

## NEW RECORDS OF LICHENICOLOUS FUNGI FROM SW POLAND

MARIA KOSSOWSKA &amp; KATARZYNA SZCZEPAŃSKA

**Abstract.** New localities of nine lichenicolous fungi from southwestern Poland are presented, of which *Zwackhiomyces martinianus* (Arnold) Triebel & Grube is reported as new for Poland and *Chaenothecopsis viridireagens* (Nádv.) A. F. W. Schmidt and *Illosporium carneum* Fr. as new for the Polish Sudetes. The first modern record of *Karschia talcophila* in Poland is given.

**Key words:** Ascomycota, biodiversity, lichens, Sudety Mts

*Maria Kossowska, Department of Biodiversity and Plant Cover Protection, Faculty of Biological Sciences, University of Wrocław, ul. Kanonia 6/8, 50-328 Wrocław, Poland; e-mail: kossmar@biol.uni.wroc.pl*  
*Katarzyna Szczepańska, Department of Botany and Plant Ecology, Wrocław University of Environmental and Life Sciences, pl. Grunwaldzki 24a, 50-363 Wrocław, Poland; e-mail: siemuszka@wp.pl*

## INTRODUCTION

The southwestern part of Poland, especially the Sudety Mountains and to a lesser degree Lower Silesia, is lichenologically one of the most intensely investigated regions of Poland, and to date *ca* 1000 lichen species have been recorded from there (Kossowska, unpublished). However, the occurrence and distribution of lichenicolous fungi there are still poorly recognized. Although distributional data from the region have been published in recent years (e.g., Kukwa 2004, 2005; Kukwa & Czarnota 2006; Szczepańska 2007; Kossowska 2006, 2008; Kukwa & Jabłońska 2008; Kukwa & Flakus 2009; Kukwa *et al.* 2010), the details of the actual biodiversity of these fungi require further study.

During lichenological investigations conducted recently in the Sudetes, nine species of lichenicolous fungi were found, of which *Zwackhiomyces martinianus* (Arnold) Triebel & Grube is reported in Poland for the first time, and *Chaenothecopsis viridireagens* (Nádv.) A. F. W. Schmidt and *Illosporium carneum* Fr. are new for the Polish Sudetes.

## MATERIAL AND METHODS

Specimens were identified using standard microscopic techniques and the following literature: Hawksworth

(1983), Triebel (1989), Smith *et al.* (2009), Groner (2006) and Czyżewska and Kukwa (2009). Anatomical characters were measured from hand-cut sections using a Nikon Eclipse E600 light microscope. Brief descriptions of the species are based on personal observations and measurements, along with data from the cited literature.

The collected material is housed in the private herbaria of the authors. The examined localities are given in the ATPOL grid square system (Cieśliński & Fałtynowicz 1993).

## THE SPECIES

*Abrothallus caerulescens* Kotte

HOST: *Xanthoparmelia conspersa* (Ach.) Halle (thallus).

Ascomata apothecia, black, strongly convex, without excipulum. Ascospores brown, verrucose, 1-septate, relatively large (10–17 × 4–7 μm). The characteristic feature of the species is the mycelium which becomes bluish with Lugol's reagent. This is a commensalistic fungus growing exclusively on thalli of yellow-green species of *Xanthoparmelia* (Diederich 2003; Czyżewska & Kukwa 2009).

*Abrothallus caerulescens* is rare in Poland, reported from only a few localities (Czyżewska

& Kukwa 2009). The record from the Przedgórze Sudeckie foreland presented below was noted by Fałtynowicz (2003), but without locality details, which are provided here.

SPECIMEN EXAMINED. [Eb-76] PRZEDGÓRZE SUDECKIE FORELAND, Masyw Ślęży massif, Radunia Mt., on *X. conspersa* growing on serpentinite rock, 1999, *M. Kossowska* (hb. Kossowska 527).

***Arthrorhaphis aeruginosa* R. Sant. & Tønsberg**

HOST: *Cladonia* sp. (squamules).

Ascomata sessile to sub-stipitate, black. Ascospores hyaline, acicular, 12–28 septate, 80–110 × 3–4 μm. The lichen thalli infected by this fungus turns aeruginose. The fungus parasitizes the squamules of various *Cladonia* species growing mainly in humid conditions (Santesson & Tønsberg 1994; Czarnota & Kukwa 2004).

*Arthrorhaphis aeruginosa* is common in Poland (Czyżewska & Kukwa 2009; Kukwa *et al.* 2010), but in the Polish part of the Sudetes it was known from only one locality (Dimos-Zych & Czarnota 2007). Now two additional localities are provided. Both specimens examined were sterile but easy to recognize by their characteristic aeruginose spots on infected basal squamules of the host.

SPECIMENS EXAMINED. [Eb-80] WESTERN SUDETY MTS, Karpacz town – Granitowa Street, 640 m, on squamules of *Cladonia* sp. growing on the base of *Acer pseudoplatanus*, 2010, *A. Juźwin* & *M. Kossowska* (hb. Kossowska 1249); KARKONOSZE MTS, Dolina Maliny valley, ca 750 m, on squamules of *Cladonia* sp. growing on the base of *Picea abies*, 2011, *P. Baryś* & *M. Kossowska* (hb. Kossowska 1282).

***Chaenothecopsis viridireagens* (Nádv.) A. F. W. Schmidt**

HOST: *Chaenotheca stemonea* (Ach.) Müll. Arg. (thallus).

Apothecia stalked, simple or branched, with obovoid capitulum. Spores 1-septate, brown, 5–7 × 2–3 μm, with weakly pigmented septum. The characteristic feature is the presence of reddish, K+ persistently green, pigment in the capitulum and stalk of apothecia (Schmidt 1970). The species usually grows on the thalli of *Chaenotheca*

species with *Stichococcus* as the photobiont or on free-living *Stichococcus* colonies (Groner 2006).

*Chaenothecopsis viridireagens* has been noted from a few localities in Poland as a lignicolous (Fałtynowicz 2003) and a lichenicolous species (Kukwa *et al.* 2010). The first record of the species from the Sudetes was parasitizing *Chaenotheca stemonea*.

SPECIMEN EXAMINED. [Ea-89] WESTERN SUDETY MTS, Karkonosze Mts, north slope of Kopa Mt., monitoring plot no. 192/20, 1125 m, on *Ch. stemonea* growing on *Picea abies*, 2011, *P. Jarema* & *H. Fałtynowicz* (hb. Kossowska 1283).

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

HOST: *Hypocenomyce scalaris* (Ach.) Choisy (thallus).

Perithecia globose, immersed, arising in groups aggregated by a dark clypeus of the hyphae of host and invading fungus. Hamathecium formed by branched and anastomosing pseudoparaphyses. Ascospores brown, 1-septate, 11–14 × 5–6 μm. The infected squamules of the host soon become black and waste away (Hawksworth 1980).

*Clypeococcum hypocenomycis* is very common in Poland (Czyżewska & Kukwa 2009; Kukwa & Flakus 2009; Kukwa *et al.* 2010), and known from the Sudetes (Kukwa & Jabłońska 2008), with the following additional localities.

SPECIMENS EXAMINED. [Eb-80] WESTERN SUDETY MTS, Karkonosze Mts, Dolina Maliny valley, c. 700 m, on *H. scalaris* growing on rotten stump of *Picea abies*, 2011, *P. Baryś* & *M. Kossowska* (hb. Kossowska 1260). [Eb-91] CENTRAL SUDETY MTS, Góry Krucze Mts, Krucza Skała Mt., 650 m, on *H. scalaris* growing on *Pinus sylvestris*, 17 Sept. 2011, *K. Szczepańska* (hb. Szczepańska 912).

***Illosporium carneum* Fr.**

HOST: *Peltigera didactyla* (With.) J. R. Laundon (thallus).

Conidial stage of fungus *Pronectria robergei* (Mont. & Desm.) Lowen. Conidiophores forming pale pink, 200–300 μm wide sporodochia. Conidia simple, 6–7 μm diam., adhering in compact masses. The fungus is restricted to the thalli of *Peltigera* spp. (Hawksworth 1979).

*Illosporium carneum*, a common species in Poland (Czyżewska & Kukwa 2009; Kukwa & Flakus 2009; Kukwa *et al.* 2010), is here recorded as new to the Polish Sudetes.

SPECIMEN EXAMINED. [Ea-78] Western Sudety Mts, Karkonosze Mts, Szrenica Mt., 1300 m, on *P. didactyla* growing on soil, 5 Sept. 2010, *A. Szczepański* (hb. Szczepańska 866).

***Karschia talcophila*** (Flot.) Körb.

HOST: *Diploschistes scruposus* (Shreb.) Norman (thallus).

Apothecia black, rough, with persistent margins, 0.3–0.6 mm diam. Hamathecium of branched and anastomosing parapysoids. Ascospores brown, 1-septate, 11–17 × 6–8 µm (Hafellner 2004).

To date *Karschia talcophila* has been reported only by Stein (1879) from the region of Silesia, as “not rare” but without detailed localities. Its presence in Poland has now been confirmed; probably it is more frequent as it is easily overlooked.

SPECIMEN EXAMINED. [Eb-91] CENTRAL SUDETY MTS, Góry Krucze Mts, Krucza Skała Mt., 600 m, on *D. scruposus* growing on volcanic rock, 17 Sept. 2011, *K. Szczepańska* (hb. Szczepańska 915).

***Muellerella pygmaea*** (Körb.) D. Hawksw. *s.str.*

HOSTS: *Rhizocarpon reductum* Th. Fr. and *Lecidea fuscoatra* (L.) Ach. (thalli).

Perithecia globose, 175–250 µm diam., black, sessile or immersed in host thallus. Asci of 20–32 spores. Ascospores brown, 1-septate, 8–10 × 4–5 µm, with relatively thick walls, finely ornamented (Triebel 1989).

*Muellerella pygmaea* is common on various species of epilithic crustose lichens in Poland (Czyżewska & Kukwa 2009), and in the Sudetes it is known from several localities (Körber 1855; Stein 1879; Kukwa & Czarnota 2006; Szczepańska 2008; Kukwa & Flakus 2009).

SPECIMENS EXAMINED. [Eb-40] WESTERN SUDETY MTS, Pogórze Kaczawskie foothills, Ostrzyca Mt., 501 m, on *Rh. reductum* growing on basalt rock, 26 Sept. 2012, *K. Szczepańska* (hb. Szczepańska 930); same locality, on *L. fuscoatra* growing on basalt rock,

26 Sept. 2012, *M. Kossowska* (hb. Kossowska 1278). [Eb-91] CENTRAL SUDETY MTS, Góry Krucze Mts, Krucza Skała Mt., 600 m, on *Rh. reductum* growing on volcanic rock, 17 Sept. 2011, *K. Szczepańska* (hb. Szczepańska 921).

***Stigmidium fuscatae*** (Arnold) R. Sant.

HOST: *Acarospora fuscata* (Nyl.) Arnold (thallus).

Ascomata perithecioid, globose, brown in upper part and hyaline in lower part, immersed or semi-immersed in host squamules. Hamathecium of pseudoparaphyses. Ascospores hyaline, 1-septate, 10–12 × 4–5 µm, with slightly narrower lower cell (Triebel & Cáceres 2004).

*Stigmidium fuscatae* is a rare species in Poland, formerly known from only six localities (Kukwa *et al.* 2010); in the Sudety Mts it has been recorded twice (Kukwa & Jabłońska 2008; Kukwa *et al.* 2010).

SPECIMENS EXAMINED. [Eb-64] PRZEDGÓRZE SUDECKIE FORELAND, Wzgórze Strzegomskie hills, Krzyżowa Mt., ca 350 m, on *A. fuscata* growing on basalt rock, 19 May 2013. *K. Szczepańska* (hb. Szczepańska 950). [Eb-91] CENTRAL SUDETY MTS, Góry Krucze Mts, Krucza Skała Mt., 600 m, on *A. fuscata* growing on volcanic rock, 17 Sept. 2011, *K. Szczepańska* (hb. Szczepańska 909).

***Zwackhiomyces martinatianus*** (Arnold) Triebel & Grube

HOST: *Porpidia* sp. (thallus).

Ascomata perithecioid, globose to pyriform, 90–130 µm diam., immersed in host thallus. Interascal filaments present, branching and anastomosing. Ascospores relatively small, 11–17 × 3–5 µm, hyaline, 1-septate. The fungus may induce gall formation on infected thalli (Grube & Hafellner 1990; Calatayud *et al.* 2007).

*Zwackhiomyces martinatianus* is a rare lichenicolous fungus, confined to *Porpidia* species. It is known from central and western parts of Europe, having been found in Austria, Belgium, France, Germany, Iceland, Italy, Luxembourg and Spain (Grube & Hafellner 1990; Sérusiaux *et al.* 1999; Ertz *et al.* 2008; Brackel 2010). Here it is reported as new for Poland. The examined specimen

corresponds with the description, but the infection did not cause the development of distinct galls on the host.

SPECIMEN EXAMINED. [Eb-91] Central Sudety Mts, Góry Krucze Mts, Krucza Skala Mt., 600 m, on *Porpidia* sp. growing on volcanic rock, 17 Sept. 2011, K. Szczepańska (hb. Szczepańska 944).

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