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The first record of *Laboulbeniales* (Fungi, Ascomycota) on Ants (Hymenoptera, Formicidae) in The Netherlands

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Summary: *Laboulbeniales* (Fungi, Ascomycetes) are obligate ectoparasites of arthropods, mostly true insects. 80% of all *Laboulbeniales* parasitize beetles, 10% flies. Also other groups of insects are known to support *Laboulbeniales* infections. This paper gives data and microscopic illustrations on *Rickia wasmannii* from an ant, a Myrmica scabrinodis worker, collected in The Netherlands. It appears to be the first Dutch record of a myrmecophilous fungus. Information on specificity and geographical distribution is given.

Keywords: Ant-specific fungi, *Rickia wasmannii*, Hymenoptera, Formicidae, ants.

Introduction

*Laboulbeniales* (Fungi, Ascomycota) include some 2,050 species in about 140 genera (Santamaria, 1998; Weir & Blackwell, 2005; 146 genera according to Kirk et al., 2008) of obligate ectoparasitic fungi that live associated with arthropods, mostly true insects. Amongst insect-associated fungi they are of excellent use in estimating the diversity of arthropods, mostly true insects. 80% of all *Laboulbeniales* parasitize beetles, 10% flies. Also other groups of insects are known to support *Laboulbeniales* infections. This paper gives data and microscopic illustrations on *Rickia wasmannii* from an ant, a Myrmica scabrinodis worker, collected in The Netherlands. It appears to be the first Dutch record of a myrmecophilous fungus. Information on specificity and geographical distribution is given.

Keywords: Ant-specific fungi, *Rickia wasmannii*, Hymenoptera, Formicidae, ants.

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Hosts of Laboulbeniales

*Laboulbeniales* occur almost exclusively on adult hosts, infections of pre-imaginal stages are excessively rare and only observed on particular hosts (cockroaches, termites and ants; Benjamin, 1971). The majority of the *Laboulbeniales* parasitize representatives of the subphylum Hexapoda, often Coleoptera (beetles); representatives of ten orders are known as hosts (table 1; Weir & Hammond, 1997).

The greater part of the beetle hosts are members of the two families Carabidae (ground beetles) and Staphylinidae (rove beetles). It is interesting that the diversification of laboulbenioid genera within Coleoptera is greatest within Staphylinidae, i.e. 49 genera, with relatively few species per genus. In contrast, Carabidae host only 15 genera of *Laboulbeniales*, sometimes with hundreds of species in a single genus (*Laboulbenia* Tavares, 1979).

Within the Hymenoptera only ants are known to serve as hosts of these fungi. In this paper the first record for The Netherlands of an ant inhabiting member of the order is described. So far, in Europe, three laboulbenioid species associated with ants (Hymenoptera, family Formicidae) have been reported: *Rickia wasmannii* Cavara, *Laboulbenia formicarum* Thaxt. and *Laboulbenia camponoti* S.W.T. Batra (Herraz & Espadaler, 2007).

Material and methods

Host

The infected ant specimen was collected in ‘Zure Dries’, a nature reserve near the city of Maastricht in the southeastern part of The Netherlands. The specific site is a very small, yet centuries old woodland clearing on a steep south facing slope. Currently the grassland is managed as a pasture and shows a strong vegetation gradient ranging from acid nutrient poor dry grassland (*Viölion caninae*) at the top, through well-developed limestone grassland (*Mesobromion*) in the middle part, to more productive grassland on loamy soil (*Arrhenatherion*) at the basis of the slope. In the 20th century the open area of the clearing has gradually shrunken by wood encroachment, but because of its rare and for Dutch standards thermophilous plant species, the limestone grassland part has always been kept open and in recent years the...
Clearing has been enlarged once again (Smits & Schaminée, 2004).

The fungus-infested ant, a Myrmica scabrinodis worker, was sampled by hand in the limestone zone, where according to an earlier ant survey (De Boer, 1983) M. scabrinodis appears to be one of the most abundant ant species. Although M. scabrinodis is somewhat thermophilous (Seifert, 1984), it has a rather broad ecological amplitude (Elmes et al., 1998) and is not characteristic for limestone grasslands (Elmes, 1994). Elsewhere in Europe, it has been recorded on Myrmica rubra (Linnaeus) by Huldén (1895); R. wasmannii has been re-described on Myrmica scabrinodis Nylander, 1846 (fig. 2). The Netherlands: Savelsbos, Zure Dries (180.3-312.6), 23.VIII.2011, leg. I. Raemakers, FH-DH40 (fig. 3).

**Specificity and geographical distribution**

*Rickia wasmannii* was originally described from Germany by Cavara (1899) on Myrmica rubra (Linnaeus), collected in Linz on the Rhine by the renown formicologist Wasmann (as *M. laevinodis*), but is known to also appear on several other species of *Myrmica* (Espadaler & Santamaria, 2012): *M. sabuleti* Meinert, *M. scabrinodis* Nylander, *M. slovaca* Sadil, *M. specioides* Nylander, *M. spinosior* Bondroit, and *M. vandei* Bondroit. This is the first report of *Rickia wasmannii* for The Netherlands, the second for the Benelux, where in Luxembourg it was recorded on *Myrmica rubra* (Linnaeus) by Huldén (1985). Elsewhere in Europe, *R. wasmannii* has been reported in France, Switzerland, Austria, Slovenia, Spain and Italy (Espadaler & Santamaria, 2012), and more recently in the United Kingdom (Poncin, 2005; «Sifolinia's AntBlog», 2009), Hungary, Romania (Tartally et al., 2007), Bulgaria (Lapeva-Gjonova & Santamaria, 2011), Czech Republic (Bezdečková & Bezdečka, 2011) and Slovakia (Bezdečka & Bezdečková, 2011). *Rickia wasmannii* seems likely to be widespread in Europe.
Fig. 1 – *Rickia wasmannii*

Fig. 2 – Head of *Myrmica scabrinodis*, heavily infested with *Rickia wasmannii*
Picture: I. Raemakers.

Fig. 3 – Site where *Myrmica scabrinodis* with *Rickia wasmannii* has been found in The Nether-
Fig. 4 – *Rickia wasmannii* - SEM

Acknowledgements

I want to express my gratitude to Ivo Raemakers for providing the Myrmica scabrinodis specimen for this research and presenting valuable information. Ron Bronckers, André De Kesel (National Botanic Garden of Belgium) and Donald Pfister (Department of Organismic and Evolutionary Biology, Harvard University) are thanked for critically reading the manuscript. Peter Martin (Christian-Albrechts-Universität zu Kiel (CAU), Zoological Institute, Department of Limnology) is thanked for the SEM pictures which were made by kind permit of Prof. S. Gorb and Dr. C. Grohmann, CAU: Functional Morphology and Biomechanics. This study was technically supported by Lauren Goldmann and Alex Weir at the State University of New York College of Environmental Science and Forestry (Syracuse, NY). The Uyttenboogaart-Eliasen Foundation provided funding.

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