

Research Article

## First finding of *Psilochalcis elegantula* (Masi, 1929) (Hymenoptera: Chalcididae) in Iraq

Ali A. Kareem<sup>1\*</sup>, Hossein Lotfalizadeh<sup>2</sup>, Ayad Alsendi<sup>1</sup>, Siena Al-Zurfi<sup>1</sup> and Raad K. Aljaafari<sup>1</sup>

1. Plant Protection Department, Agriculture College, University of Kerbala, Iraq.

2. Insect Taxonomy Research Department, Iranian Research Institute of Plant Protection (IRIPP), AREEO, Tehran, Iran.

**Abstract:** During the survey in the orchards of Al-Husiniya in Karbala in June 2019, specimens of *Psilochalcis elegantula* (Masi, 1929) were collected using a sweep net. It is the first record of the genus *Psilochalcis* Kieffer, 1905 and *P. elegantula* from Iraq. The important morphological characters are illustrated and discussed. An updated list of the chalcidid species in Iraq is also provided including ten species in six genera.

**Keywords:** Haltichellinae, Karbala, new record, taxonomy, Iraq

### Introduction

The family of Chalcididae (Hymenoptera, Chalcidoidea) is ascetically big and globally distributed taxa, containing over 80 genera and 1,500 species under eight subfamilies (Cruaud *et al.*, 2020). These are endoparasitoids of the larvae or pupae of Lepidoptera, Diptera, Coleoptera, and some species of Tenthredinidae (Hymenoptera, Symphyta) and some Neuroptera (Herting, 1978; Bouček, 1988; Delvare, 1995; Dajoz, 2010). Some species are of special importance by controlling pests causing significant economic damage. *Proconura persica* Delvare, 2011 and *Psilochalcis ceratoniae* Delvare, 2011, on carob moth, *Apomyelois ceratoniae* (Zeller) (Lepidoptera: Pyralidae) that is a key pest of pomegranate trees *Punica granatum* (L.) (Delvare *et al.*, 2011; Ehteshami *et al.*, 2019) and *Brachymeria excarinata* Gahan, 1925 as parasitoid of the diamondback moth *Plutella xylostella* (L.) (Lep.: Plutellidae) on *Brassica oleraceae* L. (Lotfalizadeh *et al.*, 2012) are the

representative chalcids associated with the key pests.

So far, more than 62 species belonging to 40 genera of Chalcidoidea have been reported from Iraq (Noyes, 2020). Very little is known about the family Chalcididae, with 7 species, about 11% of the chalcidoid species of Iraq (Bouček, 1951, 1956; Lotfalizadeh *et al.*, 2012; Noyes, 2020). Considering the scarcity of status of the family in Iraq, the present study aimed to increase the knowledge about Iraqi chalcid wasps. In our recent faunistic study on Chalcidoidea in the central part of Iraq, a new record of the family Chalcididae was discovered, which was the aim of the current study.

### Materials and Methods

Samples were collected using the sweeping net from orchards in the Al-Husayniya district of Karbala Governorate in July 2019. Specimens were point-mounted on an insect pin and primarily examined with a binocular microscope

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\*Corresponding author: ali.kareem@uokerbala.edu.iq

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at magnifications up to 80x. Identifications were made using the keys and descriptions of Masi (1929), and Nikolskaya (1960). Images of the specimens are taken with a Keyence VHX-5000 digital microscope. Morphological terminology and body measurements follow Delvare *et al.* (2019).

The specimens are deposited in the HMIM (Hayk Mirzayans Insect Museum, Tehran, Iran) and the University of Kerbala, Insect Collection, Iraq.

Abbreviations of used morphological characters are:

fu1–fu6 = funiculars 1–6

Gt1–Gt6 = gastral tergites 1–6

LOD (lateral ocellar line) = Minimum distance between the anterior and posterior ocellus

OOL = distance between posterior ocellus and the eye

POL = distance between posterior ocelli

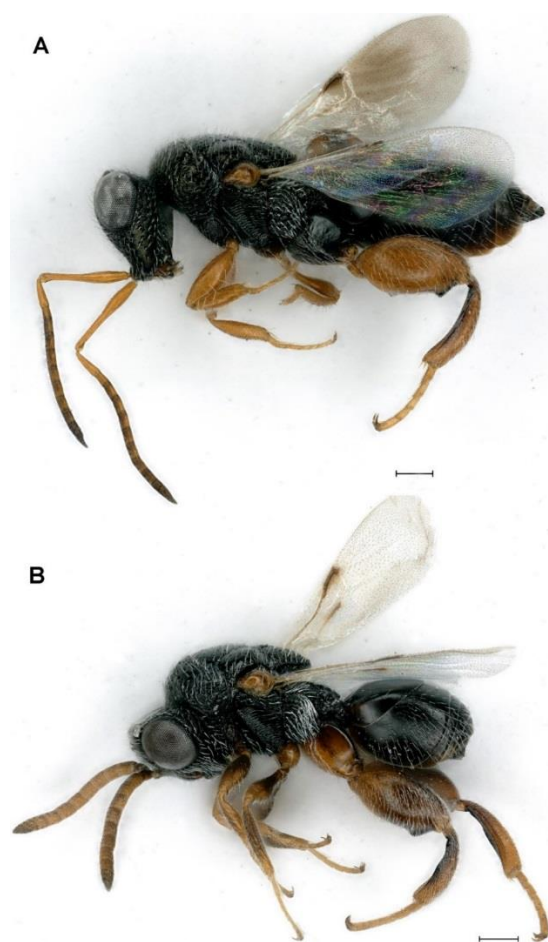
## Results

Collected specimens were identified as *Psilochalcis elegantula* (Masi, 1929).

***Psilochalcis elegantula* (Masi, 1929)** (Figs 1-3)

**Materials examined:** 5♀ & 6♂, Iraq, Karbala Governorate, Al Husayniya district, 32°31'08.00"N 45°36' 31.00"E, 04. 2020, R. K. Aljaafari leg.

**Diagnosis.** In female (Fig. 1A) head, mesosoma, metasoma, black; legs, antennae and tegulae reddish. Head about 1.14 times as broad as high and 1.8 times as broad as long (Figs 2C, D). Pilosity of body long and fine. Eyes height as large as frontovertex (Fig. 2D). POL 0.65 times as large as frontovertex; LOD 1.50 times as wide as OOL (Fig. 2C). Malar space 0.70 times as height as eyes, without sulcus or carina (Fig. 3B). Antennal scrobes smoothly joining median ocellus, superficially reticulate, ventrally with fine reticulation and dorsally with large reticulation (Fig. 2D). Scape 7.65 times as long as width (Fig. 2A). Pedicel + flagellum 1.45 times as broad as of the head. Annelus 0.85 times as long as fu1, all funiculars longer than wide, clava as long as fu6 + fu7.



**Figure 1** *Psilochalcis elegantula* A- Female and B- Male habitus in lateral view (scale bare = 200µm).

Mesosoma 1.35 times as long as broad, pilosity long and fine, and suberect, sparsely punctured, inter punctures superficially reticulate; dorsal outline of mesoscutellum slightly convex; posterior margin also regularly convex in dorsal view (Fig. 3A). Mesepimeron strigose except on posterodorsal angle (Fig. 3C). Metapleuron densely and regularly punctured with slightly thicker setae. Propodeum (Fig. 3D) bearing numerous areoles formed by secondary carinulae; bottom of areoles smooth; submedian, sublateral, and lateral carinae evident. Metafemur (Fig. 2E) broad, 1.70 times as long as wide; with a basal and distal tooth, ventrally finally serrate, a basal tooth at 1/3 of metafemur; disk of femur smooth, slightly reticulate, and sparsely piliferous points. Fore wing (Figs 1A, 2F) hyaline with a slight infumation below and behind of

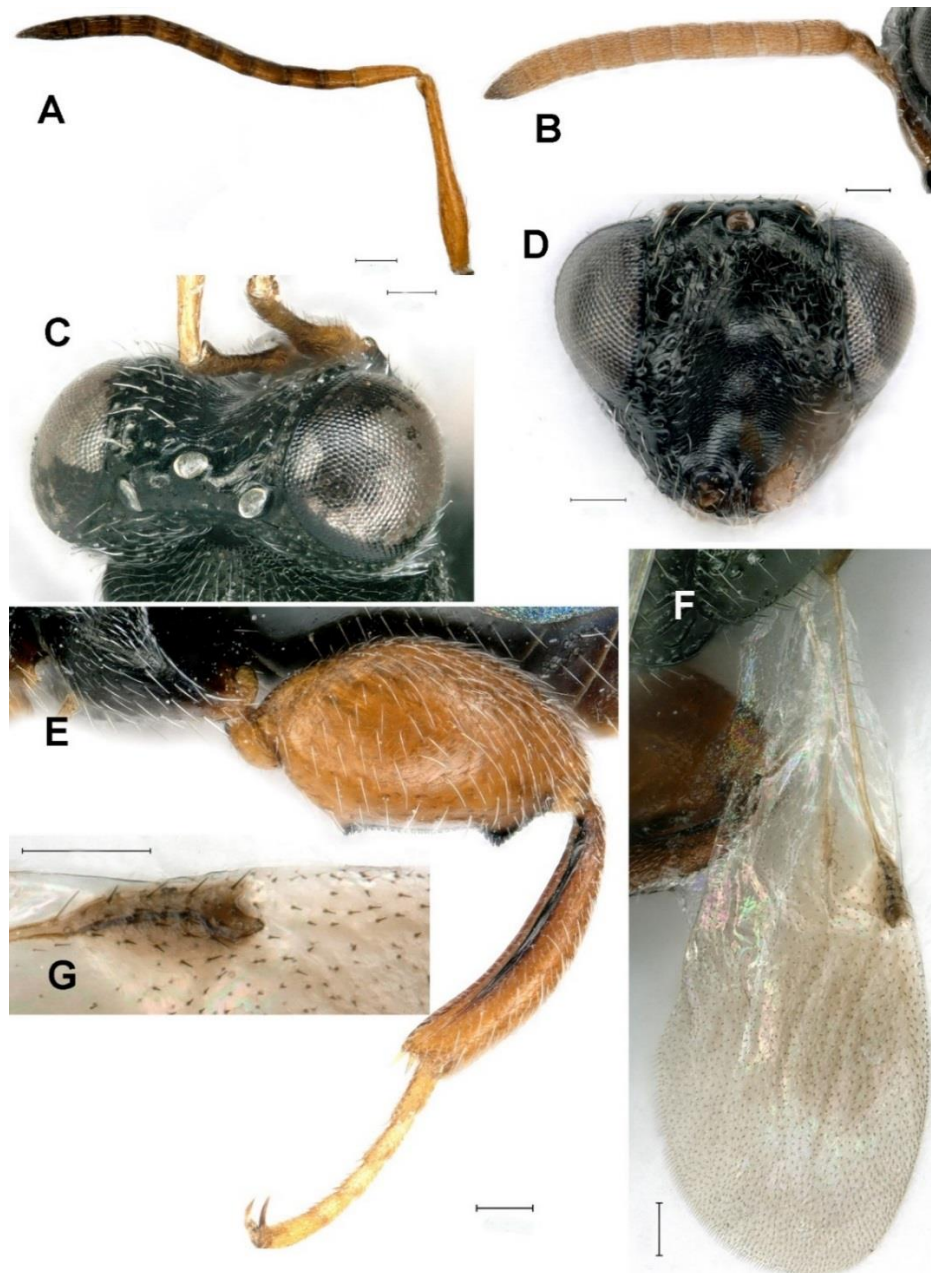
marginal vein. Gaster is slightly longer than mesosoma and 1.60 times as long as broad. Gt1-2 smooth, Gt2 laterally setose (Fig. 3E).

Morphological characteristics of the male (Fig. 1B) are identical to those of the female with the following differences: gaster shorter than mesosoma, legs and antennae brownish; wings

hyaline, with a slight infumation under marginal vein; scape excavated at apex, funiculars much broader than female (Fig. 2B).

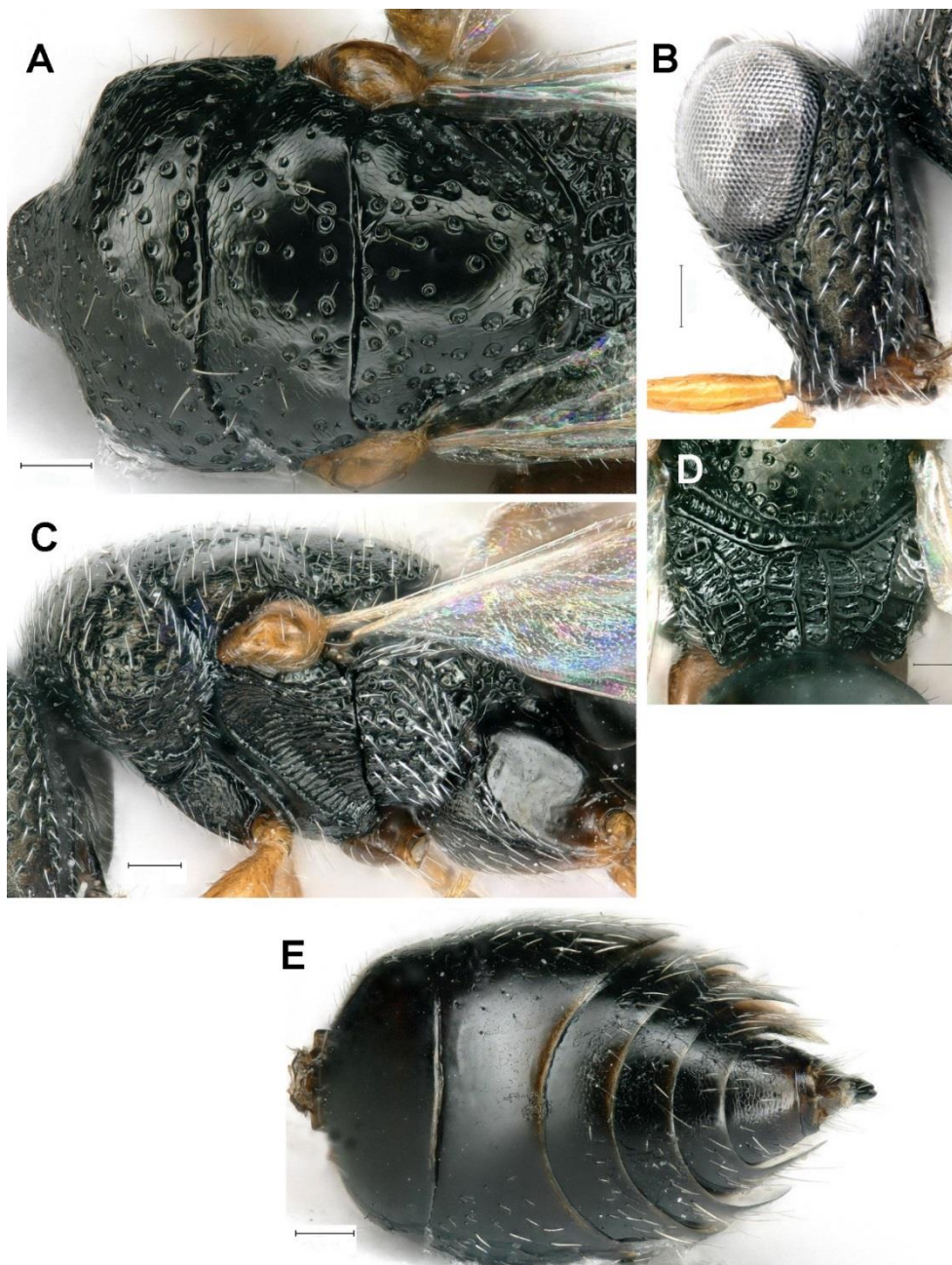
**Host:** Unknown.

**Distribution.** This species is known from North Africa (Libya) (Masi, 1929), and we found it in southern Iraq for the first time.



**Figure 2** *Psilochalcis elegantula*: A-Antenna of female; B- Antenna of male; C- Head in dorsal view; D- Head in frontal view; E- Hind leg; F- Fore wing of female; G- Fore wing venation (scale bare = 100µm).





**Figure 3** *Psilochalcis elegantula*: A- Mesosoma in dorsal view; B- Head in lateral view; C- Mesosoma in lateral view; D-Propodeum in dorsal view; E- Metasoma in dorsal view (scale bare = 100 $\mu$ m).

### Discussion

Based on available literature and personal contact with the Natural History Museum and Research Centre at the University of Baghdad (NHMRCUB), this rarely collected species has not been recorded from Iraq. Therefore, our

findings confirmed the presence of the genus *Psilochalcis* and *P. elegantula* for the first time in Iraq. Hitherto, only five chalcidid genera *Brachymeria*, *Chalcis*, *Cratocentrus*, *Kriechbaumerella*, and *Trigonura* were recorded from Iraq (Bouček 1951; Al-Maliky and Al-Izzi, 1986; Lotfalizadeh *et al.*, 2012; Abul-Sood *et al.*,

2018; Kareem *et al.*, 2022). Therefore, the genus *Psilochalcis* was included as the sixth genus of Iraqi fauna (Table 1). Also, this is the first report of the occurrence of *P. elegantula* in Asia that the failure to collect it so far may be due to scarcity of collection or the rarity of this species. This species known just from North Africa that located in the Basin Mediterranean with a semi-arid to desertic climate and our collection area has similar climatic conditions.

Biological associations of a few species of the genus *Psilochalcis* are known that mainly were reported as a parasitoid of the lepidopterous families Crambidae, Gelechiidae and Pyralidae (Lotfalizadeh *et al.*, 2012; Falahatpisheh *et al.*, 2018). These families can be found widely in the Basin Mediterranean and some of these are serious pests of the agricultural ecosystems.

Few species of Chalcididae occur in Iraq and the initial checklist of the family species in Iraq is listed here that needs to be updated. Most recorded species have unknown hosts, which is important for target pests (Table 1). Compared to neighboring countries such as Iran with more than 70 species in 20 genera (Rajabi *et al.*, 2011; Lotfalizadeh *et al.*, 2012; Tavakoli Roodi *et al.*, 2016; Falahatpisheh *et al.*, 2018; Ehteshami *et al.*, 2019) recorded species investigating this family's fauna in Iraq requires more extensive research because the reported number is far from the estimated reality. The genus *Psilochalcis* includes 10 species in Iran (Falahatpisheh *et al.*, 2018). Therefore, more surveys are necessary for different parts of the country to check the distribution of these species and extend the checklist of the family.

**Table 1** Chalcididae species in Iraq and their distribution.

Species	Collection locality	Note	Reference
<i>Brachymeria aegyptiaca</i> Masi, 1931	South-central part	Parasitoid of <i>Apomyelois ceratoniae</i> (Lep.: Pyralidae)	Al-Maliky & Al-Izzi (1986); Fry (1989)
<i>Brachymeria femorata</i> (Panzer, 1801)	Baghdad	Unknown	Bouček (1951); Swailem <i>et al.</i> (1975)
<i>Brachymeria obtusata</i> (Foerster, 1859)	Baghdad	Unknown	Bouček (1951)
<i>Brachymeria podagrica</i> (Fabricius, 1787)	Al-Husayniya of Karbala	Swept on herbs	Kareem <i>et al.</i> (2022)
<i>Brachymeria tibialis</i> (Walker, 1834)	Baghdad	Parasitoid of <i>Ocnerogyia amanda</i> Staudinger, 1891 (Lep.: Lymantriidae)	Bouček (1951); Bouček & Sedivy (1954); Askew & Shaw (2001)
<i>Chalcis myrifex</i> (Sulzer, 1776)	Al-Husayniya of Karbala	Swept on herbs	Kareem <i>et al.</i> (2022)
<i>Cratocentrus inermus</i> Delvare, 2018	Hilla (Babylon)	Unknown	Abul-Sood <i>et al.</i> (2018)
<i>Kriechbaumerella mansues</i> (Nikolskaya, 1952)	Baghdad	Unknown	Bouček (1956)
<i>Psilochalcis elegantula</i> (Masi, 1929)	Al-Husayniya of Karbala	Malaise traps	Present study
<i>Trigonura ruficaudis</i> (Cameron, 1913)	Mousl	Unknown	Lotfalizadeh <i>et al.</i> (2012)

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## Conflict of Interests

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

## References

- Abul-Sood, M. I., Gadallah, N. S., Hossni, M. T. and Delvare, G. 2018. The subfamily Cratocentrinae (Hymenoptera: Chalcididae): reappraisal of their morphological characters and review of the West Palaearctic species, with the description of two new species. *Zootaxa*, 4377(4): 490-516.
- Al-Maliky, S. K., Al-Izzi, M. A. J. 1986. Parasites of *Ectomyelois ceratoniae* with biological studies on *Apanteles* sp. group *Ulltor* in Iraq. *Entomophaga*, 31(3): 313-319.

- Askew, R. R. and Shaw, M. R. 2001. *Brachymeria tibialis* (Walker, 1834) (Hymenoptera: Chalcididae), a parasitoid of *Zygaena* Fabricius, 1777, and other Lepidoptera. *Entomologist's Gazette*, 52(4): 263-268.
- Bouček, Z. 1952. The first revision of the European species of the family Chalcididae (Hymenoptera). *Sborník Entomologického Oddelení Národního Musea v Praze*, 27(supplement 1): 1-108.
- Bouček, Z. 1956. A contribution to the knowledge of the Chalcididae, Leucospidae and Eucharitidae (Hymenoptera, Chalcidoidea) of the Near East. *Bulletin of the Research Council of Israel*, 5B: 227-259.
- Bouček, Z. 1988. Australasian Chalcidoidea (Hymenoptera). A biosystematic revision of genera of fourteen families, with a reclassification of species. CAB International, Wallingford, United Kingdom. [https://www.persee.fr/doc/bsef\\_0037-928x\\_1989\\_num\\_94\\_5\\_17602\\_t1\\_0198\\_0000\\_1](https://www.persee.fr/doc/bsef_0037-928x_1989_num_94_5_17602_t1_0198_0000_1).
- Bouček, Z. and Sedivy, J. 1954. Die Hymenopteren-Parasiten von *Hyphantria cunea* Drury in der Tschechoslowakei. *Folia Zoologica Entomologica*, 3: 169-189.
- Cruaud, A., Delvare, G., Nidelet, S., Saune, L., Ratnasingham, S., Chartois, M., Blaimer, B. B., Gates, M., Brady, S. G., Faure, S., van Noort, S., Rossi J. P. and Rasplus, J. Y. 2020. Ultra-Conserved Elements and morphology reciprocally illuminate conflicting phylogenetic hypotheses in Chalcididae (Hymenoptera, Chalcidoidea). *Cladistics*, (2020) 1-35.
- Dajoz, R., 2010. *Dictionnaire d'Entomologie*. Lavoisier/tec et doc, France.
- Delvare, G. 1995. The Family Chalcididae. In: *The Hymenoptera of Costa Rica*: 289-298 (P. Hanson, I. Gauld, Eds.). Oxford Science Publications, Oxford.
- Delvare, G., Copeland, R. S. and Tanga, C. M. 2019. Description of *Eniacomorpha hermetiae* Delvare sp. n. (Hymenoptera, Chalcidoidea, Chalcididae) a pupal parasitoid of *Hermetia illucens* (L.) (Diptera, Stratiomyidae), and a potential threat to mass production of the fly as a feed supplement for domestic animals. *Zootaxa*, 4638 (2): 237-254. <https://doi.org/10.11646/zootaxa.4638.2.4>.
- Delvare, G., Talaei, L. and Goldansaz S. H. 2011. New Chalcididae (Hymenoptera: Chalcidoidea) of economic importance from Iran. *Annales Zoologici, Warszawa*, 61 (4): 789-801.
- Ehteshami, F., Lotfalizadeh, H. and Delvare, G. 2019. Discovery of male of *Proconura persica* Delvare (Hymenoptera: Chalcididae), recently described from Iran. *Journal of Insect Biodiversity and Systematics*, 5 (2): 153-158.
- Falahatpisheh, A., Fallahzadeh, M., Dousti, A. F. and Delvare, G. 2018. Review of Iranian Chalcididae (Hymenoptera, Chalcidoidea) with nomenclatural notes. *Zootaxa*, 4394(2), 251-269. <https://doi.org/10.11646/zootaxa.4394.2.8>.
- Fry, J. M. 1989. Natural enemy databank, 1987. A catalogue of natural enemies of arthropods derived from records in the CIBC Natural Enemy Databank. CAB International, Wallingford, Oxford, UK.
- Kareem, A. A., Lotfalizadeh, H., Alsendi, A., Aljaafari, R. K. and Al-Zurfi, S. M. 2022. First record of two parasitoid wasps of the family Chalcididae (Hymenoptera) in Iraq. *Bulletin of the Iraq Natural History Museum*, 17(2): 187-195.
- Lotfalizadeh, H., Ebrahimi, E. and Delvare, G. 2012. A contribution to the knowledge of family Chalcididae (Hymenoptera: Chalcidoidea) in Iran. *Journal of Entomological Society of Iran*, 31(2): 67-100.
- Masi, L. 1929. Risultati zoologici della Missione inviata dalla R. Società Geografica Italiana per l'esplorazione dell'Oasi di Giarabub (1926-1927). *Hymenoptera Chalcididae*. *Annali del Museo Civico di Storia Naturale Giacomo Doria*. Genova, 53: 195-240.
- Michael, M. 2008. Zur Kenntnis der Familie Chalcididae (Hymenoptera: Chalcidoidea) in Österreich. *Entomofauna*, 29(4): 69-80.
- Noyes, J. S. 2020. *Universal chalcidoidea database*. *World Wide Web electronic publication*. Available at: <http://www.nhm.ac.uk/chalcidoids> (Accessed: 14 March).

- Rajabi, M., Lotfalizadeh, H. and Madjdzadeh, S. M. 2011. The family Chalcididae (Hym.: Chalcidoidea) from Kerman province, southeastern Iran with some new records. *Journal Acta Zoologica Bulgarica*, 63(3): 263-268.
- Swaillem, S. M.; Selim, A. A. and Amin, A. H. 1975. A contribution to the study of the insect fauna of Hammam Al-Alil. *Mesopotamia Journal of Agriculture*, 9: 119-141.
- Tavakoli Roodi, T., Fallahzadeh, M. and Lotfalizadeh, H. 2016. Fauna of chalcid wasps (Hymenoptera: Chalcidoidea: Chalcididae) in Hormozgan province, southern Iran. *Journal of Insect Biodiversity and Systematics*, 2(1): 155-166.

**نخستین گزارش زنبور (Hymenoptera: *Psilochalcis elegantula* (Masi, 1929) (Chalcididae) از عراق**

علی عبدالکریم<sup>۱\*</sup>، حسین لطفعلی زاده<sup>۲</sup>، ایاد السندی<sup>۱</sup>، سیناء م. الزرفی<sup>۱</sup>،  
رعدکریم الجعفری<sup>۱</sup>

۱- گروه گیاه پزشکی، دانشکده کشاورزی، دانشگاه کربلا، عراق.  
۲- بخش تحقیقات رده بندی حشرات، مؤسسه تحقیقات گیاه پزشکی، سازمان تحقیقات، آموزش و ترویج کشاورزی، تهران، ایران.  
پست الکترونیکی نویسنده مسئول مکاتبه: ali.kareem@uokerbala.edu.iq  
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**چکیده:** طی مطالعاتی که در تیر ماه در باغ های اطراف کربلا به عمل آمد، نمونه هایی از زنبور *Psilochalcis elegantula* (Masi, 1929) با استفاده از تور حشره گیری جمع آوری گردید. این جنس و گونه برای نخستین بار در عراق از شهر کربلا گزارش می گردد. مشخصات مورفولوژیکی مهم آن به همراه تصاویر دقیقی مورد بحث قرار گرفت. نهایتاً لیستی از گونه های شناخته شده از خانواده Chalcididae در عراق شامل ۱۰ گونه در شش جنس تهیه گردید.

**واژگان کلیدی:** زیرخانواده Haltichellinae، کربلا، گزارش جدید، رده بندی، عراق