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**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

Im Rahmen einer Studie der Coccinelliden Fauna von Maschhad und Umgebung (Iran) im Zeitraum 2011-2012 wurden einige von Parasiten befallenen Puppen von *Coccinella septempunctata* LINNAEUS 1758 gesammelt. Die daraus geschlüpften *Phalacrotophroa fasciata* FALLÉN 1823 (Phoridae) sind als Art sowie Gattung neu für den Iran.

Introduction

Phoridae is 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; MAC DONALD et al. 1975).

The species of genus *Phalacrotophora* ENDERLEIN 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 $25^{\circ}\pm 1^{\circ}\text{C}$, $50\pm 5\%$ 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 *Metopininae* 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).

D i a g n o s i s : 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)

D i a g n o s i s : 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.

M a l e s : Right lobe of hind margin of hypandrium clearly longer than left lobe (DISNEY 1997) (Fig. 1b).

F e m a l e s : 8th abdominal segment with short ventro-laterally hairs; Hind metatarsus dark brown and somewhat swollen (DISNEY 1997) (Fig. 2b)

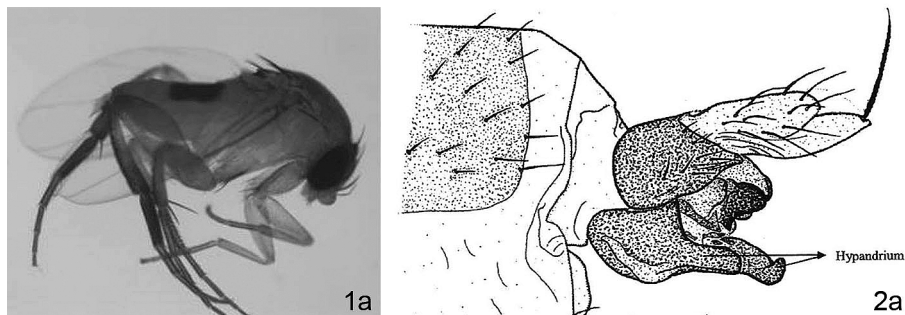


Fig. 1: *Phalacrotophora fasciata*: (a) lateral view of male; (b) hypandrium lobes (DISNEY & BEUK 1997).

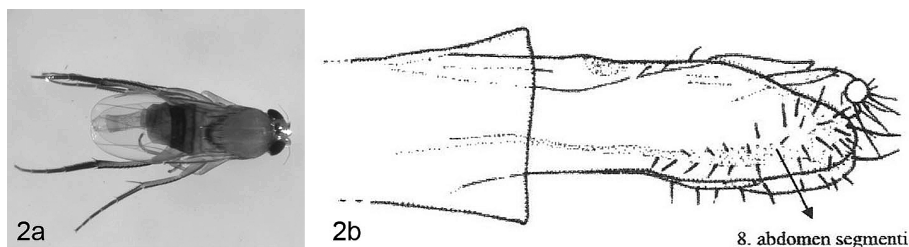


Fig. 2: *Phalacrotophora fasciata*, (a) dorsal view of female, (b) 8th abdominal segment (Ovipositor), (DISNEY & BEUK 1997).

Material examined: Khorasan-e- Razavi: Mashhad, 14.V.2011, 1♀, 7♂♂; 17.V.2012, 4♂♂ (Leg. S. Ebrahimi).

Discussion

To our knowledge, there is no 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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Buchbesprechung

NAKANO S., YAHARA T. & T. NAKASHIZUKA (eds): **The Biodiversity Observation Network in the Asia-Pacific Region.** – Toward further development of monitoring. – Springer Japan, Tokyo, 2012. 479 pp.

Dass biologische Vielfalt für viele funktionierende Ökosysteme wichtig ist, dürfte allgemein bekannt und akzeptiert sein; ebenso wird die Bedeutung von Biodiversität für das menschliche Dasein nicht in Frage gestellt. Bewirken tut dies allerdings gar nichts, der Verlust an Biodiversität schreitet ungebremst voran. Die asiatisch-pazifische Region beinhaltet einerseits Länder mit hoher Entwicklungs- und Fortschrittstendenz, andererseits aber auch zahlreiche entwickelte Länder mit einer umfangreichen Datensammlung und Datenanalyse bezüglich ihrer Biodiversität. Beiden Kategorien fehlt allerdings meist eine grundlegende Basis über den status quo der Biodiversität in dieser Region. Es wäre dringend notwendig, eine Balance zwischen Entwicklung und Fortschritt sowie Naturschutz in dieser Region zu etablieren.

Dieser Band der Reihe "Ecological Research Monographs" stellt eine erste Kollektion an Informationen zur Biodiversität im asiatisch-pazifischen Raum vor.

Teil 1 beinhaltet mit 3 Aufsätzen eine allgemeine Einführung in die Thematik: Strategien zur Beobachtung und Beurteilung von Veränderungen der terrestrischen Biodiversität, ein Ausblick zur Biodiversität in Südostasien sowie Ökonomie und ökonomische Beurteilung von Ökosystemen und Biodiversität in Japan. Der 2. Teil beschreibt exemplarisch einzelne "Bestandteile" des Netzwerks, wie z.B. die Pflanzendiversität in zwei philippinischen Langzeitstudien, Biodiversitätsstudien in Thailand, China und Indonesien, die Fischbiodiversität im Mekong-Becken, im Yangtze-Fluss und in Flüssen Südkoreas. Teil 3 zeigt auf, welche Möglichkeiten zur Etablierung einer Biodiversitäts-Datenbank bestehen; hier liegt der Schwerpunkt auf Japan. Im 4. Teil werden neue Methoden und Analysen zu Biodiversitätsstudien vorgestellt; u.a. DNA Barcoding, "Satelliten-Ökologie", long-term-monitoring, räumliche Modelle bei Süßwasserfischen zur Naturschutzplanung. Der abschließende 5. Teil beschäftigt sich mit Biodiversität und Ökosystem-Services im angewandten Bereich; u.a. CO₂-Bilanz und Biodiversität in tropischem Torfmland, Etablierung von Indikatororganismen in einer umwelt-erhaltenden Landwirtschaft, Biodiversität in Reisfeld-Ökosystemen (Korea) und Wasserbecken im Dorfbereich (Sri Lanka), Biodiversität von Süßwasserfischen in Relation zur Inlandfischerei in Japan, Schutz und Restaurierung der Ufervegetation eines Sees in Japan sowie die generelle Förderung einer Fisch-Taxonomie (v.a. marin) in Südostasien (speziell die Schulung einheimischer Spezialisten).

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

R. Gerstmeier

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