

## PARASITIDS (HYMENOPTERA: CHALCIDOIDEA) OF THE SEED EATER WEEVIL, *OXYSTOMA OCHROPUS* (GERMAR) (COLEOPTERA: APIONIDAE) IN NORTHWESTERN IRAN

HOSSEIN LOTFALIZADEH<sup>1\*</sup> and SEYED-MEHDI HASHEMI<sup>2</sup>

<sup>1</sup> Department of Plant Protection, East-Azerbaijan Agricultural and Natural Resources Research Center,  
Agricultural Research, Education and Extension Organization (AREEO), Tabriz, Iran

\* E-mail: hlotfalizadeh@gmail.com

<sup>2</sup> Young Researchers Club, Islamic Azad University, Ardabil branch, Ardabil, Iran

### Abstract

To study *Oxystoma ochropus* (Germar, 1818) parasitoids on grass pea (*Lathyrus sativus*), weekly sampling was done in Namin, Ardabil Province, Iran, during 2011, and samples were transferred to laboratory conditions. In this study, four parasitic wasps of three chalcidoid families were determined. These parasitoids were *Eupelmus microzonus* Förster, 1860 (Eupelmidae), *Eurytoma laserpitii* Mayr, 1878 (Eurytomidae), *Pteromalus chlorospilus* (Walker, 1834) and *Pteromalus sequester* Walker, 1835 (Pteromalidae). The species *P. chlorospilus* is a new record for Iranian fauna. In addition, all established trophic associations of the analyzed parasitoids with *O. ochropus* as their host are new for the investigated territory.

KEY WORDS: parasitoid, Chalcidoidea, Apionidae, new record, trophic associations

### Introduction

*Oxystoma* species (Coleoptera: Apionidae) feed in the pods of legumes such as *Vicia* spp. and *Lathyrus* spp. The weevil, *Oxystoma ochropus* (Germar), is widely distributed in the eastern Palaearctic and the Near East (Dieckmann, 1977; Freude *et al.*, 1981; Alonso-Zarazaga, 2013). Weevils are one of the most important phytophagous insects attacked by different groups of natural enemies (Sturm *et al.*, 1990). More than 230 species of Chalcidoidea have been reported as parasitoids of species of the family Apionidae (Noyes, 2015), and hymenopteran parasitoids are one of the most important biocontrol agents of weevils. Within Chalcidoidea, the families Pteromalidae and Eulophidae appeared as the most abundant species. However, there are no reports on parasitoids associated with the genus *Oxystoma*. The aim of this study was to identify

potential biological control agents to use against *O. ochropus* in northwestern Iran. This is the first study of the parasitoids of *O. ochropus*.

## Materials and Methods

Sampling *Oxystoma ochropus* on *Lathyrus sativus* together with its parasitoids in Namin, Ardabil Province, was conducted weekly during 2012. The collection for this study was made by the second author (S. M. Hashemi). Collected samples were put in plastic containers and transferred to a growing laboratory. Newly hatched living parasitoid specimens were taken from the plastic containers by aspirator and conserved in 75% ethanol for further examination. External morphology was illustrated using an Olympus™ SZH, equipped with a Canon™ A720 digital camera. The specimens were identified according to reliable keys and descriptions (Graham, 1969; Dzhankmen, 1998, 2001; Zerova & Seryogina, 2006; Gibson, 2011; Al Khatib *et al.*, 2014).

The specimens were deposited in the insect collection of the Department of Plant Protection, East-Azerbaijan Research Center for Agriculture and Natural Resources, Tabriz, Iran.

## Results and Discussion

Four chalcidoid species reared on *O. ochropus* were identified, belonging to three families: Eupelmidae, Eurytomidae and Pteromalidae, and are listed alphabetically:

### 1. *Eupelmus microzonus* Förster, 1860 (Eupelmidae) (Figs 1A, B)

Material examined: Iran, Ardabil Province, Namin, Patakhor, 25.06.2012, leg. S. M. Hashemi, 4♀.

Morphological characters: Females femora are often extensively dark except the apical part; tibiae are light to dark brown at the proximal half (excluding knees); tegula often variably colored, extensively yellowish and partly dark; mesotibia apically is usually with a row of dark pegs contrasting distinctly with the tibia; mesotarsus ventrally with a few dark pegs arranged in an asymmetric pattern on basitarsus (at the most 8 pegs along the anterior margin and 4 pegs on the posterior margin) (this is a conspicuous characteristic of this species) (Fig. 1B); 1, rarely 2, pegs apically on either side of the second tarsomere, and subsequent tarsomeres without pegs; prepectus with setae, though sometimes few in number and obscure (Gibson, 2011).

Biology. This Palaearctic species has a wide host range and was reported on the apionid, *Catapion seniculus* (Kirby) (Noyes, 2015), but not on *Oxystoma ochropus*.

Noyes (2015) listed several host species in Coleoptera (Apionidae, Bruchidae and Curculionidae), Diptera (Cecidomyiidae, Chloropidae and Tephritidae), Hymenoptera (Cynipidae and Eurytomidae), Lepidoptera (Lasiocampidae, Psychidae and Pyralidae).

### 2. *Eurytoma laserpitii* Mayr, 1878 (Eurytomidae) (Figs 1C-E)

Material examined: Iran, Ardabil province, Namin, Patakhor, 25.06.2012, leg. S. M. Hashemi, 9♀ & 3♂.

Morphological characters: This species belongs to the *nodularis*-group of *Eurytoma* (Lotfalizadeh *et al.*, 2007) and can be separated from other species of the group by the following characters: F3 to F5 funicular segments of female distinctly wider than long (Fig. 1C); metasoma of female not shorter than mesosoma,

epicnemial carina in the form of low triangular prominence; metasomal petiole short (distinctly wider than long); fore coxae with prominence rounded at apex; marginal vein about as long as stigmal vein.

Biology: We reared this species for the first time on *O. ochropus* feeding on *Lathyrus sativus*, but it is distributed in Central and Eastern Europe and Transcaucasia as a parasitoid of gall midge (Diptera: Cecidomyiidae) larvae (Zerova & Seryogina, 2006).



Figure 1. *Eupelmus microzonus*: A – Female in lateral view, B – Midtarsus; *Eurytoma laserpitii*: C – Antenna of female, D – Female in lateral view, E – Male in lateral view.

### 3. *Pteromalus chlorospilus* (Walker, 1834) (Pteromalidae) (Figs 2 A, B)

Material examined: Iran, Ardabil province, Namin, Patakhor, 25.06.2012, leg. S. M. Hashemi, 2♀.

Morphological characters: Clypeus emarginated, malar space short, gena rounded, lower edge of antennal toruli not above the level of the ventral margin of the eyes, toruli nearer to the clypeus; funicular segments (Fig. 2B) longer than broad, clava shorter than 3 preceding funicular segments; post-marginal vein not shorter than marginal vein; propodeum at least 1/2 as long as the scutellum, without costula; propodeal nucha often large and reticulate; metasoma lanceolate, 2.3-2.5 times as long as broad and as long as head+mesosoma.

Biology: This is the first report of *P. chlorospilus* from Iran and its association with *O. ochropus* is new. This species is known from Germany, Ireland, Romania, Sweden and the UK as a parasitoid of Tephritidae (Diptera), Cynipidae (Hymenoptera) and Gelechiidae (Lepidoptera) (Noyes, 2015).

#### 4. *Pteromalus sequester* Walker, 1835 (Pteromalidae) (Figs 2C-F)

Material examined: IRAN, Ardabil province, Namin, Patakhor, 25.06.2012, leg. S. M. Hashemi, 14♀ & 1♂

Morphological characters: Body green, with metallic shine (Fig. 2C); antennal flagellum and pedicel fuscous, scape pale fuscous, femora fuscous with greenish metallic shine, tibiae and tarsi usually whitish; basal cell and basal vein glabrous, lower surface of costal cell with single interrupted row of setae; marginal vein slightly longer than post-marginal vein, 1.4 times as long as stigmal vein; right and left mandibles 4 and 3 dentate, respectively; clypeus deeply emarginated anteriorly (Fig. 2D); propodeum short (slightly longer than  $\frac{1}{3}$  of scutellum) and shining medially.

Biology: This cosmopolitan species was reared for the first time on *O. ochropus*, recently reported from Iran on *Hyphenidium oculatum* (Becker) (Dip.: Tephritidae) (Mohammadi-Khoramabadi *et al.*, 2014), and known as a parasitoid of Coleoptera (Apionidae, Bruchidae and Curculionidae), Diptera (Cecidomyiidae), Hymenoptera (Eurytomidae) and Lepidoptera (Pyrilidae) (Dzhanokmen, 2001; Noyes, 2015).

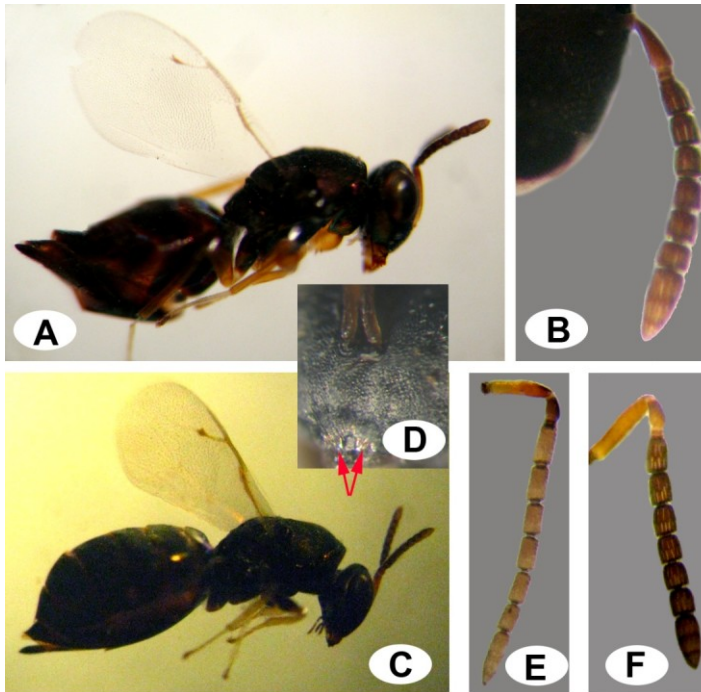


Figure 2. *Pteromalus chlorospilus*: A – Female in lateral view, B – Antenna of female; *Pteromalus sequester*: C – Female in lateral view, D – Clypeus, E – Antenna of male, F – Antenna of female.

#### Acknowledgments

We acknowledge anonymous referees for their valuable comments that improved the present article.

## References

- Al Khatib, F., Fusu, L., Cruaud, A., Gibson, G., Borowiec, N., Ris, N., Rasplus, J.-Y. & Delvarae, G. (2014). An integrative approach to species discrimination in the *Eupelmus urozonus* complex (Hymenoptera, Eupelmidae), with the description of 11 new species from the Western Palaearctic. *Systematic Entomology*, 39, 806–862. doi: 10.1111/syen.12089.
- Alonso-Zarazaga, M.A. (2013). Coleoptera. Fauna Europaea version 2.6.2, Retrieved from <http://www.faunaeur.org>.
- Dieckmann, L. (1977). Beiträge zur Insektenfauna der DDR: Coleoptera Curculionidae (Apioninae). *Beit Entomology*, 27, 7-143.
- Dzhanokmen, K.A. (1998). Review of pteromalids of the genus *Pteromalus* Swederus (Hymenoptera, Pteromalidae) from Kazakhstan: I. *Entomological Review*, 78(6), 706-717.
- Dzhanokmen, K.A. (2001). A review of pteromalids of the genus *Pteromalus* Swederus (Hymenoptera, Pteromalidae) of Kazakhstan. II. *Entomological Review*, 80(2), 472-496.
- Gibson, G.A.P. (2011). The species of *Eupelmus* (*Eupelmus*) Dalman and *Eupelmus* (*Episolidelia*) Girault (Hymenoptera: Eupelmidae) in North America north of Mexico. *Zootaxa*, 2951, 1–97.
- Graham, M.W.R. de V. (1969). The Pteromalidae of north-western Europe (Hymenoptera: Chalcidoidea). *Bulletin of British Museum (Natural History) (Entomology) Supplementary*, 16, 908pp.
- Lotfalizadeh, H., Delvare, G. & Rasplus, J.-Y. (2007). Phylogenetic analysis of Eurytominae based on morphological characters (Chalcidoidea: Eurytomidae). *Zoological Journal of Linnaean Society*, 151, 441-510.
- Lotfalizadeh, H. & Gharali, B. (2008). Pteromalidae (Hymenoptera: Chalcidoidea) of Iran: New records and a preliminary checklist. *Entomofauna*, 29(6), 93-120.
- Noyes, J.S. (2015). Universal Chalcidoid Database. The Natural History Museum. Retrieved from <http://www.nhm.ac.uk/entomology/chalcidoids>.
- Mohammadi-Khoramabadi, A., Lotfalizadeh, H., Gharali, B. & Moghadam, M. (2014). Two new records of Chalcidoidea (Hymenoptera) from Iran. *Journal of Entomological Society of Iran*, 34 (2), 1-2. [in Persian, with English abst.].
- Sturm, M.M., Sterling, W.L. & Hartstack, A.W. (1990). Role of natural mortality in boll weevil (Coleoptera: Curculionidae) management programs. *Journal of Economic Entomology*, 83, 1-7.
- Zerova, M.D. & Seryogina, L.Ya. (2006). A review of the Palaearctic species of the genus *Eurytoma*, belonging to the *E. robusta* species-group (Hymenoptera, Eurytomidae), with description of two new species. *Entomological Review*, 86(6), 695–705.

ПАРАЗИТОИДИ (HYMENOPTERA: CHALCIDOIDEA) ЖИШКА  
*OXYSTOMA OCHROPUS* (GERMAR) (COLEOPTERA: APIONIDAE)  
У СЕВРОЗАПАДНОМ ИРАНУ

ХОСЕИН ЛОТФАЛИЗАДЕХ И СЕЈЕД-МЕХДИ ХАСХЕМИ

Извод

*Oxystoma ochropus* (Germar, 1818) храни се на *Lathyrus sativus*. У граду Намин у провинцији Ардабил у Ирану у току 2011. године једанпут недељно вршена су сакупљања *Oxystoma ochropus*. Узорци су пренети у лабораторију. У овим истраживањима идентификоване су четири врсте паразитоида: *Eupelmus microzonus* Förster, 1860 (Eupelmidae), *Eurytoma laserpitii* Mayr, 1878 (Eurytomidae), *Pteromalus chlorospilus* (Walker, 1834) и *Pteromalus sequester* Walker, 1835 (Pteromalidae). Врста *P. chlorospilus* је нови налаз за фауну Ирана. Све установљене трифичке групе анализираних паразитоида са *O. ochropus* као и њихов домаћин су нови за испитивану територију.

Received September 16th, 2015  
Accepted November 25th, 2015