A newly recorded genus and species of Megaseliini (Diptera: Phoridae), a parasitoid of ladybird pupae (Coleoptera: Coccinellidae), from Iran

Somayeh Ebrahimi, Javad Karimi, Mehdi Modarres Awal & Lida Fekrat

Abstract

In the course of a survey on coccinellid fauna in Mashhad and vicinity during 2011-2012, some parasitized pupae of Coccinella septempunctata Linnaeus 1758 were collected. Adults of Phalacrotophora fasciata Fallén 1823, a dipteran parasitoid emerged from those pupae, that represented new records of the genus and species from Iran.

Key words: Natural enemy, Phoridae, Phalacrotophora, scuttle flies, Coccinellidae, new species.

Zusammenfassung

Introduction

Phorids are one of the most diverse insect families (Disney 1994). Despite the diversity of them, they have been less studied in comparison to other dipteran families. There are about 3400 described species of phorids around the world, but it is estimated that the actual number of species ranges from 20 to 50,000 (Brown 2004, 2011; Disney 1983).

Distinctive wing venation is a key diagnostic character for winged specimens of scuttle flies. The greatly enlarged apical swelling or conus on the second antennal segment is another reliable diagnostic character for the Phoridae (Disney 1983). Phorid fly larvae have diverse feeding habits from scavenging to endoparasitism which is variable among and within species (Robinson 1971; MacDonald et al. 1975).

The species of genus Phalacrotophora Endlerlein 1912 are known as endoparasitoids of various arthropods such as ladybirds, wasps and spiders. In comparison to other genera of this family, the literature about this genus is relatively abundant (Borgmeier 1967, 1971; Disney & Beuk 1997; Disney & Durska 1998; Lengyel 2009). In spite of many studies, several unresolved taxonomic problems within this genus remain (Lengyel 2011). Several species of this genus, including *P. fasciata* (Fallén 1823), *P. berolinensis* (Schmitz 1920) and *P. delageae* (Disney 1979), parasitize ladybird pupae (Disney & Beuk 1997; Durska et al. 2003). The host selection is rather catholic in these species, especially in *P. fasciata* which can parasitize many species of ladybirds belonging to the subfamilies Coccinellinae and Chilocorinae and even a chrysomelid host (Miczulski 1978; Disney 1994; Ceringyer & Hodek 1996).

To our knowledge only a few studies are contributed to phorid species in Iran (Talebi et al. 2003; Rezayei 2006; Disney et al. 2012); so, the fauna and taxonomy of phorids in Iran are far from satisfactory known.

Because of various geographical features and diverse climates, it would be expected a rich insect fauna and consequently, various species of parasitoids for the country. As a result, collecting insects from different habitats and hosts brought new species to Iranian fauna. The goal of this paper is to present some new data about a dipteran parasitoid which is new for fauna of Iran.

Material and methods

In a faunistic survey of coccinellids in Mashhad and vicinity during 2011-2012, some pupae of *Coccinella septempunctata* were collected, brought to the laboratory, placed in 9 cm diameter Petri dishes and transferred to a growth chamber at 25°±1°C, 50±5% RH and 16 L: 8D photoperiod. After 15-17 days, a phorid species was emerged from the pupae. They emerged flies were collected and transferred to 70% ethanol for preservation. The valid literature including Disney (1983) and Hodek et al. (1996) were used for morphological and morphometric study of the samples. All measurements and photos were made with a Phase contrast microscope. The specimens are deposited in Insect collection, Department of Plant Protection, Ferdowsi University of Mashhad, Iran. Dr Henry Disney from University of Cambridge, England, confirmed the identity of the species.
Results and discussion

In current study, a dipteran parasitoid obtained from the parasitized pupae of seven-spot ladybird and identified as *Phalacrotophora fasciata* (FALLÉN). This genus and species are new for Iranian fauna. Including the present record, the current total number of recorded phorid species of Iran is three (TALEBI et al. 2002; REZAYEI et al. 2006).

Subfamily *Metopinae* PETERSON 1887

Tribe *Megaseliini* DISNEY 1989

Genus *Phalacrotophora* ENDERLEIN 1912

*Phalacrotophora*, a cosmopolitan genus with about fifty known species worldwide, is comprised of two subgenera; the subgenus *Phalacrotophora* with hairy mesopleura and the subgenus *Omapanta* (SCHMITZ 1932) with bare mesopleura. The larvae of most species of this genus parasitize the pupae of ladybird beetles (DISNEY 2012).

**Diagnosis:** Hind tibia with an antero-dorsal and postero-dorsal row of bristle-like hairs; Length of *P. fasciata* is almost 5mm, Palp bristles only about size of upper occipitals; in females, tergites present only on the first four abdominal segments, the fifth segment dorsally with a complex gland opening; Third tergite with a pair of small papillae; males with proctiger ending in finely-feathered bristles which are clearly more robust than hairs on cerci (DISNEY 1983).

*Phalacrotophora fasciata* (FALLÉN 1823)

**Diagnosis:** Mesopleuron bare; Hind metatarsus somewhat swollen and dark brown to black (DISNEY 1983); Anterior pair of bristles on scutellum clearly weaker and shorter than posterior ones, frequently reduced to fine hairs.

**Males:** Right lobe of hind margin of hypandrium clearly longer than left lobe (DISNEY 1997) (Fig. 1b).

**Females:** 8th abdominal segment with short ventro-laterally hairs; Hind metatarsus dark brown and somewhat swollen (DISNEY 1997) (Fig. 2b)
Fig. 1: Phalacrotophora fasciata: (a) lateral view of male; (b) hypandrium lobs (DISNEY & BEUK 1997).

Fig. 2: Phalacrotophora fasciata, (a) dorsal view of female, (b) 8th abdominal segment (Ovipositor), (DISNEY & BEUK 1997).


Discussion

To our knowledge, there is no a comprehensive survey on parasitoids of coccinellids in Iran either faunistically or taxonomically. Until now, among nearly 100 species of parasitoids that attack different life stages of coccinellids, only a few species have been reported from Iran. With regard to the diversity of coccinellids in Iran and concerning the number of their parasitoids in the world, it is quite likely that in different parts of Iran and on various hosts, more new species of parasitoids exist.

Due to key role of ladybirds in biocontrol, finding a parasite on biocontrol agent could be an important issue. In our survey, parasitized pupae of *P. fasciata* had dark yellowish color and it is difficult to distinguish them from healthy ones.

Further and more comprehensive studies of this type with special emphasis on biological characteristics are needed in order to collection and recognition other parasitoids of coccinellids in Iran. Enhancement our knowledge about the biology of such parasitoids,
their host range and their relationships with their hosts increase our potential for using them in biological control programs. While this dipteran finally reduce the potential of a strong generalist predator, tracking it role in population dynamic of the ladybird, could be a new idea.

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Authors' addresses:

Somayeh EBRAHIMI
Prof. Dr. Javad KARIMI
Prof. Dr. Mehdi MODARRES AWAL
Prof. Dr. Lida FEKRAT
Biocontrol and Insect Pathology Laboratory
Department of Plant Protection, Faculty of Agricultura
Ferdowsi University of Mashhad, Mashhad, Iran
E-mail: jkb@ferdowsi.um.ac.ir (J. Karimi)


Insgesamt eine hervorragende Übersicht und Zusammenstellung zur Biodiversität Südost-Asiens, v.a. für Ökologen, Naturschützer und Biologen.

R. Gerstmeier