

***Lawrynomycetes*, a new genus of corticioid fungi in the Hymenochaetales**

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The new genus *Lawrynomycetes* is proposed to accommodate *Hyphoderma capitatum*, a predominantly European species growing on decayed coniferous wood. The genus belongs to the *Rickenella*-clade in the order Hymenochaetales, and it includes species characterized by resupinate basidiomes, monomitic hyphal system with simple septate hyphae, presence of cystidia and hyphidia, suburniform to subcylindrical, pedunculate basidia, and subglobose to broadly ellipsoid basidiospores with slightly thickened walls not staining in Melzer's reagent or Cotton Blue. Published molecular data support the recognition of a distinct genus for *Hyphoderma capitatum*.

Key words: taxonomy, new genus, *Hyphoderma*

INTRODUCTION

Hyphoderma capitatum J. Erikss. & Å. Strid was described from a specimen collected by Kurt Hjortstam in Alingsås, Sweden (Eriksson, Ryvarden 1975). Among the members of the genus *Hyphoderma* Wallr., it was considered to be a discordant taxon due to its simple septate hyphae and slightly thickened wall of the basidiospores. Recent phylogenetic studies revealed that *Hyphoderma* is polyphyletic and that most species cluster in two distinct, monophyletic clades (Larsson et al. 2004, 2006; Larsson 2007a, b). The generic type *Hyphoderma setigerum* (Fr.) Donk and related species were placed in the “phlebioid clade” (Meruliaceae, Polyporales). This *Hyphoderma* s.str. lineage is differentiated from other genera of the “phlebioid clade” by presence of suburniform basidia, tubular cystidia and cylindrical or elliptical spores (Larsson 2007a). The second lineage is in the *Rickenella*-clade of the Hymenochaetales. The members of this lineage produce clavate basidia and often unique cells called echinocysts and stephanocysts, which have a nutritional function (Hallenberg 1990) and capture and infect nematodes (Tzean, Liou 1993). To accommodate the species from this lineage, Larsson (2007a) reinstated the

genus *Peniophorella* P. Karst., typified by *P. pubera* (Fr.) P. Karst. Systematic position of some species from both lineages were independently (intentionally or not) confirmed in other molecular studies (Miettinen, Larsson 2011; Miettinen, Rajchenberg 2012; Nakasone, Burdsall 2012; Tellería et al. 2012). However, some species of *Hyphoderma*, for example *H. argillaceum* (Bres.) Donk, *H. capitatum*, *H. orphanellum* (Bourdot & Galzin) Donk and *H. sibiricum* (Parmasto) J. Erikss. & Å. Strid, were not included in *Hyphoderma* or *Peniophorella* in molecular phylogenetic studies.

In all published phylogenies, *Hyphoderma capitatum* was recognized as a member of the *Rickenella*-clade in the Hymenochaetales and clustered in a clade separate from species of *Peniophorella*. Morphologically, *H. capitatum* differs from *Peniophorella* species in having hyphae without clamps, suburniform-pedunculate basidia, basidiospores with slightly thickened walls, and lacking echinocysts and stephanocysts. Morphologic and molecular phylogenetic data suggest that *Hyphoderma capitatum* should be accommodated in a new genus that is described and illustrated here.

MATERIALS AND METHODS

Examined specimens were collected from the Kaszubski Landscape Park, northern Poland, in 2007-2008. Laboratory methods and abbreviations follow Karasiński (2010). Specimens are deposited in author's reference fungarium (Herb. D.K.) and duplicates are in KRAM.

TAXONOMY

Lawrynomycetes Karasiński, gen. nov.

Mycobank MB 803871

Etymology: The genus is named in honor of Polish mycologist, Professor Maria Ławrynowicz.

Basidiomata resupinate, effused, adnate, thin. ***Hymenophore*** even, margin indeterminate, without rhizomorphs. Hyphal system monomitic. ***Hyphae*** with simple septa, thin to thick-walled, hyaline. ***Cystidia*** present. ***Hyphidia*** sometimes present. ***Basidia*** suburniform to subcylindrical and constricted, more or less pedunculate, basally without clamps, with (2–)4 prominent sterigmata. ***Basidiospores*** relatively large, broadly ellipsoid to subglobose, with slightly thickened walls and distinct apiculus, smooth, inamyloid, indextrinoid, acyanophilous.

Generic type: *Hyphoderma capitatum* J. Erikss. & Å. Strid.

Lawrynomycetes capitatus (J. Erikss. & Å. Strid) Karasiński, comb. nov. Figs 1-3

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Basionym: *Hyphoderma capitatum* J. Erikss. & Å. Strid, in Eriksson & Ryvarden, Cortic. N. Eur., *Coronicium-Hyphoderma* 3: 461 (1975).

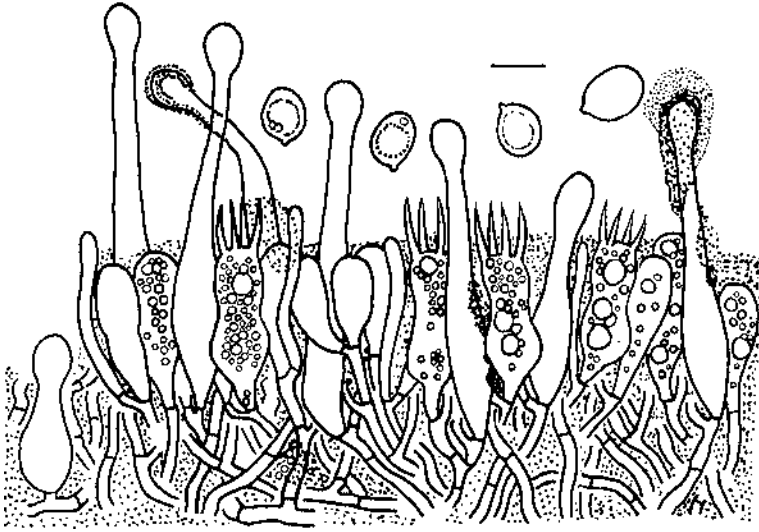


Fig. 1. *Lawrynomycetes capitatus* – section through basidiomata. Line drawing from coll. Karasiński 970 (KRAM F-56623). Scale bar = 10 μm .

Basidiome resupinate, closely adnate, very thin, 60–150 μm thick (excluding projecting cystidia), forming linear or irregular patches, becoming confluent with age, up to 20 cm in the longest dimension, soft, membranaceous, initially white, then grayish-white to grayish-cream, finally gray with brownish tint, dirty ochraceous-gray when dry. *Hymenophore* smooth, discontinuous as seen by stereomicroscope, densely reticulate, pilose from projecting cystidia; margin indeterminate, sometimes abrupt, somewhat pruinose or minutely fimbriate to loosely reticulate in some parts. Odor or taste not known. *Hyphal system* monomitic, all hyphae with simple septa. *Subiculum* absent or in well developed basidiomes as a very thin layer of basal hyphae, 2–4.5 μm wide, parallel to substrate, slightly thick-walled, hyaline, smooth, branching at right-angles; *subhymenium* 20–50(–70) μm thick, consisting vertically and loosely arranged hyphae, 2–4 μm wide, sparsely branched, somewhat sinuous, thin-walled or up to 0.2 μm thick, hyaline, without encrustation, but in mature specimens covered (in KOH) with yellowish to brownish gray resinous matter; *hymenial layer* composed of cystidia, basidioles, basidia and hyphidia. *Cystidia* 55–105 μm long, with swollen base, 7–12(–16) μm , tapering towards the apex and usually capitate, apical bulb 7–9.5(–11) μm in diameter, projecting up to 60 μm above basidia, thin-walled or with slightly thickened walls except at apex, empty, not encrusted, apical bulb enclosed by hyaline or yellow matter observed in Melzer's reagent or Cotton Blue but dissolving in KOH and other media; in some well developed specimens, short capitate cystidia produced from basal hyphae, approximately 30 μm long. *Basidia* 32–48 \times 10–13 μm , suburniform to subcylindrical and constricted, more or less distinctly pedunculate, with oily granules in the protoplasm, without basal clamp, with 4 prominent sterigmata ca. 10 \times 2.5 μm , 2-sterigmate basidia not observed in studied material. *Hyphidia* scarce, enclosed or only slightly projecting, obtuse at apex, 3–5 μm wide, hyaline, thin-walled, smooth.



Fig. 2. *Lawrynomycetes capitatus* – young basidiomata on very rotted wood of *Pinus sylvestris* stump. Coll. Karasiński 2744 (Herb. D.K.).



Fig. 3. *Lawrynomycetes capitatus* – mature and well developed basidiomata on much rotted wood of *Picea abies* stump. Coll. Karasiński 970 (KRAM F-56623?).

Basidiospores (8.8–)9–13.2(–14) × (7–)8.5–11(–11.5) µm (Lm=11.2 µm, Wm=9.3 µm, Q=1.1–1.4 µm, Qm=1.2 µm, n=120/4), subglobose to broadly ellipsoid, hyaline, containing one large or many small oil drops, smooth, with thickened walls and prominent apiculus, inamyloid, acyanophilous.

SPECIMENS EXAMINED: **Poland.** Pojezierze Kaszubskie lakeland: Kaszubski Landscape Park, Lasy Mirachowskie forests, ca. 1.5 km N of Miechucino, managed mixed forest, on very rotted wood of *Picea abies* (L.) H. Karst. stump, 26 Oct. 2007, *leg. D. Karasiński* 970 (Herb. D.K., KRAM F-56623); Kaszubski Landscape Park, Kurze Grzędy Reserve, on bark of *Picea abies* stump, 4 Dec. 2008, *leg. D. Karasiński* 2703 (Herb. D.K.); Kaszubski Landscape Park, Bącz, ca. 2.5 km SW of Mirachowo, managed mixed forest, on very rotted wood of *Pinus sylvestris* L. stump, 5 Dec. 2008, *leg. D. Karasiński* 2725 (Herb. D.K., KRAM F-56624); the same locality, substrate and date, *leg. D. Karasiński* 2744 (Herb. D.K.).

DISTRIBUTION AND ECOLOGY: *Lawrynomycetes capitatus* is an European taxon, reported from Sweden (Eriksson, Ryvar den 1975), Norway (Ryvar den et al. 2003), Finland (Kotiranta et al. 2009), Denmark (Hjortstam 1984), Germany (Ostrow, Dämmrich 2010), Switzerland (Breitenbach, Kränzlin 1986), Belgium, Croatia, Czech Republic, Estonia and France (Bernicchia, Gorjón 2010). It was reported from southern Poland (Wojewoda 2003) and from three new localities from northern Poland reported here. In addition to Europe, it was reported from Turkey in Asia Minor (Sesli, Denchev 2011). It is not known from the tropics, subtropics and the southern hemisphere (Hjortstam, Ryvar den 2007).

Lawrynomycetes capitatus is associated with much decayed wood of conifers. In one case, a basidiome was collected from the bark of *Picea abies* stump in an early stage of decomposition.

DISCUSSION

The main morphological features of the genus *Lawrynomycetes* are a monomitic hyphal system with clampless hyphae, suburniform and more or less pedunculate basidia with prominent sterigmata, and smooth, hyaline, inamyloid, acyanophilous, broadly ellipsoid basidiospores with slightly thickened walls. The basidia of *Lawrynomycetes* are similar to those observed in species of *Hyphoderma* s.str. but are typically pedunculate, i.e. with a stalk. The phylogenetic position of *Hyphoderma capitatum* supports recognition of separate genus for this species.

The other species that may be a member of the genus *Lawrynomycetes* is *Hyphoderma orphanellum* (Bourdot & Galzin) Donk. Although *H. orphanellum* has basidia and cystidia of similar shape to *Lawrynomycetes*, it has clamped hyphae, thin-walled spores, encrusted hyphidia, and a dense, agglutinated subiculum (Eriksson, Ryvar den 1975; Bernicchia, Gorjón 2010). In some molecular phylogenetic studies *H. orphanellum* is shown to be in the same, well supported monophyletic clade with *Lawrynomycetes capitatus* (Larsson 2007a; Miettinen, Larsson 2011; Nakasone, Burdsall 2012). However, these studies used the same ITS and/or LSU sequence of *H. orphanellum* derived from NH 12208 from Russia. Another

sequence of *H. orphanellum* was included in the phylogenetic tree presented by Tellería et al. (2012). In this study, *H. orphanellum* was placed in the *Peniophorella* clade. Because of these conflicting results, I accept a narrow concept of the genus which so far is monotypic.

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Lawrynomycetes – nowy rodzaj grzybów kortycjoidalnych w rzędzie Hymenochaetales

Streszczenie

W pracy opisano nowy rodzaj *Lawrynomycetes* Karasiński gen. nov., dla *Hyphoderma capitatum*. Typ rodzaju jest gatunkiem notowanym głównie z Europy, stwierdzonym także w Azji Mniejszej i nieznanym z innych kontynentów. Występuje na mocno rozłożonym drewnie iglastym, głównie *Picea abies*, rzadziej *Pinus sylvestris*, w lasach mieszanych i iglastych, zarówno naturalnych jak i sztucznego pochodzenia, a owocniki wytwarza zazwyczaj późną jesienią. Nowy rodzaj należy do tzw. „kladu *Rickenella*” w rzędzie *Hymenochaetales*. Cechami charakterystycznymi dla *Lawrynomycetes* są rozpostarte, miętko błonkowate i białawe do szaro kremowych owocniki, bardzo cienkie (60–150 µm), tworzące na drewnie nieregularne w zarysie powłoczki (Fig. 2 i 3), gładki hymenofor, monomityczny system strzępkowy ze strzępkami generatywnymi bez sprzężek, obecność cystyd tramalnych i hymenialnych oraz hyfid, podstawki niewyraźnie urnokształtne do niemal cylindrycznych z trzoneczkowatą podstawą oraz zarodniki szeroko elipsoidalne do prawie kulistych z grubiejącymi ścianami (Fig. 1), nie wykazujące reakcji w odczynniku Melzera i roztworze błękitu bawełnianego. W blisko spokrewnionym z *Lawrynomycetes* rodzaju *Peniophorella*, podstawki mają kształt maczugowaty, zarodniki są cienkościenne, a należące tu gatunki często wytwarzają na strzępkach kontekstu charakterystyczne struktury – echinocysty i sferocysty, nieobecne u *Lawrynomycetes*. Umieszczenie *Hyphoderma capitatum* w odrębnym rodzaju ma uzasadnienie w publikowanych danych molekularnych.