




## Research Article

## Three new records of Pteromalidae (Hym., Chalcidoidea) for insects' fauna of Iraq

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**Abstract.** Three species of Pteromalidae Dalman, 1820 (Hymenoptera: Chalcidoidea) namely, *Sphégigaster cuscatae* Ferriere, 1959, *S. nigricornis* Nees, 1834 and *Pachyneuron gibbiscuta* Thomson, 1878 were collected using the sweeping net and identified for the first time from Iraq, okra fields of Basrah environs. With the discovery and identification of two species of the genus *Sphégigaster* and one species of the genus *Pachyneuron*, the number of their species in the genus increases to three and two species in Iraq, respectively. Some biological notes and morphological characters along with photos of the species were provided.

**Keywords:** *Sphégigaster*, *Pachyneuron*, distribution, Basrah

## Article info

Received: 01 December 2025

Accepted: 27 March 2026

Published: 30 April 2026

Subject Editor: Mar Ferrer Suay

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DOI: <https://doi.org/10.22034/jesi.46.2.5>

## Introduction

The collection and identification of the wasps of the family Pteromalidae in Iraq began by Waterson (1922) with the description of the parasitoid wasp *Pachyneuron crassiculme* Waterston, 1922. After Waterston (1922) other researchers such as Al-Azawi (1971), Herting (1976), Abdul-Rassoul, (1990), Abdul-Rassoul *et al.* (1999), Al-Obaidy *et al.*, (2019), Hassan (2021) and Bandyan *et al.* (2021) reported new records of pteromalid wasps from Iraq through their investigations. The names of the genera and species found by these researchers are provided in the checklist published by Rahmani *et al.*, (2022). More recently, Alsendi *et al.*, (2024) have described a new species of *Norbannus* Walker, namely *Norbannus tabatabaeii* Lotfalizadeh & Alsendi, 2024 and reported five genera and six species of pteromalid wasps for the first from Iraq. The aim of this study is to discover and identify new records of pteromalid wasps in Iraq.

## Materials and methods

Specimens were collected using sweep nets from the okra fields and Adjacent areas of Basrah/ Basrah province (Fig. 1), Iraq and preserved in 70% ethanol until further processing. The specimens were prepared and mounted. For card-mounting, rectangular cards were used, with water-soluble glue applied to fix the specimens onto these cards (Noyes, 1982). Specimens were documented using a 14-megapixel Touptek L3CMOS-14000KPA digital microscope camera, mounted on a Wild M5 Stereomicroscope from Wild Heerbrugg M5 stereomicroscope. Image processing and assembly were performed out using Adobe Photoshop. Identification was carried out using the taxonomic key by Ferrière (1959), Narendran & van Harten (2007) and Shojaey *et al.* (2021). The morphological terminology follows Gibson (1997). Voucher specimens were deposited at the Insect Collection of the Plant Protection Department of Urmia University (PPDUU) for future reference.

## Results

Our sampling yielded to collection of 17 female and 7 male specimens of pteromalid wasp which falls to two genera and three species as follow. These have not been recorded from Iraq before.

### Genus *Pachyneuron* Walker, 1833

#### *Pachyneuron gibbiscuta* Thomson, 1878 (Fig. 2)



## Material examined

IRAQ - Basrah governorate, Basrah, 30°55'56.6" N, 47°14'00.6" E, 3 m a.s.l., 23.x.2024; F. Alag leg. 5♀♀

## Diagnosis

**Female;** Body metallic (Fig. 2A); antennal scape testaceous except for apical two-thirds in inner part; pedicellus and flagellum dark brown. Antenna with funiculars subquadrate; head and vertex compared to other species in this genus less broad and gena less sharp (Fig. 2A/red arrow). Mesonotum highly elevated with black setae. Fore wing with marginal vein widened distad (red arrow), and postmarginal vein longer than marginal vein (Fig. 2B). Propodeum with complete plicae and short nucha; petiole distinct and transverse with smooth sculpture dorsally. Abdomen short and ovate (Fig. 2A).

## Distribution

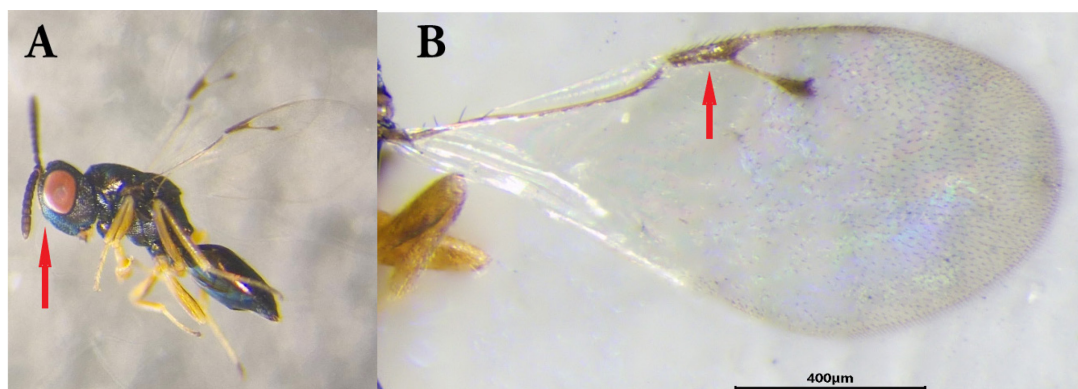
Austria, China, Czech Republic, former Czechoslovakia, Germany, Sweden (UCD Community, 2023), Iran (Shojaey *et al.*, 2021), Turkey (Doğanlar, 1986).

## Hosts

*Pachyneuron gibbiscuta* is reported as parasitoid of *Myzus cerasi* (Fabricius,1775) and hyperparasitoid of *Aphidius* Esenbeck (Braconidae), 1818 (UCD Community, 2023).



Fig. 1. Okra field and adjacent area in Basrah environs



**Fig. 2.** *Pachyneuron gibbiscuta* Thomson, 1878, female: **A.** General habitus, lateral view, head and antennae (red arrow); **B.** fore wing

### Genus *Sphegigaster* Spinola, 1811

*Sphegigaster cuscutae* Ferrière, 1959 (Figs. 3, 4)

*Sphegigaster cuscutae* Ferrière, 1959: 98, ♀♂. – Germany.

#### Material examined

IRAQ - Basrah Province, Basrah, 30°55'56.6" N, 47°14'00.6" E, 3 m a.s.l., 23.x.2024; F. Alag leg. 5♀♀2♂♂

#### Diagnosis

**Female;** Body color dark to metallic green (Fig. 3A); antennal scape yellowish; pedicellus fulvous; flagellum bronzy to dark brown; legs yellow except for coxae which are concolorous with thorax (Figs. 3A, C). Head transverse and entirely punctate; ocelli form an obtuse triangle; antennal insertion at the middle of face; pedicellus twice as long as wide; first funicular equal to pedicellus in length and width. Mesonotum wider than long (Fig. 3D); notauli indicated only anteriorly; axillae sculpture same as mesoscutellum; propodeum entirely reticulate and without median carina; petiole widened anteriorly and narrowed posteriorly, approximately 1.5 times longer than hind coxa. Fore wing large and hyaline; marginal vein twice as long as stigmal vein (Fig. 3B); hind wing with narrowly rounded apex. Abdomen with first segment large and triangular, subsequent segments are very short (Fig. 3D).

**Male;** Similar to female but smaller (Fig. 4). Antenna elongate and dark; pedicellus only slightly longer than wide; funiculars 3–4 times longer than wide and densely setose; clava as long as the preceding two funiculars combined. Pronotal denticles more pronounced and sharper than in female. Petiole longer and narrower.

#### Distribution

Widespread in Europe, Iran (Hasani *et al.*, 2011), Morocco (Klein, 1995), Yemen (Narendran & van Harten, 2007).

#### Host

The hosts of this species in Iraq are unknown. According to Bouček (1961) *S. cuscutae* is a primary parasitoid of *Melanagromyza cuscutae* Hering (Diptera: Agromyzidae) on *Cuscuta lupuliformis* Krock. (Convolvulaceae) and Spencer (1973) stated that the high rate of parasitism to be an important limiting factor for *M. cuscutae* as a biocontrol agent of *C. lupuliformis*.

*Sphegigaster nigricornis* (Nees, 1834) (Fig. 4, 5)

*Chrysolampus nigricornis* Nees, 1834:133, Lectotype ♀. – HDOU, Germany.

#### Material examined

IRAQ - Basrah Province, Basrah, 30°55'56.6" N, 47°14'00.6" E, 3 m a.s.l., 23.x.2024; F. Alag leg. 7♀♀5♂♂

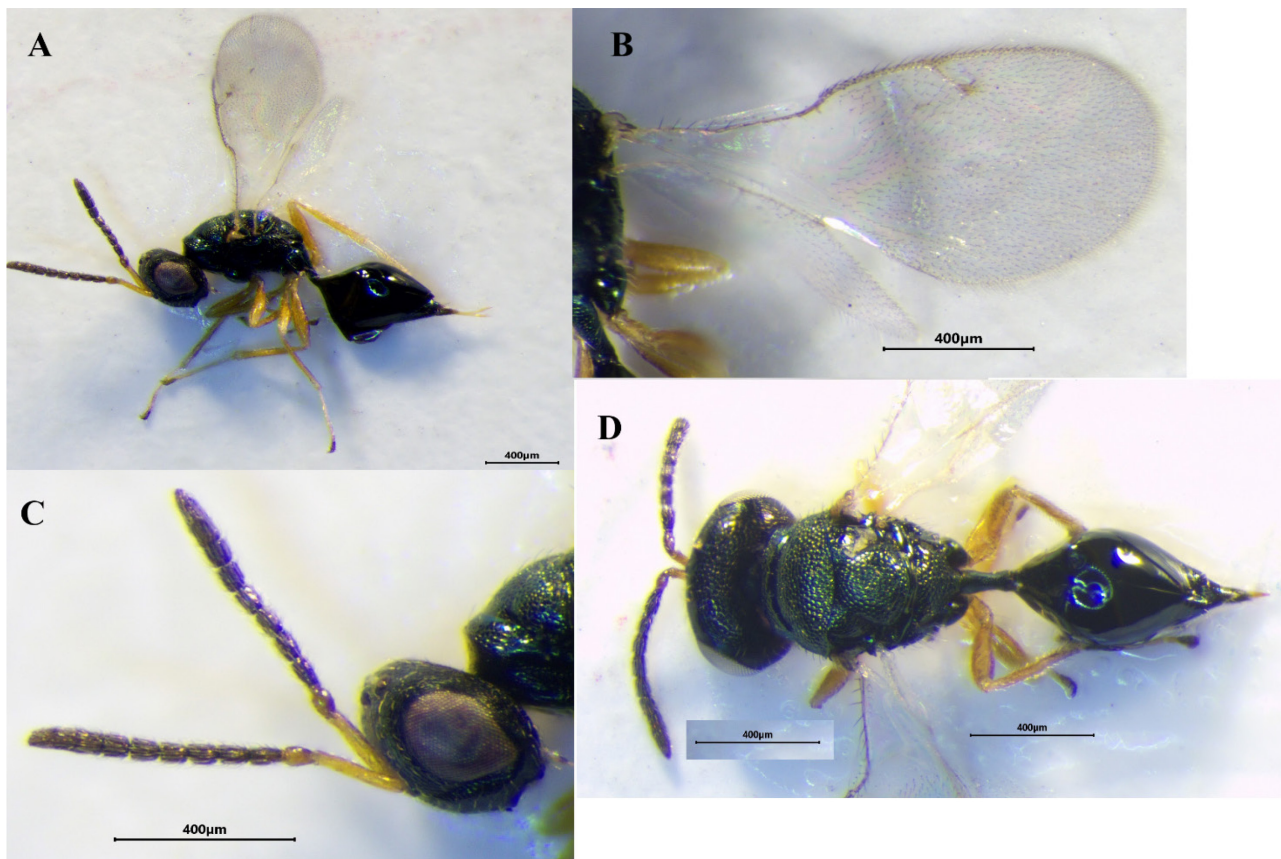


Fig. 3. *Sphegigaster cuscatae* Ferrière, 1959, Female: A. General habitus, lateral view; B. fore wing; C. Antennae; D. Dorsal view

### Diagnosis

**Female;** Body color dark to metallic green (Figs. 5A, C); antenna with scape and pedicellus metallic green and flagellum bronzy to dark brown (Fig. 5B); legs with coxae concolorous to thorax, femora in the first half metallic green and in the second half yellowish same as the remaining parts of legs (Fig. 5A). Antenna short with scape reaching middle of the median ocellus (Fig. 5B). Thorax very finely reticulate and somewhat shiny. Propodeum with sculpture stronger than thorax and without median carina; petiole slender and reaching far beyond the tips of the hind coxa. Wings hyaline (Figs. 5A and 6B). Abdomen smooth and shiny, ventral side swollen at the base (Fig. 5C).

**Male;** Similar to female but smaller and often exhibit a greener metallic body coloration (Figs. 6A, C); legs paler, fore and mid femora with dark parts **testaceous** (Fig. 6A). Antennal scape shorter and three quarters the length of an eye; pedicellus shorter; funiculars subequal n length; clava 3 times as long as broad (Fig. 6D). Spur of mid tibia relatively shorter. Petiole longer and slenderer than in females (Figs. 5C and 6A).

### Distribution

Widespread in Eastern and Western Palearctic (UCD Community, 2023), Middle East /Iran (Lotfalizadeh & Gharali, 2008; Shojaey *et al.*, 2021).

### Diagnostic similarities and differences of *S. cuscatae* and *S. nigricornis*

#### Similarities

Both species have a dark to metallic green body, large and hyaline wings, propodeum lacks median carina as a key generic feature, and in both species, males are smaller than females, coxae are concolorous with the thorax, male petiole is longer and slenderer than that of the female.



Fig. 4. *Sphegigaster cuscatae* Ferrière, 1959, Male: General habitus, lateral view

### Differences

Diagnostic differences between *S. cuscatae* and *S. nigricornis* were provided in Table 1. In addition, in *S. cuscata* mesonotum wider than long, thoracic sculpture coarser, notauli only indicated anteriorly, propodeum entirely reticulates, petiole widened anteriorly and narrowed posteriorly and about 1.5×longer than hind coxa but in *S. nigricornis*, thorax very finely reticulate and shiny, propodeal sculpture stronger than thorax, Petiole very slender extends far beyond the tips of the hind coxa.

### Hosts

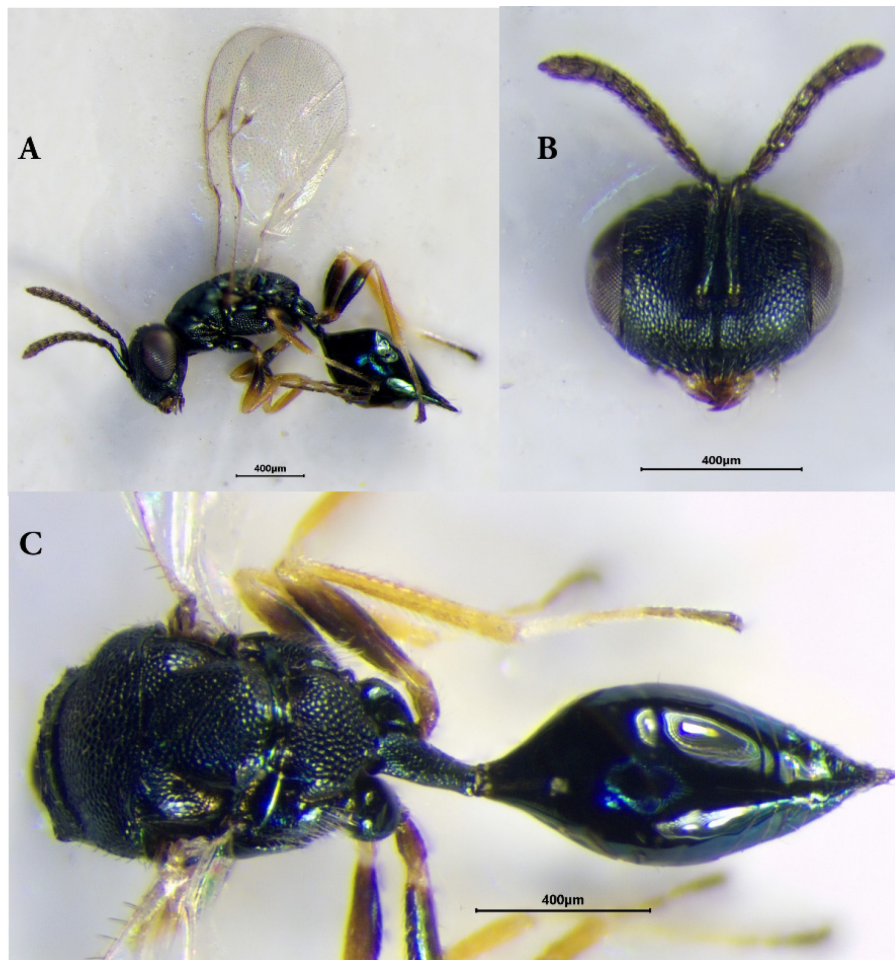
Some species of Agromyzidae (Diptera), especially in the genus *Melanagromyza* Hendel are the primary host of *S. nigricornis* (UCD Community, 2023).

### Discussion

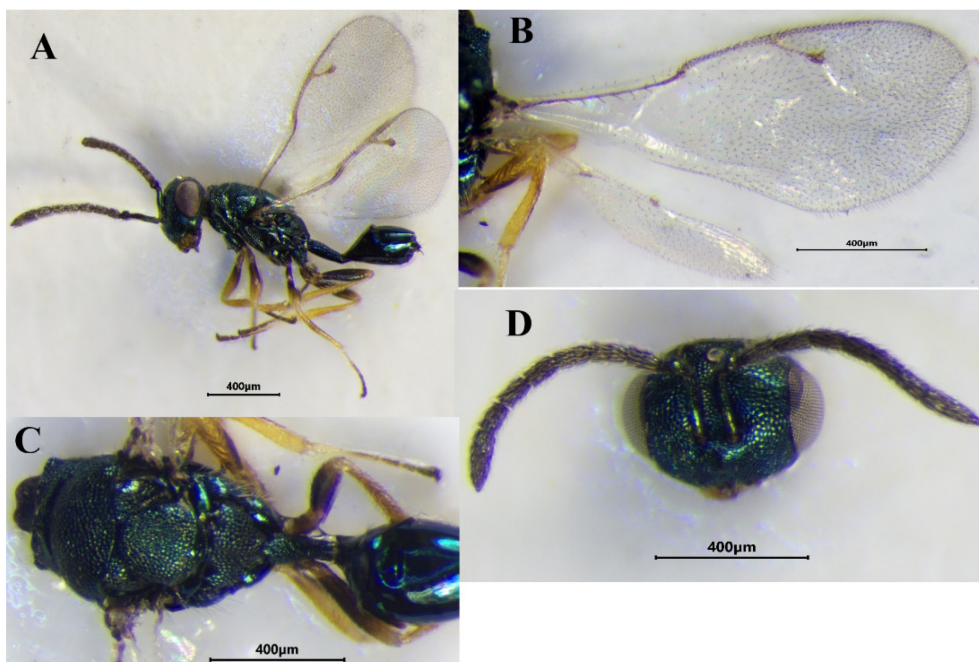
In the genus *Pachyneuron* Walker petiole longer than broad; gasteral tergite 1 enlarged; clypeal margin slightly produced; notauli shallow; antennae inserted at center of face; funiculars wider than long; postmarginal vein obviously longer than marginal and submarginal vein (Ko *et al.*, 2018). It is the cosmopolitan genus of ptromalid wasps which consists of 62 valid species (UCD Community, 2023). Among them, 21 species have been reported from the Middle East and 13 species from Iran (Rhamani *et al.*, 2022). Various species of the genus *Pachyneuron* are mostly the hyperparasitoids of the insects from the suborder Sternorrhyncha (aphids, coccids and psyllids).

Table 1: Diagnostic differences between *Sphegigaster cuscatae* and *S. nigricornis* in antennal structure and color

Character	<i>S. cuscata</i>	<i>S. nigricornis</i>
Scape color	Yellowish (female)	Metallic green
Pedicellus color	Fulvous	Metallic green
Antenna length	Relatively longer	Shorter
Scape reach	Not specified	Reaches middle of median ocellus
Male funiculars	3-4× longer than wide, densely setose	Funiculars subequal in length
Male clava	As long as preceding two funiculars combined	3× as long as broad



**Fig. 5.** *Sphegigaster nigricornis* (Nees, 1834), Female: **A.** General habitus, lateral view; **B.** head and antennae, frontal view; **C.** thorax, petiole and abdomen, dorsal view



**Fig. 6.** *Sphegigaster nigriornis* (Nees, 1834), Male: **A.** General habitus, lateral view; **B.** head and antennae, frontal view; **C.** thorax, petiole and abdomen, dorsal view

However, some species are also primary or secondary parasitoids of Diptera including Chamaemyiidae, Agromyzidae, Chloropidae, Cecidomyiidae, Coleoptera (Coccinellidae), Neuroptera (Chrysopidae) and eggs of Lepidoptera (Gibson, 2001; Dzhanokmen, 2009; Xiao *et al.*, 2009). The hosts of this species in Iraq and Iran (Shojaey *et al.*, 2021) as a neighbouring country are unknown. To date, three species of *Pachyneuron* including *Pachyneuron crassiculme* Waterston, 1922 (Waterston, 1922), *P. aphidis* (Bouché, 1834) (Bandyani *et al.*, 2021) and *P. muscarum* (Linnaeus, 1758) have been reported from Iraq. With the collection and identification of *P. gibbiscuta* from the Basrah region, the number of known *Pachyneuron* species in Iraq increases to four species.

The genus *Sphpegigaster* is defined by the following combination of characters: head transvers, vertex broad, pronotum short and margined, anterior margin of pronotum often with five small teeth especially in males, parapsidal grooves on mesonotum short and incomplete, marginal vein narrow in fore wing, abdomen with large second and third segments. They are small dipteran parasitoids and undoubtedly have a wide distribution and abundance in nature, however, they are less well known (Ferrière, 1959). Only one species of the genus *Sphpegigaster* namely *S. orobanchiae* Kurdjumov, 1912 was previously recorded from the Iraq (Mekhlif & Abdul-Rassoul, 2002). In this study, two species of genus *Sphpegigaster* namely, *S. cuscatae* and *S. nigricornis* are recorded from Iraq for the first time. With the addition of these two species the species number of genus *Sphpegigaster* in Iraq increases to three species. The species of the family Pteromalidae reported from Iraq are presented in Table 2.

**Table 2** - List of reported Pteromalidae species in Iraq

Species	References	Note	Host(s) in Iraq
<i>Scutellista caerulea</i> (Fonscolombe, 1832) as <i>S. syanae</i>	Alrubeai, 2017		<i>Ceroplastes rusci</i> (L.) (Homo., Coccidae)
<i>Halticoptera circulus</i> (Walker, 1833)	Mekhlif & Abdul-Rassoul, 2002; Abdul-Rassoul & Al-Saffar, 2014	Mosul	<i>Liriomyza</i> spp. (Dip., Agromyzidae)
<i>Thinodytes cyzicus</i> (Walker, 1839)	Al Azawi, 1971		Agromyzidae (Diptera) leaf miners
<i>Anisopteromalus calandrae</i> (Howard, 1881)	Abdul-Rassoul, 1990; Al-Obaidy et al., 2019	Baghdad	<i>Lasioderma serricorne</i> (F) (Col., Anobiidae)
<i>Dibrachys microgastri</i> (Bouché, 1834) Syn.: <i>Dibrachys cavus</i> (Walker, 1835)	Alrubeai, 2017		<i>Cydia pomonella</i> (L.) (Lep., Tortricidae)
<i>Dinarmus acutus</i> (Thomson, 1878)	Abdul-Rassoul, 1990	Baghdad	Bruchid beetles (Col., Bruchidae)
<i>Muscidifurax raptor</i> Girault & Sanders, 1910	Abdul-Rassoul et al., 1999	Baghdad	<i>Musca domestica</i> L. (Dip., Muscidae)
<i>Nasonia vitripennis</i> (Walker, 1836)	Abdul-Rassoul et al., 1999	Baghdad	<i>Musca domestica</i> L. (Dip., Muscidae)
<i>Pachyneuron aphidis</i> (Bouché, 1834)	OILB, 1971; Bandyani et al., 2021	Kurdistan	Hyperparasitoids on Aphidinae
<i>Pachyneuron crassiculme</i> Waterston, 1922	Waterston, 1922		unknown
<i>Pachyneuron muscarum</i> (Linnaeus, 1758)	Hassan, 2021	Kurdistan	<i>Aphidius transcaspicus</i> Telenga
<i>Pteromalus puparum</i> (Linnaeus, 1758)	Herting, 1976	----	unknown
<i>Pteromalus sequester</i> Walker, 1835/ as <i>Habrocytus sequester</i>	Abdul-Rassoul, 1990	Baghdad	Bruchid beetles (Col., Bruchidae)
<i>Sphpegigaster orobanchiae</i> Kurdjumov, 1912/ as <i>S. nr. orobanchiae</i>	Al Azawi, 1971; Mekhlif & Abdul-Rassoul, 2002	Mosul	pea leafminer <i>Phytomyza horticola</i> Goureau (Dip., Agromyzidae)
<i>Urolepis maritima</i> (Walker, 1834)	OILB, 1971		Unknown
<i>Spalangia cameroni</i> Perkins, 1910	Abdul-Rassoul et al., 1999	Baghdad	<i>Musca domestica</i> L. (Dip., Muscidae)
<i>Spalangia endius</i> Walker, 1839	Abdul-Rassoul et al., 1999	Baghdad	<i>Musca domestica</i> L. (Dip., Muscidae)
<i>Spalangia nigroaenea</i> Curtis, 1839	Abdul-Rassoul et al., 1999	Baghdad	<i>Musca domestica</i> L. (Dip., Muscidae)
<i>Catolaccus crassiceps</i> (Masi)	Alsendi et al., 2024	Karbala	----
<i>Goidanichium atrum</i> Bouček	Alsendi et al., 2024	Karbala	----
<i>Merisus splendidus</i> Walker	Alsendi et al., 2024	Karbala	----
<i>Notanisus vanharteni</i> Gibson	Alsendi et al., 2024	Karbala	----
<i>N. versicolor</i> Walker	Alsendi et al., 2024	Karbala	----
<i>Systasis encyrtoides</i> Walker	Alsendi et al., 2024	Karbala	----
<i>Pachyneuron gibbiscuta</i> Thomson	Current study	Basrah	----
<i>Sphpegigaster cuscatae</i> Ferrière	Current study	Basrah	----
<i>Sphpegigaster nigricornis</i> Nees	Current study	Basrah	----

In the neighbouring countries of Iraq, four species of of them namely *Sphpegigaster brevicornis* (Walker, 1833), *Sphpegigaster pallicornis* (Spinola, 1808), *Sphpegigaster pedunculiventris* (Spinola, 1808) (Doğanlar, 1985) and *Sphpegigaster orobanchiae* Kurdjumov, 1912 (Çikman & Doğanlar, 2006) were reported from Türkiye and nine species of this genus including *Sphpegigaster cuscatae* Ferrière, 1959 (Hasani *et al.*, 2011), *Sphpegigaster ineus* Mitroiu, 2008 (Lotfalizadeh *et al.*, 2015; Shojaey *et al.*, 2021), *Sphpegigaster mutica* Thomson, 1878 (Dehdar & Madjdzadeh, 2016), *Sphpegigaster*



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**Citation:** Alag, F., Karimpour, Y. & Shaaban, A. D. (2026) Three new records of Pteromalidae (Hymenoptera: Chalcidoidea) for insects' fauna of Iraq. *J. Entomol. Soc. Iran* 46 (2), 193-203.

DOI : <https://doi.org/10.22034/jesi.46.2.5>

URL: [https://jesi.areco.ac.ir/article\\_135387.html](https://jesi.areco.ac.ir/article_135387.html)



## گزارش جدید سه گونه از زنبورهای خانواده Pteromalidae (Hym., Chalcidoidea) برای فون مشترات عراق

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**چکیده:** سه گونه از زنبورهای خانواده Pteromalidae Dalman, 1820 (Hymenoptera: Chalcidoidea) به نام‌های *Pachyneuron gibbiscuta* و *S. nigricornis* Nees, 1834، *Sphelligaster cascutae* Ferriere, 1959 Thomson, 1878 با استفاده از تور حشره‌گیری از مزارع بامیه اطراف بصره جمع‌آوری و برای اولین بار در عراق شناسایی شدند. با کشف و شناسایی دو گونه از جنس *Sphelligaster* و یک گونه از جنس *Pachyneuron*، تعداد گونه‌های شناخته شده‌ی این جنسها در عراق به ترتیب به سه و دو گونه افزایش می‌یابد. برخی نکات زیستی و ویژگیهای ریخت‌شناسی این زنبورها به همراه تصاویری از آنها ارائه شده است.

### اطلاعات مقاله

دریافت: ۱۴۰۴/۰۹/۱۰

پذیرش: ۱۴۰۵/۰۱/۰۷

انتشار: ۱۴۰۵/۰۲/۱۰

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DOI: <https://doi.org/10.22034/jesi.46.2.5>

**کلمات کلیدی:** *Pachyneuron*، *Sphelligaster*، انتشار، بصره