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Two species of myrmecophilous Diapriidae (Hymenoptera) new to Poland

Dwa gatunki myrmekofilnych Diapriidae (Hymenoptera) nowe dla Polski

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ABSTRACT: *Solenopsis imitatrix* and *Trichopria inquilina* found in nests of *Solenopsis fugax* are recorded for the first time from Poland and briefly characterized. Notes on their biology, identification, and distribution are given. Colour habitus photographs of both species are also provided.

KEY WORDS: Hymenoptera, Diapriidae, new record, symphile, myrmecophily, fauna of Poland, *Solenopsis fugax*, *Solenopsis imitatrix*, *Trichopria inquilina*.

The family Diapriidae is a diverse group, traditionally classified within the apocritan superfamily Proctotrupeoidea. Some recent research, however, places it outside this group and even monophyly of diapriids has been questioned (SHARKEY 2007; HERATY et al. 2011; SHARKEY et al. 2011). Their life histories are largely unknown, but species so far investigated are known to be endoparasitoids of dipteran puparia, including Nematocera, few species were reared from Coleoptera and ants, while members of Ismarinae are hyperparasitoids of leafhoppers via Dryinidae; some diapriids are known to

exploit hosts in aquatic microhabitats (GAULD, BOLTON 1988; MASNER 1993; MASNER, GARCIA 2002; D. NOTTON, pers. comm.). Members of Diapriidae are usually small to medium-sized (1–4 mm), brown or black with polished appearance. A characteristic feature of this family is a frontal shelf or prominence, on which the antennae are placed. This, although absent in the subfamily Ismarinae and also seen in other families, such as rare Mamingidae and Monomachidae, enables quick recognition of the family. The antennal scape is rather elongated, more than three as long as broad and usually there are 11–15 antennal segments. The wings are fully developed or reduced, but when present usually there is no pterostigma, fore wing often has costal and marginal cells closed (except Diapriinae, where usually there are no closed cells) and hind wing has none or only one cell closed (GAULD, BOLTON 1988; GOULET, HUBER 1993).

Among ant-associated diapriids there are many symphilic species, numerous are adapted to life with ants; such adaptations include morphological specializations and mimicry with host ants (GAULD, BOLTON 1988; MASNER 1993; MASNER, GARCÍA 2002). An overview of diapriid diversity and biology can be obtained from the abovementioned works and species of Central Europe can be identified using KOZLOV (1978) aided by NIXON (1957, 1980). JOHNSON (1992) provided a catalogue of the world Diapriidae.

Present-day knowledge on the occurrence of this family in Poland is very limited: so far only about 120 species were reported from the country (SKI-BIŃSKA 2004), while there are about 300 known from British Isles (GAULD, BOLTON 1988) and more than 270 from Germany (JOHNSON 2009). It is likely that many more species can be added to the list of Polish Diapriidae.

Below I present the first record of two species of myrmecophilous Diapriidae in Poland and review the data on their biology. The wasps were collected from nest of the ant *Solenopsis fugax* (LATREILLE, 1798) near Pińczów in southern part of the country. Both myrmecophiles are illustrated with color figures.

Material examined

Solenopsis imitatrix: Poland, Wyżyna Małopolska, Garb Pińczowski, 2 km NW Pińczów, 50°32'N 20°31'E, (UTM: DA69), 1 V 2008 – one female, leg. Lech BOROWIEC et Marek L. BOROWIEC. Under stone, ex nest galleries of *Solenopsis fugax*.

Trichopria inquilina: two females with the same data.

The site is located on xerothermous hill north of Pińczów, covered with plant association *Inuletum ensifoliae*. The site is characteristic of many thermophilous plant and insect species rare in Poland (LIANA 1976).

Voucher specimens are deposited in author's private collection.

Solenopsis imitatrix WASMANN, 1899

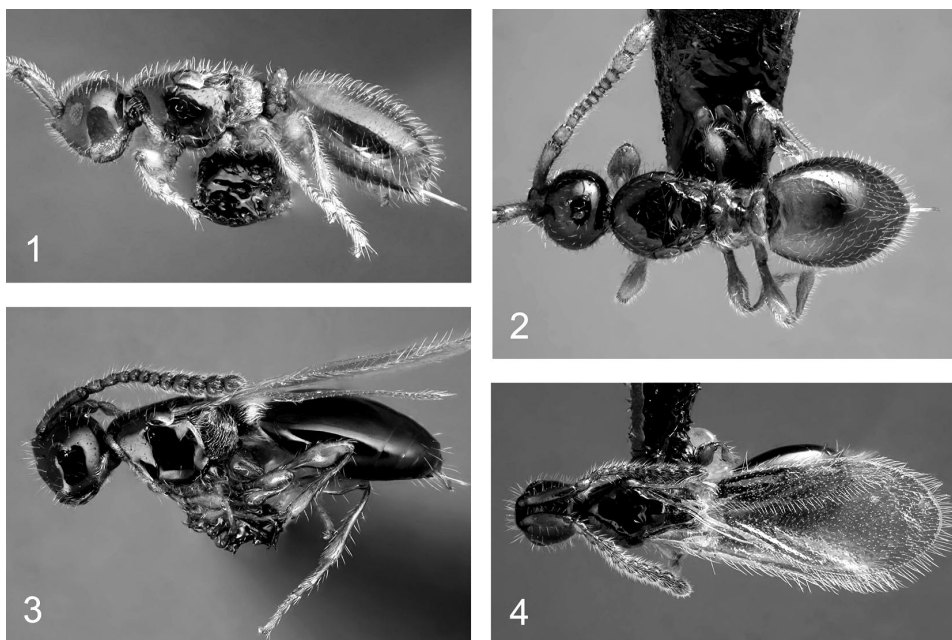
This is a species associated with *Solenopsis fugax*, known to occur throughout continental Europe (LACHAUD, PASSERA 1982). Since its original description by WASMANN (1899) there has been a considerable attention toward myrmecophilic members of Diapriidae (e.g. WING 1951; LACHAUD, PASSERA 1982; HUGGERT, MASNER 1983). One of the investigated species (*Plagiopria passerai*) has been reared from ant (*Plagiolepis pygmaea*) pupa (LACHAUD, PASSERA 1982), but most others are believed to exploit other insects in or outside ant nests with exact associations still unknown (HUGGERT, MASNER 1983). LACHAUD, PASSERA (1982) collected considerable data and confirmed that ants are parasitized by *P. passerai* simultaneously rejecting this scenario in case of *S. imitatrix* and *Lepidopria pedestris* KIEFFER, 1916, another symphylid diapiid found in colonies of *Solenopsis fugax*. From the data on temporal abundance of these myrmecophiles within ant nests they inferred that *S. imitatrix* and *L. pedestris* must reproduce and develop outside ant colonies within hosts so far unknown. Both *L. pedestris* and *S. imitatrix* in that study were most frequently found and most abundant in ant nests during winter months, declining in numbers towards summer. During the whole season study area has been investigated for potential migrations into nests of other ant species without result. LACHAUD and PASSERA (1982) thus concluded that they must complete their life cycle outside colonies of *Solenopsis fugax*. The authors could find no signs of parasitism on host ants in colonies reared under laboratory conditions. They postulated that the species emigrate from ant nests during spring and summer to complete their reproductive cycle. They could not observe emigrations directly, but basing on the changing number of infested nests and wasp abundance, as well as records of *S. imitatrix* females collected outside nests by traps and soil sifting, they concluded such emigrations probable.

Solenopsis imitarix females are highly modified in terms of morphology, being very ant-like in appearance. Females are usually wingless, although on rare occasions alates can be found (GÖSSWALD 1929; LACHAUD, PASSERA 1982). *S. imitatrix* females have 11-segmented antennae, propodeum constricted anteriorly and second abdominal segment is produced dorsally to a shape resembling ant's petiole. The other diapiid species with reduced

wings and found within *Solenopsis fugax* nests is *Lepidopria pedestris* (LACHAUD, PASSERA 1982). The species seems to be more frequent in southern parts of the ant host's range, as LACHAUD and PASSERA (1982) found it to be more abundant than *S. imitatrix* in a locality in southern France, contrary to earlier reports from northern France (JANET 1897) and Germany (HÖLLDOBLER 1928), where *L. pedestris* was the less common species. *Lepidopria pedestris* is currently not known from Poland, but its occurrence cannot be ruled out. Females of this species can be distinguished from *S. imitatrix* by 12-segmented antennae.

Trichopria inquilina (KIEFFER, 1904)

The biology of *Trichopria inquilina* has never been subject to research comparable to LACHAUD and PASSERA 1982 study and so is basically unknown: there is no data besides reports of co-occurrence of this species with



Figs. 1-4. 1 – *Solenopsis imitatrix* female, lateral habitus, 2 – *Solenopsis imitatrix* female, dorsal habitus, 3 – *Trichopria inquilina* female, lateral habitus, 4 – *Trichopria inquilina* female, dorsal habitus

Fot. 1-4. 1 – *Solenopsis imitatrix* samica, habitus z boku, 2 – *Solenopsis imitatrix* samica, habitus z góry, 3 – *Trichopria inquilina* samica, habitus z boku, 4 – *Trichopria inquilina* samica, habitus z góry

Solenopsis fugax (PSCHORN-WALCHER 1957) and the data on its distribution is scarce. JOHNSON (1992) gives only general distribution as Palearctic and JOHNSON (2009) records only Luxembourg and the Republic of Moldova.

Trichopria ASHMEAD, 1893 is a very speciose genus of worldwide occurrence (JOHNSON 1992). Only a few members were reported from ant nests (HUGGERT, MASNER 1982) and others are known to parasitize various Diptera (NOTTON 1991) and beetles of the family Psephenidae (BROWN 1967). Unlike *Solenopsis* WASMANN, 1899 and *Lepidopria* KIEFFER, 1911, *Trichopria* are rather inconspicuous diapriids in their general habitus, so their identification can be difficult, in some cases possible only by reference to combination of characters (MASNER, GARCÍA 2002). In the case of myrmecophilous species, however, identification is comparatively easy thanks to limited number of genera occurring with ants and can be carried out using the key of HUGGERT and MASNER (1982).

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STRESZCZENIE

Praca donosi o dwóch gatunkach myrmekofilnych błonkówek nowych dla Polski. Oprócz okoliczności zebrania okazów, podany jest przegląd skromnej literatury dotyczącej wyżej wspomnianych owadów. *Solenopsis imitatrix* i *Trichopria inquilina*, należące do pasożytniczej rodziny Diapriidae, zostały zebrane po raz pierwszy na terenie Polski. Obie błonkówki zostały stwierdzone na tym samym stanowisku: murawie kserotermicznej na Garbie Pińczowskim, 2 km na północny-zachód od Pińczowa, na Wyżynie Małopolskiej. Wykazane tu gatunki znane są wyłącznie z okazów zbieranych w gniazdach mrówek *Solenopsis fugax*. *Solenopsis imitatrix* była uprzednio badana, chociaż jej cykl życiowy nie jest do końca poznany. Populacja z południowej Francji wykazywała silne sezonowe fluktuacje liczebności wewnątrz gniazd gospodarza, z największą ilością obserwowaną w zimie, stopniowo spadającą do zera w lecie. Mimo długotrwałej laboratoryjnej hodowli myrmekofilnej błonkówki wraz z *Solenopsis fugax*, nigdy nie udało się zaobserwować pasożytnictwa na mrówkach. Przypuszcza się więc, że błonkówki szukają jedynie schronienia w gniazdach *Solenopsis*, a rozród i rozwój przebiegają poza kolonią mrówek. Jak dotąd, nie ma żadnych danych na temat biologii *Trichopria inquilina*, drugiego z wykazanych gatunków.

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