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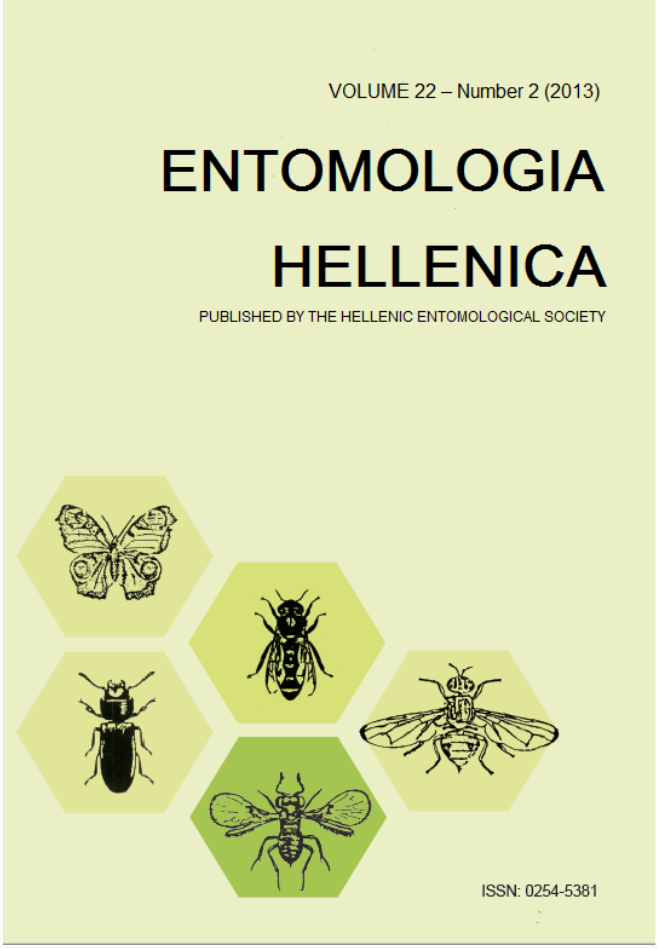

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Myrmecophilus balcanicus, a new species of ant-loving cricket from the Former Yugoslav Republic of Macedonia, with notes on the synonymy of *Myrmecophilus zorae*

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ABSTRACT

A new species of ant-loving cricket, *Myrmecophilus balcanicus* sp. n., is described and illustrated based on individuals collected in the Former Yugoslav Republic of Macedonia (FYROM). It's habitat is described. The species belongs to the subgenus *Myrmecophilus* Berthold, 1827. *Myrmecophilus zorae* Karaman, 1963 is recognized as a junior synonym of *Myrmecophilus hirticaudus* Fischer von Waldheim, 1846.

KEY WORDS: ant guest, *Myrmecophilus balcanicus* sp. n., *Myrmecophilus hirticaudus*, *Myrmecophilus zorae* syn. n., new species, new synonymy, taxonomy.

Introduction

Ant-loving crickets (genus *Myrmecophilus* Berthold, 1827) are small insects, which are known to live as guests in the nests of ants. Fifty eight valid species have been described worldwide (Eades et al. 2013, Stalling 2013). Most species are known to live as kleptoparasites in the nests of ants (Schimmer 1909, Hölldobler 1947, Junker 1997, Wetterer and Hugel 2008). They are known to feed on food resources in the ant nest and induce their hosts to regurgitate liquid food (Wetterer and Hugel 2008). Some species reproduce parthenogenetically, but most species reproduce sexually.

At least five species of *Myrmecophilus* are known from the Balkans: *Myrmecophilus hirticaudus* Fischer von Waldheim, 1846 is known from Croatia (Stalling and Birrer 2012), Bulgaria (Popov 2007), Ukraine (Fischer von Waldheim 1846, Gorochov 1984a) and Armenia (Gorochov 1984b, pers. obs.); *Myrmecophilus nonveilleri* Ingrisch and Pavicévic, 2008 is known from Serbia (Ingrisch and Pavicévic 2008, pers. obs.); *Myrmecophilus ochraceus* Fischer, 1853 is known from Greece (Schimmer 1909, Schimmer 1911, Maran 1959, Baccetti 1966, Harz 1969, Baccetti 1992, Stalling 2010); *Myrmecophilus termitophilus* Maran, 1959 is known from Greece (Maran 1959); and *Myrmecophilus zorae* Karaman, 1963 is described from the Former Yugoslav Republic of Macedonia (FYROM) by Karaman 1963. *Myrmecophilus acervorum* (Panzer, 1799) was described from Greece by Maran (1959), but was not included in the list of Greek fauna (Willemse 1984, Willemse and Willemse 2008, Chobanov and Mihajlova 2010). Only *M. zorae* is known from the FYROM and the presence of other species is unclear (Chobanov and Mihajlova 2010).

In July 2012, several specimens of *Myrmecophilus* were found in ant nests in the Northeastern and Pelagonia regions of the FYROM. These specimens proved to belong to a previously undescribed species, which is described in the present study. A targeted search was also conducted in the Kožuf Mountains in the Southeastern Region of FYROM to look for *M. zorae*, which was described in this area by Karaman (1963) but has never been found subsequently. This

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study discusses the taxonomic status of *M. zorae* and the occurrence of *M. hirticaudus* in the FYROM.

Materials and Methods

Ant nests were checked to determine the presence of *Myrmecophilus* in the FYROM during July 2012. The ant nests were found by turning stones. Specimens of *Myrmecophilus* were found in ant nests from Kriva Palanka in the Osogovski Mountains, Pletvar in the Babuna Mountains and Smrdliva Voda in the Kožuf Mountains. All of the specimens were captured and preserved in 70% ethanol, then pinned and dried.

The repository and the fate of the type specimen of *Myrmecophilus zorae* were also clarified.

Myrmecophilus balcanicus sp. n. (Figs 1–3)

Materials. Holotype male adult, 24.07.2012, FYROM, Northeastern Region, Kriva Palanka, N 42° 12' 43", E 22° 22' 19", 1010 m, in a *Lasius niger* (Linnaeus, 1758) (Hymenoptera: Formicidae) nest, leg. T. Stalling. The holotype is deposited in the Natural History Museum of Basel (NMB).

Paratypes: 3 adult males and 1 adult female in a *L. niger* nest; 13 nymphs of unknown sex in a nest of *Pheidole pallidula* (Nylander, 1849) (Hymenoptera: Formicidae), with the same date and place as the holotype; 1 adult female in a nest of *Cataglyphis nodus* (Brullé, 1832) (Hymenoptera: Formicidae); 5 nymphs of unknown sex in a nest of *Pheidole pallidula*, 28.07.2012, FYROM, Pelagonia Region, Pletvar, N 41° 22' 32", E 21° 38' 24", 1080 m; all leg. and coll. T. Stalling.

Description. Adult male (Fig. 1). Measurements: body length 2.5 mm; pronotum 0.8 mm long and 1.4 mm wide; hind femur, 1.4 mm; hind tibia, 1.2 mm; cerci, 1.1 mm. Complanate body, weakly curved, 1.6 times as long as wide; pronotum curved, narrowed distally, turned in the posterior half; colour, dark ochreous, except the posterior half of the pronotum, the complete mesonotum and the posterior margins of tergites 1–3, which are contrasting pale ochreous. Pronotum and tergites densely covered with inclined, distant, relatively short and shiny hairs. Antennae are about as long as the body and dark ochreous, and the first two segments are pale ochreous. Palpi, ochreous. Eyes are black. Hind legs: hind femur, 1.4 times as long as wide; hind tibia with four inner subapical spurs, where the first and third spurs are shorter than the second and the fourth, and the third spur is slightly shorter than the first spur; hind tibia with three inner apical spurs.

FIG. 1. Holotype of *Myrmecophilus balcanicus* sp. n. (male), lateral (A) and dorsal (B) view. Scale bar, 1 mm.

Outer side of the tibia has two subapical and two shorter apical spurs; first segment of the basitarsus is slender with two spines (one short spine in the distal third and one in the medial third) and two apical spurs (Fig. 2,

paratype). Cerci are rotund, pointed distally, densely covered with close hairs, and with long, robust distant hairs in between. The tenth abdominal tergite has a bilobate extension. The epiproct is small and unmodified. The subgenital plate is short and recessed, and densely covered with short, golden-yellow hairs.

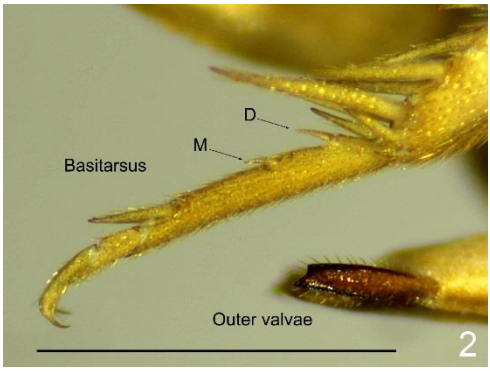

FIG. 2. Paratype of *Myrmecophilus balcanicus* sp. n. (female). First segment of basitarsus with one short spine in the distal third (D) and one in the medial third (M); outer valvae viewed laterally. Scale bar, 1 mm.

Variability. Paratypes vary in size only. Body length is 2.2–2.5 mm in males and 3.1–3.3 mm in females. Female is the same as the male, the subgenital plate is emarginated and the outer valvae appear double-pointed when viewed laterally (Fig. 2).

Diagnosis. *Myrmecophilus balcanicus* sp. n. (Fig. 3) differs from other *Myrmecophilus* species known from the Balkans with respect to the following characteristics: valvae of female (viewed laterally) is double-pointed (rounded in *M. ochraceus*); subgenital plate of female is clearly emarginated (rounded in *M. myrmecophilus*); hairs on the font and antennae are short and inconspicuous (long, distant and bushy in *M. ochraceus*); basitarsus of the hind legs has two dorsal spines in the proximal and medial positions (only one spine in the proximal position in *M. ochraceus*; basitarsus of the hind legs has three dorsal spines in *M. hirticaudus* and *M. termitophilus*, which are positioned in the proximal, medial and distal parts of the basitarsus, where the spine is sometimes absent in the medial position, but the spines in the proximal and distal positions are always present); contrasting pale ochreous posterior half of the pronotum, the complete mesonotum, and the posterior margins of tergites 1–3 (contrasting pale ochreous posterior third of the pronotum; posterior third of the mesonotum and the posterior margins of tergites 1–3 pale ochreous in *M. acervorum*; borders absent or faint in *M. nonveilleri*, *M. hirticaudus* and *M. termitophilus*).

FIG. 3. Paratype of *Myrmecophilus balcanicus* sp. n. (female).

Taxonomy. *Myrmecophilus balcanicus* sp. n. belongs to the subgenus *Myrmecophilus* Berthold, 1827.

Habitat and ecology. The species was found in the Osogovski Mountains on stony slopes, which were sparsely covered by oaks (*Quercus* sp. L.) and other trees. In the Babuna Mountains, the habitat was stony limestone slopes with grassy vegetation and scattered juniper trees (*Juniperus communis* L.). The adult specimens were found in the nests of *L. niger* and *C. nodus*, and the nymphs were in *P. pallidula* nests. The life history is mostly unknown. The adults and larvae were found in July.

Distribution. At present, the species is only known from the FYROM.

Taxonomic status of *Myrmecophilus* zorae Karaman, 1963

Myrmecophilus zorae Karaman, 1963 was originally described by Karaman (1963) based on a single specimen that originated from the Kožuf Mountains in the FYROM. The holotype is missing. Originally, it was deposited in the collection of Mladen S. Karaman and was apparently destroyed by the big flood in Skopje during 1963, which destroyed a major part of his Orthoptera collection (Ivo Karaman, pers. comm.).

The original description of *M. zorae* suggests that the specimen is essentially a male of *Myrmecophilus hirticaudus* Fischer von Waldheim, 1846. The description specifies the most important characteristics of *M. hirticaudus*, i.e., three spines on the metatarsus on the hind legs, which are positioned on the proximal, medial and distal parts of the metatarsus (also shown in Fig. 4 in Karaman 1963), and uniform colouration (Stalling and Birrer 2013). The specific identification characteristics in comparison with "*Myrmecophila tatarica* Karawaew", which is now a synonym of *M. hirticaudus*, are not helpful, i.e., the body size varies greatly and whether the eyes are covered by the pronotum depends on the posture of the body (pers. obs.), while the criterion of the number of apical post-tibial inner spurs was shown to be incorrect by Gorochov (1984a).

A targeted search was performed in the Kožuf Mountains to recover *M. zorae*. Two specimens (one adult male and one adult female) of *Myrmecophilus* were found without ants under a stone in a pine forest close to Smrdliva Voda, Gevgelija (41° 11' 19.5" N, 22° 17' 49.5" E) on 26 July, 2012 in the Kožuf Mountains (leg. and coll. T. Stalling, Fig. 4). They were both *M. hirticaudus* and they had all of the characteristics of *M. zorae* described by Karaman 1963.

FIG. 4. *Myrmecophilus hirticaudus* (female), FYROM, Smrdliva Voda, 26.07.2012. Photograph by T. Stalling.

Thus, *Myrmecophilus zorae* Karaman, 1963 syn. n. is now recognized as a junior synonym of *Myrmecophilus hirticaudus* Fischer von Waldheim, 1846.

Acknowledgements

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Myrmecophilus balcanicus, ένα νέο είδος μυρμηκόφιλου γρύλλου και σημείωση για συνωνυμία του *Myrmecophilus zorae* με το *Myrmecophilus hirticaudus*

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ΠΕΡΙΛΗΨΗ

Ένα νέο είδος μυρμηκόφιλου γρύλλου το *Myrmecophilus balcanicus,* περιγράφεται με βάση δείγματα που συλλέχθηκαν από την Πρώην Γιουγκοσλαβική Δημοκρατία της Μακεδονίας. Δίνονται στοιχεία για τα ενδιαιτήματά του. Επίσης το *Myrmecophilus zorae* Karaman, 1963 αναγνωρίζεται ως συνώνυμο του *Myrmecophilus hirticaudus* Fischer von Waldheim, 1846.

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