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CATAGLYPHIS AENESCENS – A NEWLY DISCOVERED ANT HOST OF THE FUNGAL PARASITE *MYRMICINOSPORIDIUM DURUM*

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Abstract

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Fungal infested ant workers of *Cataglyphis aenescens* (Nylander, 1849) (subfamily Formicinae) and *Tetramorium* cf. *punctatum* Santschi, 1927 (subfamily Myrmicinae) with spores of *Myrmicinosporidium durum* Hölldobler, 1933 were collected for the first time in the Republic of Macedonia. The ant species *Cataglyphis aenescens* is a new host for this fungus, thus expanding the range of the less represented Formicinae host species when compared to the Myrmicinae species. The latest available data on the geographical distribution and host detection are summarized.

Key words: insect-fungus interactions, ants, Macedonia

Introduction

Myrmicinosporidium durum Hölldobler, 1933 is an obligate endoparasitic fungus of various ant hosts (Hymenoptera: Formicidae). Over last decade more data on the geographic distribution, host utilization and seasonal dynamics of the fungus have been accumulated, although the life stages in its development and dispersal are still relatively unknown (Espadaler and Santamaria, 2012). Although infrequently found, *M. durum* has a wide geographical distribution in America, and in Europe to the Anatolian part of Turkey (Sanchez-Peña et al., 1993; Espadaler, 1997; Pereira, 2004; García and Espadaler, 2010; Csősz et al., 2012; Gonçalves et al., 2012).

M. durum has been reported in 37 ant species of three subfamilies, predominantly within Myrmicinae (30 species) and, more rarely, within Formicinae (5 species) and Dolichoderinae (2 species) (Gonçalves et al., 2012; Espadaler and Santamaria, 2012; Csősz et al., 2012). All three of the castes in ant societies were recorded with the fungus (Buschinger and Winter, 1983; Buschinger et al., 2004; García and Espadaler, 2010).

The infected specimens are usually low in number in the ant nests, and they are easily distinguished by the presence of mature dark spores that are visible through the cuticle. Heavily infested ants have fungal spores extending from the gaster, where they are more numerous, to the other parts of the body.

To date, questions about the co-specificity of different findings of *M. durum* based on its wide distribution and the use of a broad-host-range into the family Formicidae, as well as its systematic position, remain unresolved.

In the current study, new findings on distribution and host utilization of *Myrmicinosporidium durum* are presented.

Material and Methods

The fungal infested ants in the current study include a worker of *Tetramorium* cf. *punctatum* Santschi, 1927 (subfamily Myrmicinae), from a nest under a stone, and a foraging worker of *Cataglyphis aenescens* Nylander, 1849 (subfamily Formicinae), both found on 19.06.2011.

The area of collection is situated in the eastern part of the Republic of Macedonia, Kumanovo district, near Orah village, on the south slopes of the Kozjak Mountain

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(N42.15694 E21.962500, 582 m a.s.l.). The terrain displays a typical karst view with xerophilous vegetation.

The studied ant specimens were stored in 70% ethanol. The detection of the spores of *Myrmicinosporidium durum* was made under a microscope through the cuticle of the distended gaster of the *Cataglyphis aenescens* specimen (Figure 1), and more easily in the lightly pigmented body of the *Tetramorium* cf. *punctatum* specimen (Figure 2). Because of the number of cryptic species in the *Tetramorium* species-groups, the later ant species was not definitely determined.

Results and Discussion

The ant-associated fungus, *Myrmicinosporidium durum*, has not been previously found in the Republic of Macedonia, although it has been reported from Portugal in the west to the Anatolian part of Turkey in the east. Earlier reports from Croatia (Buschinger and Winter, 1983), Slovenia (Espadaler and Roig, 2012) and Bulgaria (Csősz et al., 2012) have suggested the possible occurrence in more localities in other Balkan countries.

Fig. 1. A worker of *Cataglyphis aenescens* infested with spores of *Myrmicinosporidium durum* visible through the intersegmental parts of the enlarged gaster: gaster (top) and general view of the ant host (bottom)

Two ant host species were detected with spores of *Myrmicinosporidium durum* at the same collecting place. *Cataglyphis aenescens* is a new host for the endoparasitic fungus, increasing the number of the less represented Formicinae host species to 6, against 30 host species from the subfamily Myrmicinae. It is the second recorded *Cataglyphis* host, together with *C. hispanica* (Emery, 1906) that was recently noted in Portugal (Gonçalves et al., 2012). *C. aenescens* occurs in extremely dry and warm habitats from the eastern part of Central Europe through the Balkan Peninsula to Central Asia (Bračko et al., 2013), building its nests in the soil. The other host belongs to the *Tetramorium* genus, which is associated with four other recorded host cases of infestation: *Tetramorium caespitum* (Linnaeus, 1758) (from Hungary: Kanizsai, 2010), *T. semilaeve* André, 1883 (from Spain: García and Espadaler, 2010), *T.* sp. D (*sensu* Schlick-Steiner et al., 2006) (from Bulgaria: Csősz et al., 2012) and *T.* sp. E (*sensu* Schlick-Steiner et al., 2006) (from Bulgaria and Romania: Csősz et al., 2012; Csata et al., 2013).

Both hosts contained visible spores of *Myrmicinosporidium durum* only in the gaster of the ant specimens, and were in greater number in *Cataglyphis aenescens*. Most of the spores, especially in *C. aenescens,* don't seem to fully mature; probably occurring in late summer as many previous reports summarize (Buschinger et al., 2004; Pereira, 2004; Espadaler and Santamaria, 2012).

Fig. 2. Lightly pigmented *Tetramorium* cf. *punctatum* with spores of the fungus of *Myrmicinosporidium durum* in the gaster of the ant

Conclusion

Although long after the discovery that *Myrmicinosporidium durum* occurs in Central and Western Europe, the results in the recent years have shown that it is also broadly distributed in Southern Europe and exhibits an extensive host range.

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