

MEGACHILIDS BEES (HYMENOPTERA: APOIDEA) OF AYNALI FORESTS WITH FOUR NEW RECORDS FOR IRAN

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ABSTRACT: A survey was conducted on Megachilids fauna of Aynali forests, in East Azarbaijan province during 2008-2009. Fourteen species belonging to seven genera were identified which totally are as new records for studied area and four species, *Rhodanthidium septementatum* (Lepeletier, 1841), *Coelioxys afra* Lepeletier, 1841, *Megachile nigriventris* Schenck, 1870 and *Megachile lagopoda* (Linnaeus, 1761), are the new records for the Iran insect fauna.

KEY WORDS: Fauna, Bees, Apidae, Megachilidae, East Azerbaijan, Aynali forests, Iran.

Aynali forests are located in west of Qaradag forests, a registered biosphere in world heritages by UNESCO since 1976 in East Azarbaijan province, Iran. This biosphere reserve situated in the north eastern Tabriz city with a distance of 112.6 km and UTM (Universal Transfer Mercator) coordinate system, X from 654517.66 to 655110.71 E; Y from 4306958.17 to 4308226.18 N and varying latitude from 1271 m to 1336 m. This area has rich grasslands with various species of Astraceae and Juncaceae, rangelands, forests particularly with oak and hazelnut and also rivers and springs.

Megachilids bees are mostly moderate-sized (around the size of a honey bee, ranging from 5 mm to 19 mm), stout-bodied and black or yellow, white and reddish maculation bees (Banazak and Romasenko, 1995). The diversity of bees worldwide and their importance as pollinators has been well documented. Megachilidae are important native pollinators of wildflowers, fruits, vegetables and other crops. The members belonging to *Osmia* and *Megachile* are even used as commercial pollinators (like honey bees) in crops such as sweet cherry, apple, alfalfa and blueberries (Fairey et al., 1989; Romankova, 2004). In order to promote pollination, these plants have attractive features such as color, fragrances, nectar, oils and pollen which are the main resources used by bees (Abrol, 1993). The bees of the family Megachilidae show diverse nesting habits but typically they construct a linear series of natal cells in a variety of substrates including soil, under or on rocks surfaces, on and in stems, in the nest of other bees and wasps, and in tunnels in wood left by wood-boring beetles. Even a snail shell is known to serve as a nest habitat for some species (O'Brien, 2007; Hicks, 2009). As their name implies, use 0.25 to 0.5 inch circular pieces of leaves they neatly cut from plants to construct nests. They construct cigar-like nests that contain several cells. Each cell contains a ball or loaf of stored pollen and a single egg. Therefore, each cell will produce a single bee. When a bee is carrying pollen, the underside of the abdomen appears light yellow to deep gold in color. The females, except the parasitic *Coelioxys*, carry pollen on hairs on the underside of

the abdomen (scopa) rather than on the hind legs like other bees. Generally, bees of the family Megachilidae are oligolectic playing an important role in the maintenance of plant species and being irreplaceable by generalist bees (Shebl et al., 2008). So far the study of bees fauna of Iran has been poorly studied thus the identification of Megachilids of Qaradag grasslands, one of the most important grasslands in Iran, was subjected for a series studies that the ones related to Aynali forests revealed by present manuscript (Popov, 1957, 1967, Esmaili & Rastegar, 1974, Baker 1995, Engel, 2006 & Izadi et al., 2006).

MATERIAL AND METHODS

Studied specimens were collected twice a month, during 2008- 2009. Bees were caught using common handy entomological net and malaise trap in six localities (Fig. 1). The collected specimens were placed in ordinary paper envelopes after killing them in cyanid bottle in order to bring them in laboratory. The collection thus brought was placed in a desiccators (having water at its bottom) for about 24 h in order to soak and soften them. Thereafter, they were pinned using 0, 1 and 2 mounted pins and their wings and legs set on appropriate setting boards to facilitate morphological studies. For identification, the materials were examined under a Nikon (SMZ 1000) binocular microscope. The specimens were identified up to species level using valid related keys (Osychnyuk et al. 1978; Warncke, 1980, 1992; Dorn & Weber, 1988; Banaszak & Romasenko, 1998; Michener, 2000; Amiet et al., 2004 and Scheuchl, 2006).

RESULTS

Present study has richly yielded 14 species belonged to seven genera that all of them are as new records for studied region and four species which marked with an asterisk are introduced as new records for the Iran insect fauna that are listed as follows:

***Anthidium (Anthidium) cingulatum* Latreille, 1809**

Anthidium cingulatum Latreille, 1809. Ann. Mus. Hist. Nat., 13: 43.

Material examined: 5 specimens (2♀♀, 3♂♂).

General Distribution: South and Central Europe, Siberia, North Africa, Caucasus (Comba & Comba, 1991; Banaszak & Romasenko, 1998), Iran, Turkey (Warncke, 1980).

Plant association: Polylectic (Asteraceae, Fabaceae and Lamiaceae) (Banaszak & Romasenko, 1998).

***Anthidium (Anthidium) florentinum* (Fabricius, 1775)**

Apis florentina Fabricius, 1775. Syst. Ent.: 384.

Material examined: 6 specimens (2♀♀, 4♂♂).

General Distribution: USA (Comba & Comba, 1991), South and Central Europe, Siberia, Asia Minor, Central Asian part of the former USSR, Caucasus, Syria (Banaszak & Romasenko, 1998), Iran (Warncke, 1980; Izadi et al., 1999).

Plant association: Polylectic (Fabaceae and Lamiaceae) (Banaszak & Romasenko, 1998).

****Rhodanthidium (Rhodanthidium) septemdentatum* (Latreille, 1809)**

Anthidium septemdentatum Latreille, 1809. Ann. Mus. Hist. Nat., 13: 40, 210.

Synonyms: *Anthidium florentina* Spinola, 1806; *Anthidium rufiventre* Brulle, 1832; *Anthidium binominatum* Smith, 1854; *Anthidium quadridentatum* Lepeleier, 1841; *Anthidium fuscipenne* Lepeleier, 1841; *Anthidium binominatum* Smith, 1854; *Anthidium sexlineatum* Chevrier, 1872; *Anthidium nigrosetosum* Stanek, 1968.

Material examined: 3 specimens (1♀, 2♂♂).

General Distribution: South and Central Europe (Banaszak & Romasenko, 1998), Asia Minor (Comba & Comba, 1991).

Plant association: Polylectic (Fabaceae and Lamiaceae) (Banaszak & Romasenko, 1998).

****Coelioxys (Allocoelioxys) afra* Lepeletier, 1841**

Coelioxys afra Lepeletier, 1841. Hist. Nat. Insect. Hymen., 2: 525.

Synonyms: *Coelioxys 892 haste 892 892* Förestér, 1853; *Coelioxys mandibularis* Chevrier, 1872.

Material examined: 2 specimens (1♀, 1♂).

General Distribution: Turkmenistan, Kyrgyzstan, Uzbekistan, Egypt, Tunisia, Morocco, Algeria, Russia (Warncke, 1992), South, Eastern and Central Europe, Great Britain, Asia Minor (Banaszak & Romasenko, 1998), from Western Europe to China and Indonesia (Java) (Proshchalykn & Lelej, 2004), and including all of Africa (Pasteels 1977).

Note: Cleptoparasite of *Megachile leachella*, *M. pilidens* and *M. apicalis*.

***Lithurgus chrysurus* Fonscolombe, 1834**

Lithurgus chrysurus Fonscolombe, 1834. Ann. Soc. Entom. France, 3: 220, FM.

Synonyms: *Lithurgus analis* Lepeletier, 1841; *Lithurgus haemorroidalis* Lepeletier, 1841; *Lithurgus monocerus* Morawitz, 1873

Material examined: 7 specimens (4♀♀, 3♂♂).

General Distribution: Iran (Warncke, 1981), Greece, Italy, Bulgaria, the former USSR, Syria, Israel, Spain, Turkey, Rodos (Zanden, 1986), South America (Comba & Comba, 1991), South, East and Central Europe, Asia Minor, Caucasus (Banaszak & Romasenko, 1998).

Plant association: Oligolectic (Asteraceae) (Banaszak & Romasenko, 1998).

***Lithurgus cornutus* (Fabricius, 1787)**

Andrena cornuta Fabricius, 1787. Mant. Ins., 1: 298, FM.

Synonyms: *Lithurgus fuscipennis* Lepeletier, 1841; *Lithurgus umbraculatus* Lepeletier, 1841; *Lithurgus nasutus* Dufour, 1849; *Megachile monoceros* Eversmann, 1852; *Megachile dohrni* Radoszkowski, 1862; *Lithurgus maximus* Radoszkowski, 1872.

Material examined: 6 specimens (3♀♀, 3♂♂).

General Distribution: Iran (Warncke, 1981), South, East and Central Europe, Asia Minor, North Africa, Kazakhstan, Caucasus (Banaszak & Romasenko, 1998), Japan, China, Taiwan, Morocco, Italy, Yugoslavia, the former USSR, Romania, Hungary, Greece, Turkey (Zanden, 1986).

Plant association: Oligolectic (Asteraceae) (Banaszak & Romasenko, 1998; Güler & Sorkun, 2007).

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

Synonyms: *Megachile argentata* var. *fossoria* Ferton, 1909; *Megachile (Eutricharaea) leachella maadiensis* van der Zanden, 1986.

Material examined: 4 specimens (1♀, 3♂♂).

General Distribution: Caucasus, Asia, Europe, Siberia, Russian Far East, North Africa, North America (Banaszak & Romasenko, 1998), Iran (<http://www.discoverlife.org/mp/20m?kind=Megachile+leachella>).

Plant association: Polylectic (mainly Fabaceae) (Banaszak & Romasenko, 1998).

***Megachile (Eutricharaea) pilidens* Alfken, 1924**

Megachile pilidens Alfken, 1924. Rozpr. Wiadom. Mus. Dzied., 9 (1923): 88.

Synonym: *Megachile argyrea* Cockerell, 1931.

Material examined: 5 specimens (3♀♀, 2♂♂).

General Distribution: South and Central Europe (Comba & Comba, 1991), Caucasus, Asia Minor, North Africa (Banaszak & Romasenko, 1998), Iran (Scheuchl, 2006).

Plant association: Polylectic (Fabaceae and Asteraceae) (Banaszak & Romasenko, 1998).

***Megachile (Eutricharaea) rotundata* (Fabricius, 1787)**

Apis rotundata Fabricius, 1787. Mant. Insect., 1: 303.

Synonyms: *Apis pacifica* Panzer, 1798; *Megachile imbecilla* Gerstaecker, 1869; *Megachile argentata* Elfving, 1968.

Material examined: 3 specimens (1♀, 2♂♂).

General Distribution: Europe, Caucasus, Central Asian part of the former USSR, Kazakhstan, North Africa, Far East Russia, North and South America, New Zeland (Comba & Comba, 1991; Banaszak & Romasenko, 1998), Turkey (Özbek & Zanden, 1994), Iran (Izadi et al., 1999).

Plant association: Polylectic (Asteraceae, Fabaceae and Lamiaceae) (Banaszak & Romasenko, 1998).

****Megachile (Xanthosarus) nigriventris* Schenck, 1870**

Megachile nigriventris Schenck, 1870. Jahrb. Ver. Naturk. Nassau, 21-22: 324, FM.

Synonyms: *Megachile ursula* Gerstaecker, 1869; *Megachile curvicrus* Thomson, 1872; *Megachile hasticornis* Cockerell, 1924.

Material examined: 3 specimens (2♀♀, 1♂).

General Distribution: North, South and Central Europe (Banaszak & Romasenko, 1998).

Plant association: Polylectic (Rosaceae, Fabaceae and Caprifoliaceae) (Banaszak & Romasenko, 1998).

****Megachile (Xanthosarus) lagopoda* (Linnaeus, 1761)**

Apis lagopoda Linnaeus, 1761. Fauna Suec.: 922. FM.

Material examined: 2 specimens (2♀♀).

General Distribution: Europe, Caucasus, Siberia, Central Asian part of the former USSR, Far East Russia, Japan, North Africa (Comba & Comba, 1991; Banaszak & Romasenko, 1998), Turkey (Özbek, 1979).

Plant association: Polylectic (Asteraceae, Dipsacaceae, Fabaceae and Lamiaceae) (Banaszak & Romasenko, 1998).

***Megachile (Xanthosarus) maritima* (Kirby, 1802)**

Apis maritima Kirby, 1802. Monogr. Apum Angl., 2: 242, F.

Synonyms: *Megachile flaviventris* Schenck, 1853; *Megachile fluvescens* Smith, 1853; *Phyllotoma manicata* Dumeril, 1860; *Megachile kashgarensis* Cockerell, 1913; *Megachile maritima continentalis* Hedicke, 1938.

Material examined: 3 specimens (1♀, 2♂♂).

General Distribution: Europe, Caucasus, Kazakhstan, Central Asian part of the former USSR (Comba & Comba, 1991), Far East Russia (Banaszak & Romasenko, 1998), Turkey (Özbek, 1979b), Iran (Izadi et al., 1999).

Plant association: Polylectic (Asteraceae and Fabaceae) (Banaszak & Romasenko, 1998).

***Megachile (Megachile) versicolor* Smith, 1844**

Megachile versicolor Smith, 1844. Zoologist, 2: 697.

Synonyms: *Megachile rufiventris* Schenck, 1851; *Megachile octosignata* Schenck, 1859; *Megachile distinct* Perez, 1897; *Megachile pilicruriformis* Cockerell, 1928.

Material examined: 1 specimen (1♂).

General Distribution: Europe, Kazakhstan, Siberia (Banaszak & Romasenko, 1998).

Plant association: Polylectic (Asteraceae and Fabaceae) (Banaszak & Romasenko, 1998).

***Osmia (Chalcosmia) leaiana* (Kirby, 1802)**

Apis leaiana Kirby, 1802. Monographia Apum Angliae, vol. 2, p. 263.

Synonyms: *Osmia hirta* Smith, 1844; *Osmia atra* Schenck, 1853; *Osmia fulviventris* Smith, 1855; *Osmia 893haste893* Morawitz, 1869; *Osmia solskyi* Morawitz, 1870; *Osmia truncatula* Thomson, 1872; *Osmia bidens* Pérez, 1879; *Osmia forsii* Alfken, 1924.

Material examined: 2 specimens (2♀♀).

General Distribution: Europe, Caucasus, the Pyrenees, the Alps, Turkey (Banaszak & Romasenko, 1998), Iran (<http://blogs.ethz.ch/osmiini/palaeartic-species/osmia/helicosmia/>).

Plant association: Oligolectic (Asteraceae) (Banaszak & Romasenko, 1998).

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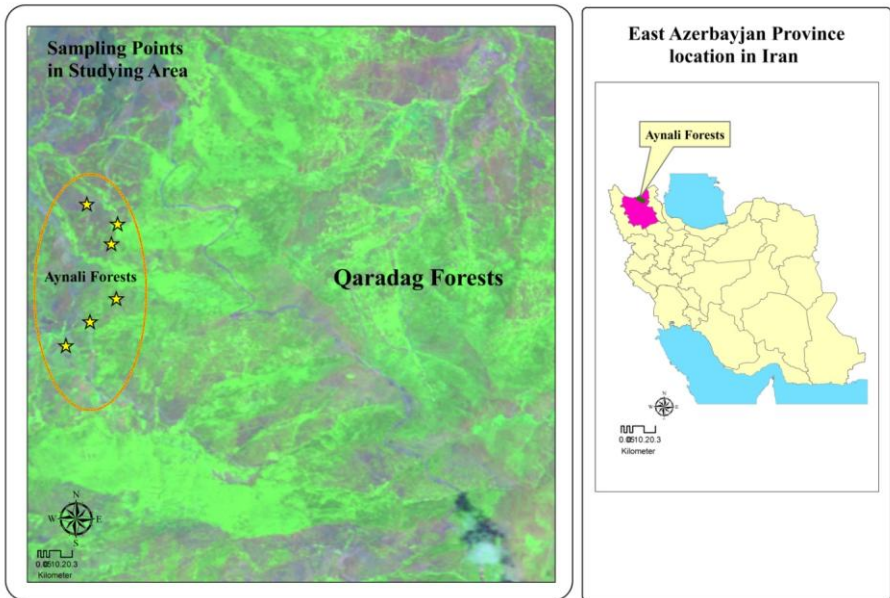


Figure 1. Location of sampling points on satellite image (SPOT) of Aynali forests.