



## New record and the updated list of Tersilochinae (Hym., Ichneumonidae) from Iran

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**ABSTRACT.** During the collection of Ichneumonidae from West Azarbaijan province in the northwest of Iran in 2019, we collected a specimen belonging to the subfamily Tersilochinae and identified it as *Aneuclis pumilus* (Holmgren). This is a new record of this species for the Iranian fauna. A checklist of all known Iranian species of the subfamily is provided.

**Key words:** *Aneuclis pumilus*, fauna, parasitoid, West Azarbaijan, checklist

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## INTRODUCTION

Tersilochinae Schmiedeknecht, 1910 (Hymenoptera, Ichneumonidae) is a moderately large subfamily with about 600 known species worldwide within 34 genera (Yu et al., 2016), and approximately 300 species in the Palaearctic region, of which 160 species from 13 genera are found in Europe (Khalaim & Yurtcan, 2011). Fifteen species in eight genera of this subfamily have been reported from Iran (Barahoei et al., 2013; Mohammadi-Khoramabadi et al., 2016; Khalaim & Tereshkin, 2019). Members of this subfamily are koinobiont endoparasitoids of Coleopteran larvae including Curculionidae, Chrysomelidae and some Hymenoptera and Lepidoptera. Some species were used in the biological control programs (Yu et al., 2016). This subfamily characterizes by the following morphological characters: fore wing without an areolet but with a large pterostigma, a thickened 2rs-m vein and an angle of 90° or less between the first and second sections of the radius, and with maxillary and labial palpi 4- and 3-segmented, respectively (Khalaim & Yurtcan, 2011). The genus *Aneuclis* Förster, 1869 is a moderately large genus with a wide geographical distribution in most zoogeographical regions. The genus *Aneuclis* is characterized by the first metasomal segment having isolated glymma (not joining by a furrow to the

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ventral part of postpetiole) or lacking glymma, the fore wing having the second recurrent vein interstitial or postfurcal, and the propodeum almost always having a basal keel (Khalaim, 2018).

Faunistic studies of the ichneumon wasps in Iran were conducted in different localities (Ghahari & Jussila, 2010, 2011a, 2011b, 2011c; Barahoei et al., 2013, 2014, 2015; Hasanshahi et al., 2014; Amiri et al., 2015; Pourhaji et al., 2016; Ghafouri Moghaddam et al., 2016; Mahyabadi et al., 2016; Mohammadi-Khoramabadi et al. 2020; Mohebban et al., 2015, 2016; Shirzadegan et al., 2018; Zardouei Heydari et al., 2019; 2020a, 2020b, 2020c, 2020d; 2021; 2022a, 2022b). However, Tersilochinae is still poorly studied in Iran and requires further sampling and faunistic studies, especially in poorly sampled areas such as West Azarbaijan province. The aim of this work is to provide a new country record of Tersilochinae species from Iran.

## MATERIAL AND METHODS

The collection of samples was conducted with a Malaise trap in a mountainous area on the road of Oshnaviyeh to Urmia (37°08'40"N, 45°09'17"E, 1816m) in West Azarbaijan province in 2019. The collected specimen was preserved in 75% ethanol and subsequently prepared according to the AXA method (van Achterberg, 2009). The prepared specimen was mounted on a rectangular card and labeled. The card-mounted specimen was studied under Nikon® SMZ645 stereomicroscope. External morphology was illustrated using an Olympus® SZH, equipped with a Canon® A720 digital camera. The specimen was identified according to reliable keys and descriptions (Broad, 2011; Khalaim, 2018). Terminology of morphological characters generally follows that of Townes (1969, 1971) and Khalaim (2011). The studied specimen is deposited in the collection of the Department of Plant Protection, Azad University of Mahabad, West Azarbaijan province, Iran.

## RESULTS

The collected specimen belongs to the genus *Aneuclis* Förster, 1869, comprising three species in Iran, and the newly collected specimen was identified as *Aneuclis pumilus* (Holmgren).

### *Taxonomic hierarchy*

**Class Insecta Linnaeus, 1758**

**Order Hymenoptera Linnaeus, 1758**

**Family Ichneumonidae Latreille, 1802**

**Subfamily Tersilochinae Schmiedeknecht, 1910**

**Genus *Aneuclis* Förster, 1869**

Type species: *Isurgus rufipes* Szépligeti, 1899 (= *maritima* Thomson, 1889).

***Aneuclis pumilus* (Holmgren, 1860) (Figs 1-2)**

**Material examined.** Iran, West Azarbaijan province, the road of Oshnaviyeh-Urmia, 37°08'40"N, 45°09'17"E, 1816 m a.s.l., 28.VIII.2019, Karimi, S. leg., 1♀.

**Diagnosis.** *Aneuclis pumilus* differs from related species by the following combination of characters: head with occipital carina widely interrupted dorsally, slender flagellum of the antenna (Fig. 2A); frons and vertex highly polished (Fig. 2B); fore wing venation reduced, with the second recurrent vein (2m-cu) completely absent, with metacarpus (R1) very short (Fig. 2C); strong notaulus, and deep and long foveate groove of mesopleuron, the foveate groove of mesopleuron shallow, as densely granulate area, sometimes with fine irregular wrinkles; basal keel of propodeum about 0.6× as long as apical area (Fig. 2D); ovipositor longer than metasoma, sinuate in the distal end (Figs 1, 2E).



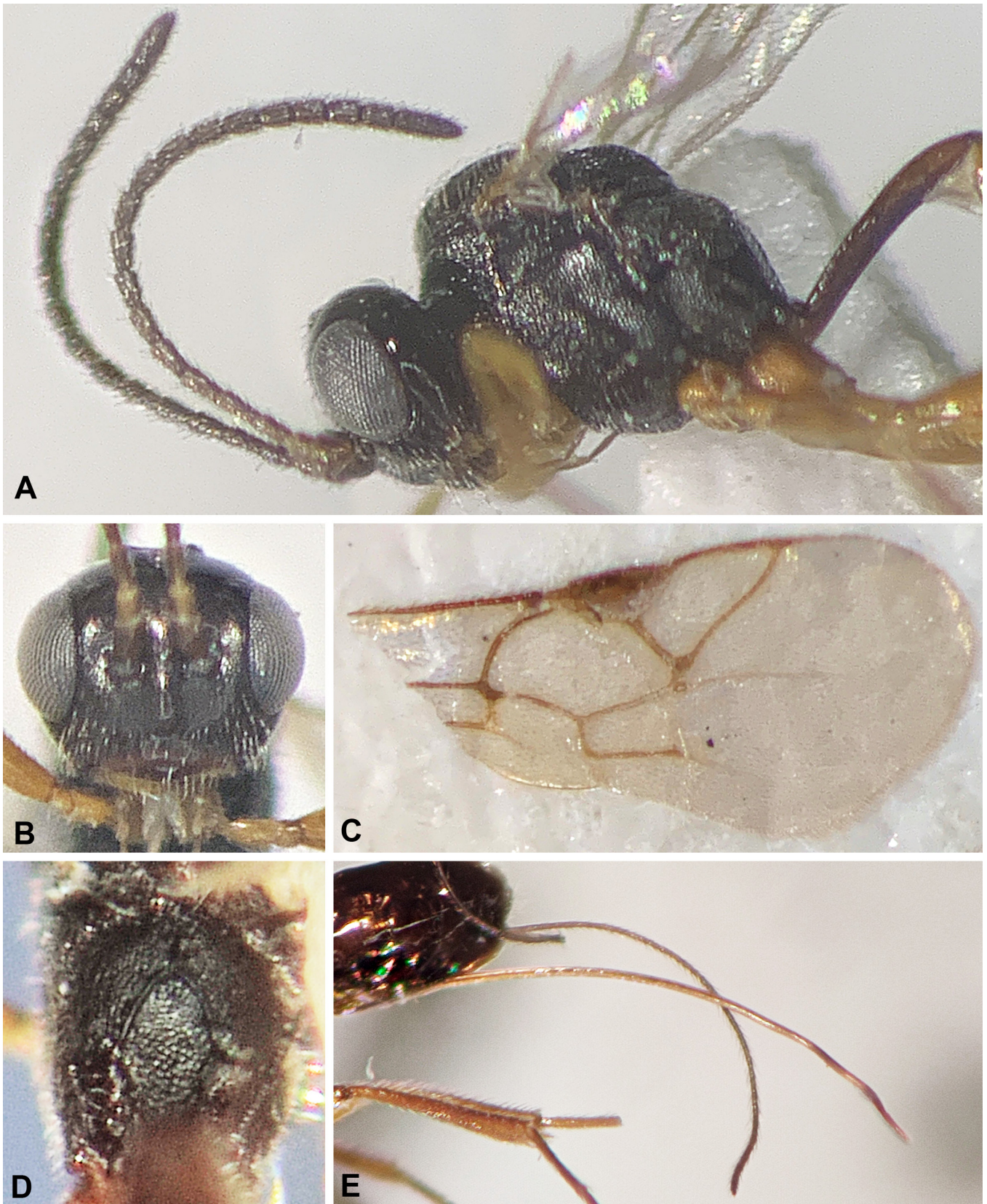
**Figure 1.** Lateral view of female *Aneuclis pumilus* (Holmgren, 1860).

**Distribution.** It is a widely distributed cosmopolitan species, probably of European origin and it was reported from Neotropical (North America, Mexico), Palaearctic (North Africa, Europe, Caucasus, Middle Asia, Mongolia, Siberia, Russian Far East), Australasian, Afrotropical and Oriental (Khalaim, 2004, 2009, 2010, 2011, 2018) regions. In this paper, it is recorded for the first time for the Iranian fauna.

**Biological association.** Biology of the species is unknown.

## DISCUSSION

Tersilochinae (Ichneumonidae) includes eight genera and 16 species in Iran (Table 1). *Aneuclis* Förster, 1869 has 18 nominated species in the Palaearctic region (Khalaim, 2004) and only three species are known from Iran. While it belongs to eight and three species in Europe and Turkey (*A. anterior* Horstmann, 1971, *A. incidens* (Thomson, 1889) and *A. melanaria* (Holmgren, 1860)), respectively (Khalaim & Yurtcan, 2011). The record of *Diaparsis improvisator* Khalaim, 2005 from Iran (Barahoei et al., 2013) is clearly an erroneous identification and this species must be deleted from the list of Iranian Tersilochinae (*A. Khalaim, pers.com.*). In the Palaearctic region, species of *Aneuclis* have been reared from coleopteran hosts of the families Chrysomelidae, Curculionidae and Nitidulidae on cruciferous plants, and are mainly associated with herbaceous landscapes (Khalaim, 2018). Here we summarize the known genera and species of Tersilochinae occurring in Iran. This checklist reflects the general composition of Iran's Tersilochinae fauna, but we expect many other species of *Aneuclis* will be identified in Iran.



**Figure 2.** *Aneuclis pumilus* (Holmgren, 1860), female: **A.** Head, mesosoma and petiole in lateral view; **B.** Head in frontal view; **C.** Fore wing venation; **D.** Propodeum in dorsal view; **E.** Tip of abdomen with ovipositor and ovipositor sheath.

**Table 1.** The genera and species of the subfamily Tersilochinae reported from Iran.

Genera	Species	Distribution in Iran	References
<i>Aneuclis</i> Förster, 1869	<i>A. incidens</i> (Thomson, 1889)	Kerman, Khorasan-e Razavi, Sistan-o Baluchestan, Isfahan, and Mazandaran	Barahoei et al. (2013, 2014, 2015)
	<i>A. lanternaria</i> Khalaim, 2009	Kerman	Beni Asad-Azad et al. (2012)
	<i>A. melanaria</i> (Holmgren, 1860)	Fars	Hasanshahi et al. (2014)
	<i>A. pumilus</i> (Holmgren, 1860)	West Azarbaijan	<b>New record</b>
<i>Barycnemis</i> Förster, 1869	<i>B. alpina</i> (Strobl, 1901)	Golestan	Ghahari & Jussila (2010)
<i>Diaparsis</i> Förster, 1869	<i>D. carinifer</i> (Thomson, 1889)	Kerman	Khalaim & Tereshkin (2019)
	<i>D. jucunda</i> (Holmgren, 1860)	Mazandaran	Ghahari & Jussila (2011a) Khalaim & Tereshkin (2019)
	<i>D. (Nanodiaparsis) aperta</i> (Thomson, 1889)	Zanjan	Khalaim & Tereshkin (2019)
<i>Heterocola</i> Förster, 1869	<i>H. longipalpis</i> Kolarov & Beyarslan, 1994	West Azarbaijan	Khalaim (2016)
	<i>H. nigrotibialis</i> Horstmann & Kolarov, 1988	West Azerbaijan	Khalaim (2016)
	<i>H. proboscidalis</i> (Thomson, 1889)	East Azarbaijan	Ghahari & Jussila (2015)
<i>Phradis</i> Förster, 1869	<i>P. brevis</i> (Brischke, 1880)	Alborz	Khalaim & Tereshkin (2019)
	<i>P. vinosus</i> Khalaim, 2007	Kerman	Mohammadi-Khoramabadi et al. (2016)
<i>Probles</i> Förster, 1868	<i>P. (Microdiaparsis) microcephala</i> (Gravenhorst, 1829)	Kermanshah	Ghahari & Jussila (2015) Khalaim & Tereshkin (2019)
<i>Spinolochus</i> Horstm.	<i>S. agilis</i> (Holmgren, 1860)	East Azarbaijan	Ghahari & Jussila (2016)* Khalaim & Tereshkin (2019)
<i>Tersilochus</i> Holmgren, 1859	<i>T. (Pectinolochus) striola</i> (Thomson, 1889)	Ilam	Ghahari & Jussila (2015) Khalaim & Tereshkin (2019)

\* as *Barycnemis agilis* (Holmgren, 1860)

## AUTHOR'S CONTRIBUTION

The authors confirm their contribution in the paper as follows: S. Karimi: Sampling and mounting of the specimens, and preparation of the photographs; A. Ghassemi-Kahrizeh: Preparation of the photographs, writing and revising the manuscript and correspondence; A. Hosseinzadeh: Writing and revising the manuscript; H. Lotfalizadeh: Identification of the specimens, and help for the preparation of the photographs. All authors read and approved the final version of the manuscript

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## AVAILABILITY OF DATA AND MATERIAL

Not applicable.

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

## CONSENT FOR PUBLICATION

Not applicable.

## CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest regarding the publication of this paper.

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## گزارش جدید و فهرست بهروز زنبورهای زیرخانواده Tersilochinae (Hym., Ichneumonidae) ایران

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**چکیده:** طی جمع‌آوری زنبورهای خانواده Ichneumonidae از استان آذربایجان غربی در شمال غرب ایران در سال ۱۳۹۸، نمونه‌ای از زیرخانواده Tersilochinae جمع‌آوری و تحت عنوان *Aneuclis pumilus* (Holmgren) شناسایی گردید. این گونه گزارش جدید برای فون ایران است. فهرست همه گونه‌های معتبر متعلق به زیرخانواده Tersilochinae گزارش شده از ایران نیز ارائه شد.

**واژگان کلیدی:** *Aneuclis pumilus*، فون، پارازیتوئید، آذربایجان غربی، چکلیست