon disappearing; asci unitunicate 15
Perithecia dark-coloured; interascal filaments persistent; asci fissitunicate 16

15(14) Perithecia immersed, bright orange; asci 8-spored; ascospores 17–24 × 4–5 µm. Lit.: Lowen & Diederich (1990) . . . . . **Pronectria xanthoriae** Lowen & Diederich
Perithecia sessile, pink; asci 4(–8)-spored; ascospores 12–19 × 6–9 µm. Lit.: Sérusiaux *et al.* (1999) . . . . . **Nectriopsis indigens** (Arnold) Diederich & Schroers

16(14) Perithecia 150–250 µm diam.; ascomatal wall brown with extracellular pigment; ascospores verrucose, (15–)16–20(–21) × 5·5–8·5(–9·0) µm. Lit.:. Grube & Hafellner (1990) . . . . **Zwackhiomyces coepulonus** (Norman) Grube & R. Sant.
Perithecia 300–400 µm diam.; ascomatal wall green with intracellular pigment; ascospores smooth, (16–)22–25(–28) × (3–)5–6(–7) µm. Lit.: Weddell (1874), Zhurbenko & Triebel (2003) . . . . . **Cercidospora xanthoriae** (Wedd.) R. Sant.

17(13) Perithecia pale orange to reddish; interascal filaments soon disappearing; asci unitunicate; ascospores 60–100 × 5–7 µm. Lit.: Hawksworth (1983) . . . . . **Trichonectria hirta** (A. Bloxam) Petch
Perithecia whitish to pale brown; interascal filaments persistent; asci bitunicate; ascospores 130–150 × 3–4 µm. Lit.: Etayo (2002) . . . . . **Tubeufia heterodermiae** Etayo

18(1) Spores produced on basidia, or sclerotia or bulbils present 19
Spores not produced on basidia; sclerotia and bulbils absent 22

19(18) Sclerotia or bulbils present; basidiomata not inducing gall-like swellings; basidia usually aseptate 20
Sclerotia and bulbils absent; basidiomata developing in host apothecia, inducing characteristic swellings; basidia mainly transversely septate, rarely with longitudinal septa, 16–25 × 7–10 µm; basidiospores ellipsoid to subspherical, 7–8 × 6·0–6·5 µm. Lit.: Diederich (1996) . . . . . **Tremella caloplacae** (Zahlbr.) Diederich

20(19) Sclerotia creamy, 100–200 µm diam., on superficial, arachnoid, white mycelium; basidiomata corticoid, creamy to buff, seasonal, 2·5–14·0 × 1–4 mm; basidia 2(–4)-spored, 21–24 × 5·0–6·5 µm; basidiospores 5–12 × 2·5–7·0 µm. Lit.: Hawksworth (1983), Yurchenko & Golubkov (2003) . . . . . **Athelia arachnoidea** (Berk.) Jülich
Bulbils orange to pink, 50–150 µm diam., on dead and dying areas of the host thalli; basidiomata very rare or unknown 21

21(20) Bulbils pale orange, superficial; basidiomata rare, light orange, reaching 10 mm diam.; basidia 4-spored, 25–40 × 12–15 µm; basidiospores 13·0–18·5 × 8·0–13·5 µm. Lit.: Diederich *et al.* (2003) . . . . . **Erythricium aurantiacum** (Lasch) D. Hawksw. & A. Henrici
Bulbils pinkish, initially immersed; basidiomata unknown. Lit.: Etayo & Diederich (1996) . . . . **Marchandiomyces corallinus** (Roberge) Diederich & D. Hawksw.

22(18) Conidia arising within pycnidial conidiomata 23
Conidia not arising within pycnidial conidiomata 32

23(22) Conidia hyaline, filiform, 0(–5)-septate, 53–70 × 2–3 µm, l/w 19–30; conidiomata dark brown, 100–220 µm. Lit.: Brackel (2009) . . . . . **Hainesia xanthoriae** Brackel
Conidia not as above 24

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24(23) Conidia brown or pale brown 25
Conidia colourless 27

25(24) Conidia aseptate, 3–5 µm diam 26
Conidia 1-septate, 8–12 × 2–3 µm. Lit.: Kondratyuk (1996) . . . . . **Lichenodiplis poeltii** S. Y. Kondr. & D. Hawksw.

26(25) Conidiomata 30–50 µm diam.; conidiogenous cells 4–5 × 3·0–3·5 µm. Lit.: Cole & Hawksworth (2004) . . . . **Lichenoconium erodens** M. S. Christ. & D. Hawksw.
Conidiomata 100–175 µm diam.; conidiogenous cells 6–8 × 2·5–4·0 µm. Lit.: Cole & Hawksworth (2004) . . . . . **Lichenoconium xanthoriae** M. S. Christ.

27(24) Conidia aseptate 28
Conidia 1-septate, 11–14 × 2·5–3·0 µm, upper end with 4–5(–6) hyaline appendages 14 × 0·2 µm; conidiomata dark brown, globose, 100–120 µm diam. Lit.: Etayo & Berger (2009) . . . . . **Pseudorobillarda** sp.

28(27) Conidiomata with setae 29
Conidiomata without setae 30

29(28) Conidiomata 50–125 µm diam., setae 30–70 × 3·5–5·0 µm, arising near the ostiole; conidia 3–4 × 1·5–2·0 µm, without setulae. Lit.: Diederich (1990) . . . . . **Pyrenochaeta xanthoriae** Diederich
Conidiomata 150–800 µm diam., setae 100–850 × 3·0–6·5 µm, arising from basal part of conidiomata; conidia 8·0–12·5 × 2·0–2·5 µm, with a single, unbranched setula at each end, 6·5–9·0 µm long. Lit.: Duan *et al.* (2007) . . . . . **Dinemasporium strigosum** (Pers. ex Fr.) Sacc.

30(28) Conidia wider than 1·5 µm 31
Conidia 3–4 × 1·0–1·5 µm (1-septate conidia are also present); conidiomata *c.* 170 µm diam. Lit.: Etayo & Berger (2009) . . . . . **Phoma** sp.

31(30) Conidia mainly 6–8 × 2·5–3·5 µm. Lit.: Hawksworth (1994), Ertz *et al.* (2015) . . . . . **Didymocyrtis slaptoniensis** (D. Hawksw.) Hafellner & Ertz
Conidia mainly less than 6·5 × 3·0 µm. Lit.: Ertz *et al.* (2015) . . . . . **Didymocyrtis epiphyscia** s. lat.

32(22) Conidia colourless 33
Conidia brown 35

33(32) Conidia fusiform, curved, both ends acute, 4–6 septate, 70–75 µm long; stroma cylindrical-clavate, shortly stipitate, reddish, pruinose, 1 mm high. Lit.: Massee (1893) . . . . . **Cosmospora flammea** (Tul. & C. Tul.) Rossman & Samuels
Conidia shorter. 34

34(33) Colonies white; conidia adhering in a slimy mass, aseptate, 4–6 × 1·5–3·0 µm. Lit.: Hawksworth (1979) . . . . . **Acremonium antarcticum** (Speg.) D. Hawksw.
Colonies pink; conidia not adhering in a slimy mass, multiseptate, 17–30 × 11–20 µm, individual cells 4–10 × 3–5 µm. Lit.: Lowen *et al.* (1986) . . . . . **Illosporiopsis christiansenii** (B. L. Brady & D. Hawksw.) D. Hawksw.

35(32) Colonies immersed in the host tissues (predominantly in hymenium) 36
Colonies caespitose 37

36(35) Conidia arising singly, aseptate, 3·5–6·0 µm diam. Lit.: Hawksworth & Punithalingam (1973) . . . . . **Xanthoriicola physciae** (Kalchbr.) D. Hawksw.
Conidia catenate, usually 1-septate, 5–8 × 4–6 µm. Lit.: Hawksworth & Cole (2002) . . . . . **Intralichen christiansenii** (D. Hawksw.) D. Hawksw. & M. S. Cole

37(35) Conidia aseptate or transversely septate; conidiophores not forming sporodochia 38
Conidia muriform, with up to 15 cells, 7–65 × 6–54 µm; conidiophores arising in brownish to black sporodochia, up to 2 mm wide. Lit.: Matsushima (1975) . . . . . **Epicoccum nigrum** Link

38(37) Conidia transversely septate or aseptate, not spherical 39
Conidia aseptate, spherical, verruculose to shortly echinulate, 5·0–10·5 µm diam.; conidiophores up to 500 µm long, 8–12 µm thick at the base, 6·0–9·5 µm immediately below the head, branches clearly visible in mature heads where the conidia are relatively loosely compacted. Lit.: Prasher & Verma (2012) . . . . . **Periconia digitata** (Cooke) Sacc.

39(38) Conidia exceeding 20 µm in length 40
Conidia not exceeding 20 µm in length 41

40(39) Conidiophores cylindrical, (1–)4–10-septate, 63–228 × 5–10 µm; conidiogenous locus 2–3 µm wide; conidia pale brown, 20–70 × 8–13(–15) µm, 1–4-distoseptate. Lit.: Heuchert & Braun (2006) . . . . . **Corynespora laevistipitata** (M. S. Cole & D. Hawksw.) Heuchert & U. Braun
Conidiophores subcylindrical, 1–4-septate, 20–60(–95) × 5–8 µm; conidiogenous locus 3·0–4·5 µm wide; conidia brown, (19–)25–107 × 8–10 µm, (1–)2–12-distoseptate. Lit.: Heuchert & Braun (2006) . . . . . **Ellisembia lichenicola** Heuchert & U. Braun

41(39) Conidiophores 0–3 times branched, dark brown, erect, arising from internal hyphae or swollen hyphal cells; conidiogenous cells terminal, occasionally intercalary, with a single or usually several conidiogenous loci (up to 12); conidia usually catenate, in branched acropetal chains, pale brown to brown, 0–3-septate 42
Conidiophores branched (mostly multi-branched), pale brown, formed as erect to decumbent threads; conidiogenous cells terminal and intercalary with numerous conspicuous denticle-like conidiogenous loci (up to 35); conidia formed singly, (0–)1(–2)-septate, subhyaline to pale olivaceous brown, (7–)9–15(–17) × (2·5–)3·0–4·0(–4·5) µm. Lit.: Berger *et al.* (2015) . . . . . **Gonatophragmium lichenophilum** F. Berger & U. Braun

42(41) Conidia smooth, 3·5–20·0 × 3–7 µm. Lit.: Bensch *et al.* (2012) . . . . . **Cladosporium licheniphilum** Heuchert & U. Braun
Conidia verruculose, 8–20 × 5–9 µm. Lit.: Etayo & Berger (2009) . . . . . **Cladosporium macrocarpum** Preuss

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