

The genus *Cheiryomycella* (hyphomycetes): nomenclature, taxonomy and a new species

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Abstract. The sporodochial hyphomycete genus *Cheiryomycella* is briefly discussed, including nomenclature and taxonomy of its type species, *C. microscopica*. *C. foliicola*, a new species of this genus on leaves of *Alnus fruticosa* from Russia, is described, illustrated and compared with other species of *Cheiryomycella*. *Coniothecium chomatosporum* var. *variegatum* is reassessed after examination of type material and reduced to a synonym of *Coniosporium spadiceum*, a new combination proposed for the anamorph of *Hysterium insidens*. A key to the species of *Cheiryomycella* is provided.

Key words: *Ascomycota*, anamorphs, *Cheiryomycella foliicola* sp. nov., *C. chomatospora*, *Coniosporium spadiceum* comb. nov., *Coniothecium chomatosporum* var. *variegatum*

Introduction

The genus *Cheiryomycella* Höhn. (Höhnel 1910) was introduced for *Cheiryomyces speiroides* (Höhnel 1903). The type species of the latter genus is a common, widespread saprobic hyphomycete mainly on coniferous wood. However, the nomenclature of this species is still unclear and not yet established. Hughes (1958) pointed out that *Dicoccum microscopicum* represents an older name for *Cheiryomycella speiroides*, the type species, and introduced the combination *C. microscopica*. Based on an arbitrary interpretation of the original description and illustration, Boerema *et al.* (1973) considered *Coniothecium chomatosporum* (Corda 1837) to be the oldest name for this species and proposed the combination *Cheiryomycella chomatospora*. Sutton (1985) published a brief survey of *Cheiryomycella* in which the latter name was not accepted as the oldest name for this species, since this decision was just based on an interpretation of Corda's dubious

description and illustration, but not substantiated by a revision of type material. Therefore, attempts to locate and re-examine type material of *C. chomatosporum* have been made, but failed. Furthermore, Sutton (1985) excluded several species previously referred to as *Cheiryomycella*. The status of *Coniothecium chomatosporum* var. *variegatum* described by Preuss (1851) is quite unclear. Type material is preserved at B (Berlin) and has been re-examined. Matsushima (1975) introduced *Cheiryomycella moniliophora* which has been recognized by Sutton (1985) as a distinctive species. Recently an undescribed sporodochial hyphomycete species has been found on leaves of *Alnus fruticosa* in Russia. The new species can be easily assigned to *Cheiryomycella* since all basic features, i.e. sporodochial conidiomata, structure of the stromatic base, conidiogenous cells, conidiogenesis and shape of conidia, agree well with the current concept of this form genus.

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Materials and methods

The collections examined were described, mounted in distilled water, using oil immersion (bright field and phase contrast), but without any staining, by means of standard light microscopy (Olympus BX 50, Hamburg, Germany). 30 measurements ($\times 1000$ magnification) of conidia and other structures were made, with the extremes given in parentheses. Micrographs have been prepared by means of a light microscope Carl Zeiss Axio Imager A1 equipped with a camera, AxioCam MRc5.

Taxonomy

1. *Cheiromycella microscopica* (P. Karst.) S. Hughes, *Canad. J. Bot.* **36**: 747, 1958.
 ≡ *Dicoccum microscopicum* P. Karst., *Meddeland. Soc. Fauna Fl. Fenn.* **14**: 91, 1887.
 = *Torula gyrosa* Cooke & Massee, in Cooke, *Grevillea* **16**: 10, 1887.
 ≡ *Cheiromycella gyrosa* (Cooke & Massee) E.W. Mason & S. Hughes, in Rimington, *Nat. Hist. Scarborough Distr.* **1**: 156, 1953.
 = *Clasterosporium punctiforme* var. *fennicum* P. Karst., *Meddeland. Soc. Fauna Fl. Fenn.* **14**: 98, 1887.
 = *Cheiromyces speiroides* Höhn., *Ann. Mycol.* **1**(5): 408, 1903.
 ≡ *Cheiromycella speiroides* (Höhn.) Höhn., *Sitzungsber. Kaiserl. Akad. Wiss., Wien, Math.-Naturwiss. Cl., Abt. 1*, **119**: 664, 1910.
 Misapplied name: *Coniothecium chomatosporum* Corda, *Icon. Fung.* **1**: 2, 1837. — *Cheiromycella chomatospora* (Corda) Boerema, Dorenb. & Kesteren, *Persoonia* **7**: 132, 1973.

Notes: Sutton (1985) emphasized that the nomenclatural problems around this common wood-inhabiting hyphomycete can only be solved by examination of original material of *Coniothecium chomatosporum*. Unfortunately type material of this species is not preserved in Corda's herbarium at PRM (J. Holec, in litt.). Corda's (1837) original description was based on material of dry pine wood collected in Bohemia. The original description reads as follows: "Subeffusum, tenue, atrum, sporis rotundato-angulosis, planis, fuscis, intus obscurioribus. Longit. spor. 0,00044. Hab. in ligno sicco pini Bohemiae." (subeffuse, thin, dark, spores rounded-angular, smooth, brown, internally darker). Corda's (1837: Tab. 1, Fig. 22) original drawing does not provide any sufficient details for a proper interpretation of *C. chomatosporum*. Boerema *et al.* (1973) discussed the confused history of the application of the name *C. chomatosporum*, which was previously considered a serious pathogen of apple trees causing scab, canker and blister of twigs and stems. However, all described symptoms are now regarded to be of non-pathogenic origin, i.e. they are caused by adverse soil conditions, like deficiencies in water and potash. Boerema *et al.* (1973) simply stated that

the original description and illustration of *Coniothecium chomatosporum* demonstrate that this species is conspecific with *Cheiromycella microscopica*, an interpretation which was not recognized by Sutton (1985). We fully agree with Sutton (1985) and reject this arbitrary treatment of *C. chomatosporum*. Some early collections determined as *C. chomatosporum* based on interpretations of Corda's name have been examined, e.g. Fuckel, *Fungi Rhen. Exs.*, Suppl. **1**, Fasc. **2**, no. 1615 ("ad Pyri Mali, Ca. Hostricham," HAL) and Rabenh., *Fung. Eur. Exs.*, no. 1667 ("ad cortice Pyri prope Schandau, Helv. saxon., Julio 1871, leg. ipse," HAL). Fuckel's material proved to be *Trimmatostroma betulinum* (Corda) S. Hughes, a common hyphomycete on attached and fallen twigs of *Betula*, *Corylus*, *Ilex*, *Salix* and *Sorbus*, but also isolated from *Pinus* (Ellis 1971; Ellis & Ellis 1997). Rabenhorst's sample is rather *Epicoccum*-like. The description and illustration of *C. chomatosporum* can easily be interpreted as *T. betulinum*, but without appropriate material for a neotypification (should be on *Pinus* from Bohemia), we tentatively prefer to consider *C. chomatosporum* a dubious name to be excluded from *Cheiromycella*.

Preuss (1851) introduced *Coniothecium chomatosporum* var. *variegatum*, which is a quite unclear taxon. Therefore, holotype material of this variety has been re-examined ("in ramis dejectis Mali in horto prope Hoyerswerda," herb. G.T. Preuss, B 700014170) and proved to be identical with the *Coniosporium* Link anamorph of *Hysterium insidens* Schwein. (Ellis 1971). This conidial state does not yet have a valid name in *Coniosporium*, although its nomenclature was already discussed and summarized on the base of examinations of type collections by Hughes (1958). Since this anamorph usually occurs independently of the teleomorph (see Ellis & Ellis 1997), a valid, separate name seems to be desirable:

Coniosporium spadiceum (Schwein. : Fr.) U. Braun, **comb. nov.**

Mycobank, No. 5154440.

Bas.: *Trichoderma spadiceum* Schwein., *Schriften Naturf. Ges. Leipzig* **1**: 77, 1822.

≡ *Hyphelia spadicea* (Schwein. : Fr.) Fr., *Syst. Mycol.* **3**: 212, 1829.

≡ *Monilia fusconigra* Schwein., *Trans. Amer. Philos. Soc.* **II**, **4**: 286, 1832 (nom. illeg.).

= *Septonema spilomeum* Berk., *J. Bot. (Hooker)* **4**: 310, 1845.

= *Sirodesmium granulosum* de Not., *Mem. Reale Accad. Sci. Torino*, **II**, **10**: 347, 1849.

= *Coniothecium chomatosporum* var. *variegatum* Preuss, *Linnaea* **24**: 101, 1851, and *Deutschlands Flora, Abtheilung III, Die Pilze Deutschlands*, **6**(29–30): 59, 1851.

= *Bonordeniella aspera* Linder, *Mycologia* **26**: 439, 1934.

= *Hysterium insidens* Schwein., *Trans. Amer. Philos. Soc.* **4**(2): 244, 1832 (teleomorph), for further synonyms see Zogg (1962).

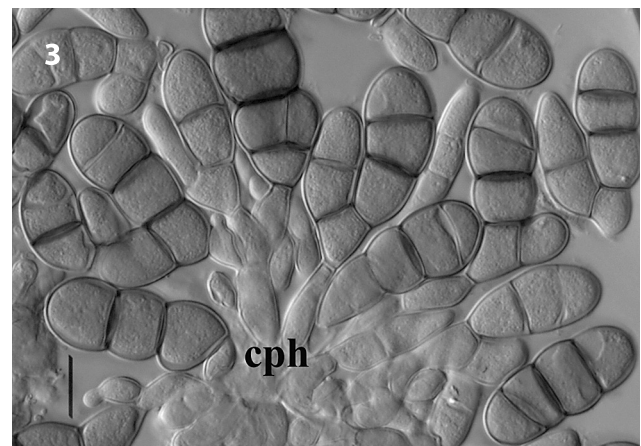
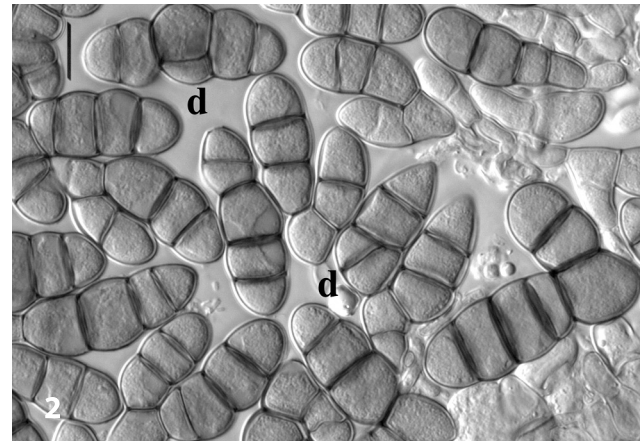
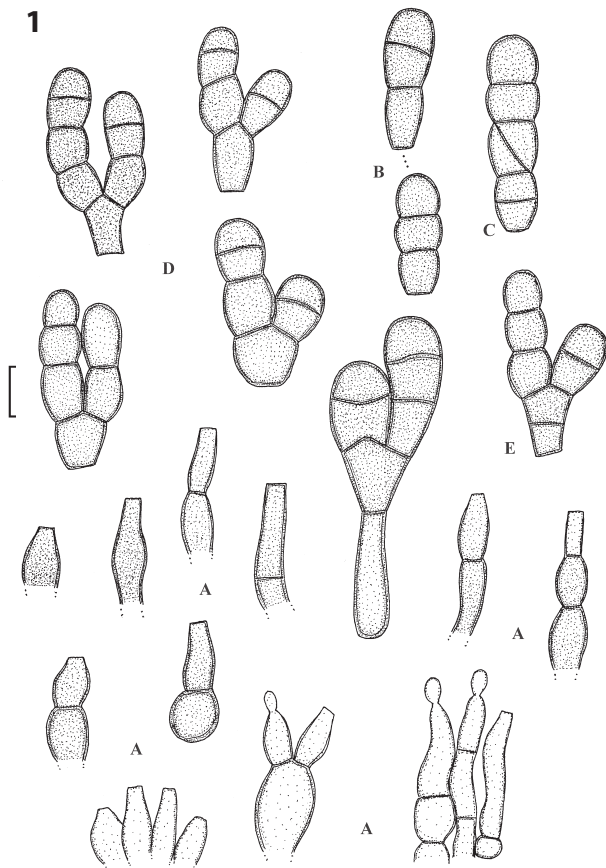


Fig. 1. *Cheiromycella foliicola*. **A.** Conidiophores and conidiogenous cells. **B.** Phragmoconidia. **C.** Dictyosporous conidium. **D.** Cheiroconidia. **E.** Cheiroconidium with two-celled base. Bar = 10 μ m. U. Braun del. **Fig. 2.** *Cheiromycella foliicola*. Micrograph of conidia (d = dictyosporous conidia). Bar = 10 μ m. **Fig. 3.** *Cheiromycella foliicola*. Micrograph of conidia and conidiophores (cph = conidiophores). Bar = 10 μ m

2. *Cheiromycella foliicola* U. Braun, Melnik & Tomoshevich, **sp. nov.** Figs 1–3
Mycobank, No. 5154441.

Cheiromycellae microscopicae similis, sed cellulis conidiogenis persaepe monoblasticis, conidiis majoribus, 25–45 μ m longis, brachiis 7–12 (–14) μ m latis, interdum dictyosporis, sine vacuolis distinctis.

Holotype: on leaves of *Alnus fruticosa* Rupr. [\equiv *Duschekia fruticosa* (Rupr.) Pouzar, *Alnus viridis* subsp. *fruticosa* (Rupr.) Nyman], Russia, Siberia, in the vicinity of Krasnoyarsk City, nature reserve “Stolby”, 5 Sep 2009, M.A. Tomoshevich (HAL 2335 F). **Isotype:** LE 261917. **Paratype:** on leaves of *A. fruticosa*, Russia, Siberia, in the vicinity of Krasnoyarsk City, nature reserve “Stolby”, 23 Aug 2008, M.A. Tomoshevich (LE 261918).

Fungus foliicolous, **conidiomata** epiphyllous, sporodochial, scattered, apparently only on necrotic spots caused by the rust fungus *Melampsorium alni*, erumpent, pulvinate, dark

brown to blackish, usually 40–100 μ m diam., pulverulent. **Conidiophores** and conidiogenous cells arising from a stromatic, cushion-like hyphal base, composed of swollen, sometimes even subglobose, to filiform elements, simple or branched, often constricted at the septa, subhyaline to pale olivaceous or very pale olivaceous-brown, thin-walled, smooth; **conidiogenous cells** integrated in simple or branched conidiophores, terminal, or single conidiogenous cells directly arising from swollen stromatic cells, usually 8–15 \times 3–7 μ m, subcylindrical-conical to ampulliform, pale greenish, olivaceous or very pale olivaceous-brown, thin-walled, smooth, unilocal, monoblastic, determinate, **conidiogenous loci** truncate, flat, 2.5–5 μ m wide, unchanged (neither thickened nor darkened). **Conidia** formed singly, some conidia phragmosporous to dictyosporous, broadly ellipsoid to oblong obovoid, usually with 2–5 transverse and occasionally (\leq 1 %) 1 (–2) oblique to longitudinal eusepta, about 20–35 \times 6–12 μ m, but most conidia cheiroid, with a total length of 25–45 μ m, composed of a subglobose, obovoid to rhomboid, 1–2-celled base, 10–15 \times 6–12 μ m, and two arms, composed of (1–) 2–5 cells, 15–35 \times 7–12

(–14) μm , arms subequal in length to distinctly unequal, divergent or non-divergent, dense, usually 4–6-cuseptate, usually distinctly constricted at the septa, conidia very pale to medium olivaceous or olivaceous-brown, thin-walled (up to about 0.5 μm), smooth, apices rounded, base (hilum) rounded to truncate, 2.5–5 μm wide.

C. microscopica is ecologically clearly distinct from the new species by being lignicolous, and it is morphologically easily distinguishable by having conidiogenous cells with 1–2 (–3) conidiogenous loci and smaller conidia, 8–23 μm long, arms 3–7 μm wide, with distinct vacuoles (Sutton 1985; Mefnik & Popushoj 1992). *C. moniliphora* has conidia with two to occasionally three arms which are apically characteristically incurved, paler and sometimes

swollen (Matsushima 1975). The ecology of *C. foliicola* is not quite clear. It is a foliicolous hyphomycete occurring on necrotic lesions caused by the rust fungus *Melampsorium alni* (Thüm.) Dietel. The uredinia of the rust fungus are hypophyllous and infected by the hyperparasitic hyphomycete *Ramularia uredinis* (W. Voss) Sacc., which has not been recorded on this host so far (Braun 1998). The sporodochia of *C. foliicola* are formed epiphyllously on necrotic spots, i.e. it could be a phytoparasitic fungus on leaves or a saprobic hyphomycete on necrotic lesions caused by the rust fungus, but any association with the rust fungus can also not be excluded. The type host, *Alnus fruticosa*, belongs in the phylogenetically basal subgenus *Alnaster* (= genus *Duschekia*) within the monophyletic genus *Alnus* (Navarro *et al.* 2003).

Key to the recognized species of *Cheiromycella*

- 1 Cheiroid conidia with two to occasionally three arms, distinctly incurved, tips paler and sometimes swollen; on wood of *Fagus crenata*, Japan *C. moniliphora*
- 1* Cheiroid conidia with two arms, straight to slightly curved, uniformly pigmented, their apical cells not swollen 2
- 2 Lignicolous; conidiogenous cells mono- to polyblastic, with 1–2 (–3) conidiogenous loci; conidia 8–23 μm long, arms 3–7 μm wide, with conspicuous vacuoles *C. microscopica*
- 2* Foliicolous; conidiogenous cells monoblastic; conidia 25–45 μm long, arms 7–12 (–14) μm wide, without vacuoles *C. foliicola*

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