



Entomofauna

ZEITSCHRIFT FÜR ENTOMOLOGIE

Band 38, Heft 6: 89-104

ISSN 0250-4413

Ansfelden, 2. Januar 2017

Species inventory of Megachilidae (Hymenoptera: Apoidea) in south of Fars province, Iran

**Shahram FALAMARZI, Behzad HABIBPOUR,
Mohammad Saeed MOSSADEGH & Alireza MONFARED**

Abstract

The study was conducted in Fars province between 2012 and 2014. The pollinator bees of the family Megachilidae were collected from different natural areas. The annotated list of 46 species in 11 genera of bees is given. Subgenus *Stenosmia* MICHENER, species *Coelioxys* cf. *acanthopyga* ALFKEN, 1940, *Megachile insignis* van der ZANDEN, 1996, *Megachile walkeri* DALLA TORRE, 1896, *Megachile dolosa* ALFKEN, 1936, *Megachile orientalis* MORAWITZ, 1895, *Hoplitis (Stenosmia) aravensis* (van der ZANDEN, 1992) and *Hoplitis fasciculata* (ALFKEN, 1934) are the first record for Iran. Also 22 species are newly recorded from Fars Province. Some ecological notes concerning *H. aravensis* were given. *Cornulaca aucheri* Moq. (Amaranthaceae), a desert halophyte plant, is also mentioned for the first time as a host plant for Megachilids.

Zusammenfassung

Die Studie ist in der Provinz Fars zwischen 2012 und 2014 durchgeführt worden. Die Bestäuberbienen aus der Familie Megachilidae wurden da gesammelt, wo sie in der Natur einheimisch sind. Es wird eine Liste von 46 Bienenarten aus 11 Gattungen hier veröffentlicht. Die Folgenden erscheinen erstmalig in Iran: Die Unterart *Stenosmia* MICHENER, die Arten *Coelioxys* cf. *acanthopyga* ALFKEN, 1940, *Megachile insignis* van der ZANDEN, 1996, *Megachile walkeri* DALLA TORRE, 1896, *Megachile dolosa* ALFKEN, 1936, *Megachile orientalis* MORAWITZ, 1895, *Hoplitis (Stenosmia) aravensis* van der ZANDEN, 1992, und *Hoplitis fasciculata* ALFKEN, 1934. Des weiteren werden 22 Arten als neu in der Provinz Fars aufgeführt. Für *Hoplitis aravensis* werden bestimmte ökologische Angaben gemacht. *Cornulaca aucheri* MOQ. (Amaranthaceae), eine Pflanze aus der Salzwüste, wird hier zum ersten Mal als Wirt für Megachiliden erwähnt.

Introduction

The Iranian megachilids fauna has been studied by several researchers (POPOV 1967, ESMALI & RASTEGAR 1974, WARNCKE 1981,1982; IZADI et al. 1998, KHAGHANINIA et al. 2010, KHODAPARAST & MONFARED 2012, NADIMI et al. 2013a,b; NADIMI et al. 2014). To date, 132 megachilid species have been recorded from Iran in "Discover Life's bee species guide and world checklist" (ASCHER & PICKERING 2015). Two faunistic studies on megachilids of Fars province were conducted by IZADI et al. (1998) and KHODAPARAST & MONFARED (2012). Although a recently extensive survey on Apoidea in Fars province led to identification of 39 species of Megachilidae, but fewer materials were collected in south of this province comparing to other localities. Because of warm climates and presence of a diverse plant community, particularly halophytic species, it appears that the faunistic composition of this family in this area can be different from north of that area. Thus we conducted faunistic study to complement species list and explore new species. In the present work we document faunal information of bees of Megachilids in south of Fars province, plant associations and their distributions.

Material and Methods

Megachilids fauna of different localities (Table 1) in south of Fars province was studied during 2012 to 2014. The Fars province is located in southern Iran, between 27°01' and 31°51'N and between 50°27' and 55°45'E. Fars is the fourth largest province of Iran, covering an area of 125,000 km². Specimens were collected by sweeping net and hand-held vacuum cleaner from flowering plants. Bees were killed with ethyl acetate and pinned according to the standard methods. The insects were identified using valid related keys (WARNCKE 1980, 1992; BANASZAK & ROMASENKO 1998; MICHENER 2007; AMIET et al. 2004; SCHEUCHL 2006). In this study, a total of 1020 specimens were collected. The plants visited by the bees were also identified. All identifications were confirmed by Andreas Müller, (ETH Zurich, Entomological Collection, Schmelzbergstrasse, Zurich,

Switzerland) and Christophe Praz (University of Neuchatel, Laboratory of Evolutionary Entomology, Neuchatel, Switzerland). Host plants were identified by Azizollah Jafari (Department of Botany, Center for Research in Natural Resource and Animal Husbandry, Yasuj University, Yasuj, Iran) and Hossein Akhiani (Department of Plant Sciences, College of Science, University of Tehran). All identified species were deposited in the Insect Museum, Plant Protection Group at the Faculty of Agriculture, Shahid Chamran University, Ahwaz, Iran. The species reported for the first time from Iran and Fars province are marked with ** and * respectively. In six cases we were not able to identify the specimens to species level.

Results

Our effort revealed 46 species of Megachilidae belonging to 11 genera, in addition to distributional data and plant preferences. Of these, we report here seven species and one subgenus of these bees for the first time in Iran and 22 species for the study area. Some notes concerning *H. aravensis* as a new record of the subgenus *Stenosmia* and *C. aucheri* as a new host plant for this family are also provided.

List of species

Family Megachilidae

Subfamily Lithurginae

Genus *Lithurgus* LATREILLE, 1825

Lithurgus chrysurus FONSCOLOMBE, 1834

Material examined: Iran, Fars, Firouzabad, Dehroud, 24.V.2013, 2♂♂; 9.v.2014, 3♀♀
4♂♂; Qir, 8.v.2014, 1♂.

Flower preference: *Centaurea* sp. (Asteraceae).

Subfamily Megachilinae

Tribe Anthidiini

Genus *Anthidium* FABRICIUS, 1804

Anthidium (Anthidium) gussakovskiji MAVROMOUSTAKIS, 1939 *

Material examined: Iran, Fars, Qir, 7.VI.2012, 2♂♂; Qir, 18.V.2013, 4♀♀ 2♂♂; Firouzabad, Dehroud, 24.V.2013, 1♀.

Flower preference: *Centaurea* sp. (Asteraceae), *Vitex agnus-castus* (Lamiaceae).

***Anthidium (Gulanthidium) anguliventre* MORAWITZ, 1888**

Material examined: Iran, Fars, Firouzabad, Dehroud, 7.VI.2012, 2♀♀; Qir, Khoshab, 26.VI.2012, 1♀.

Flower preference: *Centaurea* sp. (Asteraceae), *Vitex agnus-castus* (Lamiaceae).

Anthidium diadema* LATREILLE, 1809

Material examined: Iran, Fars, Lar, Jouyom, 22.IV.2012, 1♀; Qir, 15.VI.2012, 1♀; Kavar, 26.V.2013, 2♂♂; Firouzabad, Abshirin, 24.III.2014, 1♂.

Flower preference: *Centaurea* sp. (Asteraceae).

***Anthidium (Proanthidium) aff. undulatum* DOURS, 1873**

Material examined: Iran, Fars, Qir, Tange Karzin, 28.VI.2013, 1♀; Qir, Shaldan, 5.VII.2013, 2♀♀ 2♂♂.

Flower preference: *Alhagi* sp. (Fabaceae).

Genus *Eoanthidium* POPOV, 1950

***Eoanthidium (Eoanthidium) cf. judaeense* (MAVROMOUSTAKIS, 1945)**

Material examined: Iran, Fars, Qir, Tange Karzin, 28.VI.2013, 2♀♀ 2♂♂; Qir, Rikan, 5.VII.2013, 1♀.

Flower preference: *Alhagi* sp. (Fabaceae).

Eoanthidium (Clisanthidium) nasicum* (FRIESE, 1917)

Material examined: Iran, Fars, Qir, Rikan, 2.VII.2013, 1♀; Firouzabad, Babanajm, 16.VIII.2013, 2♂♂; Qir, Rikan, 20.VIII.2013, 1♂; Qir, Shaldan, 23.VIII.2013, 1♀ 1♂.

Flower preference: *Centaurea* sp. (Asteraceae), *Vitex agnus-castus* (Lamiaceae).

Genus *Pseudoanthidium* FRIESE, 1898

***Pseudoanthidium (Pseudoanthidium) scapulare* (LATREILLE, 1809)**

Material examined: Iran, Fars, Firouzabad, Abshirin, 24.III.2014, 1♀.

Flower preference: *Centaurea* sp. (Asteraceae), *Alhagi* sp. (Fabaceae).

Genus *Icteranthidium* MICHENER, 1948

Icteranthidium ferrugineum discoidale (LATREILLE, 1809)*

Material examined: Iran, Fars, Qir, Rikan, 5.VII.2013, 1♀; Firouzabad, Babanajm, 24.VII.2013, 1♀; Qir, 26.VII.2013, 1♀; Qir, Heydarabad, 26.VII.2013, 1♀; Firouzabad, Babanajm, 16.VIII.2013, 1♂; Qir, Rikan, 20.VIII.2013, 1♀ 1♂.

Flower preference: *Centaurea* sp. (Asteraceae), *Cornulaca aucheri* (Amaranthaceae).

Genus *Afranthidium* MICHENER, 1948

Afranthidium carduele (MORAWITZ, 1876)*

Material examined: Iran, Fars, Firouzabad, Abshirin, 15.V.2014, 1♀; Qir, 27.V.2014, 1♀.

Flower preference: *Centaurea* sp. (Asteraceae), *Vitex agnus-castus* (Lamiaceae).

Genus *Anthidiellum* COCKERELL, 1904

Anthidiellum (Anthidiellum) strigatum (PANZER, 1805)

Material examined: Iran, Fars, Qir, Shaldan, 5.VII.2013, 1♂.

Flower preference: *Alhagi* sp. (Fabaceae).

Tribe Osmiini

Genus *Hoplitis* KLUG, 1807

Hoplitis (Pentadentoscia) rufopicta (MORAWITZ, 1875)

Material examined: Iran, Fars, Firouzabad, Dehroud, 24.V.2013, 1♀; Firouzabad, Abshirin, 15.V.2014, 2♀♀; Firouzabad, Dehroud, 9.V.2014, 1♂.

Flower preference: *Centaurea* sp. (Asteraceae).

Hoplitis fasciculata (ALFKEN, 1934)**

Material examined: Iran, Fars, Qir, 11.V.2013, 5♀♀ 1♂; Firouzabad, Dehroud, 24.V.2013, 2♀♀ 2♂♂; Firouzabad, Dehroud, 9.V.2014, 1♀ 3♂♂; Qir, 23.V.2014, 2♀♀ 2♂♂; 27.V.2014, 14♀♀ 3♂♂.

Flower preference: *Centaurea* sp. (Asteraceae).

Comments: The current survey indicates the easternmost distribution record of *H. fasciculata* so far. In contrast to more western populations with entirely black, our collected females are partly red-coloured (MÜLLER 2015).

Previous known distribution: Greece, Italy, France, Cyprus, Jordan, Syria, Turkey

Hoplitis (Stenosmia) aravensis* (ZANDEN, 1992)*

Material examined: Iran, Fars, Khonj, Kahnouyeh, 20.III.2014, 105♀♀ 6♂♂.; Qir, Tang-e-rouine, 25.III.2014, 11♀♀ and 1♂.

Flower preference: *Tamarix* sp. (Tamaricaceae).

Hoplitis (pentadentosmia) nitidula* (MORAWITZ, 1877)

Material examined: Iran, Fars, Khonj, Seyfabad, 11.IV.2014, 1♂.

Flower preference: *Centaurea* sp. (Asteraceae).

Hoplitis (Alcidamea) sp.

Material examined: Iran, Fars, Firouzabad, Dehroud, 4.IV.2014, 1♀.

Flower preference: *Centaurea* sp. (Asteraceae).

Hoplitis (Anthocopa) sp.

Material examined: Iran, Fars, Firouzabad, Dehroud, 4.IV.2014, 1♂.

Flower preference: *Centaurea* sp. (Asteraceae).

Hoplitis (Anthocopa) sp.

Material examined: Iran, Fars, Fasa, Zahedshahr, 24.IV.2012, 1♂.

Flower preference: *Medicago sativa* (Fabaceae).

Genus *Osmia* PANZER, 1806

***Osmia (Helicosmia) fasciata* LATREILLE, 1811**

Material examined: Iran, Fars, Lamerd, 18.III.2014, 2♀♀ 3♂♂.; Firouzabad, Dehroud, 9.V.2014, 12♀♀ 3♂♂.; Firouzabad, Abshirin, 16.V.2014, 9♀♀.

Flower preference: *Centaurea* sp. (Asteraceae).

Osmia (Pyrosmia) viridana* MORAWITZ, 1874

Material examined: Iran, Fars, Qir, 14.III.2014, 1♀.

Flower preference: *Matricaria* sp. (Asteraceae).

Tribe Megachilini

Genus *Megachile* LATREILLE, 1802

Megachile (Creightonella) albisecta (KLUG, 1817)

Material examined: Iran, Fars, Qir, 11.V.2013, 3♀♀; Qir, 19.V.2013, 1♀; Qir, 22.V.2013, 1♀; Qir, 13.V.2014, 3♀♀ 2♂♂; Qir, 22-23.V.2014, 10♀♀ 1♂; Qir, 27.V.2014, 1♀; Qir, Heydarabad, 30.V.2014, 1♀.

Flower preference: *Centaurea* sp. (Asteraceae), *Vitex agnus-castus* (Lamiaceae), *Prosopis* sp. (Fabaceae), *Cornulaca aucheri* (Asteraceae).

Megachile (Creightonella) sp.

Material examined: Iran, Fars, Firouzabad, Dehroud, 9.V.2014, 2♀♀ 1♂.

Flower preference: *Centaurea* sp. (Asteraceae).

Megachile (Pseudomegachile) saussurei RADOSZKOWSKI, 1874*

Material examined: Iran, Fars, Lar, Jouyom, 22.IV.2012, 1♂.

Flower preference: *Centaurea* sp. (Asteraceae).

Megachile (Pseudomegachile) farinosa SMITH, 1853

Material examined: Iran, Fars, Qir, 15.VI.2013, 1♀; Qir, 27.VI.2013, 1♀ 2♂♂; Qir, 22.V.2013, 1♀; Qir, Rikan, 2.VII.2013, 1♀ 1♂♂; Qir, Rikan, 20.VIII.2013, 4♀♀ 2♂♂; Firouzabad, Dehroud, 6.VII.2012, 1♀; Qir, Shaldan, 5.IX.2013, 1♂; Qir, Aliabad, 3.V.2014, 2♀♀ 1♂; Jahrom, Yarg, 8.VIII.2014, 1♀.

Flower preference: *Vitex agnus-castus* (Lamiaceae), *Alhagi* sp. (Fabaceae).

Megachile (Pseudomegachile) rubripes MORAWITZ, 1875

Material examined: Iran, Fars, Firouzabad, Dehroud, 21.VI.2013, 1♀; Qir, Shaldan, 5.VII.2013, 1♂; Qir, Shaldan, 6.IX.2013, 1♀.

Flower preference: *Alhagi* sp. (Fabaceae).

Megachile (Euticharaea) apicalis SPINOLA, 1808

Material examined: Iran, Fars, Qir, 11.V.2013, 1♀; Qir, Rikan, 2.VII.2013, 1♀; Qir, Shaldan, 23.VIII.2013, 1♀; Firouzabad, Dehroud, 9.V.2014, 1♀.

Flower preference: *Centaurea* sp. (Asteraceae), *Vitex agnus-castus* (Lamiaceae).

Megachile (Eutricharaea) deceptor* PEREZ, 1890

Material examined: Iran, Fars, Firouzabad, Dehroud, 24.V.2013, 1♀.

Flower preference: *Centaurea* sp. (Asteraceae).

***Megachile (Eutricharaea) cf. fertoni* PEREZ, 1896**

Material examined: Iran, Fars, Qir, 11.V.2013, 1♀; Firouzabad, Dehroud, 24.V.2013, 1♀; Qir, 27.VI.2013, 2♂♂; Qir, Tange Karzin, 28.VI.2013, 1♂; Qir, Rikan, 2.VII.2013, 7♀♀ 2♂♂; Qir, Heydarabad, 12.VII.2013, 1♀.

Flower preference: *Vitex agnus-castus* (Lamiaceae), *Centaurea* sp., (Asteraceae), *Alhagi* sp. (Fabaceae), *Cornulaca aucheri* (Amaranthaceae).

***Megachile (Eutricharaea) cf. minutissima* RADOSZKOWSKI, 1876**

Material examined: Iran, Fars, Firouzabad, Dehroud, 24.V.2013, 2♀♀, Qir, Tange Karzin, 28.VI.2013, 10♀♀ 4♂♂; Qir, Fadam, 12.VIII.2013, 2♀♀ 1♂; Qir, Rikan, 20.VIII.2013, 1♂; Qir, Shaldan, 5.VII.2013, 4♀♀ 2♂♂; Qir, 6.V.2014, 1♀ 1♂; Firouzabad, Dehroud, 9.V.2014, 2♂♂; Jahrom, Yarg, 8.VIII.2014, 1♀.

Flower preference: *Centaurea* sp. (Asteraceae), *Vitex agnus-castus* (Lamiaceae), *Alhagi* sp. (Fabaceae), *Cucumis melo* (Cucurbitaceae), *Coriandrum sativum* (Asteraceae), *Punica granatum* (Punicaceae).

***Megachile (Eutricharaea) cf. anatolica* REBMANN, 1968**

Material examined: Iran, Fars, Qir, Tange Karzin, 28.VI.2013, 2♂♂; Qir, Shaldan, 5.VII.2013, 2♀♀; Firouzabad, Dehroud, 24.VII.2013, 1♀; Qir, Aliabad, 10.VIII.2013, 2♀♀; Qir, Rikan, 20.VIII.2013, 3♀♀ 1♂; Qir, 30.VI.2013, 2♀♀ 1♂; Qir, 6.V.2014, 1♂.

Flower preference: *Vitex agnus-castus* (Lamiaceae), *Alhagi* sp. (Fabaceae), *Cucumis melo* (Cucurbitaceae).

***Megachile (Eutricharaea) picicornis* MORAWITZ, 1877**

Material examined: Iran, Fars, Qir, Abgarm, 21.IV.2012, 1♂; Qir, Emamshahr, 10.VI.2013, 1♀; Qir, Rikan, 2.VII.2013, 1♀ 1♂; Qir, Shaldan, 5.VII.2013, 1♀; Qir, 13.V.2014, 8♀♀ 1♂; Qir, Najafabad, 13.VI.2014, 1♀.

Flower preference: *Centaurea* sp. (Asteraceae), *Vitex agnus-castus* (Lamiaceae), *Alhagi* sp. (Fabaceae).

***Megachile (Eutricharaea) leachella* CURTIS, 1828**

Material examined: Iran, Fars, Qir, Shaldan, 23.VIII.2013, 2♀♀; Qir, 29.VIII.2013, 1♀.

Flower preference: *Vitex agnus-castus* (Lamiaceae), *Alhagi* sp. (Fabaceae).

Megachile (Eutricharaea) walkeri* DALLA TORRE, 1896*

Material examined: Iran, Fars, Firouzabad, Dehrud, 24.V.2013, 1♀.

Flower preference: *Centaurea* sp. (Asteraceae).

Megachile (Eutricharaea) insignis* van der ZANDEN, 1996*

Material examined: Iran, Fars, Qir, Rikan, 5.VII.2013, 1♂.

Flower preference: *Vitex agnus-castus* (Lamiaceae).

Megachile (Eutricharaea) dolosa* ALFKEN, 1936*

Material examined: Iran, Fars, Qir, Heydarabad, 23.VI.2012, 2♀♀ 1♂; 12.VII.2013, 4♀♀; 10.VIII.2013, 1♂; 30.V.2014, 3♀♀.

Flower preference: *Cornulaca aucheri* (Amaranthaceae).

Megachile (Eutricharaea) orientalis* MORAWITZ, 1895*

Material examined: Iran, Fars, Qir, Heydarabad, 5.VII.2012, 2♀; 26.VI.2013, 4♀♀ 2♂♂; 26.VII.2013, 1♂; 20.VI.2014, 1♀.

Flower preference: *Cornulaca aucheri* (Amaranthaceae).

Megachile (Eutricharaea) semicircularis* van der ZANDEN, 1996

Material examined: Iran, Fars, Lar, Jouyom, 22.IV.2012, 1♂.

Flower preference: *Centaurea* sp. (Asteraceae).

***Megachile* sp.**

Material examined: Iran, Fars, Qir, Heydarabad, 24.VI.2013, 2♀♀; 28.VI.2013, 6♀♀, Qir, Shaldan, 5.VII.2013, 1♂.

Flower preference: *Cornulaca aucheri* (Amaranthaceae), *Alhagi* sp. (Fabaceae).

***Megachile* sp.**

Material examined: Iran, Fars, Qir, Heydarabad, 26.VII.2013, 1♂; 30.VII.2014, 1♀.

Flower preference: *Cornulaca aucheri* (Amaranthaceae).

Genus *Coelioxys* LATREILLE, 1809

Coelioxys (Liothyrapis) decipiens* SPINOLA, 1838

Material examined: Iran, Fars, Zarrindasht, 22.IV.2012, 1♀; Firouzabad, Dehrud, 21.VI.2013, 4♀♀.

Coelioxys (Allocoelioxys) afra* LEPELETIER, 1841

M a t e r i a l e x a m i n e d : Iran, Fars, Qir, Rikan, 2.VII.2013, 1♂; Qir, Fadam, 12.VIII.2013, 1♀ 1♂; Qir, Rikan, 20.VIII.2013, 1♀.

Coelioxys (Allocoelioxys) iranica* WARNCKE, 1992

M a t e r i a l e x a m i n e d : Iran, Fars, Qir, Heydarabad, 28.VI.2013, 1♀; Qir, Rikan, 5.VII.2013, 1♂.

Coelioxys (Allocoelioxys) caudata* SPINOLA, 1838

M a t e r i a l e x a m i n e d : Qir, 22.V.2013, 1♀; 6.VI.2013, 1♀.

Coelioxys (Mesocelioxys) argentea* LEPELETIER, 1841

M a t e r i a l e x a m i n e d : Iran, Fars, Qir, 6.VI.2013, 1♀.

Coelioxys (Allocoelioxys) cf. acanthopyga* ALFKEN, 1940*

M a t e r i a l e x a m i n e d : Iran, Fars, Firouzabad, Dehroud, 24.V.2013, 2♂♂; Firouzabad, Dehroud, 21.VI.2013, 1♀; Qir, Rikan, 2.VII.2013, 1♀.

***Coelioxys* sp.**

M a t e r i a l e x a m i n e d : Iran, Fars, Qir, Heydarabad, 7.V.2012, 2♂♂.

Some Ecological notes regarding *Hoplitis aravensis*

***Hoplitis (Stenosmia) aravensis* (ZANDEN, 1992)**

1992 *Stenosmia aravensis* ZANDEN, Linzer Biologische Beiträge 24: 822. Type material: Holotype ♂, "4 km W of Hazewa, Arava" [Israel], RMNH (Leiden); paratypes mm, ff.

Stenosmia aravensis ZANDEN, 1992: 822. Type material: Holotype ♂, "4 km W of Hazewa, Arava" (Israel), Naturalis Biodiversity Center Leiden.

P r e v i o u s k n o w n d i s t r i b u t i o n : Israel, Palestine, Syria.

Flower preferences: Presumably oligolectic on *Tamarix* sp. (Tamaricaceae) based on (MÜLLER, 2014) and current study in which a large number of pollen-collecting females were observed along with nectar-sucking males on host plant flowers (Figs. 1-2) at two locations in Fars province in southwestern of Iran in March 2014.

Record of *Cornulaca aucheri* moq. as a first host plant for Megachilids and possibly other pollinator bees of Apoidea

Cornulaca aucheri is a desert halophyte plant (Figs. 3-5) distributed in the Arabian Peninsula, Iraq, Iran, Pakistan and Afghanistan. This plant has short leaves that modified

to rigid spines and tiny flower (perianth length is about 2mm) (BOULOS 1996). To date any Megachilidae was not recorded on it (A. MÜLLER pers. comm. 2015).

Six *Megachile* species including *M. albisecta*, *M. fertoni*, *M. orientalis*, *M. dolosa*, two undetermined species, *Icterantheidium ferrugineum discoidale* and many other pollinator bees of Apoidea were observed and collected on this plant.

Discussion

Of the identified species, tribe Anthidiini and Megachilini are presented by the greatest number of (6) genera and (26) species respectively. The genus *Megachile* has greatest number of species (19). According a previous study on this family in Fars (KHODAPARAST & MONFARED 2012) the tribe Megachilini, Osmiini, and Anthidiini comprised 43 %, 35% and 22% of identified species, respectively, whereas 56% of our species belongs to tribe Megachilini and only 19% of them were osmiine bees. For example only two species of *Osmia* were collected, which indicates the genus' geographical distribution is restricted to colder localities of Fars province. Results of this survey and former ones indicate that *Vitex agnus-castus* (Lamiaceae) can be regarded as the mostly preferred plant for member of this family in the study area. At least 21 species have been collected from this plant.

South of Fars province has a different climate and plant flora from north of that area. This difference can lead to changes in the insect species composition on plants. Flora in this area contains diverse halophytic plants such as *Tamarix* sp. and *C. aucheri*. These plants are very attractive to different species of bees including megachilids and present important foraging resources in dry conditions. *C. aucheri* flowers are very small and easy to overlook, therefore sampling of bees on this plant may be done rarely. We accidentally encountered bees foraging on it. *C. aucheri* is mentioned for the first time as a host plant for pollinator bees, including Megachilidae in the world. This plant species has a rich fauna of Apoidea. For example in this study many diverse bees particularly four species of uncommon red-leg *Megachile* belonging to the subgenus *Eutricharaea* were collected from this plant. These bees were so similar in morphology that for assembling females and males in each species, sequencing one mitochondrial gene fragment of DNA was needed (unpublished data by C. PRAZ 2015). Wing geometric morphometrics can be used in the case of closely related species of red *Eutricharaea* that is not easy to discriminate based on other criteria. Investigation on wing geometry of megachilids particularly cryptic species can be complemented by molecular studies.

On *Tamarix* sp., *H. aravensis* was also collected which has been reported only from the Levant so far. This species belongs to subgenus *Stenosmia* that was previously mentioned as a genus (MICHENER 2007, UNGRICHTS et al. 2008). However, according to molecular phylogeny of the Osmiine bees (PRAZ et al. 2008), this genus was placed as a subgenus within the genus *Hoplitis*. As a result of this study hitherto, *H. aravensis* is the only species of the subgenus *Stenosmia* which has been recorded from Iran.

Because of rare and few sampled halophytic plant species, an extensive survey was proposed on bees faunas in south of Fars that can provide an opportunity for interesting discoveries of megachilids as well as other Apoidea pollinators among the Iranian bee fauna. For conservation of wild bees including megachilids we should investigate on their plant

preference. For this, we can't rely on field observations regardless of bees' pollen load composition.

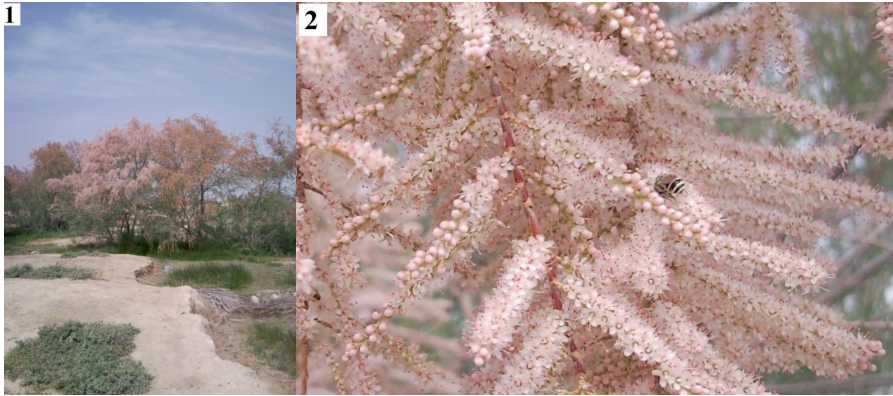
Acknowledgments

The authors thank the Plant Protection Department, Faculty of Agriculture, University of Shahid Chamran Ahvaz for financial and technical assistance. We are grateful to Dr. A. Müller and Dr. Christophe Praz for determining specimens and providing literatures. Our great thanks are due to Ehsan Moradi for his help during field survey and collecting of the bees, Dr. Azizollah Jafari and Dr. Hossein Akhani for identification of host plants, Sasan Gholami, Mohammad Falamarzi and Ms. Bahareh Goodarzi (Iranian Pollinator Insects Museum, in Yasouj University) for valued helps.

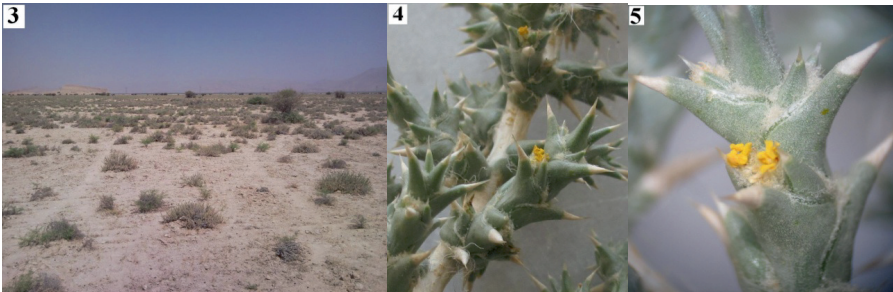
References

- ABROL D.P. (2012): Pollination Biology. Biodiversity Conservation and Agricultural Production. – Springer Publication, UK, p. 792.
- AMIET F., HERMANN M., MÜLLER A. & R. NEUMEYER (2004): Hymenoptera Apidae. 4 Teil: Gattungen *Anthidium*, *Chelostoma*, *Coelioxys*, *Dioxys*, *Heriades*, *Lithurgus*, *Megachile*, *Osmia*, *Stelis*. – Fauna Helvetica **9**, Centre Suisse de Cartographie de la Faune & Schweizerische Entomologische Gesellschaft, Luzern, p. 273.
- ASCHER J.S. & J. PICKERING (2015): Discover Life bee species guide and world checklist (Hymenoptera: Apoidea: *Anthophila*). – http://www.discoverlife.org/mp/20q?guide=Apoidea_species.
- BANASZAK J. & L. ROMASENKO (1998): Megachilid bees of Europe (Hymenoptera, Apoidea, Megachilidae). – Pedagogical University of Bydgoszcz, Bydgoszcz, p. 239.
- BOULOS L. (1996): Chenopodiaceae; 233-283. – In: Flora of the Arabian Peninsula and Socotra Vol. **1** (MILLER A.G. & T.A. COPE eds.). Edinburgh University Press, Edinburgh, p. 586.
- BOSCH J., KEMP W.P. & G.E. TROSTLE (2006): Bee population returns and cherry yields in an orchard pollinated with *Osmia lignaria* (Hymenoptera: Megachilidae). – Journal of Economic Entomology **99**: 408-413.
- CANE J.H. (2008): Bees (Hymenoptera: Apoidea: Apiformes). 419-434. – In: Encyclopedia of Entomology. (Capinera, J. L., ed.). Springer-Verlag Press. New York, New York, p. 2580.
- ESMAILI M. & R. RASTEGAR (1974): Identified species of Aculeate Hymenoptera of Iran. – Journal of Entomological Society of Iran **2**: 43-46.
- IZADI H., EBADI R. & A.A. TALEBI (1998): An introduction of Pollinator bees of north parts of Fars Province, Iran. – Journal of Sciences and Technology of Agriculture and Natural Resources **2**: 89-103. [in Persian, with English summary]
- KEVAN P.G. (1999): Pollinators as bioindicators of the state of the environment: species, activity and diversity. – Agriculture, Ecosystems and Environment **74**: 373-393.
- KHAGHANINIA S., GÜLER Y. & M. MOUSAVI (2010): Megachilids Bees (Hymenoptera: Apoidea)

- of Aynali forests with four new records for Iran. – *Munis Entomology & Zoology* **5**: 890-895.
- KHODAPARAST R. & A. MONFARED (2012): A survey of bees (Hymenoptera: Apoidea) from Fars Province, Iran. – *Zootaxa* **3445**: 37-58.
- MICHENER C.D. (2007): *The Bees of the World* [2nd Edition]. – Johns Hopkins University Press, Baltimore, xvi + [i] + 953 pp. + 20 pls.
- MÜLLER A. (2014): Palaearctic *Hoplitis* bees of the subgenus *Stenosmia* (Megachilidae, Osmiini): biology, taxonomy and key to species. – *Zootaxa* **3765**: 301-316.
- MÜLLER A. (2015): Palaearctic Osmiine Bees, ETH Zürich. – <http://blogs.ethz.ch/osmiini>
- NADIMI A., TALEBI A.A. & Y. FATHIPOUR (2013a): The tribe Osmiini (Hymenoptera: Megachilidae) in the north of Iran: new records and distributional data. – *Entomofauna* **34**: 205-220.
- NADIMI A., TALEBI A.A. & Y. FATHIPOUR (2013b): A preliminary study of the cleptoparasitic bees of the genus *Coelioxys* (Hymenoptera: Megachilidae) in northern Iran, with six new records. – *Journal of Crop Protection* **2**: 271-293.
- NADIMI A., TALEBI A.A., ZHU C.D. & Y. FATHIPOUR (2014): Study of the tribe Anthidiini (Hymenoptera: Megachilidae) in northern Iran, with the description of a new species. – *North-Western Journal of Zoology* **10**: 413-424.
- PITTS-SINGER T.L. & J.H. CANE (2011): The alfalfa leafcutting bee, *Megachile rotundata*: the world's most intensively managed solitary bee. – *Annual Review of Entomology* **56**: 221-237.
- POPOV V.B. (1967): The bees (Hymenoptera: Apoidea) of Iran. – *Trudy Zoologicheskogo Instituta Leningrad* **43**: 184-215.
- PRAZ C.J., MÜLLER A., DANFORTH B.N., GRISWOLD T.L., WIDMER A. & S. DORN (2008): Phylogeny and biogeography of bees of the tribe Osmiini (Hymenoptera: Megachilidae). – *Molecular Phylogenetics and Evolution* **49**: 185-197.
- SCHEUCHL E. (2006): *Illustrierte Bestimmungstabellen der Wildbienen Deutschlands und Österreichs*. – Band **2**: Megachilidae und Melittidae. Zweite erweiterte Auflage. Eigenverlag, p. 192.
- UNGRICHT S., MÜLLER A. & S. DORN (2008): 'A taxonomic catalogue of the Palaearctic bees of the tribe Osmiini.' – *Zootaxa* **1865**: 1-253.
- WARNCKE K. (1980): Die Bienengattung *Anthidium* FABRICIUS, 1804, in der Westpaläarktis und imTurkestanischen Becken. – *Entomofauna* **1**: 119-209.
- WARNCKE K. (1981): Beitrag zur Bienenfauna des Iran: 13. Die Bienengattung *Lithurgus*. – *Bollettino del Museo Civico di Storia Naturale di Venezia* **31**: 197-199.
- WARNCKE K. (1982): Beitrag zur Bienenfauna des Iran: 15. Die Gattung *Anthidium* F. – *Bollettino del Museo Civico di Storia Naturale di Venezia* **32**: 171-196.
- WARNCKE K. (1992): Die Westpaläarktischen Arten der Bienengattung *Coelioxys* LATR. (Hymenoptera, Apidae, Megachilinae). – *Berlinische Gesellschaft Naturforschender Freunde* **53**: 31-77.



Figs. 1–2: Habitat of Iranian specimens of *Hoplitis (Stenosmia) aravensis* (ZANDEN, 1992). (1) *Tamarix* sp. in southwestern Iran (Fars province) with large number of females and males on it; (2) A female specimen is seen on flower of host plant in this picture.



Figs. 3-5: *Cornulaca aucheri* habitat and morphology. (3) Habitat of plant in a desert region of Fars Province around Qir city; (4) Stems with spiny leaves and small flowers; (5) Close up of tiny flowers.

Table 1. List of sampling sites

No	Sampling site	Coordinates	Altitude
1	Fasa, Zahedshahr	28°42'43.85"N 53°49'56.01"E	1175 m
2	Firouzabad, Abshirin	28°35'40.34"N 52°36'17.43"E	958 m
3	Firouzabad, Babanajm	28°32'02.22"N 52°44'42.11"E	1105 m
4	Firouzabad, Dehroud	28°36'49.87"N 52°34'26.96"E	886 m
5	Jahrom, Yarg	28°35'01.76"N 53°09'24.25"E	827 m
6	Kavar	29°19'29.13"N 52°38'55.44"E	1508 m
7	Khonj, Kahnouyeh	28°03'30.85"N 53°16'17.24"E	600 m
8	Khonj, Seyfabad	28°09'02.14"N 53°09'34.56"E	578 m
9	Lamerd	27°20'56.06"N 53°11'34.01"E	412 m
10	Lar, Jouyom	28°14'14.27"N 53°59'12.45"E	846 m
11	Qir	28°27'44.61"N 53°03'08.22"E	722 m
12	Qir, Abgarm	28°17'20.35"N 53°04'39.90"E	638 m
13	Qir, Aliabad	28°25'08.84"N 53°11'26.19"E	698 m
14	Qir, Emamshahr	28°26'32.93"N 53°09'30.43"E	701 m
15	Qir, Fadam	28°26'06.43"N 53°05'40.98"E	696 m
16	Qir, Khoshab	28°24'41.59"N 53°00'26.83"E	796 m
17	Qir, Heydarabad	28°22'09.51"N 53°11'56.71"E	685 m
18	Qir, Najafabad	28°26'15.17"N 53°05'35.41"E	697 m
19	Qir, Rikan	28°34'28.47"N 52°58'27.90"E	1096 m
20	Qir, Shaldan	28°33'55.58"N 53°00'08.26"E	1036 m
21	Qir, Tang-e- Karzin	28°30'42.26"N 53°07'25.03"E	755 m
22	Qir, Tang-e-rouine	28°20'58.43"N 53°13'52.23"E	688 m
23	Zarrindasht	28°25'59.67"N 54°12'33.29"E	1130 m

Authors' addresses:

Shahram FALAMARZI

Behzad HABIBPOUR

Mohammad Saeed MOSSADEGH

Department of Plant Protection, College of Agriculture,

Shahid Chamran University of Ahvaz, Ahvaz, Iran

Corresponding author, e-mail: habibpour_b@scu.ac.ir

Alireza MONFARED

Department of Plant Protection, Faculty of Agriculture,

Yasouj University, Yasouj, Iran

Druck, Eigentümer, Herausgeber, Verleger und für den Inhalt verantwortlich:

Maximilian SCHWARZ, Konsulent f. Wissenschaft der Oberösterreichischen Landesregierung, Eibenweg 6, A-4052 Ansfelden, Austria; maximilian.schwarz@liwest.at.

Redaktion: Fritz GUSENLEITNER, Biologiezentrum Linz, f.gusenleitner@landesmuseum.at
Roland GERSTMEIER, Lehrstuhl f. Zoologie, TU München, gerstmei@wzw.tum.de
Thomas WITT, Tengstraße 33, D-80796 München, thomas@witt-thomas.com
Berthold CLEWING, Akademischer Verlag München, avm@druckmedien.de
Harald SULAK, Museum Witt München, h.sulak@atelier-sulak.de

Mitarbeiter: Karin TRAXLER, Biologiezentrum Linz, bio.redaktion@landesmuseum.at
Heike REICHERT, Museum Witt München, heike_reichert66@web.de
Erich DILLER, Zool. Staatssammlung München, Erich.Diller@zsm.mwn.de

Adresse: Entomofauna, Redaktion und Schriftentausch Thomas WITT, c/o Museum Witt München, Tengstr. 33, 80796 München, Deutschland, thomas@witt-thomas.com
Entomofauna, Redaktion c/o Fritz GUSENLEITNER, Lungitzerstr. 51, 4222 St. Georgen/Gusen, Austria, f.gusenleitner@landesmuseum.at.

ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Entomofauna](#)

Jahr/Year: 2017

Band/Volume: [0038](#)

Autor(en)/Author(s): Falamarzi Shahram, Habibpour Behzad, Mossadegh Mohammed Saeed, Monfared Ali Reza

Artikel/Article: [Species inventory of Megachilidae \(Hymenoptera: Apoidea\) in south of Fars province, Iran 89-104](#)