



New and interesting Laboulbeniales (Fungi, Ascomycota) from the Netherlands

Danny Haelewaters^{1*}, Oscar Vorst² and André De Kesel³

¹ Department of Organismic and Evolutionary Biology, Harvard University, 22 Divinity Avenue, Cambridge, MA 02138, U.S.A.

² Naturalis Biodiversity Center, PO Box 9517, 2300 RA Leiden, the Netherlands

³ National Botanic Garden of Belgium, Domein van Bouchout, 1860 Meise, Belgium

With 2 figures

Abstract: Thirteen species of Laboulbeniales (Fungi, Ascomycota) are reported for the first time from the Netherlands. These are *Bordea denotata* sp. nov., *Botryandromyces heteroceri*, *Chaetarthriomyces crassappendicatus*, *Cryptandromyces elegans*, *Ecteinomyces trichopterophilus*, *Kainomyces rehmanii*, *Laboulbenia fennica*, *L. inflata*, *L. luxurians*, *L. philonthi*, *Monoicomycetes britannicus*, *M. myllaenae*, and *Siemaszkoa fennica*. A new staphylinid host is reported for *Monoicomycetes*, i.e. *Acrotona pseudotenera*.

Key words: ectoparasites, insect-fungus interactions, Laboulbeniales, new species, taxonomy.

Introduction

Recent study of Laboulbeniales in the Netherlands yielded over 25 species in 11 genera (De Kesel & Gerstmanns 2012, Haelewaters 2012, Haelewaters et al. 2012, Haelewaters & De Kesel 2013).

Thanks to new material, mostly obtained from the entomological collection of the second author, we can present data on further 13 unrecorded species of Laboulbeniales from the Netherlands, four of which have been described by Thaxter (1892, 1893, 1900, 1902) more than a century ago: *Ecteinomyces trichopterophilus*, *Laboulbenia inflata*, *L. philonthi*, and *Monoicomycetes britannicus*. The other records are *Bordea denotata* sp. nov., *Botryandromyces heteroceri*, *Chaetarthriomyces crassappendicatus*, *Cryptandromyces elegans*, *Kainomyces rehmanii*, *Laboulbenia fennica*, *L. luxurians*, *Monoicomycetes myllaenae*, and *Siemaszkoa fennica*.

*Author for correspondence: dhaelewaters@fas.harvard.edu

Most of these parasites and their hosts have been reported elsewhere in Europe. However, we found thalli belonging to the genus *Bordea* on the pselaphin beetle *Bibloporus bicolor*. These specimens did not fit the descriptions in Spegazzini (1917) and Benjamin (2001) and therefore are described here as a new species, *B. denotata*.

Materials and methods

All insect collections used for the present contribution were supplied and identified by the second author, unless otherwise stated. Insects were preserved dried and card mounted. Each insect was carefully screened using an Olympus SZ61 dissecting microscope. Individual thalli were transferred with an insect pin size 0 and embedded in Amann's solution (Benjamin 1971). Cover slips were ringed with transparent nail varnish. Drawings and measurements were made using an Olympus BX51 light microscope with drawing tube, digital camera and AnalySIS Five imaging software (Soft Imaging System GmbH). Microscope slides are deposited at the National Herbarium of Belgium (BR) or at the Farlow Herbarium, Harvard University (FH). Insect hosts are preserved in the collection of the second author (cOV) or at the Brabant Museum of Nature, Tilburg (NNKN).

Host taxonomy and classification follow Vorst (2010).

Taxonomy

Bordea denotata Haelew. & De Kesel **sp. nov.**

Fig. 1

MycoBank: MB 804337

DIAGNOSIS: Thallus resembling *Bordea strangulata*, but smaller (total length 147–181 μm). Cell II free on the posterior margin for only 1–2 μm , separated from cell III by a very oblique septum. Basal part of cell VI not or weakly constricted, yet with a clear septum-like differentiation. Profile of cell VI towards perithecial body discontinuous by a widening starting at the basal cells of the perithecium. Perithecium with striae in both the first and second tier of wall cells. Perithecial apex gradually narrowing and rounded, not wider than the fourth tier of wall cells, with tiny but distinct papillae.

TYPE: On *Bibloporus bicolor* (Denny, 1825) (Coleoptera, Staphylinidae, Pselaphinae), collected in Haren, Harener Wildernis (Groningen), N 53°10' E 6°38', 2.ix.2000, under bark of standing dead *Alnus glutinosa* tree, leg. and det. O.Vorst (cOV), D.Haelewaters 60d (HOLOTYPE, 1 mature thallus, found on elytra, BR MYCO 173758-31); ISOTYPES D.Haelewaters 60a (BR MYCO 173755-28), 60b (BR MYCO 173757-30), 60c (BR MYCO 173756-29), and 60e (BR MYCO 173754-27). All taken from elytra, 16 thalli.

ETYMOLOGY: From the Latin adjective *denotatus* = marking, referring to the septum-like marking in the basal part of cell VI.

DESCRIPTION: THALLUS: 147–181 μm long, straight or slightly bent, pale amber colored, except for a darkening at the most apical part of cell III and the lower part of the basal cell of the appendage. RECEPTACLE: three-celled, 31–37 μm high; black foot with a tiny hyaline tip. CELL I: obtriangular, 17–21 \times 6.7–11.4 μm , its apex entirely supporting cell II. CELL II: 5.7–9.7 μm high at its anterior margin, bearing cell III obliquely leaving a free posterior margin of only 1–2 μm , and bearing cell VI at the apex. CELL III: moderately elongate, 11.1–13.6 \times 6.8–10.6 μm , apically supporting the appendage and separated from it by a slightly constricted septum, its upper inner

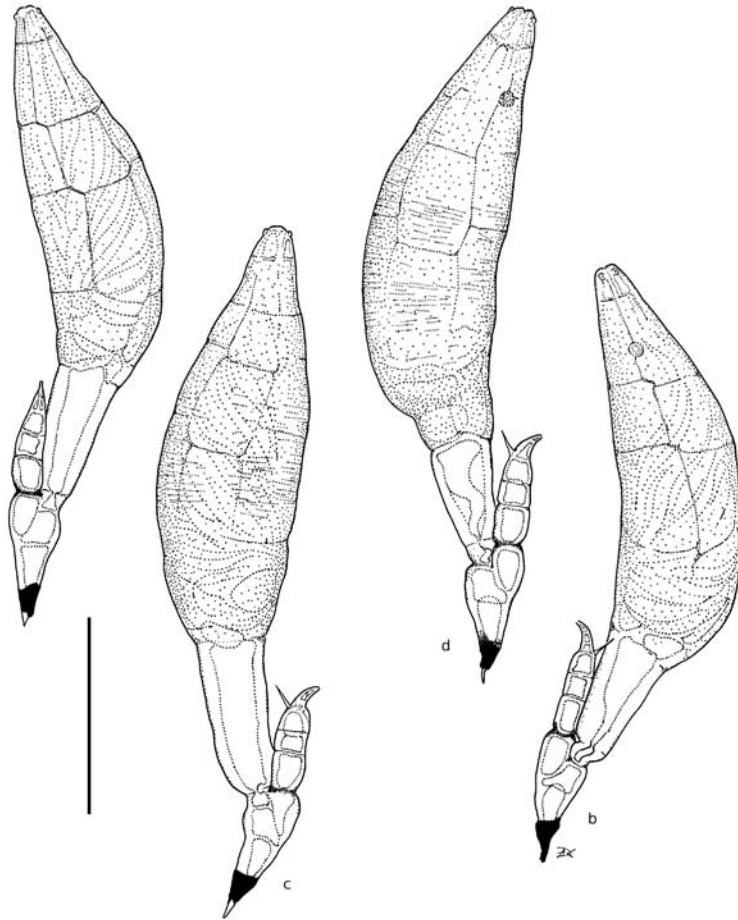


Fig. 1. *Bordea denotata* sp. nov. from *Bibloporus bicolor*. a, b. Mature thalli from left elytron (D.Haelewaters 60a). c. Mature thallus from left elytron (D.Haelewaters 60d). d. Mature thallus from left elytron (D.Haelewaters 60e). Scale bar = 50 μ m.

wall adnate with the base of cell VI. APPENDAGE: straight, rarely extending beyond the basal cells of the perithecium, two-celled, apically bearing a single antheridium. The basal cell 7.5–11.1 \times 6.4–9.4 μ m, rectangular; suprabasal cell shorter, 4.8–7.7 \times 6.1–8.9 μ m. ANTHERIDIUM: flask-shaped, 12.8–17.2 \times 6.1–8.6 μ m, with the efferent tube curved, 6.6–12 μ m long, its adaxial side with a subapical, straight and spiky remnant of the spore apex, about 3.4–7.0 μ m long. CELL VI: variable, 24.5–52.3 μ m long, the base 5.1–7.3 μ m wide, showing a cytoplasmatic stricture and septum-like marking at 3.6–6.6 μ m above septum II–VI, gradually broadening upwards, the apex 12.5–18.3 μ m wide. PERITHECIUM: relatively large, elongate, 89.6–108 \times 28.3–36.7 μ m, asymmetrical, slightly inflated near the basal cells, posterior margin straight or slightly concave, anterior margin convex, widest in the middle, upper part tapering,

apex symmetrical, ostiolar lips poorly differentiated, but with tiny papillae; mature perithecia with moderate to conspicuous transversal striae on the first and second tier of outer wall cells; remnant of the trichogyne usually conspicuous, 3.2–4.6 µm in diameter. ASCOSPORES: 26.8–30.6 × 2.3–3.1 µm.

REMARKS: The genus *Bordea* Maire, which had been included in *Autophagomyces* by Thaxter (1931), was reinstated and redefined by Benjamin (2001), based on slides from Spegazzini. The new species most closely resembles *Bordea spinigera* R.K.Benj. and *Bordea strangulata* (Thaxt.) R.K.Benj.

Bordea spinigera differs from the new species in the absence of transverse perithecial striae and in the presence of a strongly diagonal instead of transverse septum between the basal and supra-basal cell of the appendage; it also lacks the cytoplasmatic stricture and septum-like marking in cell VI, which are descriptive for *B. denotata*.

From all 14 thus far described species of *Bordea* (Spegazzini 1917, Benjamin 2001) *B. denotata* seems most closely related to *B. strangulata*. Important to notice is that the description of *B. strangulata* is based on just two mature specimens (Thaxter 1931, as *Autophagomyces strangulatus*). Like *B. denotata*, this taxon shows a differentiation in the basal part of cell VI. The nature of this differentiation, however, is different in both taxa. In *B. strangulata* cell VI is entirely constricted at about 8.3–8.7 µm above septum II–VI (observations at Thaxter 1636, FH #'s 4041 [holotype] and 4042 [isotype]). In *B. denotata* the cell wall clearly shows a marking and there is no full constriction in the cytoplasm. The antheridial venter of *B. strangulata* is relatively short (3.4–3.5 µm high), whereas in *B. denotata* it is up to 1.5–2× higher (5.2–8.4 µm). Finally, *B. strangulata* shows closely spaced transverse striae only at the first tier of outer wall cells of the perithecium (Benjamin 2001), while the new species has this feature on both the first and the second tier.

B. platensis (Speg.) R.K.Benj. differs from *Bordea denotata* in a clearly geniculate thallus with shorter antheridium and stouter efferent tube. Moreover, its posterior perithecial margin is convex and lacks both apical perithecial papillae and differentiation in the basal part of cell VI.

Botryandromyces heteroceri (Maire) I.I.Tav. & T.Majewski, Mycotaxon 3: 196 (1976).

≡ *Misgomyces heteroceri* Maire, Bull. Soc. Hist. Nat. Afr. Nord 11: 159 (1920).

KNOWN DISTRIBUTION AND HOSTS: Described from Algeria (as *Misgomyces heteroceri*) on *Heterocerus maritimus* Guérin-Méneville, 1844 (Coleoptera, Heteroceridae; now often placed in *Augyles*). Recorded from Spain, France, England, Belgium, Germany, Italy, Poland, Lithuania and Greece on several species of *Heterocerus* s.l., in China on *H. fenestratus* (Thunberg, 1784) and in Thailand on *Augyles gabriellae* (Mascagni, 1993) (Coleoptera, Heteroceridae) (Santamaría & Rossi 1999, Shen et al. 2006, Majewski 2008, De Kesel 2009).

NEW RECORDS FROM THE NETHERLANDS: On *Heterocerus obsoletus* Curtis, 1828 (Coleoptera, Heteroceridae), De Cocksdorp, Polder Wassenaar (Noord-Holland), N 53°10' E 4°52', 18.v.1996, brackish ditch, leg. and det. O.Vorst (cOV), D.Haelewaters 30a (BR-MYCO 1744416-10); Lauwersmeer, Marnewaard (Groningen), N 53°24' E 6°15', 6.vi.1998, brackish lake, leg. and det. O.Vorst (cOV), D.Haelewaters 73a (BR MYCO 173770-43).

Chaetarthromyces crassappendicatus Scheloske, Parasitol. Schriftenreihe 19: 97 (1969).

KNOWN DISTRIBUTION AND HOSTS: This species always parasitizes *Chaetarthria seminulum* s.l. (Coleoptera, Hydrophilidae, Hydrophilinae) and has so far only been recorded in Spain, Great Britain, Germany and Poland (Majewski 2008).

NEW RECORDS FROM THE NETHERLANDS: On *Chaetarthria seminulum* (Herbst, 1797) (Coleoptera, Hydrophilidae, Hydrophilinae), Retranchement (Zeeland), N 51°20' E 3°23', 1.ix.2002, cattle pond, leg. and det. O.Vorst (cOV), D.Haelewaters 54a (BR MYCO 173769-42).

REMARKS: Until recently, *Chaetarthria seminulum* was considered the only European representative of the genus *Chaetarthria* Stephens, 1835. *Chaetarthria*, however, appears to be a complex of three species (Hebauer 1993, Vorst & Cuppen 2003); older host records may as well refer to one of the other species, i.e. *C. similis* Wollaston, 1864 and *C. simillima* Vorst & Cuppen, 2003.

Cryptandromyces elegans (Maire) W.Rossi & Castaldo, Plant Biosyst. 138: 264 (2004).

≡ *Peyerimhoffiella elegans* Maire, Bull. Soc. Hist. Nat. Afr. Nord 7: 19 (1916).

≡ *Corethromyces elegans* (Maire) Maire in Thaxter, Mem. Am. Acad. Arts Sci. 16: 366 (1931).

= *Cryptandromyces brachyglutae* J.Siemaszko & W.Siemaszko, Pol. Pismo Entomol. 6: 205 (1928).

≡ *Corethromyces brachyglutae* (J.Siemaszko & W.Siemaszko) Thaxt., Mem. Am. Acad. Arts Sci. 16: 224 (1931).

KNOWN DISTRIBUTION AND HOSTS: Described from Algerian *Brachygluta* sp. (as *Peyerimhoffiella elegans*). Recorded on species of the genus *Brachygluta* Thomson, 1859 (Coleoptera, Staphylinidae, Pselaphinae) and related genera from Greece, Spain, Italy, Great Britain, France, Belgium (as *Peyerimhoffiella elegans*), Germany, Poland and Finland (De Kesel & Rammeloo 1992, Majewski 2008).

NEW RECORDS FROM THE NETHERLANDS: On *Brachygluta fossulata* (Reichenbach, 1816) (Coleoptera, Staphylinidae, Pselaphinae), Ameide, Zouweboezem (Zuid-Holland), N 51°56' E 4°59', 7.v.2005, *Carex* wetland, leg. and det. O.Vorst (cOV), D.Haelewaters 61a (BR MYCO 173768-41).

Ecteinomyces trichopterophilus Thaxt., P. Am. Acad. Arts Sci. 38: 26 (1902).

≡ *Misgomyces trichopterophilus* (Thaxt.) Thaxt., Mem. Am. Acad. Arts Sci. 16: 304 (1931).

KNOWN DISTRIBUTION AND HOSTS: Described from *Acrotrichis haldemani* (LeConte, 1863) (as *Trichopteryx haldemani*) (Coleoptera, Ptiliidae, Acrotrichinae), New Hampshire (U.S.A.). It has also been recorded in Argentina, Chile, Italy, Spain, Great Britain, Belgium, Germany and Poland (De Kesel & Rammeloo 1992, Weir 1994, Majewski 2008). Except for a single finding on *Baeocrara* Thomson, 1859 (Coleoptera, Ptiliidae, Acrotrichinae) from Poland, all host insects of this fungus belong to the genus *Acrotrichis* Motschulsky, 1848 (Majewski 1994, 2008).

NEW RECORDS FROM THE NETHERLANDS: On *Acrotrichis grandicollis* (Mannerheim, 1844) (Coleoptera, Ptiliidae, Acrotrichinae), Noordlaren, Noordlaarderbosch (Groningen), N 53°07' E 6°38', 1.ix.2000, horse dung, leg. and det. O.Vorst (cOV), on elytra, D.Haelewaters 58a (BR MYCO 173767-40).

REMARKS: *Ecteinomyces trichopterophilus* probably is the most frequently recorded species of Laboulbeniales in Poland, and it is also expected to be very common in other countries (Majewski 1994, 2008). Santamaría (2003) suggests it is the most common

species of Laboulbeniales. It is frequently recorded on hosts taken from horse and cow feces in pastures and feces of wild animals in forests (Majewski 1994). Our material is consistent with these findings since it was collected in horse feces in a mixed deciduous forest (including oak, pine, mountain-ash, holly, common ivy, *Rubus* and *Urtica*) on dry sandy soil. *Acrotrichis grandicollis* is a rather widespread species, commonly found in dung, but also in other kinds of decaying organic matter, such as carrion, compost heaps and rotting mushrooms (Sundt 1958). Several other *Acrotrichis* have similar habitat preferences, while other species are to be found in wetlands and forest litter.

In an attempt to categorize some of the variability of *E. trichopterophilus*, Majewski (1994) recognized three host-related morphotypes, all based on thalli from the elytra and abdominal tergites. The morphology of our material, as well as the host, corresponds with the traits of type 1 known from *Acrotrichis grandicollis*.

Kainomyces rehmanii T.Majewski, Polish Bot. Stud. 1: 121 (1991).

KNOWN DISTRIBUTION AND HOSTS: Species only known from Poland on *Acrotrichis dispar* (Matthews, 1865) (Coleoptera, Ptiliidae, Acrotrichinae) (Majewski 1991, 2008) and from Belgium on *Acrotrichis* sp. (De Kesel 2010).

NEW RECORDS FROM THE NETHERLANDS: On *Acrotrichis dispar*, Noordlaren, Noordlaarderbosch (Groningen), N 53°07' E 6°38', 1.ix.2000, horse dung, leg. and det. O.Vorst (cOV), D.Haelewaters 59a (BR MYCO 173766-39).

REMARKS: The host was found in a mixed deciduous forest (including oak, pine, mountain-ash, holly, common ivy, *Rubus* and *Urtica*) on dry sandy soil in horse feces, confirming the habitat preference of this species; Polish hosts have been collected in European bison feces, in cow feces and – rather exceptionally – in horse feces (Majewski 1991, 2008). Due to its rarity and the vulnerability of its habitat, Majewski (1994) suggested that this species may be endangered. The recent records in Belgium (De Kesel 2010) and the Netherlands, were made in more anthropogenic habitats, indicating that this species is probably not as rare or endangered as originally thought.

Laboulbenia fennica Huldén, Karstenia 23: 54 (1983).

KNOWN DISTRIBUTION AND HOSTS: *Laboulbenia fennica* is reported from *Gyrinus* Geoffroy, 1762 (Coleoptera, Gyrinidae) from Spain, Great Britain, Belgium, Poland, Finland, Estonia and Belarus (De Kesel & Werbrouck 2008, Majewski 2008).

NEW RECORDS FROM THE NETHERLANDS: On *Gyrinus marinus* Gyllenhal, 1808 (Coleoptera, Gyrinidae), Tilburg, De Kaaistoep (Noord-Brabant), N 51°32' E 5°01', 5.ix.2004, leg. H.Spijkers, det. P.van Wielink (NNKN), D.Haelewaters 78a (FH 00313158); on *Gyrinus substriatus* Stephens, 1828, Tilburg, Dongevallei (Noord-Brabant), N 51°34' E 4°59', 24.vii.2012, leg. P.van Wielink and H.Spijkers, det. P.van Wielink (NNKN), D.Haelewaters 108a (FH 00313179).

REMARKS: Although not observed in the available material from Tilburg area (Netherlands), *Laboulbenia fennica* occasionally occurs together with *Laboulbenia gyrinicola* Spig. in the same populations of beetles belonging to the genus *Gyrinus* (Majewski 1994). *Laboulbenia fennica*, however, can easily be recognized by the height of the receptacular cells III and IV: cell III is taller than cell IV (Santamaría 1998, De Kesel & Werbrouck 2008). Also, the perithecial apical outgrowths, which are not as long as those of *L. gyrinicola*, show dark spots.

Laboulbenia inflata Thaxt., Proc. Am. Acad. Arts Sci. 27: 41 (1892).

KNOWN DISTRIBUTION AND HOSTS: On species of *Acupalpus*, *Stenolophus*, and *Bradycellus* (Coleoptera, Carabidae, Harpalinae) from several European countries, the U.S.A., Korea, Argentina, and the Galápagos Archipelago (De Kesel 1997, 1998, Majewski 2008).

NEW RECORDS FROM THE NETHERLANDS: On two specimens of *Acupalpus dubius* Schilsky, 1888 (Coleoptera Carabidae, Harpalinae), Berkel-Enschot (Noord-Brabant), N 51°35' E 5°08', 14.vii.2005, leg. and det. P.van Wielink (NNKN), D.Haelewaters 81a (FH 00313162), 82a (FH 00313163) and 82b (FH 00313214).

REMARKS: The genus *Laboulbenia* Mont. & C.P.Robin, including over 500 species, shows a relative homogeneity of morphological characters (Tavares 1985). Dioecism, however, is not a common character in the genus (Santamaría 1998); this feature has been demonstrated in only one species, i.e. *Laboulbenia formicarum* Thaxt. (Benjamin & Shanor 1950). Dioecism in *L. inflata* was suggested for the first time by Majewski 1994. Santamaría (1996) suggests that *L. inflata* and *L. marina* F.Picard show the feature of dioecism by providing the following arguments: constant release of paired ascospores and the apparent strengthening of this pairing observed at the base of the ascospores; the small "male" thallus having six or seven superposed cells, the distal one flask-shaped and functioning as antheridium; and the downward growth of the trichogyne (in *L. marina*).

Laboulbenia luxurians Peyr., Sitzb. k. Akad. Wissensch., Math.-naturwiss. Cl. 68: 248 (1873).

KNOWN DISTRIBUTION AND HOSTS: *Laboulbenia luxurians* is found throughout Europe – although not recorded before in the Benelux – and in Algeria, Japan, Argentina, and the U.S.A. (Santamaría et al. 1991, Majewski 2008). Hosts are species belonging to the genus *Bembidion* Latreille, 1802 and closely related genera (Coleoptera, Carabidae, Trechinae).

NEW RECORDS FROM THE NETHERLANDS: On *Bembidion dentellum* (Thunberg, 1787) (Coleoptera, Carabidae, Trechinae), Oostburg, Groote Gat (Zeeland), N 51°19' E 3°30', 30.viii.2002, meadow, leg. and det. O.Vorst (cOV), D.Haelewaters 50a (BR MYCO 173765-38).

REMARKS: The available host specimen was infected with both *Laboulbenia luxurians* and *Laboulbenia vulgaris* Peyr. Also Majewski (1994) reports this combination of parasite species occurring on the same host specimen.

Bembidion dentellum has not previously been recorded as a host of *L. vulgaris* in the Netherlands. This carabid species, however, is known to be a suitable host for up to four *Laboulbenia* species. In Poland it is host to *Laboulbenia luxurians*, *L. pedicellata* Thaxt., *L. tenera* T.Majewski and *L. vulgaris* (Majewski 1994).

Laboulbenia philonthi Thaxt., Proc. Am. Acad. Arts Sci. 28: 174 (1893).

KNOWN DISTRIBUTION AND HOSTS: Reported from many European countries, however not any of the Benelux countries, as well as from Turkey, Korea, Argentina, Ecuador, Guatemala, Mexico, and the U.S.A. (Majewski 2008, Proaño Castro & Rossi 2008,

Lee et al. 2011). It parasitizes representatives of the genus *Philonthus* Stephens, 1829 and related genera (Coleoptera, Staphylinidae, Staphylininae) (Majewski 2008).

NEW RECORDS FROM THE NETHERLANDS: On *Philonthus micans* (Gravenhorst, 1802) (Coleoptera, Staphylinidae, Staphylininae), Kekerdom, Millingerwaard (Gelderland), N 51°52'E 6°00', 5.ix.2004, riverine *Salix* forest, leg. and det. O.Vorst (cOV), D.Haelewaters 71a (BR MYCO 173764-37).

REMARKS: Different opinions have been put forward about the relationship of *Laboulbenia philonthi* and *L. barbara* Middelh. & Boelens. Rossi (1975), Santamaría (1989) and Santamaría et al. (1991) consider *L. barbara* a synonym of *L. philonthi*. We agree with Majewski (1994, 2008) and Lee et al. (2002), who suggest that both should be treated as separate species, based on the presence or lack of dark septa between cells of the appendage and the branching character of the appendage. Accordingly, *Laboulbenia philonthi* is new to the mycota of the Netherlands.

Monoicomyces britannicus Thaxt., Proc. Am. Acad. Arts Sci. 35: 413 (1900) (as *Monoicomyces brittanicus*).

KNOWN DISTRIBUTION AND HOSTS: Described from *Aloconota insecta* (Thomson, 1856) (as *Homalota insecta*) (Coleoptera, Staphylinidae, Aleocharinae), Great Britain. Beetles from the genera *Acrotona* Thomson, 1859, *Aloconota* Thomson, 1858 and *Mocyta* Mulsant & Rey, 1874 (Coleoptera, Staphylinidae, Aleocharinae) serve as host for this species. These genera were once considered subgenera of *Atheta* Thomson, 1858. The taxonomic complexity of the tribe Athetini (Coleoptera, Staphylinidae, Aleocharinae) (Elven et al. 2010) makes it hard to determine the complete and accurate host range of *M. britannicus*.

Some authors consider *M. britannicus* a synonym of *M. homalotae* (Majewski 1994). In his monograph Thaxter (1908) already suggested that *M. britannicus* "may prove to be only a variety [of *M. homalotae*]." In spite of some confusion the species has at least been recorded in Greece, Spain, France, Great Britain, Germany, Belgium, and Poland (Castaldo et al. 2004, De Kesel 2005).

NEW RECORDS FROM THE NETHERLANDS: On *Acrotona pseudotenera* (Cameron, 1933) (Coleoptera, Staphylinidae, Aleocharinae), Weende, Liefstinghsbroek (Groningen), N 51°52' E 6°00', 16.vi.2001, hay bales, leg. and det. O.Vorst (cOV), D.Haelewaters 67a (BR MYCO173763-36).

REMARKS: The parasite-host combination of *M. britannicus* and *Acrotona pseudotenera* is new. This host is a recent immigrant originating from eastern Asia, which reached Europe in the last decades of the twentieth century (Ødegaard 1999).

Although Santamaría (1992) recorded *M. britannicus* on *Atheta atramentaria* (Gyllenhal, 1810), he later referred it to further study (Santamaría 1996). The collections of *M. britannicus* mentioned on *Atheta vestita* (Gravenhorst, 1806) (De Kesel & Haghebaert 1991) and on *Aloconota insecta* (Thomson, 1856) (as *Atheta insecta*) and *Atheta longicornis* (Gravenhorst, 1802) (Huldén 1983) belong to *Monoicomyces homalotae* Thaxt. (De Kesel 2005, 2010).

As stated earlier, *M. britannicus* is closely related to *M. homalotae* (Thaxter 1908, Santamaría 1989, De Kesel 2005). Some authors state that they are identical (Majewski 1994); both species, however, can be morphologically separated based on the shape and pigmentation of the basal cell of the primary appendage.

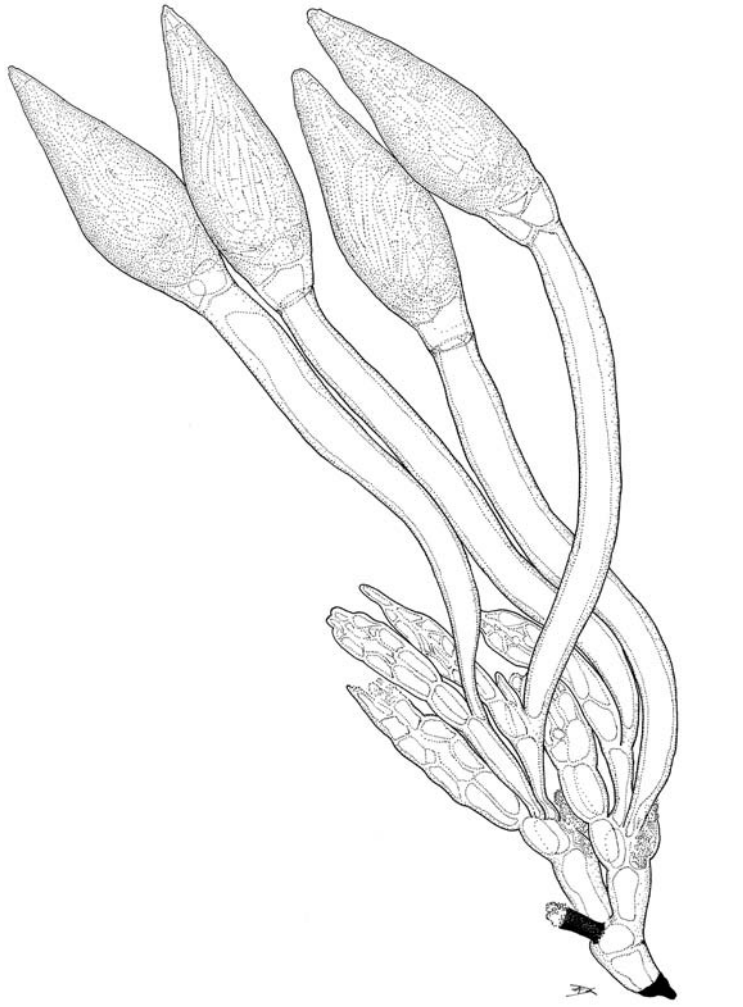


Fig. 2. *Monoicomyces myllaenae* from *Myllaena elongata*. Mature thallus from abdomen (last tergite) (D.Haelewaters 68a). Scale bar = 50 μ m.

Monoicomyces myllaenae Santam., Nova Hedwigia 82: 358 (2006).

Fig. 2

KNOWN DISTRIBUTION AND HOSTS: First and only observation so far from Spain (Santamaría 2006), on *Myllaena elongata* (Matthews, 1838) (Coleoptera, Staphylinidae, Aleocharinae) in riparian habitats.

NEW RECORDS FROM THE NETHERLANDS: On *Myllaena elongata*, Overdinkel, Het Welpelo (Overijssel), N 52°14' E 7°02', 30.iv.1996, sandy brook, leg. and det. O.Vorst (cOV), D.Haelewaters 68a (BR MYCO 173762-35).

REMARKS: Our material corresponds very well with the original description. Santamaría (2006) places *Monoicomyces myllaenae* within the alliance of *Monoicomyces homalotae* Thaxt. based on the common host subfamily, thallus symmetry, and fan-like organization of perithecia and antheridia. To separate it from *M. homalotae*, Santamaría (2006) uses the strongly elongated cell VI, the unbranched primary appendage, the broadened cell III (basal cell of the primary appendage), and characteristics of the antheridia. We agree that these characters suffice to clearly distinguish this taxon. Close observation reveals, moreover, that all older antheridial stalk cells have the capacity to produce both perithecia and several new antheridial stalk cells. In turn, the latter can produce both an antheridium and a perithecium. Consequently the one-celled aspect of the secondary receptacles, as seen in *M. homalotae*, is lost. The length of the perithecial stalks combined with the prolific nature of the antheridial stalks, indicate the typical habit of *M. myllaenae*.

All Spanish and Dutch specimens were taken from one host species, *Myllaena elongata*, suggesting the univorous character of *Monoicomyces myllaenae*.

Siemaszkoa fennica Huldén, Karstenia 23: 63 (1983).

KNOWN DISTRIBUTION AND HOSTS: On species of the genus *Ptenidium* Erichson, 1845 (Coleoptera, Ptiliidae, Ptiliinae) from Finland, Poland, Spain, Great Britain and Italy (Santamaría & Rossi 1999).

NEW RECORDS FROM THE NETHERLANDS: On *Ptenidium formicetorum* Kraatz, 1851 (Coleoptera, Ptiliidae, Ptiliinae), Nieuw-Reemst, Het Oude Hout (Gelderland), N 52°02'E 5°47', 2.iv.1999, ant nest of *Lasius fuliginosus*, leg. and det. O.Vorst (cOV), D.Haelewaters 56a (BR MYCO 173761-34).

Acknowledgements

We thank the entomologist Paul van Wielink for supplying us with infected and identified insects. Donald H. Pfister is acknowledged for giving valuable suggestions. An anonymous reviewer is thanked for giving valuable input concerning the new species and adding further geographical records. This research was financially supported by the Uyttenboogaart-Eliassen Foundation.

References

- BENJAMIN, R.K. 1971: Introduction and supplement to Roland Thaxter's contribution towards a monograph of the Laboulbeniaceae. – *Biblioth. Mycol.* **80**: 1–155.
- BENJAMIN, R.K. 2001: *Autophagomyces*, *Bordea* and a new genus, *Rossiomyces* (Laboulbeniales). – *Aliso* **19**: 99–136.
- CASTALDO, D., W. ROSSI & F. SABATINI 2004: Contribution to the knowledge of the Laboulbeniales from Greece. – *Plant Biosystems* **138**: 261–269.
- DE KESEL, A. 1998: Identificatie en gastheerspectrum van het genus *Laboulbenia* in België (Ascomycetes, Laboulbeniales). – *Sterbeeckia* **18**: 13–31.
- DE KESEL, A. 2005: *Monoicomyces* (Ascomycetes, Laboulbeniales) in Belgium. – *Sterbeeckia* **25**: 62–72.
- DE KESEL, A. 2009: *Botryandromyces* and *Ecteinomyces* (Laboulbeniales) in Belgium. – *Sterbeeckia* **29**: 23–26.

- DE KESEL, A. 2010: Laboulbeniales (Ascomycetes) from coprophilic Coleoptera on Galloway cow dung in Belgium. - Polish Bot. J. **55**: 353–358.
- DE KESEL, A. & C. GERSTMANS 2012: *Distolomyces forficulae* (Laboulbeniales), a common parasite on *Forficula auricularia* (Dermaptera). – Sterbeekia **31**: 43–44.
- DE KESEL, A. & G. HAGHEBAERT 1991: Laboulbeniales (Ascomycetes) of Belgian Staphylinidae (Coleoptera). – Bull. Soc. Roy. Belge d'Entomologie **127**: 253–270.
- DE KESEL, A. & J. RAMMELOO 1992: Checklist of the Laboulbeniales (Ascomycetes) of Belgium. – Belgian J. Bot. **124**: 204–214.
- DE KESEL, A. & T. WERBROUCK 2008: Belgian records of Laboulbeniales from aquatic beetles. – Sterbeekia **28**: 48–54.
- ELVEN, H., L. BACHMANN & V.I. GUSAROV 2010: Phylogeny of the tribe Athetini (Coleoptera: Staphylinidae) inferred from mitochondrial and nuclear sequence data. – Mol. Phyl. Evol. **57**: 84–100.
- HAELEWATERS, D. 2012: The first record of Laboulbeniales (Fungi, Ascomycota) on Ants (Hymenoptera, Formicidae) in the Netherlands. – Ascomycete.org **4**: 65–69.
- HAELEWATERS, D. & A. DE KESEL 2013: A new species of *Cantharomyces* (Laboulbeniales, Ascomycota) from the Netherlands. – Mycotaxon **123**: 467–472.
- HAELEWATERS, D., J. NUYTINCK & A. DE KESEL 2012: Laboulbeniales in Nederland: Een introductie. – Natuurh. Maandblad **101**: 88–93.
- HEBAUER, F. 1993: European *Chaetarthria*. – Latissimus **3**: 1–3.
- HULDÉN, L. 1983: Laboulbeniales (Ascomycetes) of Finland and adjacent parts of the U.S.S.R. – Karstenia **23**: 31–136.
- LEE, Y.B., K.T. KIM & C.K. LIM 2002: Interesting species of the Laboulbeniales from Upo Swamp. – Mycobiology **30**: 128–132.
- LEE, Y.B., S.T. CHA, S.H. PARK, C.K. LIM & Y.H. NA 2011: Studies on interesting species of the Laboulbeniales collected from Korea. – Mycobiology **39**: 219–225.
- MAIRE, R. 1916: Deuxième contribution à l'étude des Laboulbeniales de l'Afrique du Nord. – Bull. Soc.Histoire Nat.Afrique Nord **7**: 6–39.
- MAIRE, R. 1920: Troisième contribution à l'étude des Laboulbeniales de l'Afrique du Nord (suite). – Bull. Soc.Histoire Nat.Afrique Nord **11**: 143–170.
- MAJEWSKI, T. 1991: Three new species of the Laboulbeniales (Fungi, Ascomycetes) from Poland. – Polish Bot. Stud. **1**: 121–126.
- MAJEWSKI, T. 1994: The Laboulbeniales of Poland. – Polish Bot. Stud. **7**: 1–466.
- MAJEWSKI, T. 2008: Atlas of the Geographical Distribution of Fungi in Poland. **4**. Laboulbeniales: pp. 1–240. – W. Szafer Inst. Bot., Polish Acad. Sci., Kraków.
- NEWTON, A.F. & D.S. CHANDLER 1989: World catalog of the genera of Pselaphidae (Coleoptera). – Fieldiana, Zool., N.S. **53**: 1–93.
- ØDEGAARD, F. 1999: Invasive beetle species (Coleoptera) associated with compost heaps in the Nordic countries. – Norweg. J. Entomology **46**: 67–78.
- PEYRITSCH, J. 1873: Beiträge zur Kenntniss der Laboulbenien. – Sitzungsber. Kaiserl. Akad. Wiss. (Wien), Math.-naturw. Classe **68**: 227–254, Plates I–III.
- ROSSI, W. 1975: Su alcune Laboulbeniali (Ascomycetes) nuove per l'Italia. – Giorn. Bot. Italiano **109**: 71–85.

- PROAÑO CASTRO, A.C. & W. ROSSI 2008 : New records of Laboulbeniales (Fungi, Ascomycota) from Ecuador. – (Giachino PM) Biodiversity of South America. – In : GIACHINO, P.M. (ed.) Biodiversity of South America, I. Mem. Biodiv. **1**: 11–18. – World Biodiv. Ass. onlus, Verona.
- SANTAMARÍA, S. 1989: El orden Laboulbeniales (Fungi, Ascomycotina) en la Península Ibérica e Islas Baleares. – Ed. esp. Soc. Catalana Micologia **3** : 1–396. – Barcelona.
- SANTAMARÍA, S. 1992: Laboulbeniales (Ascomycotina) ibéricos. Nuevos datos corológicos. – Orsis **7**: 139–144.
- SANTAMARÍA, S. 1996: Cuadernos de trabajo de flora micológica ibérica. – Consejo Superior de Investigaciones Científicas Real Jardín Botánico: 1–126. – Real Jardín Botánico, Madrid.
- SANTAMARÍA, S. 1998: Laboulbeniales, I. *Laboulbenia*. – Flora Mycologica Iberica **4**: 1–186.
- SANTAMARÍA, S. 2003: Laboulbeniales, II. *Acompsomyces-Iliomyces*. – Flora Mycologica Iberica **5**: 1–344.
- SANTAMARÍA, S. 2006: New or interesting Laboulbeniales (Fungi, Ascomycota) from Spain, V. – Nova Hedwigia **82**: 349–363.
- SANTAMARÍA, S., J. BALAZUC & I.I. TAVARES 1991: Distribution of the European Laboulbeniales (Fungi, Ascomycotina). An annotated list of species. – Treb.Inst. Bot. Barcelona **14**: 1–123.
- SANTAMARÍA, S. & W. ROSSI 1999: New or interesting Laboulbeniales (Ascomycota) from the Mediterranean region. – Plant Biosystems **133**: 163–171.
- SCHELOSKE, H.W. 1969: Beiträge zur Biologie, Ökologie und Systematik der Laboulbeniales (Ascomycetes) unter besonderer Berücksichtigung des Parasit-Wirt-Verhältnisses. – Parasitol. Schriftenr. **19**: 1–176.
- SHEN, Y.H., YE, D.H., LI, T.H., SONG, B., ZHANG, A.L. et al. 2006: Laboulbeniales. – Flora Fungorum Sinicorum **28**: 1–294. – Science Press, Beijing.
- SIEMASZKO, J. & W. SIEMASZKO 1928: Owadorosty polskie i palearktyczne. – Polskie Pismo Entomologiczne **6**: 188–211.
- SPEGAZZINI, C. 1917: Revisión de las Laboulbeniales Argentinas. – Anales Museo Nac. Hist. Nat. Buenos Aires **29**: 445–688.
- SUNDT, E. 1958: Revision of the Fenno-Scandian species of the genus *Acrotrichis* Motsch., 1848. – Norsk Entomol. Tidsskr. **10**: 241–277.
- TAVARES, I.I. 1985: Laboulbeniales (Fungi, Ascomycetes). – Mycol. Memoir **9**: 1–627.
- TAVARES, I.I. & T. MAJEWSKI 1976: *Siemaszkoa* and *Botryandromyces*, two segregates of *Misgomyces* (Laboulbeniales). – Mycotaxon **3**: 193–208.
- THAXTER, R. 1892: Further additions to the North American species of Laboulbeniaceae. – Proc. Am. Acad. Arts Sci. **27**: 29–45.
- THAXTER, R. 1893: New species of Laboulbeniaceae from various localities. – Proc. Am. Acad. Arts Sci. **28**: 156–188.
- THAXTER, R. 1900: Preliminary diagnosis of new species of Laboulbeniaceae. II. – Proc. Am. Acad. Arts Sci. **35**: 409–450.
- THAXTER, R. 1902: Preliminary diagnosis of new species of Laboulbeniaceae. V. – Proc. Nat. Acad. Sci. **38**: 9–57.
- THAXTER, R. 1908: Contribution towards a monograph of the Laboulbeniaceae. Part II. – Mem. Am. Acad. Arts Sci. **13**: 217–469, Plates XXVIII–LXXI.
- THAXTER, R. 1912: New or critical Laboulbeniales from the Argentine. – Proc. Am. Acad. Arts Sci. **48**: 155–223.

- THAXTER, R. 1931: Contribution towards a monograph of the Laboulbeniaceae. Part V. – Mem. Am. Acad. Arts Sci. **15**: 1–435.
- VORST, O. (ed.) 2010: Catalogue of the Coleoptera of the Netherlands. – Monogr. Ned. Entomol. Ver. **11**: 1–317.
- VORST, O. & J.G.M. CUPPEN 2003: A third Palearctic species of *Chaetarthria* Stephens (Coleoptera: Hydrophilidae). – Koleopterol. Rundschau **73**: 161–167.
- WEIR, A. 1994: Further records of Laboulbeniales from collections of British Coleoptera. – Mycol. Res. **98**: 433–444.

Manuscript submitted September 20, 2012; accepted May 15, 2013.