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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.

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 laboulbenial 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 laboulbenialean species associated with ants (Hymenoptera, family Formicidae) have been reported: Rickia wasmannii Cavara, Laboulbenia formicarum Thaxt. and Laboulbenia camponoti S.W.T. Batra (Herraz & Espadaier, 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 (Violion 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 shrunk 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

Hosts of Laboulbeniales

Laboulbeniales occur almost exclusively on adult hosts, infections of pre-imaginal stages are excessively rare and only

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Laboulbeniales

Thalli were removed from the hosts and mounted in permanent microscope slides for identification. Thalli were removed from the host using an entomological pin (size 2 or 3) and immediately embedded in glycerine to which was added a small amount of a saturated alcoholic solution of eosin for permanent mounting (Thaxter, 1896). Cover slips were rinsed with nail varnish.

Microscopic photographs of thalli were taken in the lab of Dr. Alex Weir at the State University of New York College of Environmental Science and Forestry, Syracuse (NY), using a Nikon Eclipse E800 light microscope equipped with differential interference contrast optics and Spot Edition 4.5 imaging software (Digital Camera Systems, Sterling Heights, MI). The microscope slide collection is deposited in FH (Farlow Herbarium, Harvard University Herbaria, Cambridge, MA).

**Description**

*Rickia wasmannii* Cavara, Malpighia, 13 : 182, pl. VI (1899) – Fig. 1.

Total length of thallus average 153 µm, maximum 175 µm.

**Receptacle** comprising a single (non-septate) basal cell surmounted by three series of cells: a posterior series consisting of five to six cells, with secondary appendages or antheridia, terminated by a single primary appendage; an anterior series similar to the posterior, consisting of four to five cells, and ending in a perithecium; and a median series consisting of about six cells. **Antheridia** 7–15 × 2.5–4.8 µm, compound, subtended by a blackened septum, irregularly disposed, numbers varying in different individuals, flask-shaped, the inflated venters about twice as long as the narrow necks. **Perithecium** 44–53 × 14–21 µm, hyaline, normally solitary, somewhat asymmetrical, its distal half ending in the somewhat irregular blunt, or truncate, hardly differentiated tip.

**Studied material:** (female) *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. vandeli* 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 (Pontin, 2005; «Sifolinia’s AntBlog», 2009), Hungary, Romania (Tartally et al., 2007), Bulgaria (Lapeva-Gjorgova & Santamaria, 2011), Czech Republic (Bezděčková & Bezděčka, 2011) and Slovakia (Bezděčka & Bezděčková, 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

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