DESCRIPTION OF THE FEMALE OF THE MYRMECOPHILOUS MITE
ANTENNOPHORUS GOESSWALDI WIŚNIEWSKI ET HIRSCHMANN, 1992
(ACARI: MESOSTIGMATA: ANTENNOPHORIDAE)

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ABSTRACT: The first description of the female of Antennophorus goesswaldi Wiśniewski et Hirschmann, 1992 (Acari: Mesostigmata: Antennophoridae) associated with the ant Lasius flavus Fabricius, 1781 (Hymenoptera: Formicidae) from Crimea is provided. The family Antennophoridae is recorded in Crimea for the first time.

KEY WORDS: Parasitiformes; Trigynaspida; Antennophorina; ants; Formicidae; Lasius flavus; morphology.

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INTRODUCTION

The suborder Trigynaspida comprises about 350 mite species from 27 families that are mostly associated with arthropods in subtropical and tropical habitats (Lindquist et al. 2009; Beaulieu et al. 2011). Four families of Trigynaspida have been recorded from Crimea: Celaenopsidae, Cercomegistidae, Diplogyniidae and Parantennulidae (Khaustov 1997, 1999; Trach 2013; Trach and Khaustov 2017; unpublished data).


Mites of the genus Antennophorus Haller, 1877 are closely associated with ants of the genus Lasius Fabricius, 1804 (Hymenoptera: Formicidae). In Europe, their hosts are Lasius alienus ( Förster); L. flavus Fabricius; L. fuliginosus (Latreille); L. mixtus (Nylander); L. niger (Linnaeus); L. umbratus (Nylander) (Janet 1897; Wasmann 1899, 1902; Berlese 1904; Wheeler 1910; Krantz 1970; Wiśniewski and Hirschmann 1992).

The mites position themselves under the ant’s head and induce themselves to regurgitate a drop of fluid by stroking the ant’s mouthparts with their hypertrophied pair of front legs (Franks et al. 1991; Lindquist et al. 2009).

During the study of mites associated with insects, Alexander A. Khaustov found specimens of the genus Antennophorus on Lasius flavus in Crimea. Later, these mites were identified as Antennophorus goesswaldi Wiśniewski et Hirschmann, 1992 by the senior author. This species was described on the base of one male specimen from the ant Lasius flavus; it is known only from the type locality—Poland (Wiśniewski and Hirschmann 1992). The family Antennophoridae is reported from Crimea for the first time.

The purpose of this paper is to describe a female of Antennophorus goesswaldi.

MATERIAL AND METHODS

The ants were sampled with the help of an aspirator and placed into vials containing 96% ethanol. Mites from the alcohol sediments were extracted and mounted in Hoyer’s medium for the purposes of light-microscopy. The morphology of mites was studied with the aid of a JSM-6510LV SEM microscope (JEOL). The morphological terminology generally follows Evans and Till (1979). Palpal and leg chaetotaxy follows Evans (1963a, 1963b, 1965). The length of the second cheliceral segment was measured from its base to the apex of the fixed digit. Leg length was taken...
from the base of the coxa to the apex of the tarsus, excluding the ambulacrum. Measurements are given in micrometres (μm). The studied materials are deposited in the collection of the Department of Zoology of Odessa I.I. Mechnikov National University (Ukraine).

**SYSTEMATICS**

**Family Antennophoridae**

**Diagnosis** (based on Kethley 1977; Kim 2004; Lindquist et al. 2009; Gwiazdowicz 2010). Body strongly convex dorsally; holodorsal shield and soft cuticle hypertrichous, all setae of similar shape. Tritosternal laciniae free and pilose. Jugular shield entire. In female, sternal shield entire or divided longitudinally; latigynial shields free, overlapping mesogynal region; vaginal sclerites present; mesogynal shield reduced; ventrianal shield with anterior projection. In male, sternal shield paired, entire or fused with ventrianal shield. Metapodal-peritrematal shields large, peritremes wide and relatively short. Hypostomal seta \( hp1 \) sharply modified, swollen and denticulate. Corniculi membranous, with irregularly margins and rounded apex. Epistome triangular, with median keel. Palp genu with 7 setae, palptibia and palptarsus ventrally clearly distinguished, palptarsal apotele 2-tined. In female, chelicera chelate-dentate with minute denticles; fixit digit without excrescence or membranous process; movable digit ventrally with
series of short setae and bunch of whip-like apically blunt projections. In male, chelicera edentate; fixit digit with several protrusions and sharp protrubrance at the base of movable digit; movable digit smooth, ventrally with series of short setae and bunch of long blunt projections. Leg I hypertrophied, without ambulacrum, legs II–IV with ambulacra lacking in distinct claws.

Genus *Antennophorus* Haller, 1877

Type species: *Antennophorus uhlmanni* Haller, 1877, by monotypy

**Diagnosis.** As for family (monobasic).

*ANTENNOPHORUS GOESSWALDI* WIŚNIEWSKI ET HIRSCHMANN, 1992

Figs. 1–21


**Diagnosis.** Dorsal shield hypertrichous, with more than 600 setae. Sternal shield not divided, smooth; in female, with 3 pairs of setae, *st2–st4* (rarely additional seta present asymmetrically); in male, with 4–5 pairs of setae. Ventrianal shield with numerous setae; in female, flask-like narrowing anteriad, its posterior edge rounded; in male, posterior edge weakly protruding, not widely rounded. In female, fixed cheliceral digit with about 20 small teeth, movable digit with 20–25 small teeth.

**Description of female** (six specimens measured; Figs. 1–20)

*Idiosomal dorsum* (Figs. 1, 10, 15, 16). Body subcircular in plan, strongly convex dorsally; color from yellow to brown; length of idiosoma...
791–837, maximum width 725–772. Dorsal shield circular in form; covering about half of dorsal surface; 716–753 long and 521–577 maximum wide; its surface slightly reticulated; with numerous (more than 600) weakly barbed setae and 8 pairs of distinguishable pore-like structures; dorsal shield setae decreasing in length from 63–84 (anterior setae) to 15–21 (posterior setae). Soft cuticle weakly striated (Fig. 16), hypertrichous; all setae weakly barbed.

Idiosomal venter (Figs. 2, 11–14, 17, 20). Tritosternum with trapezoidal base, 46–55 long, 42–53 wide at base; laciniae free, pilose, 120–126 long. Jugular shield transversal; minimal length 8–19 (at midline), maximal width 179–200; smooth; with one pair of fine barbed setae (st1; 46–50 long) and one pair of lyrifissures (iv1). Sternal shield pentagonal, with irregular anterior margin and convex, obtuse angled posterior margin; 141–155 long; smooth; sternal shield partly fused with endopodal strip combining platelets of coxae I/II, coxae II/III and coxae III/IV; shield bearing three pairs of weakly barbed setae (st2, st3, st4; rarely one additional seta present) and lyrifissures iv2; setae st2 located at anterolateral margins of shield, 36–40 long; setae st3 and st4 located in center of shield, st3 29–34 long, st4 25–29 long. Latigynial shields triangular (Figs. 2, 12), with rounded edges; smooth; their lateral margins indistinguishable; each bearing 3–6 (usually 4) weakly barbed and smooth setae (23–32 long) and group of pore-like structures. Vaginal sclerites well-developed (Fig. 17). Mesogynal shield reduced or imperceptibly merged with ventral shield. Ventrianal shield elongated, flask-like, smooth, with narrow anterior part reaching middle of latigynial shield and expanded posterior part, its posterior margin rounded, almost reaching posterior idiosomal edge (Figs. 12, 13); length 307–328, minimum width of anterior part 21–29, maximum width of posterior part 170–181; shield bearing about 40 unpaired smooth and weakly barbed setae (23–34 long); anus and lyrifissures iv5 located near posterior shield margin; sigillae well-developed; pair of weakly sclerotized irregular platelets adjoining to middle part of ventrianal shield each with 5–9 setae. Soft cuticle behind these platelets with 1–7 pairs of smooth or weakly barbed setae (23–32 long); besides 3–5 pairs of smooth setae (17–21 long), located caudally. Metapodal-peritrematal shields large and curved, reticulated; with anterior margin weakly sclerotized and poorly visible; every shield bearing 0–2 setae (posteriorly) and 3 pairs of distinguishable pores. Peritremes wide (15–17 in middle) and relatively short (231–273), extending between posterior level of coxae III and anterior level of coxae II; with two rows of cells (about 30 in each; Fig. 20).
Figs. 6–9. *Antennophorus goesswaldi* Wiśniewski et Hirschmann, 1992, female: 9–12—legs I–IV, respectively, ventral view. Scale bar=100 μm.
Gnathosoma (Figs. 3–5, 14, 18, 19). Subcapitulum 294–336 wide. Hypostome with 4 pairs of setae; hp1 modified, club-shaped and S-shaped curved, with denticles; palpcoxal seta (pc) and setae hp2, hp3 simple, weakly barbed; pc 55–63, hp1 69–76, hp2 63–76, hp3 53–63, (Figs. 3, 14, 18). Deutosternum with distinguishable 6 rows; row 1 with 10–15 small denticles, rows 2–6 each with about 5 irregular, often rounded, denticles. Corniculi poorly sclerotized; with irregularly margins and rounded apex; their inner margins weakly serrated; 53–61 long, 23–27 wide. Internal malae elongated, narrowed distally, with rounded apex, longer than corniculi and setae hp1; smooth. Epistome triangular; with median keel; reticulated (Figs. 4, 19). Palp length from trochanter to tarsus tip 200–216; setal formula: 2–5–7–15–11; tarsus displaced to ventral surface of tibia; setae on tro-
chanter, femur, genu and tibia finely barbed; palp- 
tarsal apotele 2-tined (Fig. 3). Chelicerae chelate-
dentate; second cheliceral segment length 210–225, 
movable digit length 109–113 (Fig. 5). Fixed digit 
with about 20 small denticles; dorsal lyrifissure, 
antiaxial lyrifissure and dorsal seta distinct. Movable 
digit with 20–25 small denticles; ventrally 
with series of short setae and bunch of whip-like, 
apically blunt projections.

Legs (Figs. 6–9, 14, 15). Lengths: I—921– 
Leg I without ambulacrum; legs II–IV with ambu-
lacra, claws not distinct. Leg chaetotactic formulae: 
leg I: coxa 2 (0 0/1 0/1 0), trochanter 6 (1 0/1 1/2 
1), femur 12 (2 2/1 2/3 2), genu 12 (2 3/1 3/1 2), 
tibia 14 (2 3/2 3/2 2); leg II: coxa 2 (0 0/1 0/1 0), 
trochanter 5 (1 0/1 0/2 1), femur 10 (2 2/1 2/2 1), 
genu 9 (1 3/0 2/1 2), tibia 10 (1 2/1 3/1 2), tarsus 19 
(4 3/2 1/1 3/2 3); leg III: coxa 2 (0 0/1 0/1 0), 
trochanter 5 (1 1/1 0/2 0), femur 7 (1 2/1 2/1 0), 
genu 8 (2 2/1 2/0 1), tibia 10 (2 2/1 3/1 1), tarsus 19 
(4 3/2 1/1 3/2 3); leg IV: coxa 2 (0 0/1 0/1 0), 
trochanter 5 (1 1/1 0/2 0), femur 8 (1 2/1 2/1 1), 
genu 8 (2 2/1 2/0 1), tibia 11 (2 2/1 3/1 2), tarsus 21 
(4 3/3 1/1 3/3 3). All coxae and tarsi with pores. 
Setae pv2 on trochanters II–IV flagellate and 
smooth, other setae on coxae, trochanters, femora, 
genua and tibiae weakly barbed; setae of ad- and 
pl-series on genua and tibiae II–IV thickened. 
Setae on tarsi I rather long, weakly barbed (lo-
eated proximally) or smooth (located distally; Figs. 
6, 14, 15). On tarsi II–IV, setae ad1, pd1 and all 
ventral setae simple and smooth; setae ad2, ad3, 
pl2, pd3 thickened, barbed; seta md thickened at 
base, smooth; setae al1 and pl1 flagellate, smooth; 
shape of setae al2 and pl2 variable (flagellate or 
weakly thickened); setae al3 and al4 thickly 
thickened, hardly barbed or smooth; setae pd3 thickened, 
weakly barbed (Figs. 7–9).

Material examined. Ca. 100 females and 
males, Crimea, Yalta City Municipality, vicinity of 
Nikita, 44°33′40″ N; 34°12′30″ E, 12 July 2015, 
Nikitskaya Mt., mountain steppe, on workers of 
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REFERENCES

Berlese, A. 1904. Illustrazione iconografica degli Ac-

Evans, G.O. 1963a. Observations on the chaeto-
taxy of the legs in the free-living Gamasina 
5962/bhl.part.20528

Evans, G.O. 1963b. Some observations on the chaeto-
taxy of the pedipalps in the Mesostigmata (Acari). 
Annals and Magazine of Natural History, Series 
13, 6: 513–527. http://dx.doi.org/10.1080/0022293 
6308651393

Evans, G.O. 1965. The ontogenetic development of 
the chaetotaxy of the tarsi of legs II–IV in the Anten-
nophorina (Acari: Mesostigmata). Annals and 
Magazine of Natural History, Series 
13, 8: 81–83. https://doi.org/10.1080/00222936508651543

Evans, G.O. and Till, W.M. 1979. Mesostigmatic mites 
of Britain and Ireland (Chelicerata: Acari-Parasit-
iformes). An introduction to their external mor-
phology and classification. Transactions of the 
dx.doi.org/10.1111/j.1096-3642.1979.tb00059.x


