

# Contribution to the knowledge of Chalcidoidea (Hymenoptera) of Biskra, Algeria

K. Djouama, F. Marniche, B. Doumandji–Mitiche, S. E. Doumandji

Djouama, K., Marniche, F., Doumandji–Mitiche, B., Doumandji, S. E., 2018. Contribution to the knowledge of Chalcidoidea (Hymenoptera) of Biskra, Algeria. *Arxius de Miscel·lània Zoològica*, 16: 221–242, <https://doi.org/10.32800/amz.2018.16.0221>.

## Abstract

*Contribution to the knowledge of Chalcidoidea (Hymenoptera) of Biskra, Algeria.* We provide here a list of Chalcidoid wasps collected from the region of Biskra in the south east of Algeria in 2017. The list is comprised of 35 individuals classified into 17 species belonging Walker, 1839 (Chalcidoidea, Aphelinidae) and *Pachyneuron groenlandicum* Holmgren, 1872 (Chalcidoidea, Pteromalidae) are new records from Algeria. Biological data and geographical distributions of each species are mentioned.

Data published in GBIF ([Doi: 10.15470/jx3ahv](https://doi.org/10.15470/jx3ahv))

Key words: Checklist, Chalcidoidea, Distribution, Biskra, Algeria

## Resumen

*Contribución al conocimiento de los Chalcidoidea (Hymenoptera) de Biskra, Argelia.* Este trabajo aporta una lista de avispas Chalcidoideas recolectadas en la región de Biskra, en el suroeste de Argelia, en 2017. Consta de un total de 35 individuos clasificados en 17 especies de Chalcidoideos pertenecientes a ocho familias e incluye cinco géneros registrados por primera vez en Argelia. *Aphelinus asychis* Walker, 1839 (Chalcidoidea, Aphelinidae) y *Pachyneuron groenlandicum* Holmgren, 1872 (Chalcidoidea, Pteromalidae) son asimismo nuevos registros en Argelia. Se consignan brevemente los datos biológicos y la distribución geográfica de cada especie.

Datos publicados en GBIF ([Doi: 10.15470/jx3ahv](https://doi.org/10.15470/jx3ahv))

Palabras clave: Lista de comprobación, Chalcidoidea, Distribución, Biskra, Argelia

## Resum

*Contribució al coneixement dels Chalcidoidea (Hymenoptera) de Biskra, Algèria.* Aquest treball aporta una llista de vespes Chalcidoidees recol·lectades a la regió de Biskra, al sud-oest d'Algèria, el 2017. Consta d'un total de 35 individus classificats en 17 espècies de Chalcidoideos pertanyents a vuit famílies i inclou cinc gèneres registrats per primera vegada a Algèria. *Aphelinus asychis* Walker, 1839 (Chalcidoidea, Aphelinidae) i *Pachyneuron groenlandicum* Holmgren, 1872 (Chalcidoidea, Pteromalidae) també són nous registres a Algèria. Es consignen breument les dades biològiques i la distribució geogràfica de cada espècie.

Dades publicades a GBIF ([Doi: 10.15470/jx3ahv](https://doi.org/10.15470/jx3ahv))

Paraules clau: Llista de comprovació, Chalcidoidea, Distribució, Biskra, Algèria

*Received: 22/06/2018; Conditional acceptance: 09/10/2018; Final acceptance: 06/11/2018*

*Khalida Djouama, Bahia Doumandji–Mitiche, Salah Eddine Doumandji, Zoology Department, National Superior School of Agronomy, El Harrach, Algiers, Algeria. Faiza Marniche, Zoology Laboratory, Superior National Veterinary School, Algiers, Algeria.*

\*Corresponding author: Khalida Djouama. E–mail: [khalida2.djouama@gmail.com](mailto:khalida2.djouama@gmail.com)

Research Gate profile: [https://www.researchgate.net/profile/Khalida\\_Djouama](https://www.researchgate.net/profile/Khalida_Djouama)

Linkedin: <https://www.linkedin.com/in/kalida-djouama-a171b1176/>

---

## Introduction

Chalcidoidea is one of the largest and most diverse Hymenoptera superfamilies, morphologically and biologically. Currently it is known to contain 22 families, and more than 22,000 described species worldwide (Dale–Skey et al., 2016). Most species of this superfamily are parasitoids and are considered as the most important group in biological control. Several species have been associated with biocontrol programmes in Algeria (Doumandji–Mitiche, 1983; Doumandji–Mitiche and Idder, 1984; Doumandji–Mitiche and Doumandji, 1993; Tsankov et al., 1995; Idder et al., 2009; Rahim et al., 2016; Zamoum et al., 2017).

The Chalcidoidea fauna of Algeria have been little studied, with only a few species of this superfamily mentioned in some fragmentary studies (Bouček, 1956; Hedovist, 1967; Grahm, 1969; Baquero and Jordana, 2002; Zhu and Huang, 2002; Japoshvili and Noyes, 2006; Stojanova and Ghahari, 2009; Caleca, 2010; Peters and Baur, 2011; Talebi et al., 2011; Evans and Abd–Rabouand, 2013; Madl and Schwarz, 2014., Chehema and Laamari, 2014; Samin, 2015; Laamari and Chaouche, 2016; Lopes et al., 2016; Noyes, 2018).

Biskra is considered the vegetable garden and the main supplier of agricultural produce in Algeria and despite the area's wide diversity of natural habitats, data concerning this chalcidoid are lacking. The present study provides a list of the species recorded to date with the valid nomenclature, new distribution and host records based on bibliography.

---

## Material and methods

### Study area

The study area is located in the Saharan bioclimatic zone, where the winter is temperate and summers are hot and dry (fig. 1). The climatic conditions of the region favour a diversified agricultural practice. Samples were collected from various locations and habitats: Ain Naga (fields producing aromatic and medicinal plants), Ain Naga (Horaya) (vegetable cultivation), El Outaya (olive groves) and Tolga (palm groves).

### Sampling method

This faunistic study was based on samples of Chalcidoids collected between December 2016 and August 2017. Sampling was performed by the main author using yellow pan traps and Malaise traps. The samples were preserved in 70% ethanol until their transfer to the

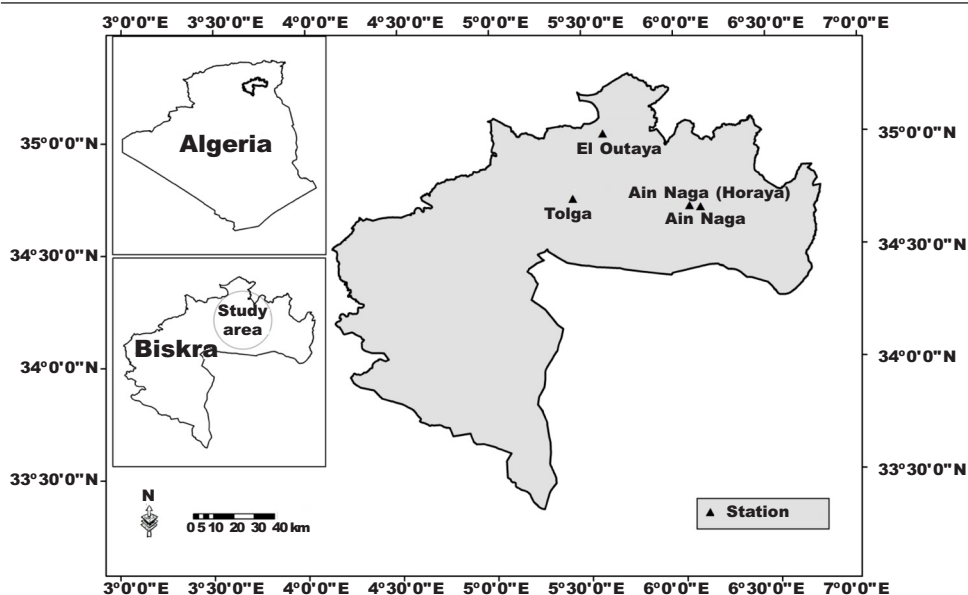


Fig. 1. Location of the study area: Ain Naga, Ain Naga (Horaya), El Outaya and Tolga in Biskra, Algeria.

*Fig. 1. Localización del área de estudio: Ain Naga, Ain Naga (Horaya), El Outaya y Tolga en Biskra, Argelia.*

laboratory. They were identified using available keys and the original descriptions (Graham, 1969; Gibson, 1986; Noyes and Valentine, 1989; Dawah and Rothfritz, 1996; Baquero and Jordana, 1999; Doğanlar and Mendel, 2007; Guerrieri and Viggiani, 2005; Yefremova et al., 2007; Dzhankmen, 2009; Gómez et al., 2013; Bayegan et al., 2014; Shirley et al., 2017). The specimens are housed at the collection of the insectarium at the Ecole Nationale Supérieure Agronomique, El Harrach, Alger (hereafter ENSA coll.). Nomenclature is taken from Burks (1979), Ferrière and Delucchi (1957), Triapitsyn and Berezovskiy (2001), Delvare (2005), Japoshvili and Noyes (2006), Zimmermann and Schöller (2008), Dzhankmen (2009), Dale–Skey et al. (2016), Ghahari and Doğanlar (2017), Shirley et al. (2017), Noyes (2018).

## Results

The sampling enabled us to obtain 35 records (dataset published in GBIF as a datapaper, [doi:10.15470/jx3ahv](https://doi.org/10.15470/jx3ahv)). The list of the recorded species is given below in alphabetic order according to family names (\* genus and species recorded for the first time for Algeria).



Fig. 2. *Aphelinus asychis*, male.  
Fig. 2. *Aphelinus asychis*, macho.

#### List of species

**Family Aphelinidae Thomson, 1876**  
**Subfamily Aphelininae Dalman, 1820**

**Genus *Aphelinus* Dalman, 1820**

\* *Aphelinus asychis* Walker, 1839 (fig. 2)  
*A. affinis* (Föster, 1841)

#### General distribution

Afro–Tropical: South Africa. Nearctic: Canada, USA. Neotropical: Brazil, Chile. Oriental: Nepal, Pakistan. Palaeartic: Egypt, France, Germany, Italy, Japan, Morocco, Spain, Sweden, Turkey, United Kingdom (Shirley et al., 2017).

#### Distribution in Algeria

The species *Aphelinus asychis* is reported for the first time in Algeria.

#### Hosts

This species is reported by Shirley et al. (2017) to parasitise: *Acyrtosiphon kondoi* Shinji, 1938; *A. Pisum* Harris, 1776; *Aphis gossypii* Glover, 1877; *A. Umbrella* Börner, 1950; *Brevicoryne brassicae* Linnaeus, 1758; *Chaetosiphon fragaefolii* Cockerell, 1901; *Diuraphis noxia* Kurdjumov, 1913; *Hyperomyzus lactucae* Linnaeus, 1758; *Myzus persica* Sulzer, 1776; *Rhopalosiphum maidis* Fitch, 1856; *Schizaphis graminum* Rondani, 1852; *Therioaphis trifolii* Monell, 1882; and *Toxoptera* sp. There are no current host records from Algeria.

#### Material examined

1♂, Algeria, Biskra: Ain Naga, –2 m, 34° 41' 4.23" N, 6° 7' 27.28" E, Djouama, 28 II 2017, yellow pan trap, ENSA coll.



Fig. 3. *Prochiloneurus aegyptiacus*, female.

Fig. 3. *Prochiloneurus aegyptiacus*, hembra.

**Family Encyrtidae Walker, 1837**

**Subfamily Encyrtinae Walker, 1837**

**Genus *Prochiloneurus* Silvestri, 1915**

***Prochiloneurus aegyptiacus* (Mercet, 1929) (fig. 3)**

*Achrysocephalus aegyptiacus* Mercet, 1929

**General distribution**

Afrotropical: Democratic Republic of Congo, Eritrea, Ethiopia, Gabon, Ghana, Ivory Coast, Nigeria, South Africa, Tanzania, Togo. Oriental: India. Palaearctic: Afghanistan, Algeria, Egypt, Iran, Iraq, Israel, Italy, Turkmenistan, USSR (former), Yugoslavia (Evans and Abd-Rabou, 2013).

**Distribution in Algeria**

No available information on the distribution of this species in Algeria.

**Hosts**

Parasitoid of *Anagyrus* spp. (Hymenoptera: Encyrtidae) (Hesami and Fallahzadeh, 2004). Hyperparasitoid of *Maconellicoccus hirsutus* Green, 1980 (Hemiptera: Pseudococcidae) on *Morus alba* L. 1753 (Moraceae) (Fallahzadeh et al., 2007). This species is also reported as hyperparasitoids associated with Coleoptera (Coccinellidae): *Chilocorus bipustulatus* L., 1758; *Exochomus flavipes* Thunberg, 1781; *Hyperaspis aestimabilis* Mader, 1955; (Hemiptera, Coccidae): *Coccus hesperidum* L., 1758, *Saissetia coffeae* Walker, 1852; Pseudococcidae: *Ferrisia virgata* Cockerell, 1893; *Formicococcus njalensis* Laing, 1929; *Maconellicoccus hirsutus* Green, 1908; *Nipaecoccus viridis* Newstead, 1894; *Octococcus africanus* Brain, 1915; *Pedrococcus* sp., *Phenacoccus manihoti* Matile-Ferrero, 1977; *Phenacoccus* sp., *Planococcus citri* Risso, 1813; *P. ficus* Signoret, 1875, *P. kenyae* Le Pelley, 1935, *Pseudococcus cryptus* Hempel, 1918; Hymenoptera (Encyrtidae): *Anagyrus kivuensis* Compere, 1939; *A. pseudococci* Girault, 1915; *Clausenia purpurea* Ishii, 1923; *Epidinocarsis lopezi* De Santis, 1964; *Gyranusoidea tebygi*, Noyes, 1988; *Homalotylus flaminus* Dalman, 1820; *H. quaylei* Timberlake, 1919; *Leptomastix bifasciata* Mercet, 1927; Pteromalidae: *Metastenus* sp. (Evans and Abd-Rabou, 2013).



Fig. 4. *Syrophophagus aphidivorus*, female.

Fig. 4. *Syrophophagus aphidivorus*, hembra.

**Materiel examined**

1♀ Algeria, Biskra: Ain Naga, 1 m, 34° 41' 15,526" N, 6° 6' 3,238" E, Djouama, 26 III 2017, yellow pan trap, ENSA coll.

**Genus *Syrphophagus* Ashmead, 1900**

***Syrphophagus aphidivorus*** (Mayr, 1876) (fig. 4)

*Encyrtus aphidivorus* Mayr, 1876

**General distribution**

Nearctic: Mexico, USA. Neotropical: Argentina, Brazil, Chile, Mangolia, Puerto Rico, Peru. Oriental: India, Hawaii. Palaearctic: Algeria, Armenia, Austria, Azerbaijan, Bulgaria, Czech Republic, Egypt, France, Greece, Germany, Georgia, Holland, Hungary, Iraq, Italy, Jordan, Moldova, Russia, Slovakia, Spain, Turkey, Turkmenistan, United Kingdom, Ukraine, Yugoslavia (Noyes, 2018).

**Distribution in Algeria**

Region of Biskra (Hemidi et al., 2013).

**Hosts**

Agromyzidae (Diptera), *Leucopis obscura* Haliday, 1833 (Diptera, Chamaemyiidae), *Trialeurodes vaporariorum* (Homoptera, Aleyrodidae) and species of Homoptera (Aphididae) (Noyes, 2018). In Algeria this species was recorded as a secondary parasitoid of aphids (*Aphis gossypii*) (Hemidi et al., 2013).

**Materiel examined**

1♀, 1♂, Algeria, Biskra: Ain Naga (Horaya), 2 m, 34° 41' 31,734" N, 6° 6' 52.269" E, Djouama, 18 II 2017, yellow pan trap, ENSA coll.



Fig. 5. *Closterocerus* sp. indet., female.

Fig. 5. *Closterocerus* sp. indet., hembra.

**Family Eulophidae Westwood, 1829**  
**Subfamily Entedoninae Förster, 1856**

**\* Genus *Ceranisus* Walker, 1842**

***Ceranisus* sp. indet. (fig. 5)**

**General distribution**

Afrotropical: Tanzania. Nearctic: Canada, USA. Neotropical: Mexico, Panama, Venezuela, Trinidad, Tobago. Oriental: India, Nepal, Taiwan, Thailand. Palaeartic: Czechoslovakia, Japan, Spain (Canary Islands), Switzerland, Peoples' Republic of China (Beijing) (Noyes, 2018).

**Distribution in Algeria**

Recorded for the first time

**Host**

Primary hosts: Lepidoptera: Nepticulidae (*Stigmella juglandifoliella* Clemens, 1861). There are no current host records in Algeria.

**Material examined**

2♀♀ Algeria, Biskra: Ain Naga (Horaya), 2 m, 34° 41' 30,646" N, 6° 6' 52,708" E, Djouama, 25 V 2017, yellow pan trap, ENSA coll. 1♀ Algeria, Biskra: Ain Naga (Horaya), 2 m, 34° 41' 30.352" N, 6° 3' 54.007" E, Djouama, 10 IV 2017, yellow pan trap, ENSA coll.





Fig. 6. *Ceranisus* sp. indet., female.  
Fig. 6. *Ceranisus* sp. indet., hembra.

\* Genus *Cheiloneurus* Westwood, 1833

*Cheiloneurus* sp. indet. (fig. 6)

General Distribution

Cosmopolitan species (Noyes, 2018)

Distribution in Algeria

Recorded for the first time

Hosts

Parasitoid of Coleoptera (Chrysomelidae, Coccinelidae); Hemiptera (Aphididae, Asterolecaniidae, Coccidae, Delphacidae, Diaspididae, Eriococcidae, Kermesidae, Psyllidae); Neuroptera (Chrysopidae) (Noyes, 2018). No current host record in Algeria.

Materiel examined

1♀ Algeria, Biskra: Ain Naga, –2 m, 34° 41' 4.23" N, 6° 7' 27.28" E, Djouama, 26 V 2017, yellow pan trap, ENSA coll. 2♀♀ Algeria, Biskra: Ain Naga, 2 m, 34° 41' 4.23" N, 6° 7' 27.28" E, Djouama, 10 IV 2017, yellow pan trap, ENSA coll.

Subfamily Eulophinae

Genus *Pnigalio* Schrank, 1802

*Pnigalio mediterraneus* Ferrière and Delucchi, 1957 (fig. 7)

*Pnigalio agraulis* Walker, 1839

General distribution

Palaeartic: Algeria, Austria, Croatia, Greece, Crete, France, Israel, Italy, Libya, Moldova, Portugal, Russia, Spain, Tunisia, Turkey, Yugoslavia (Noyes, 2018).





Fig. 7. *Pnigalio mediterraneus*, female.

Fig. 7. *Pnigalio mediterraneus*, hembra.

#### Distribution in Algeria

Region of Rouiba, Algiers (Doumandji–Mitiche et al., 1999).

#### Hosts

*Pnigalio mediterraneus* seems to have a broader host–range (Gebiola et al., 2014). In Noyes (2018), this species is reported to parasitise Coleoptera (Coccinellidae, Curculionidae), Lepidoptera (Gracillariidae, Lyonetiidae, Tischeriidae, Yponomeutidae). The species could be a secondary parasite of Hymenoptera (Braconidae, Eulophidae and Euplemidae). In Algeria *P. mediterraneus* is reported as a local parasitoid of *Phyllocnistis citrella* Stainton, 1856 on lemon and orange trees (Doumandji–Mitiche et al., 1999).

#### Material examined

2♀♀ Algeria, Biskra: El Outaya, 248 m, 35° 1' 12,124" N, 5° 36' 25.654" E, Djouama, 01 II 2017, Malaise trap, ENSA coll.

#### Subfamily Opheliminae Ashmead, 1904

#### Genus *Ophelimus* Haliday, 1844

*Ophelimus maskelli* Ashmead, 1900

*Pteroptrix maskelli* Ashmead, 1900

#### General distribution

Palaeartic: Algeria (Caleca, 2010), France (EPPO, 2006), Israel (Mendel et al., 2005), (Kavallieratos et al., 2006), Portugal (Branco et al., 2009), Tunisia (Dhahri et al., 2010), Turkey (Doganlar and Mendel, 2007).

#### Distribution in Algeria

Béjaïa, Algeria (Caleca, 2010).

#### Hosts

Plants: *Eucalyptus globulus*, Labill, 1800 and *E. gunnii*, Hook (Caleca, 2010).



Fig. 8. *Tetramesa* sp. indet., male.

Fig. 8. *Tetramesa* sp. indet., macho.

**Material examined**

2♀♀ Algeria, Biskra: El Outaya, 248 m, 35° 1' 13.358" N, 5° 36' 23.981" E, Djouama, 23 VI 2017, Djouama, Malaise trap, ENSA coll. 2♀♀ Algeria, Biskra: Tolga (Lichana), 152 m, 34° 43' 58.738" N, 5° 26' 11.823" E, Djouama, 25 VI 2017, yellow pan trap, ENSA coll.

**Family Eurytomidae Walker, 1832**

**Subfamily Eurytominae Walker, 1832**

**\* Genus *Tetramesa* Walker, 1848**

***Tetramesa* sp. indet. (fig. 8)**

**General distribution**

Oriental: India (Odisha). Nearctic: New Mexico, USA (Idaho, Oregon). Palaearctic: Bulgaria, Germany, Japan, Spain (Canary Islands), France, Moldova (Noyes, 2018).

**Distribution in Algeria**

Recorded for the first time

**Hosts**

Primary hosts: Diptera: Cecidomyiidae (*Orseolia* sp.).

**Material examined**

1♂ Algeria, Biskra: Ain Naga (Horaya), 25 m, 34° 41' 31.774" N, 6° 3' 53.751" E, Djouama, 28 XII 2016, yellow pan trap, ENSA coll.

**Genus *Eurytoma* Illiger, 1807**

**\* *Eurytoma rosae* Nees, 1834 (fig. 9)**

*Eurytoma pubicornis* Boheman, 1836

**General distribution**

Neotropical: Argentina. Oriental: Malaysia. Palaearctic: Andorra, Armenia, Austria, Belgium, Bulgaria, Czech Republic, Finland, France, Germany, Greece, Hungary, Iran, Italy,



Fig. 9. *Eurytoma rosae*, male.  
Fig. 9. *Eurytoma rosae*, macho.

Kazakhstan, Netherlands, Peoples' Republic of China, Poland, Romania, Serbia, Slovakia, Spain, Sweden, Switzerland, Turkey, United Kingdom, Yugoslavia (former) (Stojanova and Ghahari, 2009).

Distribution in Algeria

Recorded for the first time.

Hosts

This species was reported in Central and south Europe as parasitoid of Cynipidae forming galls in *Rosa*, *Quercus* and *Acer*, also it was reported as parasite of *Dacus* (Diptera). In Algeria there is no host information.

Material examined

1♂ Algeria, Biskra: Tolga (Lichana), 152 m, 34° 43' 58.706" N, 5° 26' 9.022" E, Djouama, 15 VII 2017, yellow pan trap PT, ENSA coll.

### **Genus *Sycophila* Walker, 1871**

***Sycophila* sp. indet.**

General distribution

Afrotropical: Benin, Gabon, Ivory Coast. Nearctic: USA. Neotropical: Brazil. Oriental: Hawaii, India (Noyes, 2018). Palaeartic: Algeria (Benia and Bounechada, 2013), Bulgaria, France, Japan, Peoples' Republic of China, Spain, Turkey (Noyes, 2018).

Distribution in Algeria

*Sycophila binotata* is the only recorded species of the *Sycophila* genus from Algeria. It was reported from Tafat national forest situated in Djebel Tafat in the department of Bougaa, North West of the of Setif city (Benia and Bounechada, 2011).



Fig. 10. *Anagrus* sp. indet., male.  
Fig. 10. *Anagrus* sp. indet., macho.

#### Hosts

*Sycophila* species is as koinobiont endoparasitoids of cynipid gall communities (Claridge 1961 in Gómez et al., 2013). There is no current host information in Algeria.

#### Material examined

1♀ Algeria, Biskra: Ain Naga, –2 m, 34° 41' 4.23" N, 6° 7' 27.28" E, Djouama, 28 II 2017, yellow pan trap, ENSA coll.

#### Family Mymaridae Haliday, 1833

#### Subfamily Alaptinae Perkins, 1912

#### \* Genus *Anagrus* Haliday, 1833

*Anagrus* sp. indet. (fig. 10)

#### General distribution

Afrotropical: Cape Verde Islands, Yemen. Indo–Australasian: New Zealand. Nearctic: Canada, USA. Neotropical: Argentina, Chile. Oriental: Pakistan. Palaeartic: Austria, Belgium, Bulgaria, Croatia, Denmark, Egypt, Finland, France, Germany, Greece, Iran, Israel, Italy, Kyrgyzstan, Korea, Macedonia, Moldova, Peoples' Republic of China, Poland, Serbia, Spain, Sweden. Switzerland, Turkey, Turkmenistan, United Kingdom, Yugoslavia (Noyes, 2018). This species is nearly cosmopolitan (Hilburn et al., 1990).

#### Distribution in Algeria

Recorded for the first time. This species belongs to the *A. Atomus* species group, identification at species level of individuals belonging to this genus is often difficult due to the paucity of diagnostic characters and morphological variability within species (Triapitsyn et al., 2010).



Fig. 11. *Mymar taprobanicum*, female.  
Fig. 11. *Mymar taprobanicum*, hembra.

#### Hosts

Natural enemy of *Empoasca* leafhoppers (Letourneau, 1990). No current host in Algeria.

#### Material examined

1♂ Algeria, Biskra: Ain Naga (Horaya), 1 m, 34° 41' 28.056" N, 6° 3' 49.332" E, Djouama, 28 I 2017, yellow pan trap, ENSA coll. 1♂ Algeria, Biskra: Ain Naga, –2 m, 34° 41' 4.23" N, 6° 7' 27.28" E, Djouama, 15 II 2017, yellow pan trap, ENSA coll.

#### Subfamily Mymarinae Haliday, 1833

##### \* Genus *Mymar* Curtis, 1829

##### \* *Mymar taprobanicum* Ward, 1875 (fig. 11)

*Mymar tyndalli* Girault, 1912

#### General distribution

Afro tropical: Ivory Coast, Kenya, South Africa. Indo–Australian: Australia, New Zealand. Nearctic: USA. Oriental: India, Sri Lanka, Taiwan. Neotropical: Colombia, Puerto Rico. Palearctic: Spain, Egypt, France, Greece, Italy, Japan, Morocco, Romania, Russia, Spain, Madagascar (Noyes, 2018).

#### Distribution in Algeria

Recorded for the first time

#### Hosts

This species is reported by Triapitsyn and Berezovskiy (2001) as paratoids of *Laodelphax striatella* Fallén (Delphacidae) and *Nilaparvata lugens* (Stål) (Delphacidae) (Chandra, 1980). No current host in Algeria.



Fig. 12. *Pachyneuron groenlandicum*, female.

Fig. 12. *Pachyneuron groenlandicum*, hembra.

**Material examined**

1♀ Algeria, Biskra: Ain Naga (Horaya), 2 m, 34° 41' 27.957" N, 6° 3' 52.585" E, Djouama, 28.I.2017, yellow pan trap, ENSA coll. 1♀ Algeria, Biskra: Ain Naga, –2 m, 34° 41' 4.54" N, 6° 7' 27.825" E, Djouama, 02 II 2017, yellow pan trap, ENSA coll.

**Family Pteromalidae Dalman, 1820**

**Subfamily Pteromalinae Dalman, 1820**

**Genus *Pachyneuron* Walker, 1833**

**\* *Pachyneuron groenlandicum* (Holmgren, 1872) (fig. 12)**

*Pachyneuron umbratum* Delucchi, 1955

**General distribution**

Nearctic: Greenland. Oriental: India (Gupta and Poorani, 2008). Palaearctic: Belgium, Bulgarian Czech Republic, Czechoslovakia, France, Germany, Iran, Italy, Japan, Kazakhstan, Korea, Netherlands, South Moldovia, Peoples' Republic of China, Poland, Romania, Slovakia, Sweden, Switzerland, Turkey, United Kingdom, USSR, Siberia, Yemen (Noyes, 2018).

**Distribution in Algeria**

Recorded for the first time

**Hosts**

Known as a primary parasitoid of various insects belonging to families Chloropidae, Psilidae, Syrphidae, Aphididae, Coccidae and Noctuidae, and as hyperparasitoid of Braconidae (Noyes, 2018). Gupta and Poorani (2008) reported this species as parasitoid of the Hemerobiidae *Ischiodon* sp. on *Cassia* sp., and Syrphids associated with *Brachycaudus* sp. No current host record in Algeria.

**Material examined**

1♀ Algeria, Biskra: Ain Naga, –2 m, 34° 41' 4.23" N, 6° 7' 27.28" E, Djouama, 28 III 2017, Malaise trap, ENSA coll. 1♀ Algeria, Biskra: Ain Naga, –2 m, 34° 41' 4.262" N, 6° 7' 27.811" E, Djouama, 25 IV 2017, Malaise trap, ENSA coll.



Fig. 13. *Pachyneuron* sp. indet., female.

Fig. 13. *Pachyneuron* sp. indet., hembra.

***Pachyneuron* sp. indet.** (fig. 13)

Material examined

1♀ Algeria, Biskra: Tolga (Lichana), 152 m, 34° 43' 59.849" N, 5° 6' 10.263" E, Djouama, 16 VII 2017, yellow pan trap, ENSA coll.

**Genus *Sphegigaster* Spinola, 1811**

***Sphegigaster stepicola* Bouček, 1965** (fig. 14)

*Acroclisis melanogromyzae*, Mani, 1971

General distribution

Oriental: India. Palaeartctic: Algeria, Austria, Bulgaria, Croatia, Czechoslovakia, Czech Republic, Ethiopia, Hungary, Iran, Italy, Kazakhstan, Moldova, Morocco, Peoples' Republic of China, Romania, Slovakia, Thailand, Transcaucasus, Romania, Yugoslavia (Federal Republic) (Noyes, 2018).

Distribution in Algeria

This species was found especially in the steppe regions (Andriescu and Mitroiu, 2001).

Hosts

Parasitoids of Diptera Agromyzidae (Noyes, 2018). There are no host records from Algeria.

Material examined

2♀♀ Algeria, Biskra: Ain Naga, –2 m, 34° 41' 3.722" N, 6° 7' 27.342" E, Djouama, 28 IV 2017, yellow pan trap, ENSA coll.





Fig. 14. *Sphegigaster stepicola*, female.

Fig. 14. *Sphegigaster stepicola*, hembra.

**Family Torymidae Walker, 1833**

**Subfamily Toryminae Walker, 1833**

**Genus *Podagrion* Spinola, 1811**

***Podagrion pachymerum*** (Walker, 1833) (fig. 15)

*Cleptimorpha binotata* Walker, 1872

**General distribution**

Oriental: India. Palaearctic: Algeria, Austria, Bulgaria, Croatia, Czech Republic, France, Germany, Hungary, Iran, Italy, Madeira, Moldova, Poland, Romania, Slovakia, Spain, Syria, Ukraine (Lotfalizadeh and Gharali, 2005).

**Distribution in Algeria**

This species emerged from oothecae found in El Kantara (Biskra) and was common in small, dry watercourses (Oueds) (Williams, 1914).

**Hosts**

This species is known as a parasite of praying mantid egg cases (Leroy et al., 1936; Breland, 1941). In Algeria this species was reared from *Blepharopsis mendica* (Fabricius, 1775) (Leroy et al., 1936).

**Material examined**

4♀♀ Algeria, Biskra: Ain Naga (Horaya), 2 m, 34° 41' 28.116" N, 6° 3' 53.764" E, Djouama, 01 III 2017, Malaise trap. ENSA coll. 2♀♀ Algeria, Biskra: Ain Naga, -2 m, 34° 41' 4.02" N, 6° 7' 28.695" E, Djouama, 16 IV 2017, yellow pan trap, ENSA coll.



Fig. 15. *Podagrion pachymerum*, female.

Fig. 15. *Podagrion pachymerum*, hembra.

**Family Trichogrammatidae Haliday, 1851**  
**Subfamily Trichogrammatinae Haliday, 1851**

**Genus *Trichogramma* Westwood, 1833**

***Trichogramma embryophagum* Westwood, 1833 (fig. 16)**

**General distribution**

Nearctic: USA. Neotropical: Chile, Netherlands. Oriental: India (Jammu And Kashmir), Taiwan, Vietnam. Palaearctic: Albania, Algeria, Armenia, Austria, Belarus, Czech Republic, Czechoslovakia, France (Corsica), Georgia, Germany, Greece, Hungary, Iran, Israel, Italy, Kazakhstan (Tselinograd, Kirgizia), Latvia, Moldova, Norway, Peoples' Republic of China, Poland, Portugal, Romania, Russia, Slovakia, Spain, Ukraine, Yugoslavia (Noyes, 2018).

**Distribution in Algeria**

This species was introduced against *Ectomyelois ceratoniae* Zeller (Lepidoptera, Pyralidae) in a carob tree field (El Alia, Algeris) and in palm grove Ouargla (South Algerian) (Doumandji–Mitiche, 1983); Djurdjura Mountain (Tala–Guilef) (Rahim et al., 2016); Algerian cedar forests, Bordj Bounaama (Ouarsenis), National Tissemsilt, Blida, Tizi Ouzou, Djurdjura (Bouira), Col Telmet (Batna), Ras Keltoum (Khenchela) (Zamoum et al., 2017).



Fig. 16. *Trichogramma embryophagum*, female.

Fig. 16. *Trichogramma embryophagum*, hembra.

**Hosts**

Egg parasitoid of the grape berry moth in Iran (Lotfalizadeh et al., 2012). In Algeria this species was recorded as an egg parasitoid of *Ectomyelois ceratoniae* (Doumandji–Mitiche, 1983) and as an egg parasitoid of *Thaumetopoea bonjeani* Powell, 1922, and *T. pityocampa* (Denis and Schifferrmüller, 1775) by Rahim et al. (2016).

**Material examined**

1 ♀, Algeria, Biskra: Ain Naga, –2 m, 34° 41' 3.938" N, 6° 7' 28.415" E, Djouama, 28 I 2017, yellow pan trap, ENSA coll.

---

**Discussion**

This paper reports 17 Chalcidoidea species belonging to eight families collected from Biskra (Algeria). Situated in northwestern Africa on the Mediterranean Sea, Algeria has unique habitats for Chalcidoidea fauna. The species is poorly studied in Algeria, with very few papers dealing with Algerian Chalcidoidea published to date. Five species have been recorded by Hedovist (1967), three species were mentioned by Hemidi et al. (2013), five species belonging to the Leucospidae family were reported by Madl and Schwarz, 2014; one encyrtid and two pteromalids were reported in by Chehema and Laamari (2014), and four species by Laamari and Chaouche, 2016. In the most recent catalogues of the Chalcidoidea species listed for Algeria, compiled by Noyes (2018), only 214 species were mentioned, and some of the new species were not included therein (table 1). As most of these species are of economic relevance, more research on this group is required. We consider that this paper will draw attention to the richness of the diversity and the importance of this superfamily in Algeria, especially in Biskra, and will hopefully lead to the observation and identification of additional samples.

---

Table 1. List of the new records of Chalcidoid for the region of Biskra (Algeria).  
 Tabla 1. Lista de los nuevos registros de Chalcidoideos de la región de Biskra (Argelia).

| <b>Family</b> | <b>Species</b>                   |
|---------------|----------------------------------|
| Aphelinidae   | <i>Aphelinus asychis</i>         |
| Eulophidae    | <i>Ceraninus</i> sp.             |
|               | <i>Cheiloneurus</i> sp.          |
| Eurytomidae   | <i>Tetramesa</i> sp.             |
|               | <i>Eurytoma rosae</i>            |
| Mymaridae     | <i>Anagrus</i> sp.               |
|               | <i>Mymar aprobanicum</i>         |
| Pteromalidae  | <i>Pachyneuron groenlandicum</i> |

## Acknowledgements

We are very grateful to Dr. Santiago Bordera, Professor of the Department of Environmental Sciences and Natural Resources, University of Alicante (Spain) for helping to improve this manuscript, Dr. Hossein Lotfalizadeh, Associate Professor of Entomology, Department of Plant Protection East–Azarbaijan Reserch Center for Agriculture and Natural Resources (Iran), Dr. Serguei Triapitsyn, Principal Museum Scientist, Department of Entomology, University of California (USA), Dr. J. Poorani, *Indian Council of Agricultural Research*, India for help identifying material, and Mounira Benhamacha and the staff at the Zoology Laboratory of the Superior National Veterinary School (Algiers) for their support for this work.

## References

- Andriescu, I., Mitroiu, M. D., 2001. Contribution to the knowledge of the pteromalids (Hymenoptera, Chalcidoidea, Pteromalidae) from Davis's Valley hay fields natural reserve. *Lasi biologie animalia*, 47: 21–28.
- Baquero, E., Jordana, R., 1999. Species of *Anagrus* Haliday (1833) (Hymenoptera, Chalcidoidea, Mymaridae) in Navarra (Spain). *Arxiu de Miscel·lània Zoològica*, 22(2): 39–50.
- 2002. Contribution to the knowledge of the family Mymaridae Haliday (Hymenoptera: Chalcidoidea) in Navarra, North of Iberian peninsula. *Boletín de la Asociación Española de Entomología*, 26(3-4): 75–91.
- Bayegan, Z. A., Lotfalizadeh, H., Zargarán, M. R., Pooraiouby, R., 2014. New record of a genus and species of Mymaridae (Hymenoptera: Chalcidoidea) from Iran. *Turkish Journal of Zoology*, 38(5): 655–656.
- Benia, F., Bounechada, M., 2011. Data concerning the entomological fauna in Tafat National Forest (North–East of Algeria). *Bulletin UASVM Agriculture*, 68: 42–51.
- Bouček, Z., 1956. A contribution to the knowledge of the Chalcididae, Leucospididae and Eucharitidae (Hymenoptera: Chalcidoidea) of the Near East. *Bulletin of the Research Council of Israel B*, 5: 227–259.
- Branco, M., Boavida, C., Durand, N., Franco, J. C., Mendel, Z., 2009. Presence of the Eucalyptus all wasp *Ophelimus maskelli* and its parasitoid *Closterocerus chamaeleon* in Portugal: First record, geographic distribution and host preference. *Phytoparasitica*, 37: 51–54.
- Breland, O. P., 1941. Podagrion mantis Ashmead and other parasites of praying mantid egg cases (Hym.: Chalcidoidea; Dipt.: Chloropidae). *Annals of the Entomological Society of America*, 34(1): 99–113.
- Burks, B. D., 1979. Family Eulophidae. In: *Catalog of Hymenoptera in America North of Mexico, Vol. 1. Symphyta and Apocrita (Parasitica)*: 967–1022 (K. V. Krombein, P. D. Hurd, Jr., D. R. Smith, B. D. Burks, Eds.). Smithsonian Institution Press, Washington DC.
- Caleca, V., 2010. First record in Algeria of two eulophid wasps: *Closterocerus chamaeleon* (Girault) and its host, the eucalyptus gall wasp *Ophelimus maskelli* (Asmead) (Hymenoptera Eulophidae). *Naturalista siciliano, Series IV*, 34(1–2): 201–206.
- Chandra, G., 1980. Taxonomy and bionomics of the insect parasites of rice leafhoppers and planthoppers in the Philippines and their importance in natural biological control. *The Philippine Entomologist*, 4(3): 119–139.
- Chehma, S., Laamari, M., 2014. Etude Bioécologique des Hyménoptères Parasitoïdes des Pucerons Associés au Milieu Naturel et Cultive Dans la Région de Ghardaïa, Bio–Écology Study of Hymenoptera Parasitoids of Aphids Associated with Natural and Cultivated Area in the Region of Ghardaïa. *Revue des Bioressources*, 257(3242): 1–14.
- Claridge, M. F., 1961. An advance towards a natural classification of eurytomid genera (Hym., Chalcidoidea) with particular reference to British forms. *Transaction Society British Entomology*, 14: 167–185.

- Dale–Skey, N., Askew, R. R., Noyes, J. S., Livermore, L., Broad, G. R., 2016. Checklist of British and Irish Hymenoptera–Chalcidoidea and Mymarommatoidea. *Biodiversity Data Journal*, 4: e8013, doi: [10.3897/BDJ.4.e8013](https://doi.org/10.3897/BDJ.4.e8013)
- Dawah, H. A., Rothfritz, H., 1996. Generic–level identification of final instar larvae of Eurytomidae and their parasitoids associated with grasses (Poaceae) in NW Europe (Hymenoptera: Braconidae, Eulophidae, Eupelmidae, Eurytomidae, Ichneumonidae, Pteromalidae). *Journal of Natural History*, 30(10): 1517–1526.
- Delvare, G., 2005. A revision of the West–Palearctic *Podagrion* (Hymenoptera: Torymidae), with the description of *Podagrion bouceki* sp. nov. *Acta Societatis Zoologicae Bohemicae*, 69: 65–88.
- Dhahri, S., Ben Jamaa, M., Lo Verde, G., 2010. First record of *Leptocybe invasa* and *Ophelimus maskelli* eucalyptus gall wasps in Tunisia. *Tunisian Journal of Plant Protection*, 5(5(2)): 231–236.
- Doğanlar, M., Mendel, Z., 2007. First record of the eucalyptus gall wasp *Ophelimus maskelli* and its parasitoid, *Closterocerus chamaeleon*, in Turkey. *Phytoparasitica*, 35(4): 333–335.
- Doumandji–Mitiche, B., 1983. Contribution à l'étude bioécologique des parasites de la Pyrale des caroubes *Ectomyelois ceratoniae* Zeller (Lepidoptera, Pyralidae) en Algérie en vue d'une lutte biologique contre ce ravageur. PhD thesis, Univ. Pierre et Marie Curie, Paris.
- Doumandji–Mitiche, B., Chahbar, N., Sahraoui, L., 1999. Predators and parasitoids of the Citrus leaf miner *Phyllocnistis citrella* (Lepidoptera–Gracillariidae) in Algeria in view of their utilization in biological control. *International symposium on biological control of insect pests of agricultural crops*: 59–60. Arab and Near East Plant Protection Newsletter, Aleppo, Syria.
- Doumandji–Mitiche, B., Doumandji, S. E., 1993. *La lutte biologique contre les déprédateurs des cultures*. Ed. Office des Publications Universitaires, Alger.
- Doumandji–Mitiche, B., Idder, A., 1984. Essais de lâchers de *Trichogramma embryophagum* Hartig (Hymenoptera, Trichogrammatidae) contre la pyrale des dattes *Ectomyelois ceratoniae* Zeller (Lepidoptera, Pyralidae) dans la palmeraie de Ouargla. *Annales de l'INA*, 10(1): 167–180.
- Dzhanokmen, K. A., 2009. Review of Kazakhstan species of the genus *Pachyneuron* Walker, 1833 (Hymenoptera: Chalcidoidea: Pteromalidae). *Zoosystematica Rossica*, 18(1): 73–82.
- EPPO (European and Mediterranean Plant Protection Organization), 2006. First report of two new eucalyptus pests in the South of France: *Ophelimus maskelli* and *Leptocybe invasa*. *EPPO Reporting Service*, 189(9): 9.
- Evans, G., Abd–Rabou, S., 2013. An annotated list of the encyrtids of Egypt (Hymenoptera: Chalcidoidea: Encyrtidae). *Acta Phytopathologica Entomologica Hungarica*, 48(1): 107–128.
- Fallahzadeh, M., Shojaei, M., Ostovan, H., Kamali, K., 2007. Study of the parasitoids and hyperparasitoids of *Maconellicoccus hirsutus* (Hem. Pseudococcidae) in Fars province, *Journal of Agricultural Sciences, Islamic Azad University*, 13(3): 593–609.
- Ferrière, C., Delucchi, V., 1957. Les hyménoptères parasites de la mouche des olives I. Les chalcidiens de la région méditerranéenne. *Entomophaga*, 2(2): 119–124.
- Gebiola, M., Lopez–Vaamonde, C., Nappo, A. G., Bernardo, U., 2014. Did the parasitoid *Pnigalio mediterraneus* (Hymenoptera: Eulophidae) track the invasion of the horse chestnut leafminer? *Biological Invasions*, 16(4): 843–857.
- Ghahari, H., Doğanlar, M., 2017. An annotated catalog of the Iranian Torymidae (Hymenoptera: Chalcidoidea). *Transactions of the American Entomological Society*, 143(2): 453–472.
- Gibson, G. A., 1986. Evidence for monophyly and relationships of Chalcidoidea, Mymaridae, and Mymarommatoidea (Hymenoptera: Terebrantes). *The Canadian Entomologist*, 118(3): 205–240.
- Gómez, J. F., Nieves–Aldrey, J. L., Stone, G. N., 2013. On the morphology of the terminal–instar larvae of some European species of *Sycophila* (Hymenoptera: Eurytomidae)

- parasitoids of gall wasps (Hymenoptera: Cynipidae). *Journal of Natural History*, 47(47–48): 2937–2960.
- Graham, M. W. R. D. V., 1969. *The Pteromalidae of North–Western Europe (Hymenoptera–Chalcidoidea)*. British Museum of Natural History, London.
- Guerrieri, E., Viggiani, G., 2005. A review of the encyrtid (Hymenoptera: Chalcidoidea) parasitoids of Dryinidae (Hymenoptera: Chrysidoidea) with description of a new species of Cheiloneurus. *Systematics and Biodiversity*, 2(3): 305–317.
- Gupta, A., Poorani, J., 2008. New distribution and host records of Chalcidoidea (Insecta: Hymenoptera) from various parts of India. *Check List*, 4(4): 410–410.
- Hedovist, K. J., 1967. Notes on some chalcid flies reared from Buprestidae and Bostrychidae, injurious to *Acacia raddiana* Savi in Algeria (Sahara) and North Tchad (Hym. Chalcidoidea). *Eos: Revista Española de Entomología* (MNCN–CSIC), 43(1–2): 135–146.
- Hemidi, W., Laamari, M., Tahar Chaouche, S., 2013. Les hyménoptères parasitoïdes des pucerons associés aux plantes ornementales de la ville de Biskra. In: *Proceedings of the USTHB–FBS–4th International Congress of the Populations and Animal Communities "Dynamics and Biodiversity of the Terrestrial and Aquatic Ecosystems" "CIPCA" Taghit (Bechar), Algeria: 19–20*. Inter Islamic Science and Technology Network on Oceanography, Baku Bulvari no: 100, Inciralti Izmir, Turkey.
- Hesami, S., Fallahzadeh M., 2004. Study of the natural enemies of the citrus mealybug *Nipaecoccus viridis* (Homoptera: Pseudococcidae) in Jahrom region of Fars province. *Proceeding of the 16th Plant Protection Congress of Iran: 1–50*.
- Hilburn, D. J., Marsh, P. M., Schauff, M. E., 1990. Hymenoptera of Bermuda. *Florida Entomologist*: 161–176.
- Idder, M., Bolland, P., Pintureau, B., Mitiche, B. D., 2009. Efficacité de *Trichogramma cordubensis* Vargas & Cabello (Hymenoptera, Trichogrammatidae) pour lutter contre la pyrale des dattes *Ectomyelois ceratoniae* Zeller (Lepidoptera, Pyralidae) dans la palmeraie d'Ouargla, Algérie. *Recherche Agronomique*, 1(23): 58–64.
- Japoshvili, G. O., Noyes, J. S., 2006. New data on the European fauna of encyrtid wasps (Hymenoptera, Chalcidoidea, Encyrtidae). *Entomological Review*, 86(3): 298–304.
- Kavallieratos, N. G., Kontodimas, D. C., Anagnou–Veroniki, M., Emmanouel, N. G., 2006. First record of the gall inducing insect *Ophelimus eucalypti* (Gahan) (Hymenoptera: Chalcidoidea: Eulophidae) in Greece. *Annals Benaki phytopatological Institute*, 20: 125–128.
- Laamari, M., Chaouche, S. T., 2016. Associations tri–trophiques (parasitoïdes–pucerons–plantes) notées dans le milieu naturel de la région de khenchela (Est–Algérie). *Revue Nature et Technologie*, 8(2): 02–08.
- Leroy, P., Contaut, H., Tétry, A., Lienhart, R., Joly, H., 1936. *Bulletin mensuel de la Société des sciences de Nancy*, 1936, nouvelle série, n° 6.
- Letourneau, D. K., 1990. Abundance patterns of leafhopper enemies in pure and mixed stands. *Environmental Entomology*, 19(3): 505–509.
- Lopes, T., Libert, P. N., Starý, P., Japoshvili, G., Hatt, S., Francis, F., 2016. Checklist of Aphidiinae (Hymenoptera: Braconidae) and *Aphelinus* (Hymenoptera: Aphelinidae) species from Belgium with respectively four and three new records. *Zootaxa*, 4092(4): 548–560.
- Lotfalizadeh, H., Gharali, B., 2005. Introduction to the Torymidae fauna (Hymenoptera: Chalcidoidea) of Iran. *Zoology in the Middle East*, 36(1): 67–72.
- Lotfalizadeh, H., Masnadi–Yazdinejad, A., Saber, M., 2012. New records of the grape berry moth hymenopterous parasitoids in Iran. *Munis Entomology and Zoology*, 7(1): 284–291.
- Madl, M., Schwarz, M., 2014. Notes on Palaearctic species of the family Leucospidae (Hymenoptera, Chalcidoidea), with new records from North Africa and Middle East. *Linzer biologische Beiträge*, 46(2): 1569–1580.
- Mendel, Z., Protasov, A., Saphir, N., Brand, D., Assale, F., Blumberg, D., 2005. Insect plant interactions of two invasive *Eucalyptus* gall inducers, *Leptocybe invasa* Fisher & La Salle and *Ophelimus maskelli* (Ashmead) (Hymenoptera: Eulophidae), and management possibilities. In: *IV Congreso Nacional de Entomología Aplicada, Bragança (17–21 de*



- Outubro de 2005): 79 (A. Bento, M. J. Miranda–Arabolaza, J. A. Pereira, Eds.). Instituto Politécnico de Bragança, Escola Superior Agrária, Portugal.
- Noyes, J., 2018. *Universal Chalcidoidea Database*. Database accessible at: <http://www.nhm.ac.uk/entomology/chalcidoids/> [Accessed on 10 June 2018].
- Noyes, J. S., Valentine, E. W., 1989. Chalcidoidea (Insecta: Hymenoptera)—introduction, and review of genera in smaller families, *Fauna of New Zealand*, 18: 1–91.
- Peters, R. S., Baur, H., 2011. A revision of the *Dibrachys cavus* species complex (Hymenoptera: Chalcidoidea: Pteromalidae). *Zootaxa*, 2937(1): 1–30.
- Rahim, N., Chakali, G., Battisti, A., 2016. Egg mortality in the cedar processionary moth, *Thaumetopoea bonjeani* (Lepidoptera: Notodontidae), in an outbreak area of Algeria. *Bio-control Science And Technology*, 26(6): 849–860.
- Samin, N., 2015. A faunistic study on some families of Chalcidoidea (Hymenoptera) from Iran. *Arquivos Entomoloxicos*, 14: 119–124.
- Shirley, X. A., Woolley, J. B., Hopper, K. R., 2017. Revision of the *Asychis* species group of *Aphelinus* (Hymenoptera: Aphelinidae). *Journal of Hymenoptera Research*, 54: 1–32.
- Stojanova, A., Ghahari, H., 2009. Checklists of Iranian Eurytomidae and Torymidae (Hymenoptera, Chalcidoidea). *Linzer Biologische Beiträge*, 41(1): 845–862.
- Talebi, A., Khoramabadi, A. M., Rakhshani, E., 2011. Checklist of eulophid wasps (Insecta: Hymenoptera: Eulophidae) of Iran. *Check List*, 7(6): 708–719.
- Triapitsyn, S. V., Berezovskiy, V. V., 2001. Review of the Mymaridae (Hymenoptera, Chalcidoidea) of *Primorskii krai*: genus *Mymar* Curtis. *Far Eastern Entomologist*, 100: 1–20.
- Triapitsyn, S. V., Rugman–Jones, P. F., Jeong, G., Morse, J. G., Stouthamer, R., 2010. Morphological and molecular differentiation of the *Anagrus epos* species complex (Hymenoptera: Mymaridae), egg parasitoids of leafhoppers (Hemiptera: Cicadellidae) in North America. *Zootaxa*, 2428: 1–21.
- Tsankov, G., Schmidt, G. H., 1995. Impact of parasitoids in egg–batches of *Thaumetopoea pityocampa* (Den. & Schiff.) in Algeria. *Bollettino di Zoologia Agraria di Bachicoltura*, 27(1): 35–60.
- Williams, C. B., 1914. Notes on *Podagrion pachymerum*, a Chalcid Parasite of Mantis eggs. *Entomologist*, XLVII: 262–266.
- Yefremova, Z., Ebrahimi, E., Yegorenkova, E., 2007. The subfamilies Eulophinae, Entedoninae and Tetrastichinae in Iran, with description of new species (Hymenoptera: Eulophidae). *Entomofauna*, 28(30): 405–440.
- Zamoum, M., Bouragba–Brague, N., Nouredine, R., Khemici, M., Gachi, M., Battisti, A., Claude, J., 2017. Structure of the natural enemies' community composition to *Thaumetopoea pityocampa* and *Thaumetopoea bonjeani* (Lepidoptera Thaumetopoeidae) in the Algerian cedar forests. *Journal of Entomology and Zoology Studies*, 5(4): 1536–1542.
- Zhu, C. D., Huang, D. W., 2002. *Platyplectrus medius*, new species, and new records of *Euplectrus* from South Korea (Insecta: Hymenoptera: Eulophidae). *The Raffles Bulletin of Zoology*, 50(1): 129–136.
- Zimmermann, O., Schöller, M., 2008. Eiparasitoide der Gattung *Westwood* in Deutschland: Vergleich und Diskussion der vorliegenden Faunenlisten (Hymenoptera, Trichogrammatidae). *Mitteilungen der Deutschen Gesellschaft für Allgemeine und Angewandte Entomologie*, 16: 347–352.