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HOVER-FLIES (DIPTERA: SYRPHIDAE) OF KERMAN PROVINCE, IRAN

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A list of 28 species of hover-flies (Syrphidae) collected in Kerman province of Iran in 2013 is given. All species are new for Kerman province, beside them *Paragus romanicus* Stanescu, 1992 is firstly recorded from Iran.

KEY WORDS: Diptera, Syrphidae, fauna, new records, Kerman province, Iran.

З. Хосравиан¹⁾, Н. Садехи^{1*)}, А. Симанк²⁾. Мухи-журчалки (Diptera: Syrphidae) провинции Керман, Иран // Дальневосточный энтомолог. 2015. N 290. С. 1-12.

Приведен список 28 видов семейства Syrphidae, собранных в 2013 г. в провинции Керман (Иран). Все виды мух-журчалок впервые указываются из этой провинции, а *Paragus romanicus* Stanescu, 1992 впервые приводится для фауны Ирана.

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INTRODUCTION

The family Syrphidae is among the most abundant and conspicuous dipterans, found in every geographical regions except the Antarctic (Gilbert, 1993). There are about 6000 species of hover-flies worldwide and 1600 species are distributed in the Palearctic region (Peck, 1988; Sommaggio, 1999).

The Syrphidae fauna of Iran is not yet completely studied. In a checklist of important insects Farahbakhsh (1961) reported only four hover-flies species from Iran. Modarres (1994) provided a list of 15 species. In the Palaearctic Catalogue 41 species are recorded from Iran (Peck, 1988). Dousti & Hayat (2006) listed 124 hover-flies species from this country. Later several faunistic papers were published (Mehrabi & Ssymank, 2008; Naderloo & Pashaei, 2010; Ashrafi & Pashaei Rad, 2010; Ehteshamnia *et al.*, 2010; Khaghaninia *et al.*, 2010a; Khaghaninia *et al.*, 2010b; Gilasian & Sorokina, 2011; Khaghaninia *et al.*, 2012; Kazerani *et al.*, 2012). Now 153 species of Syrphidae are known from different provinces of Iran, but there are no any published data on hover-flies of Kerman province.

MATERIALS AND METHODS

The Kerman province covers an area of 181714 km² located in the south eastern part of Iran (53°26'-59°29'E and 25°55'-32°N). It borders Yazd and South Khorasan provinces in the north, Sistan and Baluchestan provinces in the east, Hormozgan province in the south and Fars and Yazd provinces in the west. Hover-flies were collected in following 17 localities (Fig.1): **(1)** Kerman-Horjand, Jerk (30°38'15"N, 57°08'23"E, h = 1260 m); **(2)** Kerman-Horjand, Gorkani (30°40'35"N, 57°09'17"E, h = 1130 m); **(3)** Kerman-Zarand (30°80'N, 56°58'E, h = 1650 m); **(4)** Kerman-Chatroud, Sardar (30°59'81"N, 56°90'75"E, h = 1820 m); **(5)** Kerman-Joupar (30°03'49"N, 57°06'43"E, h = 1890 m); **(6)** Kerman-Mahan (30°06'40"N, 57°17'29"E, h = 1850 m); **(7)** Kerman-Sirch (30°11'50"N, 57°34'12"E, h = 1550 m); **(8)** Kerman-Shahdad (30°42'50"N, 57°71'06"E, h = 420 m); **(9)** Kerman-Darsinooyeh (30°23'38"N, 57°12'50"E, h = 2050 m); **(10)** Kerman-Vameqabad, Kohpayeh (30°30'51"N, 57°15'20"E, h = 2170 m); **(11)** Kerman-Baft, Golzar (29°71'08"N, 57°04'08"E, h = 2300 m); **(12)** Rabor (29°28'97"N, 56°09'89"E, h = 2350 m); **(13)** Kerman-Baft, Hararan (29°78'N, 58°16'25"E, h = 2280 m); **(14)** Kerman-Baft, Googher (29°27'28"N, 56°25'5"E, h = 2280 m); **(15)** Kerman-Jiroft (28°29'02"N, 57°736'94"E, h = 640 m); **(16)** Kerman-Baft, Negar (29°86'67"N, 56°80'12"E, h = 2100 m); **(17)** Kerman- Baft (29°30'65" N, 56°80'12"E), h = 2170 m).

Totally 92 specimens of Syrphidae were collected in Kerman province by the first author (Zohreh Khosravian) in 2013. Almost all materials are deposited in the department of Plant Protection, College of Agriculture, Ferdowsi University of Mashhad, Iran. A few specimens are kept in the personal collection of A. Ssymank (Germany) who identified the majority of recorded species in this study.

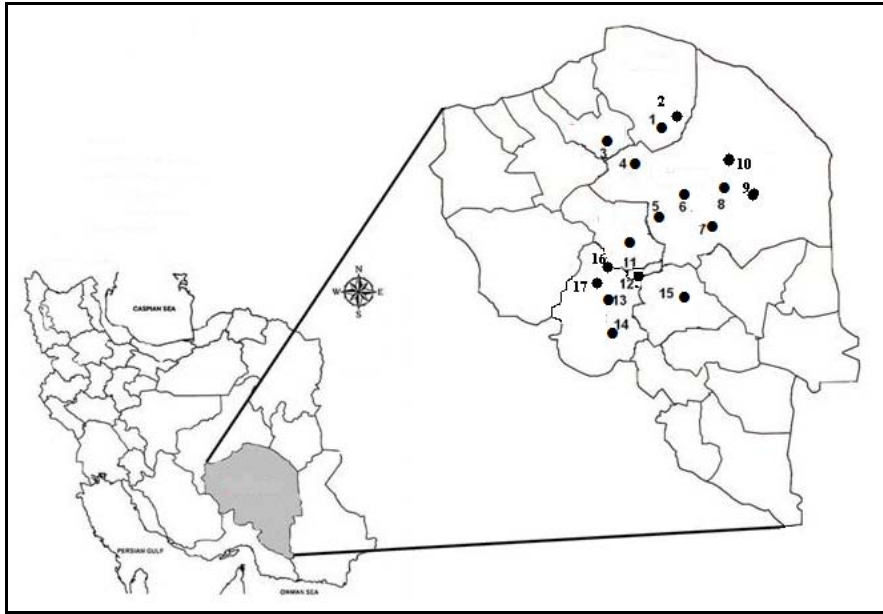


Fig. 1. Location of sampling sites on map of Kerman province (Iran). Studied localities – see in text.

LIST OF SPECIES

Subfamily Syrphinae

Chrysotoxum aff. *intermedium* Meigen, 1822

MATERIAL EXAMINED. Kerman province: Kerman-Baft, 28 July 2013, 1♀; Kerman-Darsinooyeh, April 2013, 1♂, 2♀.

DISTRIBUTION. Iran: Razavi Khorasan (Dousti & Hayat, 2006); Kerman province (new record).

NOTES. *Chrysotoxum intermedium* is a species aggregate and needs in revision. The studied specimens belong to a relatively wide-spread in the Mediterranean region form; but they are not identical to the Central European *C. intermedium*.

Dasysyrphus albostrigatus (Fallén, 1817)

MATERIAL EXAMINED. Kerman province: Kerman- Joupar, 6 May 2013, 1♂.

DISTRIBUTION. Iran: West Azarbaijan, Razavi Khorasan (Dousti & Hayat, 2006; Khaghaninia *et al.*, 2010a); Kerman province (new record). – North Africa, Europe, Russia, Caucasus, Turkey, Central Asia, Mongolia, Japan.

***Episyrrhus balteatus* (De Geer, 1776)**

MATERIAL EXAMINED. Kerman province: Kerman-Horjand, Gorkani, 5 June 2013, 3 ♀.

DISTRIBUTION. Iran: Fars, West Azarbaijan, Khozestan, Qazvin, Hamadan, Golestan, Guilan, Razavi Khorasan, Lorestan, Golestan, Alburz, Kurdistan, Mazandaran, Sistan, Baluchestan (Dousti & Hayat, 2006; Khaghaninia *et al.*, 2010a); Kerman province (new record). – Azores, Canary Isles, North Africa, Europe, Russia, Caucasus, Central Asia, Afghanistan, Mongolia, China, Japan; Oriental region; Australian region.

***Eupeodes corollae* (Fabricius, 1794)**

MATERIAL EXAMINED. Kerman province: Kerman-Darsinooyeh, 4 April, 3 May, 7 June 2013, 2♂, 2♀; Kerman-Mahan, 4 April, 21 May, 19 July 2013, 2♂, 1♀; Kerman-Chatroud, Sardar, 10 May 2013, 1♂.

DISTRIBUTION. Iran: Tehran, Razavi Khorasan, Markazi, West Azarbaijan, Khozestan, Qazvin, Hamadan, Golestan, Razavi Khorasan, Lorestan, Golestan, Alburz, East Azarbaijan, Razavi Khorasan, Kurdistan, Mazandaran (Dousti & Hayat, 2006; Khaghaninia *et al.*, 2010a); Kerman province (new record). – Canary Isles, North Africa, Madeira, Europe, Russia, Caucasus, Central Asia, Mongolia, China, Japan; Oriental region (Taiwan); Afrotropical region, Mauritius.

***Eupeodes nuba* (Wiedemann, 1830)**

MATERIAL EXAMINED. Kerman province: Kerman-Chatroud, Sardar, 10 May 2013, 2 ♀; Kerman-Darsinooyeh, 17 May 2013, 3♂, 1♀,

DISTRIBUTION. Iran: Khozestan, Fars, Golestan, Razavi Khorasan, Kurdistan, Sistan, Baluchestan, Fars, Kuzestan, Guilan (Dousti & Hayat, 2006); West Azarbaijan (Khaghaninia *et al.*, 2010a); Kerman province (new record). – Canary Isles, North Africa, Southern Europe, Middle East, Central Asia, Afghanistan, Mongolia.

***Simosyrphus aegyptius* (Wiedemann, 1830)**

MATERIAL EXAMINED. Kerman province: Kerman-Darsinooyeh, 22 August 2013, 1♂.

DISTRIBUTION. Iran: Khozestan, Guilan, Razavi Khorasan, Baluchestan, Sistan, Fars, Kuzestan (Dousti & Hayat, 2006); West Azarbaijan (Khaghaninia *et al.*, 2010a); Kerman province (new record). – Canary Isles, Mediterranean, Yemen; Afrotropical region.

***Symosyrphus scutellaris* (Fabricius, 1805)**

MATERIAL EXAMINED. Kerman province: Kerman-Joupar, 19 March 2013, 2 ♀; Kerman-Darsinooyeh, 31 May, 21 June 2013, 1♂, 1♀.

DISTRIBUTION. Iran: Fars, Khozestan (Ahwaz) (Dousti & Hayat, 2006); Kerman province (new record). – Turkey, Caucasus, Central Asia, Afghanistan, Mongolia, China, Japan; Oriental region; Oceania; Australasian region.

***Melanostoma mellinum* (Linnaeus, 1758)**

MATERIAL EXAMINED. Kerman province: Kerman-Darsinooyeh, 15 July 2013, 1 ♀; Kerman-Vameqabad, Kohpayeh, 26 May 2013, 1 ♀.

DISTRIBUTION. Iran: West Azarbaijan, Khozestan, Golestan, Guilan, Razavi Khorasan, Kurdistan, Mazandaran (Dousti & Hayat, 2006; (Khaghaninia *et al.*, 2010a); Kerman province (new record). – Iceland, Madeira, Canary Isles, North Africa, Europe, Russia, Middle East, Caucasus, Central Asia, Afghanistan, Mongolia, China, Japan; North America.

***Scaeva albomaculata* (Macquart, 1842)**

MATERIAL EXAMINED. Kerman province: Kerman-Joupar, 19 March 2013, 1 ♀.

DISTRIBUTION. Iran: West Azarbaijan, Fars, Khozestan, Golestan, Razavi Khorasan, Lorestan, Alburz, East Azarbaijan, Sistan, Baluchestan, Kurdistan, Fars, Kuzestan (Dousti & Hayat, 2006; Khaghaninia *et al.*, 2010a); Kerman province (new record). – Canary Isles; Mediterranean, Russia, Caucasus, Central Asia, Afghanistan, China, Mongolia.

***Scaeva dignota* (Rondani, 1857)**

MATERIAL EXAMINED. Kerman province: Kerman-Mahan, 31 May 2013, 1 ♂.

DISTRIBUTION. Iran: Khozestan, Mazandaran (Dousti & Hayat, 2006); Kerman province (new record). – Europe, Turkey, North Africa.

***Sphaerophoria bengalensis* Macquart, 1842**

MATERIAL EXAMINED. Kerman province: Kerman-Baft, Golzar, 8 June, 2 August 2013, 2 ♂; Kerman-Baft, Negar, 2 August 2013, 1 ♂; Kerman-Darsinooyeh, 4 April 2013, 1 ♂; Kerman-Mahan, 26 May, 16 June 2013; 1 ♂, 1 ♀; Kerman-Horjand, Jerk, 5 June 2013, 1 ♂.

DISTRIBUTION. Iran: Khuzestan, Golestan, Fars, Kuzestan (Dousti & Hayat, 2006); Kerman province (new record). – China, ?Korea, ?Japan; Oriental region.

***Sphaerophoria rueppelli* (Wiedemann, 1830)**

MATERIAL EXAMINED. Kerman province: Kerman-Baft, 2 August 2013, 1 ♂; Kerman-Vameqabad, Kohpayeh, 6 May 2013, 1 ♂.

DISTRIBUTION. Iran: West Azarbaijan, Khuzestan, Golestan, Razavi Khorasn, Golestan, Sistan, Baluchestan, Kurdistan, Mazandaran (Dousti & Hayat, 2006; Khaghaninia *et al.*, 2010a); Kerman province (new record). – Canary Isles, North Africa, Europe, Russia, Middle East, Central Asia, Afghanistan, China, Korea; the eastern parts of Afrotropical region.

***Sphaerophoria scripta* (Linnaeus, 1758)**

MATERIAL EXAMINED. Kerman province: Kerman-Jiroft, 28 April 2013, 1♂; Kerman-Shahdad, 19 June 2013, 1♂; Kerman-Joupar, 26 April 2013, 1♂; Kerman-Baft, Negar, 8 June 2013, 1♂; Kerman-Baft, 2 August 2013, 1♂; Kerman-Mahan, 7 June 2013, 1♂; Kerman-Darsinooyeh, 28 June, 19 July 2013, 2♀; Kerman-Horjand, Jerk, 5 June 2013; 1♂; Rabor, 8 June 2013, 1♂.

DISTRIBUTION. Iran: Razavi Khorasan, West Azarbaijan, Fars, Khuzestan, Qazvin, Hamadan, Golestan, Guilan, Razavi Khorasan, Kurdistan, Mazandaran, Sistan, Baluchestan (Dousti & Hayat, 2006; Khaghaninia *et al.*, 2010a); Kerman province (new record). – Canary Isles, North Africa, Europe, Russia, Middle East, Central Asia, Afghanistan, Mongolia, China, Japan; Oriental region (Kashmir, Nepal).

***Syrphus ribesii* (Linnaeus, 1758)**

MATERIAL EXAMINED. Kerman province: Kerman-Baft, Googher, April 2012, 5♀.

DISTRIBUTION. Iran: Fars, Isfahan, Tehran, Markazi, West Azarbaijan, Razavi Khorasan, Mazandaran, Sistan, Baluchestan (Doust & Hayat, 2006; Khaghaninia *et al.*, 2010); Kerman province (new record). – Iceland, Canary Isles, Europe, Russia, Turkey, Caucasus, Central Asia, Afghanistan, Mongolia, China, Japan; North America.

***Syrphus vitripennis* Meigen, 1822**

MATERIAL EXAMINED. Kerman province: Kerman-Darsinooyeh, 26 April 2013, 1♀.

DISTRIBUTION. Iran: West Azarbaijan, Golestan, Razavi Khorasan, Mazandaran (Dousti & Hayat, 2006; Khaghaninia *et al.*, 2010a); Kerman province (new record). – Europe, Russia, Caucasus, Central Asia, Afghanistan, Mongolia, China, Japan; North America; Oriental region (Taiwan).

***Paragus (Pandasyophtalmus) albipes* Gimmerthal, 1842**

MATERIAL EXAMINED. Kerman province: Kerman-Horjand, Jerk, 5 June 2013, 1♂.

NOTES. We accept opinion about synonymy of *Paragus albipes* and *P. abrogans* Goeldlin de Tiefenau, 1971 (Peck, 1988), though the status of both species remains not clear (Speight, 2011). This species can be determined with male genitalia, depicted in the key by Goeldlin (1976), as well as in the recent key (Claussen & Weipert, 2004).

DISTRIBUTION. Iran: Tehran (Dousti & Hayat, 2006); East Azarbaijan, Golestan; Razavi Khorasan; Kordestan; Lorestan; Mazandaran; Tehran (Gilasian & Sorokina, 2011); Kerman province (new record). – Europe (Estonia, Latvia), Russia (Altai, Eastern Siberia), Central Asia, China; Nepal.

***Paragus (Pandasyophthalmus) compeditus* Wiedemann, 1830**

MATERIAL EXAMINED. Kerman province: Kerman-Baft, Hararan, 8 June 2013, 1 ♂.

DISTRIBUTION. Iran: West Azarbaijan, Khozestan, Golestan, West Azarbaijan, Fars, Kuzestan, Bushehr (Dousti & Hayat, 2006; Khaghaninia *et al.*, 2010a); Kordestan; Sistan, Balouchestan; Zanjan (Gilasian & Sorokina, 2011); Kerman province (new record). – North Africa, Europe (Italy, Ukraine), Russia (European part), Cyprus, Turkey, Central Asia, China; Afrotropical region.

***Paragus (Pandasyophthalmus) haemorrhous* (Meigen, 1822)**

MATERIAL EXAMINED. Kerman province: Kerman-Baft, Googher, 2 August 2013, 1 ♂; Kerman-Zarand, 14 July 2013, 1 ♂; Kerman-Vameqabad, Kohpayeh, 30 April 2013, 1 ♂.

DISTRIBUTION. Iran: Guilan, Razavi Khorasan, Guilan (Dousti & Hayat, 2006); East Azarbaijan; Razavi Khorasan; Tehran (Gilasian & Sorokina, 2011); Kerman province (new record). – North Africa, Europe, Russia, Middle East, Central Asia, Afghanistan, China, Korea, Japan; North America; Afrotropical region.

***Paragus (Paragus) romanicus* Stanescu, 1992**

Fig. 2

MATERIAL EXAMINED. Kerman province: Kerman-Joupar, May 2013, 1 ♂; Kerman-Vameqabad, Kohpayeh, May 2013, 1 ♂; Kerman-Darsinooyeh, May 2013, 1 ♂.

NOTES. This species belongs to the *Paragus bicolor* group and is closely related with *P. bicolor*, from which it can only be separated by the male genitalia (Stanescu, 1992). Quite possible, that some records of *P. bicolor* are partly belonging to *P. romanicus*.

DISTRIBUTION. Iran (new record): Kerman province. – Central and Southern Europe, Turkey (Speight, 2011).



Fig. 2. *Paragus romanicus* Stanescu, male collected in Kerman province, Joupar on 3 May 2013.

***Paragus (Paragus) quadrifasciatus* Meigen, 1822**

MATERIAL EXAMINED. Kerman province: Kerman-Darsinooyeh, 30 April 2013, 1 ♀; Kerman-Baft, Googher, 8 June 2013, 1 ♀.

DISTRIBUTION. Iran: Razavi Khorasan (Dousti & Hayat, 2006); West Azarbaijan (Khaghaninia *et al.* 2010a); Guilan; Zanzan (Gilasian & Sorokina, 2011); Kerman province (new record). – Central and Southern Europe, Russia (European part), Caucasus, Turkey, Central Asia, China, ?Korea, ?Japan.

Subfamily Eristalinae

***Eristalinus aeneus* (Scopoli, 1763)**

MATERIAL EXAMINED. Kerman province: Kerman-Horjand, Jerk, 28 June 2013, 1 ♂; Kerman-Sirch, 26 July 2013, 1 ♂.

DISTRIBUTION. Iran: West Azarbaijan, Khozestan, Golestan, Guilan, East Azarbaijan, Razavi Khorasan (Dousti & Hayat, 2006); Kerman province (new record). – Cosmopolitan.

***Eristalinus taeniops* (Wiedemann, 1818)**

MATERIAL EXAMINED. Kerman province: Kerman-Baft, 19 July 2013, 1 ♀.

DISTRIBUTION. Iran: West Azarbaijan, Khozestan, Hamadan, Golestan, East Azarbaijan (Dousti & Hayat, 2006); Kerman province (new record). – Canary Isles, Mediterranean, Middle East, Caucasus, Central Asia; Afrotropical region, Oriental region.

***Eristalis arbustorum* (Linnaeus, 1758)**

MATERIAL EXAMINED. Kerman province: Kerman-Darsinooyeh, 4 April, 10 May 2013, 2♂, 1♀; Kerman-Horjand, Jerk, 28 June 2013, 1♀.

DISTRIBUTION. Iran: West Azarbaijan, Khozestan, Hamadan, Golestan, Guilan, East Azarbaijan, Razavi Khorasan, Kurdistan, Mazandaran, Sistan, Baluchestan (Dousti & Hayat, 2006; Khaghaninia *et al.*, 2010a); Kerman province (new record). – North Africa, Europe, Middle East, Central Asia, Afghanistan, Mongolia, China, Korea, Japan; North America; Northern India.

***Eristalis tenax* (Linnaeus, 1758)**

MATERIAL EXAMINED. Kerman province: Kerman-Darsinooyeh, 4 April, 7 June 2013, 3♂, 1♀; Kerman-Chatroud, Sardar, 10 May 2013, 1♂; Kerman-Vameqabad, Kohpayeh, 28 June 2013, 1♀.

DISTRIBUTION. West Azarbaijan, Fars, Khozestan, Hamadan, Golestan, Guilan, East Azarbaijan, Razavi Khorasan, Mazandaran, Sistan, Baluchestan (Dousti & Hayat, 2006; Khaghaninia *et al.*, 2010a); Kerman province (new record). – Cosmopolitan.

***Merodon fulcratus* Becker, 1913**

MATERIAL EXAMINED. Kerman province: Kerman-Chatroud, Sardar, 6 May 2013, 1♂, 1♀ (determined by A. Vujic, Novi Sad).

DISTRIBUTION. Iran: Baluchestan (Becker & Stein, 1913); Kerman province (new record). – Transcaucasus, Turkey.

NOTES. There are no other published records from Iran since the description of this species (Dousti & Hayat, 2006).

***Volucella zonaria* (Poda, 1761)**

MATERIAL EXAMINED. Kerman province: Kerman-Baft, 8 June 2013, 1♂, 1♀.

DISTRIBUTION. Iran: North Khorasan, Lorestan, West Azarbaijan, Hamadan, Golestan, Guilan, Razavi Khorasan (Dousti & Hayat, 2006; Khaghaninia *et al.*, 2010a); Kerman province (new record). – North Africa, Europe, Russia, Turkey, Central Asia, Mongolia.

***Syritta flaviventris* Macquart, 1842**

MATERIAL EXAMINED. Kerman province: Kerman-Zarand, May 2013, 2 ♀.

DISTRIBUTION. Iran: Khuzestan, Fars, Golestan, Razavi Khorasan (Dousti & Hayat, 2006); Kerman province (new record). – Mediterranean, Middle East; Afro-tropical region; Neotropical region; Oceania; southern part of North America.

***Syritta pipiens* (Linnaeus, 1758)**

MATERIAL EXAMINED. Kerman province: Kerman-Baft, Hararan, May 2013, 5 ♀.

DISTRIBUTION. Iran: West Azarbaijan, Khuzestan, Golestan, Guilan, Razavi Khorasan, Kurdistan, Mazandaran (Dousti & Hayat, 2006; Khaghaninia *et al.*, 2010a); Kerman province (new record). – Cosmopolitan (except Afrotropical region).

DISCUSSION

Thus, we found 28 species of hover-flies in Kerman province of Iran. Beside them 20 species belongs to subfamily Syrphinae and 8 species to subfamily Eristalinae.

The adult of Syrphidae are essential pollinators. The larvae of hover-flies can be found throughout the year in a wide variety of habitats, they are phytophagous, predacious, saprophagous, saproxylic, mycophagous, etc. and being used as bio-indicators of site quality such as nature reserve assessment (Speight, 1986; Speight 2011). The larvae of the subfamily Syrphinae are predaceous, chiefly on aphids or psyllids on plants (Rojo *et al.*, 2003). For this reason, some species of hover-flies have potential to be used in the biological control of aphids.

As mostly arable fields and crops were in the focus of this study, the species number of 28 species is certainly much lower than the potential of hover-flies species in Kerman province. A systematic sampling of seminatural and natural habitats would yield many additional species, which under certain conditions can partly also inhabit field margins or part of the crops. This would be necessary to also learn the potential of biocontrol and/or pollination services and how to enhance these ecosystem services or assess their stability under changing climate conditions.

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REFERENCES

- Ashrafi, F. & Pashaei rad, S. 2010. A new record of the subfamily Syrphinae (Diptera: Syrphidae) for the Iranian fauna, *Zoology in the Middle East*, 51: 119–120.
- Becker, T. & Stein, P. 1913. Persische Dipteren von den Expeditionen des Herrn N. Zarudny 1898 und 1901. *Annuaire du Musee Zoologique de l'Academic imperiale des sciences de St. Petersbourg*, 17: 503–654.
- Claussen, C. & Weipert, J. 2004. Notes on the subgenus *Paragus* (*Pandasyophthalmus*) (Diptera, Syrphidae) from Nepal, with the description of a new species. *Volucella*, 7: 75–88.
- Dousti, A.F. & Hayat, R. 2006. A catalogue of the Syrphidae (Insecta: Diptera) of Iran. *Journal of the Entomological Research Society*, 8 (3): 5–38.
- Ehteshamnia, N., Khaghaninia, S. & Farshbaf PourAbad, R. 2010. Some hoverflies of subfamily Syrphinae of Qurigol fauna in East Azerbaijan province, Iran (Diptera: Syrphidae). *Munis Entomology & Zoology*, 5 (2): 499–505.
- Farahbakhsh, G.A. 1961. *Checklist of important insects and other enemies of Plants and Agricultural Products in Iran*. Min. Agric., Plant Protection Org., Tehran. 153 pp.
- Gilasian, E. & Sorokina, V.S. 2011. The genus *Paragus* Latreille (Diptera: Syrphidae) in Iran, with the description of a new species. *Zootaxa*, 2764: 49–60.
- Gilbert, F. 1993. *Hoverflies*. Naturalists' hand books 5, Richmond Publishing Co. Ltd. 67 pp.
- Goeldlin de Tiefenau, P. 1976. Revision du genre *Paragus* (Dipt., Syrphidae) de la region palearctique occidentale. *Bulletin de la Societe Entomologique Suisse*, 49: 79–108.
- Kazerani, F., Talebi, A.A., & Gilasian, E. 2012. First record of the genus and species *Pipiza accola* Violtovitch (Diptera: Syrphidae) from Iran. *Journal of Crop Protection*, 1 (4): 287–291.
- Khaghaninia, S., Shakeri, A. & Hayat, R. 2012. First record of the genus *Trichopsomyia* Williston, 1888 (Diptera: Syrphidae) from Iran. *Turkish Journal of Zoology*, 36(5): 725–727.
- Khaghaninia, S., Jafarlu, M., Khaiaban, N. G. & Askari, O. 2010a. Introduction to hover flies (Diptera: Syrphidae) of sunflower and pumpkin fields in West Azerbaijan province-Iran. *Munis Entomology & Zoology*, 5 (1): 270–277.
- Khaghaninia, S., Farshbaf Pour Abad, R. & Hayat, R. 2010b. Seven species as new records for hover flies fauna of Iran (Diptera, Syrphidae) from Qaradag Forests. *Munis Entomology & Zoology*, 5 (1): 307–308.
- Mehrabi, R. & Ssymank, A. 2008. Species composition and flower visiting by Syrphidae (Diptera) in north-eastern Iran. *Zoology in the Middle East*, 45: 73–78.
- Modarres, A.M. 1994. *List of Agricultural Pests and Their Natural Enemies in Iran*. Ferdowsi Univ. Pub., No. 147, 364 pp.
- Naderloo, M., Pashaei rad, S. 2010 A new record of the genus *Spazigaster* (Diptera: Syrphidae) from Iran. *Zoology in the Middle East*, 50: 147–148.
- Peck, L.V. 1988. Syrphidae. In: Soos, A. & Papp, L. (eds.), *Catalogue of Palaearctic Diptera*, 8. Elsevier Science Pub., Netherlands/Academiai Kiado, Hungary. 230 pp.
- Rojo, S., Gilbert, F., Marcos-Garcia, M.A., Nieto, J.M. & Mier, M.P. 2003. *A World Review of Predatory Hoverflies (Diptera: Syrphidae: Syrphinae) and their prey*. CIBIO (Centro Iberoamericano de Biodiversidad). University of Alicante Publications. 319 pp.
- Sommaggio, D. 1999. Syrphidae: can they be used as environmental bioindicators? *Agriculture, Ecosystems & Environment*, 74: 343–356.

- Stanescu, C. 1992. Sur le genre *Paragus* Latreille, 1804 (Diptera, Syrphidae) en Roumanie. *Travaux du Museum National d'Historire Naturelle "Grigore Antipa"*, 32: 197–209.
- Speight, M.C.D. 1986. Criteria for the selection of insects to be used as bioindicators in nature conservation research, pp. 485–488. In: *Proceedings of 3rd European congress of Entomology*, Velthuis, H.H.W.(Ed.), Amsterdam, August 1986. Amsterdam, The Netherlands.
- Speight, M.C.D. 2011. *Species accounts of European Syrphidae (Diptera), Glasgow 2011*. Syrph the Net, the database of European Syrphidae 65, Syrph the Net publications, Dublin. 285 pp.

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