Colacogloea peniophorae (Platygloeales) in Poland

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The fourth Polish locality of unusual auricularioid mycoparasite, Colacogloea peniophorae (Bourdot et Galzin) Oberw. et Bandoni, is reported and distribution of the fungus in Poland is reviewed. The taxonomy of the fungus is discussed and key to Colacogloea species is provided. Fungi parasites through colacosomes are briefly reviewed.

Key words: auricularioid fungi, mycoparasitism, colacosomes, distribution of fungi in Poland.

INTRODUCTION

In the course of chorological and ecological studies on wood-inhabiting saprobic basidiomycetes occurring in Tarnów, southern Poland, one specimen of corticioid fungus densely covered by pulvinate, gelatinous galls was found in May 2001. The presence of galls growing parasitically on the surface of host hymenium already in the field suggested the possible discovery of Colacogloea peniophorae (Bourdot et Galzin) Oberw. et Bandoni. Subsequent microscopic examination confirmed this assumption.

The aim of the present paper was to characterize the morphological features of Colacogloea peniophorae based on the new collection, to discuss taxonomy of the fungus and to show its distribution in Poland.

DESCRIPTION AND DISCUSSION

Colacogloea peniophorae (Bourdot et Galzin) Oberw. et Bandoni

Basidiomes pulvinate to effused, gelatinous, growing parasitically in and on the surface of host hymenium. Hyphae thin-walled, hyaline, with clamps. Basidia very numerous, auricularioid, without probasidia, transversely three-
septate, with long sterigmata; basidiospores self-replicating, 4.2–5.2 × 6.2–8.2 μm; conidia, 3.1–6.2 × 6.2–8.2(–10.4) μm, produced terminally on conidiophores (Fig. 1).

Fig. 1. Colacogloea peniophorae: 1, 2, 3 — auricularioid basidia, 4 — basidiospores, two of them self-replicating, 5 — conidia. Scale bars: A = 10 μm (4–5), B = 20 μm (1–3).
Mycoparasitic on hymenium of corticioid fungus; its determination was impossible because no basidia or basidiospores were found. Even so, the microstructure of parasite matched perfectly with literature descriptions (Oberwinkler et al. 1990) and the correct identification was doubtless.

Taxonomy: Colacogloea peniophora is an unusual mycoparasitic heterobasidiomycete, one of the most remarkable amongst occurring in Poland. Its exact taxonomical position was explained only recently. In the past, in the name Platygloea peniophora Bourdot et Galzin were included populations both from aphyllophoraceous and dacyromycetaceous hosts (vide Wojewoda 1981), the latter were treated as a separate variety Platygloea peniophora var. interna L. S. Olive. Wojewoda (1977) transferred the species to the genus Achroomyces Bonord., with a following combination: Achroomyces peniophora (Bourdot et Galzin) Wojewoda. This name is still used by some authors for populations on aphyllophoraceous fungi (e.g. Hansen and Knudsen 1997). Oberwinkler et al. (1990) and Oberwinkler (1990) made intense, comparative studies on species from the genus Platygloea J. Schroet. s.l. and showed that populations from aphyllophoraceous and dacyromycetaceous hosts are not conspecific. Moreover, they are quite different from Platygloea disciformis (Fr.) Neuhoff, the generitype of Platygloea. For these reasons two new separate genera were proposed, Colacogloea Oberw. et Bandoni and Occultifur Oberw., with representatives of Colacogloea peniophora and Occultifur internus (L. S. Olive) Oberw. occurring on aphyllophoraceous and dacyromycetaceous hosts respectively.

Initially, the genus Colacogloea was described as monotypic, two more species, viz. C. bispora (Hauerslev) Oberw. et R. Bauer (Oberwinkler et al. 1999) and C. papilionacea R. Kirschner et Oberw. (Kirschner and Oberwinkler 2000), were added or described later. These three species can be determined on the basis of morphological features using the key given below. The occurrence of two remaining species in Poland is possible, as they are known in Central European countries: C. bispora in Denmark (Hauerslev 1987, as Platygloea bispora Hauerslev) and C. papilionacea in Germany (Kirschner and Oberwinkler 2000). The former should be looked in the hymenia of Tubulicrinis Donk species. Colacogloea papilionacea was isolated from the bark beetles infesting conifers, but it is probably not regularly associated with bark beetles (Kirschner and Oberwinkler 2000).
Key to Colacogloea species

1. Basidiomes present, conspicuous as pulvinate, gelatinous galls on surface of host hymenium, basidia auricularioid, transverse 3-septate, conidia and conidiophores present, usually on Hyphoderma praeterrissum... C. peniophora
2. Basidiomes absent, fungi forming only basidia or basidium and conidiophores on ascomycetous or basidiomycetous hosts.

2. Conidial stage absent, fungus forming only auricularioid, 1-septate basidia, intrahymenially in basidiomes of corticioid fungi (Tubulicrinis)... C. hispora
2. Conidial stage present, fungus forming auricularioid, 1-3-septate basidia and conidiophores with characteristic butterfly-like zygoconidia, on unknown ascomycetous host... C. papilionacea

Distribution in Poland: Platygloea peniophora s.l. has been rarely collected in Poland. In the monograph of tremellaceous fungi, Wojewoda (1977) reported none Polish localities of the fungus on aphyllophoraceous hosts, and one probable locality on Dacryomyces stillatus Nees: Fr. Later, he listed some collections from various parts of the country, but all were found on Dacryomyces Nees: Fr. (Wojewoda 1979, 1980, 1998), so these all populations actually represent Occultifur internus. Komorowska (1980) reported ‘Achroomyces peniophorae’ from the Niepolomice Forest without details on its host fungus. Fortunately in KRAM there is herbarium specimen collected in this locality, which was found on Hyphoderma ?argillaceum (Bres.) Donk (det. W. Wojewoda), so it means that this collection refer to truly Colacogloea peniophora, representing its first finding in Poland. However, under the name Colacogloea peniophora the species was first published by Oleśniski and Wojewoda (1987) on the basis of 1982 collection by Longin Oleśniski in northeastern part of the country. Then the fungus was reported by Wojewoda (1998) from the Beskid Niski Mts. In two latter localities the species grew parasitically in basidiomes of Hyphoderma praeterrissum (P. Karst.) J. Erikss. et Á. Strid, which is a typical host fungus for C. peniophora (Oberwinkler et al. 1990). The newly found station in Tarnów is the fourth record for this peculiar species in Poland (Fig. 2). Details of these all records are given below:


Notes on mycoparasitic interactions: Mycoparasitic, auricularioid fungi form various structures, which enable interactions with host fungus. Most of species have haustoria of tremelloid type, and such occur inter alia in Achroomyces soranus Hauerslev (Hauerslev 1999), Occultifur internus (O ber winkler 1990), Spiculogloea minuta P. Roberts (Roberts 1997), S. occulta P. Roberts (Roberts 1996), S. subminuta
Hauerslev (Hauerslev 1999) or Zygogloea gemellipara P. Roberts (Roberts 1994). A special type of host-parasite interactions occurs in Colacogloea peniophorae. The parasite penetrates host cells through colacosomes, which are organelles developed by parasite at the contact area between parasite and the host fungus and visible by transmission electron microscopy as vesicular bodies with electron-dense cores and electron-transparent margin (Bauer and Oberwinkler 1991).

Colacosomes were first observed and described in Colacogloea peniophorae, but subsequently found also in other taxa. These organelles were found in two remaining Colacogloea species, and in some monotypic genera, Atractocolax R. Kirschner, R. Bauer et Oberw., Colacosiphon R. Kirschner, R. Bauer et Oberw., Cryptomyccocolax Oberw. et R. Bauer, Heterogastrium Oberw. et R. Bauer and Krieglsteiner Pouzar (Oberwinkler and Bauer 1990, Bauer et al. 1997, Kirschner et al. 1999, 2001). Otherwise, colacosomes were detected in the yeast-like genera Leucosporidium Fell, Statzell, I. L. Hunter et Phaff, Rhodosporidium Banno and Sporidiobolus Nyland (Bauer et al. 1997).

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S treszczenie

