

Study of Syrphid fly in Ilam province and the first report of *Merodon hirtus* (Hurkmans, 1993) for Iranian fauna

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Abstract: Syrphid fly in Ilam province fauna were studied during 2006 and 2007. In this study a total of 21 species belonging to 13 genus and 2 subfamilies were collected and identified. Samples were collected and identified by characteristics of their appearance and their genitalia using a valid key. The identified species were identified are as follows: *Chrysotoxum parmense* (Rondani, 1845), *Episyrphus balteatus* (De Geer, 1776), *Eristalinus aeneus* (Scopoli, 1763), *Eristalinus sepulchralis* (Linnaeus, 1758), *Eristalinus taeniops* (Wiedemann, 1818), *Eristalis arbustorum* (Linnaeus, 1758), *Eristalis tenax* (Linnaeus, 1758), *Eumerus ahmadi* (Barkalova & Gharaei, 2004), *Eupeodes corolla* (Fabricius, 1794), *Eupeodes nuba* (Wiedemann, 1830), *Ischiodon aegypticus* (Wiedemann, 1830), *Melanostoma melinum* (Linnaeus, 1758), *Merodon hirtus** (Hurkmans, 1993), *Paragus bicolor* (Fabricius, 1794), *Paragus compeditus* (Hull, 1949), *Scaeva albomaculata* (Macquart, 1842), *Scaeva dignota* (Rondani, 1857), *Sphaerophoria rueppelli* (Wiedemann, 1830), *Sphaerophoria turkmenica* (Bankowska, 1964), *Sphaerophoria scripta* (Linnaeus, 1758), *Syrirta pipiens* (Linnaeus, 1758). From the top species, *Merodon hirtus* (Hurkmans, 1993) new species in Iranian fauna were identified and confirmed by Dr. Ante Vujic from Serbia.

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1. Introduction

Diptera is the one of the largest orders of insects, Insects in this order are identified by the first pair of wings that are membranous and hind wings that are reduced and known as halteres, which are used for stability (Triplehorn & Johnson, 2004).

Syrphid fly is one of largest families of the Diptera order and there are 6000 species (Vockeroth, 1969), known as flower flies or hover flies that have been identified within the family. Adult insects of the Syrphid fly family are important pollinators that eat the pollen and sap of flowers. The larvae of this family have a varied diet and based on morphological and other features are divided into two subfamilies Syrphinae and Milesiinae (Vockeroth, 1969). Most larvae of the subfamily Syrphinae are predators of Aphididae, Coccidae and the larvae of some Coleoptera (Buprestidae, Chrysomelidae) Due to their large appetite and the high fertility rate of the female insects, they can be considered for biological pest control. While the subfamily Milesiinae includes species that are saprophagous, herbivorous and producing Myiasis (Vockeroth, 1969). Some Syrphid flies eat other insects such as Coccidae, Aleyrodidae and larvae of Coleoptera and Cicadellidae (Sommaggio, 1999).

Flowers are a favorite location for Syrphid flies. Different species of flower flies tend favor different species of flowering plants. Insects have mouthparts of various different structures, and as such are attracted to plants with a shape that best fits their physical characteristics (Gilbert, 1988). In this family, adult insects of each different species tend to be attracted to flowers of a specific height (Coe, 1953); some species tend toward short-stemmed flowers and others to tall ones. One way of locating a specific family of these insects is to search in places where specific plants favored by these insects grow. Some species feed on nectar and others on pollen and these species specific feeding habits provide a way to distinguish between the Syrphid fly and other families within the order of Diptera (Gilbert, 1988). Feeding on prey and pollen is essential for gametogenesis in syrphid flies (Gilbert, 1988). Syrphid flies, due to small size and short snout often feed on flowers with shallow corolla such as Apiaceae and Common Ivy (Coe, 1953). Flies of this family show a keen interest in red and yellow colored flowers (Coe, 1953). Fauna studies on Syrphid flies have been done in many different regions of the world. In 1758 Linnaeus for the first time placed all species within this family in the genus of *Musca*. Fabricius in 1775 placed this insect in the genus

Syrphus. In 1805, species of the genus were divided into two groups by Fabricius; the first group with plumose arista and the other group without plumose arista, this researcher called the first group *Syrphus* (it had previously had been named by *Volucella* by Geoffroy) and the second group were named *Scaeva*. In 1921 a review was published by Metcalf that stressed the importance of genitalia for observing difference among species. Genitalia of different species of *Syrphus* in the Palearctic were studied by Hippa in 1968 and 13 genera close to it were identified. In 1968 these genera were examined and the desired species were identified. Insects of this family were classified in to the following seven subfamilies by Verral in 1969; Cerinae, Microdontinae, Chrysotoxinae, Volucellinae, Eristalinae, Milesiinae and Syrphinae. In another classification, done by Vockeroth in 1969, the family was divided into two subfamily groups Milesiinae and Syrphinae. The most important subfamily identified was that of the flower fly Syrphinae, among which are the aphid-eating species (Coult, 1997), this subfamily in the Palearctic region has 5 tribes Paragini, Bacchini, Chrysotoxini, Melanostomini and Syrphini. So far about 6000 species in 180 genera of this family have been reported, of which 590 species from 120 genera are in the Palearctic region (Vockeroth & Thompson, 1981).

In Iran there have been numerous studies on the insect fauna of this family, Radjabi introduced species of the subfamily Syrphinae as predators that damage aphid populations in cold fruit trees (Radjabi, 1986). Farahbakhsh reported on *Metasyrphus corolla* from Tehran province and Markazi province (Madarrese et al., 1997). Golmohamad Zadeh khyaban *et al.*, reported 35 species of Syrphid fly in 23 genera from Nazlu area and surrounding villages in western Azarbaijan province and there were studies on the biology of the two species, *Eupeodes corollea* and *Episyrphus balteatus* (Golmohamad Zadeh khyaban *et al.*, 1998). The review of Syrphidae of Ahwaz by Doosti introduced two species *Scaeva dignota* and *Paragus azureus* for the first time in Iran. Lotfalizadeh and Gharali in a review of Marand Syrphids reported 20 species of the subfamily Syrphinae (Lotfalizadeh and Gharali, 2000). In a study of Syrphid fly in Gorgan fauna, Goldasteh *et al.*, 2002 reported *Chrysotoxum ceraerum* for the first time in Iran. Sadeghi, 2003 added *Paragus antioionetta*, *P. aegypticus* and *Scava selenitica* to the list of Iranian Syrphid. Considering that studies of fauna provide the foundation for further biological, demographic and ecological studies, this research aimed to investigate the Syrphid fly fauna in Ilam district and its suburbs, paving the

way for further research in the field of biological pest control in the province.

2. Material and method

Sampling Syrphid flies was done in February 2007 until May 2007 with regular daily and weekly samples taken. Standard nets were used with a 30 cm diameter metal ring and Malaise traps. A Malaise trap is tent-like construction with one side higher than the other. The function of this trap is consistent with the behavior of these insects, in that when they encounter an obstacle they fly upward, therefore on encountering one of these traps the fly will pass through it to the top. At the top of the trap used in this study was installed a plastic canister with a hole through which the flies entered. Under this plastic canister cyanide was placed in a glass container. When insects were at the highest point of the tent area, from the hole in the bottom of the trap they entered a plastic canister and then the glass of alcohol. A number of samples was collected by special steel needles and insects were kept as samples with an attached label containing information on the location of the collection site, the host and the date of collection. Samples collected with the Malaise trap were kept in a glass vessel containing 90 percent alcohol. Species of Syrphid fly were identified by their genitalia using the method cited below:

Dried samples were placed for 24 hours in a desiccator to soften. After softening the samples' male genitalia, that are located outside the body of the insect, were separated with a fine needle. Genitalia were boiled for a few minutes at 20-15 percent solution of potassium, once they had become transparent they were then rinsed in distilled water and placed in 75% alcohol or glycerin solution and then onto a single cavity slide for observation. Adult insects were placed on prepared slides for observation of their organs and then identified by existing valid keys to genus level and then in terms of species. Images of new species of Iranian fauna were sent to Dr. Ante Vujic of Serbia for approval.

3. Results and discussion:

Insect samples were taken from February 2007 until May 2007 to identify species of flower fly in Ilam province. A total of 21 species belonging to two subfamilies were collected, species that marked with symbol * are newly identified species for Iran fauna, they are as follows:

Chrysotoxum parmense (Rondani, 1845), *Episyrphus balteatus* (De Geer, 1776), *Eristalinus aeneus* (Scopoil, 1763), *Eristalinus sepulchralis* (Linnaeus, 1758), *Eristalinus taeniops* (Wiedemann, 1818), *Eristalis arbustorum* (Linnaeus, 1758), *Eristalis*

tenax (Linnaeus, 1758), *Eumerus ahmadi* (Barkalova & Gharaei, 2004), *Eupeodes corolla* (Fabricius, 1794), *Eupeodes nuba* (Wiedemann, 1830), *Ischiodon aegypticus* (Wiedemann, 1830), *Melanostoma melinum* (Linnaeus, 1758), *Merodon hirtus** (Hurkmans, 1993), *Paragus bicolor* (Fabricius, 1794), *Paragus compeditus* (Hull, 1949), *Scaeva albomaculata* (Macquart, 1842), *Scaeva dignota* (Rondani, 1857), *Sphaerophoria rueppelli* (Wiedemann, 1830), *Sphaerophoria turkmenica* (Bankowska, 1964), *Sphaerophoria scripta* (Linnaeus, 1758), *Syrirta pipiens* (Linnaeus, 1758).

***Episyrphus balteatus* De Geer, 1776:**

Flower flies with a length of 10 mm, this species was recorded in the following locations: Eyvan, Sarabele, Dareh Shahr, Abdanan, Mehran, Dehloran. Numbers were reported as 61♂, 57♀.

This species had also been reported from Savadkooh, Babol, Sari, Amol, Ghaemshahr, Joibar, Behshahr, Neka and noshhr (Ghahari *et al.*, 2008), Marand, Ardabil, Qazvin, Andimeshk, Gorgan, Gilan, Khorramabad, Hamedan and Kerman (Gilasian, 2007).

***Ischiodon aegypticus* Wiedemann, 1830**

Flower flies with a length of 8-9 mm, this species was recorded in the following locations: Eyvan, Sarabele, Dareh Shahr, Abdanan, Mehran, Dehloran. Numbers were reported as 68♂, 51♀.

This species had also been reported from urmia (Khiaban & Parchami Araghi, 2001).

***Eupeodes corolla* Fabricius, 1794**

Flower flies with a length of 8-10 mm, this species was recorded in the following locations: Eyvan, Sarabele, Dareh Shahr, Abdanan, Mehran, Dehloran. Numbers were reported as 62♂, 39♀.

This species had also been reported from Savadkooh, Babol, Sari, Amol, Babolsar, Joibar and Neka (Ghahari *et al.*, 2008), Ardabil, Golpayegan, Kalibar, Maku, Damavand, Varamin, Andimeshk, Dezful, Shahrood, Zabol, Eghlid, Kazeroon, Qom, Qasr-e Shirin, Gonbad, Gorgan and Khorramabad (Gilasian, 2007).

***Eupeodes nuba* Wiedemann, 1830**

Flower flies with a length of 8-10 mm, this species was recorded in the following locations: Eyvan, Sarabele, Dareh Shahr, Abdanan, Mehran, Dehloran. Numbers were reported as 48♂, 52♀.

This species had also been reported from Varamin, Dezful, Zabol and Eghlid (Gilasian, 2007).

***Scaeva albomaculata* Macquart, 1842**

Flower flies with a length of 10-16 mm, this species was recorded in the following locations: Eyvan, Sarabele, Dareh Shahr, Abdanan, Mehran, Dehloran. Numbers were reported as 49♂, 53♀.

This species had also been reported from Ghaemshahr (Ghahari *et al.*, 2008), Natanz, Damavand, Absard and Dizin (Gilasian, 2007).

***Scaeva dignota* Rondani, 1857**

Flower flies with a length of 10-13 mm, this species was recorded in the following locations: Eyvan, Sarabele, Dareh Shahr, Abdanan, Mehran, Dehloran. Numbers were reported as 37♂, 32♀.

This species had also been reported from Savadkooh, Babol, Sari, Amol, Babolsar, Ramsar and Behshahr (Ghahari *et al.*, 2008), Shiraz, Tonekabon, Ramsar (Gilasian, 2007).

***Sphaerophoria rueppelli* Wiedemann, 1830**

Flower flies with a length of 5-8 mm, this species was recorded in the following locations: Eyvan, Sarabele, Dareh Shahr, Abdanan, Mehran, Dehloran. Numbers were reported as 41♂, 32♀.

This species had also been reported from Shiraz and Shirgah (Gilasian, 2007).

***Sphaerophoria turkmenica* Bankowska, 1964**

Flower flies with a length of 8-9 mm, this species was recorded in the following locations: Eyvan, Sarabele, Dareh Shahr, Abdanan, Mehran, Dehloran. Numbers were reported as 75♂, 35♀.

This species had also been reported from Kalibar, Shiraz, Tonekabon and Ramsar (Gilasian, 2007).

***Sphaerophoria scripta* Linnaeus, 1758**

Flower flies with a length of 9-12 mm, this species was recorded in the following locations: Eyvan, Sarabele, Dareh Shahr, Abdanan, Mehran, Dehloran. Numbers were reported as 25♂, 11♀.

This species had also been reported from Rostam abad (Moetamedian *et al.*, 2004).

***Melanostoma melinum* Linnaeus, 1758**

Flower flies with a length of 7-8 mm, this species was recorded in the following locations: Eyvan, Sarabele, Dareh Shahr, Abdanan, Mehran, Dehloran. Numbers were reported as 36♂, 27♀.

This species had also been reported from Fars province (Gharali, 2004) and Khuzestan province (Rezaei *et al.*, 2006).

***Chrysotoxum parmense* Rondani, 1845**

Flower flies with a length of 7-8 mm, this species was recorded in the following locations:

Eyvan, Sarabele, Dareh Shahr, Abdanan, Mehran, Dehloran. Numbers were reported as 54♂, 32♀.

***Paragus compeditus* Hull, 1949**

Flower flies with a length of 4-5 mm, this species was recorded in the following locations: Eyvan, Sarabele, Dareh Shahr, Abdanan, Mehran, Dehloran. Numbers were reported as 37♂, 25♀.

This species had also been reported from Urmia (Khiaban & Parchami Araghi, 2001).

***Paragus bicolor* Eabricus, 1794**

Flower flies with a length of 5-6 mm, this species was recorded in the following locations: Eyvan, Sarabele, Dareh Shahr, Abdanan, Mehran, Dehloran. Numbers were reported as 37♂, 40♀.

This species had also been reported from Neka (Ghahari *et al.*, 2008), Urmia (Khiaban & Parchami Araghi, 2001), Keleyber (Khaghaninia *et al.*, 2011).

***Eristalis arbustorum* Linnaeus, 1758**

Flower flies with a length of 7-8 mm, this species was recorded in the following locations: Eyvan, Sarabele, Dareh Shahr, Abdanan, Mehran, Dehloran. Numbers were reported as 32♂, 41♀.

This species had also been reported from Amol, Behshahr, Noshahr, Noor, Chalus and Neka (Ghahari *et al.*, 2008), Keleyber (Khaghaninia *et al.*, 2011).

***Eristalis tenax* Linnaeus, 1758**

Flower flies with a length of 14-15 mm, this species was recorded in the following locations: Eyvan, Sarabele, Dareh Shahr, Abdanan, Mehran, Dehloran. Numbers were reported as 52♂, 37♀.

This species had also been reported from Sari, Joibar, Ramsar, noor and Amol (Ghahari *et al.*, 2008), Keleyber (Khaghaninia *et al.*, 2011).

***Eristalinus taeniops* Wiedemann, 1818**

Flower flies with a length of 12-15 mm, this species was recorded in the following locations: Eyvan, Sarabele, Dareh Shahr, Abdanan, Mehran, Dehloran. Numbers were reported as 48♂, 29♀.

This species had also been reported from Neyshabur (Sadeghi Namaghi & Hussein, 2009).

***Eristalinus aeneus* Scopioil, 1763**

Flower flies with a length of 10-12 mm, this species was recorded in the following locations: Eyvan, Sarabele, Dareh Shahr, Abdanan, Mehran, Dehloran. Numbers were reported as 34♂, 28♀.

This species had also been reported from Keleyber (Khaghaninia *et al.*, 2011), Neyshabur (Sadeghi Namaghi & Hussein, 2009).

***Eristalinus sepulchralis* Linnaeus, 1758**

Flower flies with a length of 7-11 mm, this species was recorded in the following locations: Eyvan, Sarabele, Dareh Shahr, Abdanan, Mehran, Dehloran. Numbers were reported as 50♂, 29♀.

This species had also been reported from Keleyber (Khaghaninia *et al.*, 2011).

***Syrirta pipiens* Linnaeus, 1758**

Flower flies with a length of 7-11 mm, this species was recorded in the following locations: Eyvan, Sarabele, Dareh Shahr, Abdanan, Mehran, Dehloran. Numbers were reported as 50♂, 29♀.

This species had also been reported from Keleyber (Khaghaninia *et al.*, 2011), Ghaemshahr, Babol, Noor, Amol and Sari (Ghahari *et al.*, 2008), Neyshabur (Sadeghi Namaghi & Hussein, 2009).

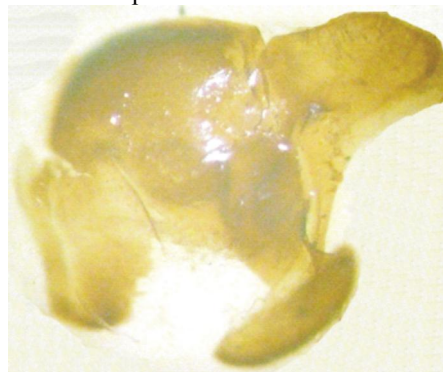
***Eumerus ahmadi* Barkalova & Gharaei, 2004**

Flower flies with a length of 7-11 mm, this species was recorded in the following locations: Eyvan, Sarabele, Dareh Shahr, Abdanan, Mehran, Dehloran. Numbers were reported as 55♂, 29♀.

***Merodon hirtus* Hurkmans, 1993**

This species was first reported from Iran, this hoverfly from Ilam (Dalab forest park) has been collected and reported. Records identified 10♂, 4♀.

The species has large eyes, clear and with long hairs. The legs are completely black with yellow spots, hind part of the second coxa is without hair, the trochanter is simple and without any appendage. The thorax is filled with orange hair and hair the front of the anepisternum is reduced. The second section of the abdomen is without the red and orange spots. The third section of the tergite has two narrow bands, the fourth segment has bands that appear at the front margins of the tergite. The posterior part of the male genitalia (surstyli) has two hairy lumps and two lumps without hair are found, the hypanderium is without any indentation at the base and at the end it has two shoulder plates.



Male genitalia in *Merodon hirtus* Hurkmans, 1993



Merodon hirtus Hurkmans, 1993 (Adult)

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