

## About a fast developing community of lichenicolous deuteromycetes decaying *Xanthoria parietina*

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**Abstract:** Ten species of lichenicolous and saprotrophic fungi were observed colonizing a decaying community of *Xanthoria parietina* in the NW of Upper Austria (Austria). A new species of *Pseudorobillarda*, not described here in full detail, and some saprotrophic taxa not usually recorded on lichens as *Cladosporium macrocarpum*, *Epicoccum nigrum* and *Periconia digitata*, are pointed out.

**Zusammenfassung:** Auf einer absterbenden Population von *Xanthoria parietina* im NW von Oberösterreich wurde eine Assoziation von zehn Arten lichenicoler bzw. saprotropher Deuteromyceten gefunden. Einige davon waren auf diesem Substrat bisher unbekannt (*Cladosporium macrocarpum*, *Epicoccum nigrum* und *Periconia digitata*, weiters eine neue Art von *Pseudorobillarda*). Die letztgenannte Art wird skizziert, für eine gültige Beschreibung reicht aber das Material noch nicht aus.

In a mountainous location in Upper Austria (Austria) the second author observed an assemblage of several fungi growing on thalli and apothecia of misshaped and discoloured thalli of *Xanthoria parietina* (L.) TH. FR. They are listed here because although they are known to grow on other substrates, their way of life has not been recognized as lichenicolous before. In total ten species of imperfect fungi have been recorded.

Besides *Xanthoriicola physciae* – the fungus which attracts attention already from distance – the most common colonizer observed was *Cladosporium macrocarpum*, a very invasive dematiaceous hyphomycete covering large parts of the surface of the thallus and apothecia. It causes a dark cottony appearance on the pre-damaged lichen thalli. Spotted between these some other species were observed – not all of them known to be typical lichenicolous fungi on *Xanthoria* such as *Lichenocodium xanthoriae*, *Lichenodiplis poeltii* and *Pyrenochaete xanthoriae*. Most interesting was an undescribed species of *Pseudorobillarda* with hyaline conidia with four terminal setae. Conspicuous salmon pink crumbles are sclerotia of *Marchandiomyces aurantiacus*.

The assemblage of these species is remarkable and has never been reported before. Required conditions for its development are unknown as no visible impacts on the site, a small assembly of various bushes (*Sambucus nigra*, *Rosa canina*) has been observed. The area is surrounded by meadows and grain fields, microclimatic conditions are

well-lit, sun-exposed, sheltered against wind by topographic features, but therefore also higher and longer snow coverage.

Factors of origin, proceeding and time profile of the ongoing colonization are unknown as is the sequence of host damage but it seems that impacts like high rainfall or unusual long-term snow cover perhaps have altered the health of the lichen biota, making it vulnerable against overgrowing algae and fungal occupation. The average temperature in the Austrian site between 2001-2007 was approximately 8 °C while the average precipitation was 1050 mm.

At another locality in northern Spain the first author collected some of the lichenicolous fungi, here pointed out, in a poorer community, with four species growing on *X. parietina*: *Periconia digitata*, *Phoma* spec. (different to *Phoma epiphyscia*), *Pyrenochaeta xanthoriae* and *Xanthoriicola physciae*.

**Localities and herbarium vouchers: Austria:** Upper Austria, Sauwald, St. Ägidi, small thicket in agricultural area NE Vierling, 570 m s. m., on *Xanthoria parietina* on *Sambucus nigra*, (N 48° 29' 48'', E 13° 42' 48''), MTB 7548, 26. 10. 2003, leg. F. BERGER, private herbarium F. BERGER (Be) 18450, 18451, 18452, 18454, 18455, 18456 (some duplicates in private herbarium ETAYO).

**Spain:** País Vasco, Álava, hill between Berantevilla and Mijancas, *Quercus faginea* wood, c. 600 m s. m., N 42° 31' 21'', W 2° 46' 32'', 23. 2. 2009, J. ETAYO 25100 (herbarium ETAYO).

**Compared specimen of *Pseudorobillarda peltigerae*: Austria:** Upper Austria, Mühlviertel, Bezirk Freistadt, Thurytal, 570 m s. m., on acidic sandy soil, on *Peltigera praetextata*, MTB 7453, 10. 3. 2008, leg. F. PRIEMETZHOFFER (duplicate in herbarium BERGER 22611).

## Species list

### *Cladosporium macrocarpum* PREUSS

According to ELLIS (1971) this is a common, cosmopolitan, aggressive hyphomycete found especially on dead herbaceous and woody plants. The infection on *Xanthoria* causes a dark demarcation line and discrete discoloration and unevenness of the discs of the apothecia. It overgrows the attacked parts of the disc with fine, dark, cottony filaments and finally destroys the lichen structure. Our material has verruculose, brown conidia with (0-)1-3 septa, c. 10-20 × 5-8 µm.

HAWKSWORTH (1979) described another strictly lichenicolous *Cladosporium* species, *C. arthoniae* M. S. CHRIST. & D. L. HAWKSW. on *Arthonia pruinata* (PERS.) A. L. SM. [= *A. impolita* (HOFFM.) BORRER] and further recorded *C. sphaerospermum* PENZ, collected on a sterile lichen thallus.

Be 18450.

### *Epicoccum nigrum* LINK

= *Epicoccum purpurascens* EHRENB. ex SCHLECHT.

= *E. neglectum* DESM.

According to ELLIS (1971: 72) this is an extremely common cosmopolitan secondary invader of different plants, leaves, culms and other substrates. The ubiquitous saprotrophic mould can cause human illness inducing allergy. The describing author emphasizes its frequent occurrence with *Periconia byssoides*. In our location *P. digitata* is replacing it.

On *Xanthoria* it appears especially on the surface of the discs and also on the margins of shrunk apothecia as dark purple-brown hemispherical heaps with a fine tuberculate surface at 80 × magnification. Under the microscope these are identified as sporodochia, covered with clustered brown subspherical phaeodictyosporous conidia. It has rarely been recorded before on lichens: on *Peltigera canina* by VOUAUX (1914) and HAWKSWORTH (1979), and on *P. canina* and *P. didactyla* by SANTESSON & al. (2004).

Be 18450, 18454, 18456.

#### ***Lichenoconium xanthoriae* M. S. CHRIST.**

Host of the type of this species is *Xanthoria* but since its description it has also been recorded on other not related genera of lichens (KOCOURKOVÁ 2000, TRIEBEL & al 1991; BRACKEL & KOCOURKOVÁ 2006).

Be 18453.

#### ***Lichenodiplis poeltii* S. Y. KONDRATYUK & D. HAWKSW.**

It is common on the collected samples and differs from the most similar *L. lecanorae* in its larger conidia of 7-10.5 × 3-3.5 µm, the deeper immersed conidiomata and the foliaceous host genus *Xanthoria*. It appears as a rather aggressive colonizer of the pre-damaged host. Since its description from Australia (KONDRATYUK 1996), only few additional records from New Zealand (HAFELLNER & MAYRHOFER 1997) have been published.

Be 18450, 18451, 18452.

#### ***Marchandiomyces aurantiacus* (LASCH) DIEDERICH & ETAYO**

This is the anamorph of *Marchandiobasidium aurantiacum* DIEDERICH & SCHULTHEIS (DIEDERICH & al. 2003). It is a very destructive invader of *Physcia* and *Xanthoria*, forming pale orange coloured crumbles. The infection shrinks the lichen to a bleached, fragile film, which clings to the substrate before decaying completely.

Be 18451.

#### ***Periconia digitata* (COOKE) SACC.**

A dematiaceous hyphomycete with stalked spherical heads which look like round-headed needle pins. It is found cosmopolitan on leaves and culms of several genera of plants (ELLIS 1971). Despite its very notorious habitus it has not been recorded before on lichens. We found it especially on the discs but also along the margins of shrinking apothecia of *Xanthoria*.

Be 18450, 18454, 18456.

#### ***Phoma* cf. *epiphyscia* VOUAUX**

Our sample has conidiomata immersed in the upper surface of the host, about 170 µm in diam.; wall composed of c. 5 layers of compressed cells (textura epidermoidea) with a brown pigment located strictly in the walls. The conidiogenesis is enteroblastic, the

colour of the conidia in bulk is brownish but single conidia are hyaline,  $3-4 \times 1-1.5 \mu\text{m}$ , smooth, ampulliform. It should be noticed that a second type of scattered 1-septate conidia was also observed, but a conclusive proof of conidiogenesis inside the conidiomata could not be obtained.

Be 19027.

### ***Pseudorobillarda* spec.**

*Pseudorobillarda* is a genus of coelomycetes of at least 11 species with the only *P. peltigerae* DIEDERICH known to live exclusively on lichens. As the quantity of the sample material on *Xanthoria* is restricted, we are hesitating to describe it formally, as the spectrum of anatomical features should be studied in full detail with more material.

Be 18455.

**Description of the specimen:** lichenicolous, conidiomata pycnidial, scattered, partly immersed in the thallus of *Xanthoria parietina*, not changing the colour of the host, infected area wilted. Conidiomata globose, 100-120  $\mu\text{m}$  diam., unilocular, dark brown, smooth; wall dark brown, 7-12  $\mu\text{m}$  thick, dark brown cells forming a *textura angularis* outside, a hyaline *textura prismatica* on the inner side. Conidiogenous cells hyaline, short, smooth, ampulliform,  $3 \times 2 \mu\text{m}$ , lining the cavity, mixed with hyaline, unbranched, rather straight, aseptate paraphyses, 36-40  $\mu\text{m}$  long, somewhat irregularly in thickness of 1-1.5  $\mu\text{m}$ . Conidia elliptical, straight, hyaline, smooth, with one median transversal septum, not constricted at the septum, apices rounded, 11-12-14  $\times$  2.5-3  $\mu\text{m}$ , L/B ratio c. 4.5, at the upper end with a small hyaline apiculus bearing 4-5(-6) extracellular divergent appendages, 14  $\times$  0.2  $\mu\text{m}$ , best visible in phase contrast at 400-1000  $\times$  magnification. In contrast to all other structures these appendages are not stainable with lactophenol-cottonblue 10 %.

**Remarks:** Species of this genus are distinguished mainly by the presence or absence of paraphyses and by conidial size and septation (NAG RAJ 1993, BIANCHINOTTI 1997). In VUKANOVICH & ST.-ARNAUD (2003) the most similar congeneric taxon is *P. setariae* on *Oryza* and *Setaria*, but its paraphyses are 1-septate, conidia slightly wider (12-14  $\times$  3-4  $\mu\text{m}$ ), with 2-4 appendages of 9-21  $\mu\text{m}$  length. Our specimen keys out in couple "D" in the key of NAG RAJ (1993: 738) differing from the other non lichenicolous "couple D species" in the L/B ratio of <5 and mean conidium width of 2.5-3. It differs from the second lichenicolous *P. peltigerae* DIEDERICH, apart from the different host, in shorter conidia with a lower L/B ratio but more (4 to 6) very fine appendages. *Pseudorobillarda peltigerae* would key out in couple "F". Both lichenicolous species have aseptate paraphyses between the conidiogenous cells.

### ***Pyrenochaeta xanthoriae* DIEDERICH**

New for Austria!

Be 22287.

### ***Xanthoriicola physciae* (KALCHG.) D. HAWKSW.**

This is by far the most frequent hyphomycete in this and many other locations. It seems to prefer elevated humidity and shadow.

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