ISSN 1211-8788 *Acta Musei Moraviae, Scientiae biologicae* (Brno)
96(1): 193–197, 2011

First records of the myrmecophilous fungus *Rickia wasmannii* (Ascomycetes: Laboulbeniales) in the Czech Republic

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Methodical Centre for Myrmecology, Museum of the Bohemian-Moravian Highlands, Masarykovo náměstí 55, CZ-586 01 Jihlava, Czech Republic; e-mail: bezdeckova@muzeum.ji.cz; [1]corresponding author

Bezděčková K. & Bezděčka P. 2011: First records of the myrmecophilous fungus *Rickia wasmannii* (Ascomycetes: Laboulbeniales) in the Czech Republic. *Acta Musei Moraviae, Scientiae biologicae* (Brno) **96(1):** 193–197. – We report here the first records of the myrmecophilous ectoparasitic fungus *Rickia wasmannii* Cavara, 1899 in the Czech Republic. The fungus was found at three localities in ants of the species *Myrmica slovaca* Sadil, 1952 and *M. scabrinodis* Nylander, 1846. Since we checked 8524 specimens from various parts of the Czech Republic, originating from both field and museum collections, we assume that *R. wasmannii* is not very abundant in the Czech Republic. Nevertheless, intensive research may reveal additional sites at which it occurs.

Key words. Laboulbeniales, *Rickia wasmannii*, ants, Hymenoptera, Formicidae

Introduction

The fungus *Rickia wasmannii* Cavara, 1899 is an obligate mymecophile in ants of the genus *Myrmica* Latreille, 1804. The first specimens were collected by Wasmann in *Myrmica rubra* (Linnaeus, 1758) in Linz am Rhein (Germany), a find reported by Rick to Bresadola and Cavara, which resulted in a description of the new genus and species (Cavara 1900). To date it has also been found in *M. sabuleti* Meinert, 1861, *M. slovaca* Sadil, 1952, *M. scabrinodis* Nylander, 1846, *M. specioides* Bondroit, 1918, and *M. vandeli* Bondroit, 1920. To the best of current knowledge, its distribution area covers Spain, Italy, France, Germany, Switzerland, former Yugoslavia, Romania, Hungary, and Austria. (Espadaler & Suner 1989, Santamaria *et al*. 1991, Tartally *et al*. 2007, Tartally 2008, 2009).

It is reported to grow on all parts of the ant cuticle, parasitizing the majority of individuals in some of its host nests (Thaxter 1908). We report here the first finds of *Rickia wasmanni* in the Czech Republic.

Material and methods

To investigate the occurrence of *R. wasmannii* we checked 6000 specimens of the genus *Myrmica* in the field and 2524 in museum collections, between 2007 and 2010. The material originated from various parts of the Czech Republic (altitude 165–1490 m). Altogether we examined 12 *Myrmica* species: *M. gallienii* Bondroit, 1920, *M. lobicornis* Nylander, 1846, *M. lonae* Finzi, 1926, *M. rubra*, *M. ruginodis* Nylander, 1846, *M. rugulosa* Nylander, 1849, *M. sabuleti*, *M. slovaca*, *M. scabrinodis*, *M. schencki* Viereck,

1903, *M. specioides,* and *M. vandeli*. Investigative equipment included an Olympus SZX7 binocular microscope, an Olympus BX 40 research microscope (laboratory) an a 30× magnifying lens (field), used in combination with reference to publications by Cavara (1900), Thaxter (1908), and Tartally *et al*. (2007).

Abbreviations

MHJ . . . . . Museum of the Highlands, Jihlava, Czech Republic
NNR . . . . . national nature reserve
NM . . . . . nature "monument"

Results

We found seven colonies of *M. scabrinodis* and four colonies of *M. slovaca* parasitized by *R. wasmannii* (Fig. 1) at a total of three sites during the field survey. No infested material was detected in museum collections. The fungus grew from the cuticle, anywhere on the body, on the majority of workers in each colony (Fig. 2). The parasitized ants that we observed were active, with no sign of injury, limitation or behavioural changes. No queen, male or brood was found infested. All lgt. et det. Bezděčková & Bezděčka; samples of five infested workers per colony are deposited in MHJ.

Collecting data

- Czech Republic, Moravia, Sedlec u Mikulova, Slanisko u Nesytu NNR (co-ordinates of the centre 48°46'31" N, 16°41'51" E, max. altitude 175 m), 19. vi. 2010. In 2 colonies of *M. scabrinodis* and 3 colonies of *M. slovaca*.
- Czech Republic, Moravia, Sedlec u Mikulova, Lednické rybníky NNR (co-ordinates of the centre 48°46'32" N, 16°42'01" E, max. altitude 175 m), 19. vi. 2010. In 3 colonies of *M. scabrinodis* and 1 colony of *M. slovaca*.
- Czech Republic, Bohemia, Vysoké Mýto, U Vinic NM (co-ordinates of the centre 49°57'43" N, 16°11'23" E, max. altitude 270 m), 28. vii. 2010. In 2 colonies of *M. scabrinodis*. Revised by W. Rossi.

Discussion

The Laboulbeniales are an enigmatic group of fungi growing out of the cuticle of arthropods, particularly insects (Tavares 1985, Weir & Beakes 1995, Santamaria 2001, Espadaler & Santamaria 2003, Santamaria 2003, Rossi & Máca 2006, Herraiz & Espadaler 2007). They exhibit quite a high level of host specificity, occurring on beetles (80%) and flies (10%), and less commonly on mites, millipedes and other groups (Tavares 1985, Herraiz & Espadaler 2007).

Among the Hymenoptera, only ants are known as hosts of certain species of Laboulbeniales, specifically of the genera *Rickia* Cavara, 1899, *Dimorphomyces* Thaxter, 1893, and *Laboulbenia* Mont. & C.P. Robin, 1853 (Espadaler & Santamaria 2003). This fact is remarkable, since ants produce antibiotic substances that come into selective use upon infection by pathogens. The Laboulbeniales thus seem to be among the few micro-organisms able to surmount this barrier (summarised by Herraiz & Espadaler 2007).

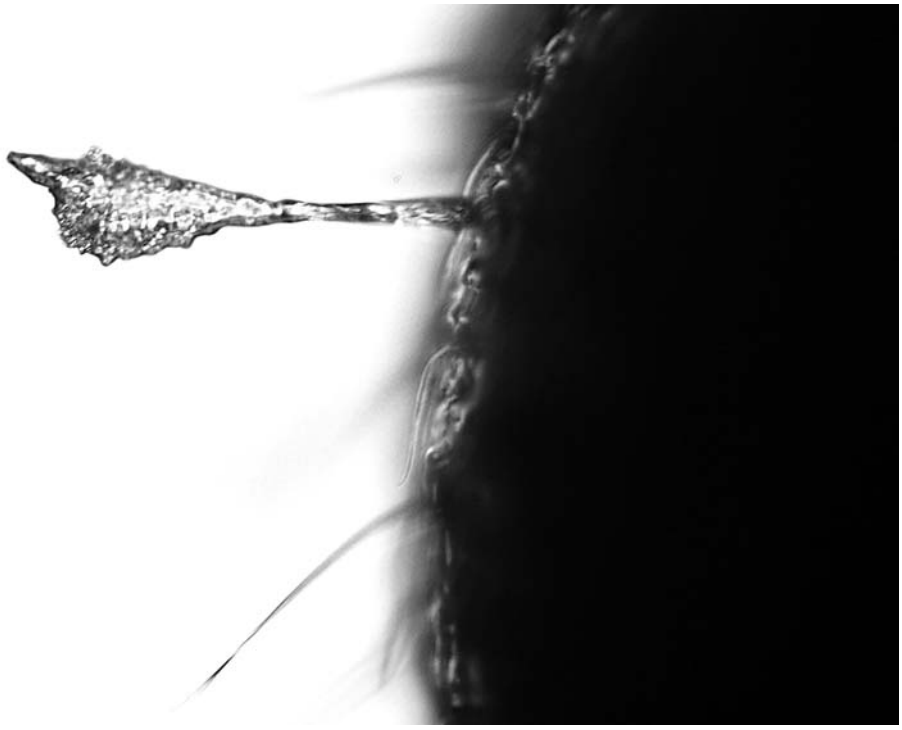


Fig. 1. *Rickia wasmannii* – detail.

R. wasmannii has been reported from various countries in western, southern and central Europe (Espadaler & Suner 1989, Santamaria *et al*. 1991, Tartally *et al*. 2007). Our finds represent a further extension of its currently known distribution area.

We found *R. wasmannii* at three sites in the Czech Republic, at altitudes that did not exceed 300 m. Although we examined 12 species of the genus *Myrmica*, we recorded *R. wasmannii* in only two – *M. scabrinodis* and *M. slovaca*. Similarly, Tartally *et al*. (2007) checked 11 *Myrmica* species in the Carpathian Basin, but found only four host species. *M. scabrinodis* has also been reported as host to *R. wasmannii* in Italy (Spegazzini 1914), Hungary and Romania (in the latter two countries as the most common host of *R. wasmannii*), and *M. slovaca* in Hungary (Tartally *et al*. 2007).

In the Czech Republic we recorded *R. wasmannii* only in workers. However, Tartally *et al*. (2007) report infestation of both workers and dealate queens in material from the Carpathian Basin. We did not observe any apparent detriment to the ants arising out of the presence of *R. wasmannii* on their cuticules. This is consistent with what Espadaler & Lodos (1983) and Espadaler & Santamaria (2003) maintain, that



Fig. 2. *Rickia wasmannii* on the body of *Myrmica scabrinodis*.

Laboulbeniales damage their hosts only slightly, if at all. Earlier authors even reported more than 180 individual *R. wasmanni* in the head and many others on the remainder of the body of a *M. sabuleti* worker foraging out of the nest (Espadaler & Lodos 1983). Tartally *et al*. (2007) also mention the probable indifference of the infected ants to the presence of the fungus on their cuticle. In contrast, Spegazzini (1914) observed changed behaviour, mainly slower movement in parasitized workers.

The results of our research suggest that *R. wasmannii* is not very abundant in the Czech Republic. Nevertheless, more intensive research may reveal additional localities in which it occurs. A similar situation may pertain in other European countries, including those in which it has not yet been recorded.

Souhrn

Myrmekofilní ektoparazitická houba *Rickia wasmannii* Cavara, 1899 je obligátně nalézána u mravenců rodu *Myrmica* Latreille, 1804. Dosud byla zaznamenána u druhů *M. rubra* (Linnaeus, 1758), *M. sabuleti* Meinert, 1861, *M. slovaca* Sadil, 1952, *M. scabrinodis* Nylander, 1846, *M. specioides* Bondroit, 1918, a *M. vandeli* Bondroit, 1920.

Areál rozšíření *R. wasmannii* zahrnuje Španělsko, Itálii, Francii, Německo, Švýcarsko, bývalou Jugoslávii, Rumunsko, Maďarsko, Rakousko a Slovensko (Espadaler & Suner 1989, Santamaria *et al*. 1991, Tartally *et al*. 2007, Tartally 2008, 2009). V této práci předkládáme zprávu o prvních nálezech *R. wasmannii* v České republice. Tuto myrmekofilní houbu jsme zjistili na třech lokalitách (jedna ve východních Čechách a dvě na jižní Moravě) u mravenců druhu *M. scabrinodis* Nylander, 1846 a *M. slovaca* Sadil, 1952. Vzhledem k tomu, že jsme prověřili celkem 8524 exemplářů z různých částí České republiky, předpokládáme, že *R. wasmannii* není na našem území příliš hojná. Intenzivní průzkumy však mohou odhalit další lokality tohoto druhu.

Acknowledgements

We extend our thanks the Ministry of Culture of the Czech Republic for financial support for this research, through project ref. No. DE07PO4OMG009 MK ČR, and also to the authority of the district of Pardubice. We are very grateful to W. Rossi for revision of our determination, J. Máca for valuable information and J.W. Jongepier for preliminary language correction.

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