# *Sclerococcum cladoniae*, a new lichenicolous hyphomycete on *Cladonia* from Luxembourg

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**Abstract.** The new *Sclerococcum cladoniae* is described from *Cladonia* thalli in Luxembourg. It is characterized by extremely small conidiomata, in which a mass of aseptate, brown, very small, indistinctly catenate conidia are produced.

Key words. Anamorphic fungi, Intralichen, taxonomy.

### 1. Introduction

The genus Sclerococcum Fr. includes c. 15 species of sporodochial anamorphic fungi, which are all lichenicolous, except the lichenized S. griseosporodochium Etayo (Etayo 1995). Although no phylogenetic data are available, the genus is most probably not monophyletic. The core of the genus is formed by the generic type, S. sphaerale (Ach.) Fr., together with several morphologically similar species with black sporodochia (Etayo & Calatayud 1998). Several species with small conidiomata and catenate conidia were provisionally described within the genus, such as S. hawksworthii Etayo & Diederich, S. normandinae Diederich & Etayo and S. parmeliae Etayo & Diederich (Etayo & Diederich 1995, 1996), but may eventually prove to belong to distinct genera.

While studying the lichenicolous fungi from large terricolous *Cladonia* populations in several parts of Luxembourg, we discovered an apparently undescribed hyphomycete forming minuscule sporodochia on the host thallus, producing brown, indistinctly catenate, aseptate conidia. The species does not resemble *S. sphaerale*, as conidiomata are smaller and not blackish, and conidia aseptate. We are not aware, however, of any more suitable genus, and therefore we describe the new species in *Sclerococcum*, pending future phylogenetic studies. Unfortunately, attempts to isolate the species in pure culture failed.

# 2. Material and Methods

The material examined is deposited in BR and HAL, and in the private herbarium of P. Diederich. For microscopical examination, thin sections were examined in water and in 5% KOH.

# 3. Results and Discussion

#### *Sclerococcum cladoniae* Diederich sp. nov. Fig. 1

MycoBank 519050.

Conidiomata lichenicola, sporodochia, irregulariter rotundata, convexa, superficialia, griseorufa, 7–20(–30) µm. Conidiophora semi-macronemata, e catenis conidiis ramosis irregularibus composita. Cellulae conidiogenae monoblasticae vel polyblasticae, integratae, terminales, rufae. Conidia indistincte catenata, sicca, acrogena, aseptata, subglobosa, fusca, levia, 2.2–3 µm diam. *Type*: Luxembourg, W of Kayl, Monument des mineurs, alt. 370 m, over mosses in a disused quarry, on *Cladonia pocillum* and *C. subulata*, 1 Sept. 2009, *P. Diederich* 16826 (BR – holotype; HAL, herb. Diederich – isotypes).

Colonies forming discrete, minuscule conidiomata on the host thallus; mycelium immersed, brownish, macroscopically not visible. Conidiophores semi-macronematous, pale to medium brown, aggregated into irregularly rounded, convex, medium to dark brown or greyish brown, simple, partly immersed to superficial sporodochia



Fig. 1. *Sclerococcum cladoniae* (holotype). A, Squamules of *Cladonia pocillum* with numerous sporodochial conidiomata; right squamule additionally with superficial mycelium of cf. *Sphaerellothecium cladoniae*. B–D, Sections through host thallus, showing several conidiomata. E, Same as D, after pressure on cover glass. Scale bars:  $A = 100 \mu m$ , B–E (same scale bar) =  $10 \mu m$ .

of 7-20(-30) µm diam. Conidiogenous cells monoblastic or polyblastic, integrated, terminal, brown, not clearly defined, and the terminal cells acting in turn as conidiogenous cells. Conidia irregularly adhering in short, branched, acropetal chains, dry, subspherical, pale to medium brown, K–, aseptate, smooth-walled, thin-walled, 2.2–3 µm diam.

Observations: The new species is characterized by the extremely small conidiomata, in which a mass of aseptate, brown, very small, indistinctly catenate conidia are produced. It resembles Sclerococcum hawksworthii, S. normandinae and S. parmeliae, but is distinguished from the three by the size of the conidiomata (30–100 µm in S. hawksworthii; 150-300 µm in S. normandinae; and 50-120 um in S. parmeliae), and by the less distinctly catenate, aseptate and smaller conidia (they are 0–1-septate,  $2.5-4 \mu m$  diam. in S. *hawksworthii*; 0-septate,  $4-6 \times 3.5-4 \mu m$  in S. normandinae; and (0-)1(-2)-septate, 7-9  $\times$  3.5–5 µm in S. parmeliae) (Etayo & Diederich 1995, 1996). Two other known Sclerococcum species have aseptate conidia: S. simplex D. Hawksw. has larger conidiomata, (50-)100-300 µm and conidia (3.5-)4-7(-8) µm (Hawksworth 1979); and S. verrucisporum Alstrup is readily distinguished by conidiomata up to 600 µm diam. and larger conidia,  $5-8 \times 4.5-6 \mu m$ , with a vertuculose wall (Alstrup 1993). The new species also resembles species of the genus Intralichen D. Hawksw. & M. S. Cole (Hawksworth & Cole 2002), but differs by the poorly visible, immersed mycelium and the sporodochial arrangement of the conidiophores.

In the type collection, the species was sometimes intermixed with a sterile superficial mycelium probably belonging to *Sphaerellothecium cladoniae* (Alstrup & Zhurb.) Hafellner (see Fig. 1A, right squamule). *Distribution and host*: The species is known only from the type locality in Luxembourg on *Cladonia pocillum* and *C. subulata*, where it is very common and present on almost all host thalli examined (basal squamules and podetia). It has probably been frequently overlooked owing to the extremely small size of the conidiomata. The fungus does not visibly damage the host thallus.

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