



Research Article

A contribution to Tachinidae (Diptera) from the Arasbaran Biosphere Reserve and vicinity, northwestern Iran

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ABSTRACT: The fauna of Tachinidae (Diptera) from Arasbaran and vicinity in Northwestern Iran is documented in this paper. Totally 27 species were collected from the mentioned region. Additionally, the hosts of some tachinid parasitoids are given.

KEY WORDS: Diptera, Tachinidae, Arasbaran, Northwestern Iran

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INTRODUCTION

The Tachinidae are the second largest family of Diptera and most important group of entomophagous parasitoids with approximately 10,000 described species worldwide (Mellini, 1990; Irwin *et al.*, 2003). All tachinid species are parasitoids, more specifically internal (endo-) parasitoids of other arthropods. As is typical of parasitoids, tachinids usually kill their hosts (but there are exceptions) (Stireman *et al.*, 2006). Tachinids are found in nearly all terrestrial environments throughout the world including deserts, forests, grasslands, mountains, and tundra, and at times may constitute a large proportion of flies observed in particular habitats. In addition, they are widely regarded as a relatively recent, actively radiating group of insects that we may be seeing in the full climax of evolutionary diversification (Crosskey, 1976; Belshaw, 1993).

Arasbaran is an important region in East Azarbaijan province. This biosphere reserve is situated in the north of Iran at the border of Armenia and Azerbaijan and belongs to the Caucasus Iranian Highlands. In between the Caspian, Caucasus and Mediterranean regions, the area covers mountains up to 2,200 meters, including high alpine meadows, semi-arid steppes, rangelands and forests, rivers and springs. Arasbaran is a territory of about 23,500 nomads who are mainly living in the buffer and transition zones. The location of Arasbaran is between 38°40' and 39°08'N; 46°39' and 47°02'E and its elevation (meters above sea level) is +250 to +2,887.

The fauna of Tachinidae is studied from different regions of northwestern Iran (especially Arasbaran and vicinity). Some specimens were collected by different researchers in recent years by sweeping nets and also some tachinid parasitoids were obtained through the rearing from their hosts in optimum conditions ($27 \pm 2^\circ\text{C}$, $60 \pm 5\%$ RH, 14:10 L:D) in an incubator for emergence of parasitoids.

RESULTS AND DISCUSSION

A total of 27 tachinid species were collected from Arasbaran and vicinity. The list of species is given below with the hosts of some parasitoids.

Actia pilipennis (Fallén)

Material: East Azarbaijan: Arasbaran (Kaleibar), 1 specimen, July 2006.

Aplomyia confinis (Fallén)

Material: West Azarbaijan: Khoy, 3 specimens, August 2007.

Comment: Although *A. confinis* is a known common parasitoid of Lycaenidae, during the present study it was reared from some unidentified larvae belonging to Noctuidae in West Azarbaijan.

Baumhaueria goniaeformis (Meigen)

Material: East Azarbaijan: Arasbaran, 3 specimens, July 2005. Reared from an unidentified Saturniidae larva.

***Blondelia nigripes* (Fallén)**

Material: East Azarbaijan: Arasbaran, 3 specimens, August 2007. Reared from an unidentified Pyralidae larva.

***Carcelia iliaca* (Ratzeburg)**

Material: West Azarbaijan: Ourmieh, 1 specimen, September 2005.

***Carcelia lucorum* (Meigen)**

Material: Ardabil: Meshkinshahr, 2 specimens, August 2007. Reared from an unidentified Noctuidae larva.

***Chetogena obliquata* (Fallén)**

West Azarbaijan: Piranshahr, 2 specimens, September 2006. Reared from an unidentified Saturniidae larva.

***Descampsina sesamiae* Mesnil**

Material: East Azarbaijan: Arasbaran, 3 specimens, June 2007. Reared from *Sesamia* sp. (Noctuidae).

***Dionomelia hennigi* Kluger**

Material: East Azarbaijan: Maragheh, 1 specimen, July 2007.

***Drino vicina* (Zetterstedt)**

Material: Ardabil: Moghan, 2 specimens, June 2006. Reared from an unidentified Noctuidae larva.

***Exorista fasciata* (Fallén)**

Material: East Azarbaijan: Arasbaran, 3 specimens, October 2006. Reared from an unidentified Noctuidae larva.

***Exorista segregata* (Rondani)**

Material: Ardabil province: Pars-Abad (wheat fields), 1 specimen, June 2007.

Comment: *E. segregata* mainly is a parasitoid of lepidopteran larvae but Ghahari *et al.* (2008) recorded it from a Pentatomidae nymph erroneously (H. Ghahari, personal communication). The mentioned mistake is corrected in this paper.

***Goniophthalmus halli* Mesnil**

Material: East Azarbaijan: Arasbaran, 2 specimens, August 2006. Reared from an unidentified Pyralidae larva.

***Heraultia albipennis* (Villeneuve)**

Material: Ardabil: Pars-Abad, 1 specimen, September 2005.

***Masicera pavoniae* (Robineau-Desvoidy)**

Material: West Azarbaijan: Piranshahr, 5 specimens, September 2006. Reared from unidentified larvae of Notodontidae and Sphingidae.

***Masicera sphingivora* (Robineau-Desvoidy)**

Material: East Azarbaijan: Arasbaran (Ahar), 3 specimens, July 2003. Reared from an unidentified Pieridae larva.

***Pales pavida* (Meigen)**

Material: Ardabil: Germy, 4 specimens, August 2004. Reared from an unidentified larvae of Geometridae and Nymphalidae.

Comment: A pteromalid hyper parasitoid, *Eupteromalus arzoneae* was reared from the larvae of *P. pavida*.

***Pales processionea* (Ratzeburg)**

Material: East Azarbaijan: Arasbaran (Aynalo), 4 specimens, July 2007.

Comment: During the present research, *P. processionea* was collected around many Hesperiidae larvae. We also obtained many unknown tachinid larvae from inside the hesperiid larvae through dissection. However, further studies on the hosts of *P. processionea* in Iran are necessary.

***Peleteria meridionalis* Robineau-Desoidy**

Material: West Azarbaijan: Ourmieh, 2 specimens, September 2007.

***Peleteria umbratica* Zimin**

Material: East Azarbaijan: Aras boundary, 1 specimen, September 2006.

***Phryxe caudata* (Rondani)**

Material: East Azarbaijan: Arasbaran (Khomarloo), 6 specimens, September 2007.

Comment: Although *P. caudata* is a specific parasitoid of *Thaumetopoea* spp. (Thaumetopoeidae), during the present survey, we collected many specimens of this parasitoid around the colonies of Gelechiidae larvae in the forests of Arasbaran and obtained many unknown tachinid larvae inside the Gelechiidae larvae through dissection. Ghahari *et al.* (2008) reported *P. caudata* as a parasitoid of a gelechiid larva, but in a personal communication, H. Ghahari, opines that "such moths are rather small for development of a medium-sized fly as *P. caudate*". However, further studies on the hosts of *P. caudata* in Iran is necessary.

***Pseudogonia cinerascens* (Rondani)**

Material: East Azarbaijan: Arasbaran, 4 specimens, September 2005. Reared from larvae of *Chilo sacchariphagus indicus* (Kapur) (Crambidae).

***Smidtia amoena* (Meigen)**

Material: West Azarbaijan: Maco, 1 specimen, July 2006.

***Sturmiopsis inferens* Townsend**

Material: East Azarbaijan: Arasbaran, 3 specimens, July 2006. Reared from larvae of *Chilo phragmitellus* (Hübner) (Crambidae).

***Tachina magnicornis* (Zetterstedt)**

Material: Ardabil province: Moghan, 2 specimens, July 2006.

Comment: *T. magnicornis* is rather widespread in Iran and recorded by Ghahari *et al.* (2008) and Gheibi *et al.* (2010) from Ardabil and Fars provinces, respectively. *T. magnicornis* mainly is a parasitoid of lepidopteran larvae, but Ghahari *et al.* (2008) erroneously recorded it from a Pentatomidae nymph (H. Ghahari, personal communication). The mentioned mistake is corrected in this paper.

***Tachina nupta* (Rondani)**

Material: East Azarbaijan: Arasbaran, 2 specimens, September 2005. Reared from a Noctuidae larva.

***Winthemia cruentata* (Rondani)**

Material: West Azarbaijan: Ourmieh, 2 specimens, July 2005. Reared from a Saturniidae larva.

DISCUSSION

The findings through this research and also other works on Iranian Tachinidae (Ghahari *et al.*, 2008; Gheibi *et al.*, 2009, 2010) indicate that there is a diverse fauna of Tachinidae in different regions of Iran, especially northwestern Iran. *Exorista segregata* and *Tachina magnicornis* belong to the subfamilies Exoristinae and Tachininae, respectively; but only tachinids of the subfamily Phasiinae parasitize the true bugs such as Pentatomidae (Shima, 1999). *E. segregata* and *T. magnicornis* were described from Europe and are widespread throughout the Palearctic region (Herting, 1984).

Tachinids exploit a wide diversity of hosts belonging to many orders and families of insects (and a few other arthropods). Apart from general observations of tachinid taxa with particular host orders and families, host associations are evolutionarily influenced in Tachinidae and often vary considerably among congeneric species. Detailed host associations of tachinid taxa have been summarized for most regions (Guimaraes, 1977; Belshaw, 1993; Shima, 1999). The strictest associations between tachinid and host groups are the restriction of Phasiinae to heteropterous hosts and Rutiliini to scarab hosts. Other broad associations include Scarabaeidae as hosts of Dexiini, Lepidoptera as hosts of most Tachininae and Exoristinae (as well as Voriini of Dexiinae), and Orthoptera as hosts of Ormiini. Most tachinids attack exophytic caterpillars or other larvae of holometabolous insects that are ecologically and morphologically similar to caterpillars, such as larval sawflies and chrysomelid beetles (Eggleton and Belshaw, 1992). The predominance of these insects as hosts of tachinids may be explained by their external feeding habit, generally weak physical defenses, taxonomic diversity, adequate size, and perhaps most importantly,

their specialized associations with plants. In general, the most diverse clades of parasitoids including Tachinidae, Chalcidoidea, and Ichneumonoidea attack primarily phytophagous insects, and the tritrophic interactions between plants, phytophagous insects, and parasitoids may play a central role in both herbivore and parasitoid diversification. The indirect effects of plants on parasitoids, via their role in host location by parasitoids and their use as defenses against parasitoids by herbivores (e.g., sequestered secondary compounds), demand increased specialization and encourage diversification in parasitoids. Explicit consideration of the tritrophic framework of host plants, herbivores, and tachinids is central to understanding patterns of tachinid host use at both micro-evolutionary and macroevolutionary scales (Stireman *et al.*, 2006).

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