

*This contribution is dedicated
to the memory of Prof. Dan Gerling,
a scientist, a colleague and a friend*

Tersilochinae (Hymenoptera: Ichneumonidae) of Israel. Part 1

ANDREY I. KHALAIM

*Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia, and
Facultad de Ingeniería y Ciencias, Universidad Autónoma de Tamaulipas, Cd. Victoria, Mexico.
E-mail: ptera@mail.ru*

ABSTRACT

The Tersilochinae fauna of Israel is reviewed. Five genera with nine species are found to occur in Israel: *Aneucelis brevicauda* (Thomson), *A. incidens* (Thomson), *Diaparsis gerlingi* n. sp., *D. nitida* Horstmann, *D. frontella* (Holmgren), *Gelanes clavulatus* Khalaim & Blank, *G. simillimus* Horstmann, *Palpator turpilucricupidus* Khalaim and *Phradis interstitialis* (Thomson). Two more genera, *Probles* Förster and *Tersilochus* Holmgren, are formally recorded here from Israel but excluded from the present paper and will be treated separately.

KEYWORDS: Ichneumonidae, Tersilochinae, Middle East, fauna, new species, new records, parasitoids, taxonomy.

INTRODUCTION

Tersilochinae is a moderately large subfamily of ichneumonid wasps of world-wide distribution. It comprises approximately 500 described species, with 190 species in 13 genera known to occur in Europe (Yu *et al.* 2016; Khalaim & Várkonyi 2018). Most host records of Tersilochinae are from larvae of Coleoptera, mostly of the families Curculionidae, Chrysomelidae and Nitidulidae, but some tersilochines are known as parasitoids of xyelid sawflies (Hymenoptera: Xyelidae) in staminate pine cones, gall-forming *Pontania* spp. (Hymenoptera: Tenthredinidae) and leaf-mining Eriocraniidae (Lepidoptera) (Yu *et al.* 2016; Khalaim & Várkonyi 2018).

Virtually nothing was known about the Tersilochinae of Israel before commencement of this study. In a review of Israeli Ichneumonidae, only one unidentified taxon “*Tersilochus* (*Gelanes* Horst.) sp. ... groupe de *T. fuscus* Holm.” based on a single male from Yoqneam [Yokneam] in northern Israel was mentioned (Aubert *et al.* 1984: 229). The aims of this work are to review the genera and species of Tersilochinae occurring in Israel (except the genera *Probles* Förster and *Tersilochus* Holmgren that will be treated separately) and describe one new species.

MATERIALS AND METHODS

This work is based on the ichneumonid collection of the Steinhardt National History Museum and Research Center, Tel Aviv University, Israel (TAU), from which 190 specimens of Tersilochinae collected in Israel have been examined. An

additional specimen of *Diaparsis frontella* (Holmgren) was examined from Naturalis (Leiden, the Netherlands; RMNH). Voucher specimens are deposited in the insect collection of the Zoological Institute of the Russian Academy of Sciences (St Petersburg, Russia; ZISP).

General distribution and biology of species are given in a brief form, mainly following my recent publications (Khalaïm 2016; Khalaïm & Várkonyi 2018). Morphological terms predominantly follow Townes (1969) with changes according to Khalaïm (2011). Photographs were taken in ZISP, with a Canon EOS 70D digital camera attached to an Olympus SZX10 stereomicroscope, and partially focused images were combined using Helicon Focus Pro software. A photograph of wings (Fig. 8) was taken from a microscope slide prepared with Canada balsam.

TAXONOMY

Seven genera of Tersilochinae have been recognized in the Israeli fauna. Five genera comprising nine species are reviewed in this paper: *Aneuclis* Förster, 1869 (2 spp.), *Diaparsis* Förster, 1869 (3 spp., including one new to science), *Gelanes* Horstmann, 1981 (2 spp.), *Palpator* Khalaïm, 2006 (1 sp.) and *Phradis* Förster, 1869 (1 sp.). The genera *Probles* Förster, 1869 and *Tersilochus* Holmgren, 1859 are excluded from the present paper and will be treated in the second part of the review. In addition to nine identified species, four morphospecies in the genera *Aneuclis*, *Gelanes* and *Phradis* have been recognized. These taxa can be identified when their females and/or new material is collected and examined.

The Tersilochinae fauna of Israel is found to be rather sparse being represented by only seven genera, each comprising one or several species in the Israeli fauna. Two more genera, *Barycnemis* Förster and *Heterocola* Förster, may be found in Israel as both are abundant in Europe and have been recorded in Turkey and Iran (Yu *et al.* 2016).

Aneuclis brevicauda (Thomson, 1889)

Variation: Most specimens from Israel have the hind coxa entirely yellow, not darkened basally, and the first tergite of the metasoma laterally smooth, not striate.

Material examined: 1♀, Herzliya [32°11'N 34°49'E], 23.xii.1981, A. Freidberg, Malaise trap (TAU); 1♀, Avenat, Rt. 90, 31°41.0'N 35°26.5'E, -380 m, 28.iii.2007, A. Freidberg (ZISP); 4♀ 1♂, Bet Dagan, 30.vii–30.ix.1992, W. Kuslitzky, Malaise trap (3♀ 1♂ TAU; 1♀ ZISP); 1♀ 1♂, Mikhmoret, Miramar Hotel Garden, viii.1990, Q. Argaman (TAU).

Distribution: Europe, Israel, Kazakhstan, Middle Asia.

Biology: Parasitoid of the turnip flea beetle *Phyllotreta nemorum* (L.) (Chrysomelidae) in Europe (Horstmann 1981).

Aneuclis incidens (Thomson, 1889)

Material examined: 2♀, Tel Aviv, 1.v.2007, 2.vi.2007, W. Kuslitzky, Malaise trap (TAU, ZISP); 1♀, Har Hermon, 1600 m, 12.vi.2003, A. Freidberg (TAU); 2♀, same data but 33°18'N 35°46'E,

20.vii.2009 (TAU); 4♀, Har Meron, Field School, 32°0'N 35°24'E, 900 m, 26.v.2009, A. Freidberg (3♀ TAU, 1♀ ZISP); 1♀, Nahal Tananim, 7.vi.2016, A. Freidberg (TAU); 1♀, Bet Dagan, on cotton, 12.viii.1987, I. Susman (TAU); 1♀, Ma'agan Mikha'el, 32°33'N 34°55'E, 2–20.xii.2009, W. Kuslitzky (TAU).

Distribution: Madeira Islands, Europe, Caucasus, Turkey, Iran, Israel, Kazakhstan, Middle Asia, Mongolia, Russian Siberia and Far East.

Aneuclis sp.

The morphospecies is represented by five unidentified males from different localities and characterized by the second recurrent vein (2m–cu) strongly postfurcal, intercubitus (2rs–m) short and thick (virtually absent) and the foveate groove of the mesopleuron well developed. It resembles *A. melanaria* (Holmgren, 1860) but cannot be assigned exactly to this species until its female is found.

Diaparsis (Diaparsis) gerlingi n. sp.

(Figs 1–9)

LSID: urn:lsid:zoobank.org:act:8D2960CA-9428-4A3A-95BF-F75BF1EF798F.

Etymology: The new species is named in memory of Prof. Dan Gerling, an Israeli entomologist and an expert in biocontrol, whiteflies and parasitic Hymenoptera.

Comparison: In the key to Palaearctic species by Khalaim (2005), the new species runs to couplet 17 but does not correspond with either species in this couplet. *Diaparsis gerlingi* differs from all Palaearctic species of the subgenus by the combination of a densely punctate mesopleuron, very weak foveate groove (virtually absent), and the long ovipositor with two conspicuous dorsal, subapical teeth (Fig. 9).

Description: *Female.* Body length 3.9 mm. Fore wing length 2.2 mm.

Head weakly rounded posterior to eyes in dorsal view (Fig. 4); temple 0.6 times as long as eye width. Mandible with upper tooth distinctly longer than lower. Clypeus (Fig. 3) lenticular, about 2.5 times as broad as long, distinctly separated from face, smooth and shining, with distinct punctures in its upper half. Malar space 0.9–1.1 times as long as basal mandibular width. Antennal flagellum (Fig. 2) filiform, robust, with 19–21 flagellomeres (19 flagellomeres in holotype); subbasal and mid flagellomeres 1.2–1.3 times, and subapical flagellomeres 1.1–1.2 times as long as broad. Face and frons finely granulate, dull, with moderately dense punctures; face with a moderately strong swelling centrally. Vertex weakly shining, with shallow (sometimes indistinct) punctures. Temple smooth and shining, finely and sparsely punctate. Occipital carina complete.

Notaulus as weak wrinkle (in holotype) or absent. Mesoscutum dull, finely punctate on finely granulate background. Scutellum with lateral longitudinal carinae developed in its anterior 0.3. Foveate groove very shallow, slightly oblique, with a few weak transverse wrinkles, situated in centre or somewhat before centre of

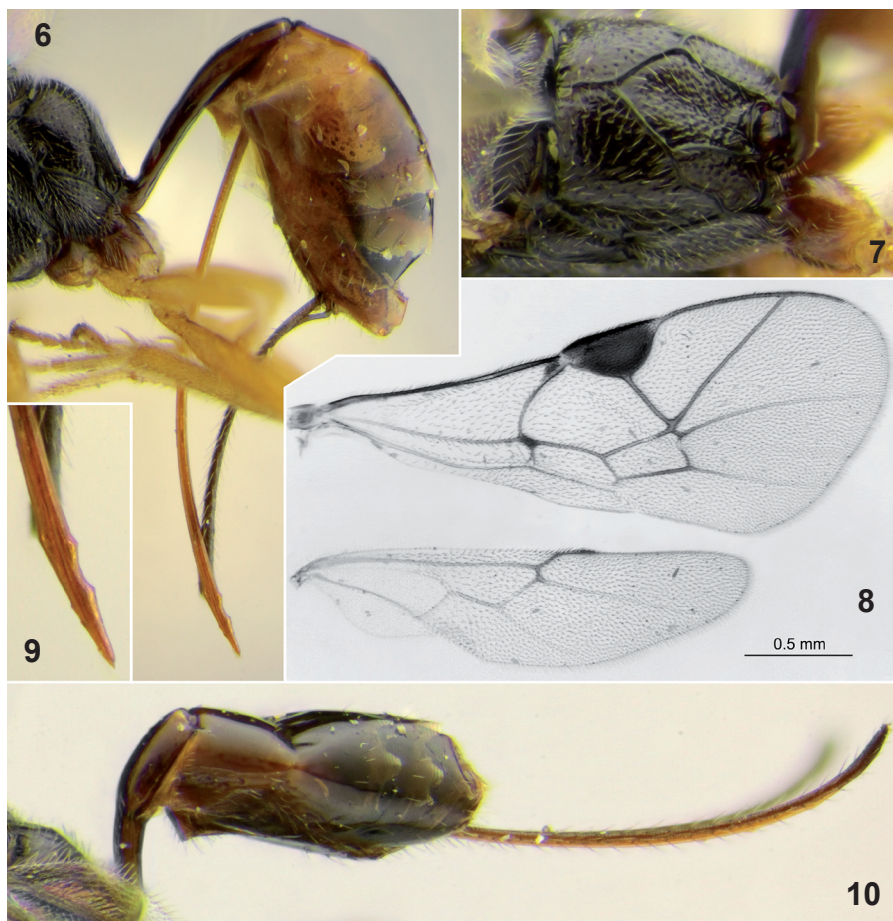
mesopleuron. Mesopleuron distinctly and densely punctate, smooth and shining between punctures. Propodeum (Fig. 7) with basal keel which is 0.35 times as long as apical area. Dorsolateral area finely punctate on very shallowly granulate or smooth background, weakly shining to dull. Propodeal spiracle separated from pleural carina by 3.0–4.0 times diameter of spiracle. Apical area slightly impressed along midline or flat, pointed anteriorly (Fig. 7).



Figs 1–5: *Diaparsis gerlingi* n. sp., holotype female: (1) habitus, lateral view; (2) antennae, lateral view; (3) head, front view; (4) head and mesoscutum, dorsal view; (5) head and mesosoma, lateral view.

Fore wing (Fig. 8) with intercubitus (2rs-m) thick, shorter than abscissa of cubitus between intercubitus and second recurrent vein (abscissa of M between 2rs-m and 2m-cu). First abscissa of radius (Rs+2r) 1.2–1.3 times as long as width of pterostigma. Metacarpus (R1) not reaching apex of fore wing. Hind wing with nervellus (cu1&cu-a) weakly reclivous. Legs moderately slender; hind femur 3.6 times as long as broad and 0.8 times as long as tibia.

First tergite slender, 4.2 times as long as posteriorly broad, smooth, round or slightly trapeziform in cross-section centrally. Glymma small, isolated, situated more or less in centre of first tergite. Second tergite 1.25 times as long as anteriorly



Figs 6–10: (6–9) *Diaparsis gerlingi* n. sp., holotype (6, 7, 9) and paratype (8) females: (6) metasoma with ovipositor, lateral view; (7) propodeum, dorsolateral view; (8) wings; (9) apex of ovipositor, lateral view; (10) *Gelanes clavulatus*, female, metasoma with ovipositor, lateral view.

broad. Thyridial depression small, about as long as broad. Ovipositor long, weakly and evenly bent upwards over its total length, with two strong subapical teeth dorsally and a few fine teeth ventrally (Fig. 9); sheath 1.65 times as long as first tergite and 1.8 times as long as hind tibia.

Head and mesosoma black; mouthparts, lower 0.4–0.5 of clypeus, mandible (teeth reddish) and tegula brownish yellow. Antenna and pterostigma brown. Legs brownish yellow, all coxae more or less darkened with brown. First metasomal tergite dark brown to brownish black. Metasoma posterior to first tergite yellow-brown to brown, darker dorsally.

Male. Unknown.

Holotype: ♀ **Israel:** Tivon [32°43'N 35°08'E], 2.iv.1975, F. Kaplan (TAU).

Paratypes: 2♀, same data as holotype (TAU, ZISP).

Distribution: Israel.

Diaparsis (Diaparsis) nitida Horstmann, 1981

Material examined: 1♀, Nahal Hazav, Bitronot Ruhama, 31°32'N 34°42'E, 5.iv.2005, A. Freidberg (TAU); 1♀, Bet Dagan, 10.iv.1993, W. Kuslitzky, Malaise trap (ZISP); 1♂, Tel Aviv, 20.iii.1975, A. Freidberg (TAU); 1♀, Tel Aviv, 1.iv.2007, W. Kuslitzky, Malaise trap (TAU); 2♀, Ma'agan Mikha'el, 32°33'N 34°55'E, 5 and 26.iii.2009, W. Kuslitzky (TAU); 1♂, Mishmar Dawid, 31°49'N 34°54'E, 3.iv.2009, W. Kuslitzky (TAU); 1♀, Tarum, 31°47'N 34°58'E, 11.v.2009, W. Kuslitzky (TAU).

Distribution: Europe, Caucasus, Turkey, Israel, Kazakhstan, Russian Far East.

Diaparsis (Nanodiaparsis) frontella (Holmgren, 1860)

Material examined: 1♀, Har Meron, 1100 m, 21.x.1996, A. Freidberg (RMNH); 1♀, Nahal Oren, on grass, 12.xi.1996, L. Friedman (TAU); 1♀, Nahal Nimrod, 33°15'N 35°45'E, 1082 m, 18.x.2009, L. Friedman (TAU).

Distribution: Europe, Caucasus, Turkey, Israel, Kazakhstan and Russian Siberia.

Biology: Reared from shothole borer *Scolytus rugulosus* (Müller) (Curculionidae) in Europe (Horstmann 1981).

Gelanes clavulatus Khalaim & Blank, 2011

(Figs 10, 11)

Remarks: Males of this species differ from those of *G. simillimus* by the dark face (often yellow or pale brown in *G. simillimus*), entirely fuscous antenna (usually pale proximally in *G. simillimus*), strongly darkened legs, mesopleuron with more or less distinct foveate groove/area with wrinkles and/or strong granulation (foveate groove absent or represented by weakly granulate area in *G. simillimus*), and second flagellomere very short, conspicuously shorter and smaller than first and third flagellomeres (more or less equal in length to first and third flagellomeres in *G. simillimus*).

Material examined: 1♀ 3♂, Even Yizhaq (Gal'ed), 20.ii.2002, L. Friedman (1♂ without metasoma; 1♀ 2♂ TAU, 1♂ ZISP); 2♂, Bet She'arim, ex gall on *Quercus ithaburensis*, 20.ii.2002, L. Friedman

(TAU, ZISP); 2♀ 2♂, Bar Giyyora, 31°43'54"N 35°04'36"E, 880 m, 8–9.iii.2016, M. Mostovski, yellow pan traps (1♀ 2♂ TAU, 1♀ in ZISP). *Note*: Two males in the examined material are labelled as reared from a gall on *Quercus* Decne (Fagaceae). It is rather odd and probably wrong host record because all other reports of *Gelanes* species were only from xyelid sawflies (Xyelidae) (see Khalaim & Blank 2011; Horstmann 2013).

Distribution: Austria, Croatia, Greece, Bulgaria, Turkey, Israel.

Biology: Reared from *Xyela* sp. (Xyelidae) on *Pinus nigra* Aiton in Greece; collected on and reared from *P. halepensis* Mill. in Croatia; reared from *Xyela curva* Benson and *X. graeca* Stein on *P. nigra* in Austria (Khalaim & Blank 2011).



Figs 11–16: (11) *Gelanes clavulatus*, female, head with antenna; (12–16) *Palpator turpilucricupidus*, female (12–15) and male (16): (12) head with antenna; (13) head and mesoscutum, dorsal view; (14) propodeum, dorsal view; (15, 16) habitus, lateral view.

Gelanes simillimus Horstmann, 1981

Material examined: 1♀, Har Meron, 1100 m, 14.iv.1999, A. Freidberg (TAU); 3♀ 5♂, Bar Giyyora, 31°43'54"N 35°04'36"E, 880 m, 8–9.iii.2016, M. Mostovski, yellow pan traps (2♀ 4♂ TAU, 1♀ 1♂ ZISP); 4♀ 1♂, Mishmar Dawid, 31°49'N 34°54'E, W. Kuslitzky: 2.iii.2010 (2♀ TAU, ZISP), 9.iv.2012 (1♀ 1♂ TAU), 28.iv.2012 (1♀ TAU).

Distribution: Europe, Turkey, Israel, Russian Siberia and Far East, South Korea.

Biology: Reared from sawfly *Xyela julii* (Brébisson) (Xyelidae) on *Pinus sylvestris* L. (Pinaceae) and collected from *Pinus halepensis* Mill. in Europe (Khalaim & Blank 2011).

Gelanes sp.

Three unidentified females may represent either variation of *G. fuscus* (Holmgren, 1860) or an undescribed species.

Palpator turpilucricupidus Khalaim, 2006

(Figs 12–16)

Variation: Specimens from Israel have the vertex, temple, mesoscutum and mesopleuron distinctly punctate on a smooth or shallowly granulate background, shining (Figs 12, 13); maxillary palps reaching the distal end of the hind coxa (Fig. 16); pterostigma brown; and ovipositor sheath somewhat longer than the body (Fig. 15). One male has second recurrent vein (2m–cu) interstitial.

Material examined: 1♀, Ma'ayen Zevi, 28.iii.2010, W. Kuslitzky (TAU); 1♂, Ma'agan Mikha'el, 32°33'N 34°55'E, 1–28.iii.2010, W. Kuslitzky (TAU); 2♂, Shoham, 16.iv.2008, W. Kuslitzky (TAU).

Distribution: Spain (south), Tunisia, Israel.

Phradis interstitialis (Thomson, 1889)

Material examined: 1♀, Har Meron, 1100 m, 14.iv.1999, A. Freidberg (TAU).

Distribution: Europe, Caucasus, Israel, Middle Asia.

Biology: Parasitoid of several *Meligethes* species (Nitidulidae) in Europe (Yu *et al.* 2016).

Phradis spp.

Two morphospecies of *Phradis* represented only by males (1 male and 7 males, respectively) are recognized in addition to one identified species. Identification of these morphospecies is problematic until their females are found.

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