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A survey on family Andrenidae (Hymenoptera: Apoidea) in Gorgan County, Iran

Allahverdi, S; Nadimi, A.*; Afshari, A.

Department of Plant Protection, Faculty of Plant Production, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Iran

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The Andrenidae (Hymenoptera: Apoidea) are widely distributed in the Palaearctic region. We present the results of a survey of the Andrenid bee fauna of Gorgan County, Golestan province, Iran, between 2014 and 2015. Bees were collected from flowers with sweep nets, and killed with ethyl acetate. The survey led to the identification of twenty-three species belonging to genera of *Andrena* Fabricius, 1775 and *Melitturga* Latreille, 1809 and subgenera of *Campylogaster* (1 species), *Chlorandrena* (1 species), *Holandrena* (2 species), *Hoplandrena* (1 species), *Melanapis* (1 species), *Melandrena* (4 species), *Micrandrena* (4 species), *Nobandrena* (1 species), *Notandrena* (1 species), *Plastandrena* (2 species), *Simandrena* (1 species), *Truncandrena* (1 species), *Zonandrena* (2) and *Melitturga* (1 species). Among these, eight and two species are new to the fauna of Iran and Asia, respectively. Available biological data, and geographical distribution of the newly recorded species are discussed briefly.

Key words: Andrenidae, Gorgan County, Iran, new record

INTRODUCTION

More than three-fourths of the all angiosperms (i.e., about 75% of 250,000 species) rely on over 200,000 species of animal pollinators to various extents to meet their reproductive needs (Committee on the Status of Pollinators in North America, 2007). Because of their variety of morphological adaptations to collect, manipulate, transport and store pollen efficiently (e.g., different types of tongues, corbicula or scopa), bees are the most specialized insects for plant pollination (Danforth et al., 2006). About 20000 bee species are known worldwide, and this number is continuously increasing (Osytshnjuk et al., 2005). Family Andrenidae with about 3000 described species worldwide is the fourth largest family of bees (Ascher and Pickering, 2015). *Andrena* is the biggest genus among the bee genera in the world from a species abundance perspective (Osytshnjuk et al., 2005), and can be considered as one of the most important pollinators of spring-blooming crops and trees (Deleplane et al., 2000). Among approximately 800 bee species reported from Iranian fauna, family Andrenidae with 125 species is the fourth largest bee family (Nadimi et al. 2014; Ascher and Pickering, 2015). With regard to different geographical regions with many a variance of flora and climates (Esmaili & Rastegar, 1974), the identification of the bees, particularly Andrenid bees, is inadequate so that many species are still unknown to Iranian bee fauna (Nadimi et al. 2014). Gorgan County is located in Golestan province (North of Iran) and characterized by Hyrcanian Zone which includes Alborz range forest steppe, Caspian Hyrcanian mixed forest and Caspian lowland desert (Heshmati, 2007), with rich flora that is supposed to support rich bee faunas. The aim of this study is to record the Andrenid bee species hosted by different flower plants in

*Corresponding Author: nadimi@gau.ac.ir

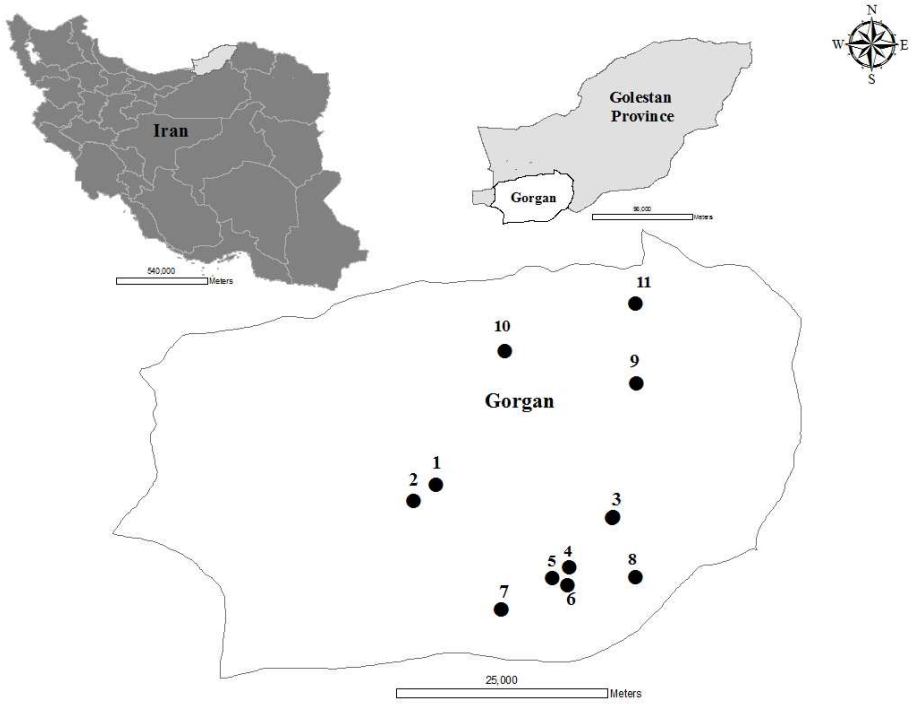

FIGURE.1. A field collection map of various localities of Gorgan County by GPS coordinates. 1. Barankuh forest, 2. Shastkalate forest road, 3. Jahannama road & Chelcheli, 4,5,6. Surrounding area of Choharbagh village, 7. Shahkuh sofla, 8. Choharbagh village, 9. Tuskestan road, 10. Gorgan University of Agricultural Sciences and Natural Resources (Pardis), 11. Sorkhankalate.

agricultural and natural ecosystems in Gorgan County, Golestan province, Iran. The present paper is a continuation of the previous main researches recently published to explore Iranian bee faunas (Dehghan et al., 2015; Nadimi et al., 2013a, b, 2014; Khodaparast & Monfared, 2012).

MATERIAL AND METHODS

Bees were caught by using sweep nets from different cultured and non-cultured localities of Gorgan County, Iran, during the 2014- 2015 time period. Gorgan County is located in 36°50' Northern latitude and 54°30' Eastern longitude (Fig. 1). Bees were collected during flowering seasons in study area, between 9:00h and 15:00h, when most of the species were active (Antonini & Martins, 2003). All the bees were killed by ethyl acetate. Specimens were identified by Olympus binocular microscope using major keys including Michener (2007), Osytchnjuk et. al. (2005, 2008) to the species level. All host plants were collected and identified by botanists in Gorgan Research Agricultural Institute. The main localities along with their GPS coordinates are shown in Fig.1.

RESULTS

The present study has yielded 23 species belonging to 14 subgenera, which are new records for the studied region; eight and six species are also new to the fauna of Iran and Asia, respectively. Species are ordered alphabetically, and new species records for Iran and Asia are indicated by one and two asterisks, respectively. *Melandrena* and *Micrandrena* with 4 species were the most diverse subgenera (Table 1). The food plants of families Asteraceae, Fabaceae and Brassicaceae with about 48, 35 and

TABLE 1. Genera and subgenera of the family Andrenidae identified in study area.

Genera	Subgenera	No. Species
Andrena	*Campylogaster*	1
	Chlorandrena	1
	Holandrena	1
	Hoplandrena	1
	Melanapis	1
	Melandrena	4
	Micrandrena	4
	Nobandrena	1
	Notandrena	1
	Plastandrena	2
	Simandrena	1
	Truncandrena	1
	Zonandrena	2
Melitturga	*Melitturga*	1

TABLE 2. The number of Andrenid bees recorded from Iran and neighbour countries (Ascher and Pickering, 2015).

Country	No. of Andrenid species
Turkey	384
Iran	133
Azerbaijan	103
Russia	102
Turkmenistan	74
Pakistan	31
Afghanistan	26
Jordan	19
Saudi Arabia	10

21.5 % visiting species hosted most Andrenid bees in study area; among them genus *Centaurea*, which hosted 21.5% of all collected species, was the most attractive flower for bees (Fig. 2).

***-Andrena* (*Campylogaster*) *lateralis* (Morawitz, 1876)**
Material examined: Iran, Golestan province, Gorgan County, Near to Choharbagh village (N= 36° 36.755 E= 054° 29.969 H= 2127 M), 24.VII.2014, 1♀, **Host plant:** *Centaurea* sp.

General distribution: Spain, Greece, Israel, Turkey, Georgia, Turkmenistan, Iran, Uzbekistan, Kyrgyzstan (Ascher & Pickering, 2015; Hazir et al., 2014; Grace, 2010; Tadauchi, 2008; Osytshnjuk et al., 2005; Popove 1967; Alfken, 1935).
Distribution in Iran: Golestan (Gorgan) (Alfken, 1935).

***-Andrena* (*Chlorandrena*) *panurgimorpha* (Mavromoustakis, 1957)**
Material examined: Iran, Golestan province, Gorgan County, Jahannama road (N= 36° 38.006 E= 054° 30.787 H= 2240 M), 24.V.2014, 1♀. **Host plant:** *Lepidium sativum.*
General distribution: Ukraine, Georgia, Armenia, Turkey, Israel, Cyprus, Greece, Crete, Iran (Ascher & Pickering, 2015; Hazir et al., 2014; Khodaparast & Monfared, 2012; Grace, 2010; Osytshnjuk et al., 2008).
Distribution in Iran: Fars (Sepidan) (Khodaparast & Monfared, 2012).

***-Andrena* (*Holandrena*) *forsterella* (Osytshnjuk, 1978)**
Material examined: Iran, Golestan province, Gorgan County, Near to Shahkuh sofla village (N= 36° 34.095 E= 054° 25.593 H= 2176 M), 13.VII.2014 & 09.VI.2014, 2♀; 1 km to Choharbagh village (N= 36° 34.490 E= 054° 25.295), 07.VII.2014, 1♀. **Host plant**: *Rhaponticum repense, Medicago sativa* & Asteraceae.
General distribution: Azerbaijan, Turkey, Iran, Cyprus, Greece, Bulgaria, Macedonia, Croatia, Sicily, Italy (Ascher & Pickering, 2015; Grace, 2010).
Distribution in Iran: Qazvin, Mazandaran, Zandjan (Ascher & Pickering, 2015).

***-Andrena* (*Holandrena*) *labialis* (Kirby, 1802)**
Material examined: Iran, Golestan province, Gorgan County, Near to Choharbagh village (N= 36° 36.755 E= 054° 29.969 H= 2127 M), 24.V.2014, 1♂. **Host plant:** *Acanthophyllum* sp.
General distribution: Portugal, Algeria, Tunisia, France, Italy, United Kingdom, Belgium, Czech Republic, Poland, Germany, Denmark, Sweden, Finland, Hungary, European Russia, Georgia, Afghanistan, Kyrgyzstan, Kazakhstan, Iran (Ascher & Pickering, 2015; Hazir et al., 2014; Khodaparast & Monfared, 2012; Grace, 2010; Osytshnjuk et al., 2008; Tadauchi, 2008; Esmaili & Rastegar, 1974; Popove, 1967).
Distribution in Iran: Mazandaran, Alborz (Ascher & Pickering, 2015; Khodaparast & Monfared, 2012; Esmaili & Rastegar, 1974; Popove, 1967).

-Andrena* (*Hoplandrena*) *ferox* (Smith, 1847)
Material examined: Iran, Golestan province, Gorgan County, Near to Choharbagh village (N= 36° 36.755 E= 054° 29.969 H= 2127 M), 09.VI.2014, 1♀; 1 km to Choharbagh village (N= 36° 34.490 E= 054° 25.295), 13.VII.2014, 1♀, **Host plant:** *Melilotus officinalis* & *Reseda lutea.*
General distribution: Central southern and southeastern Turkey, Greece, Sicily, Italy, Bosnia and Herzegovina, Slovakia, Hungary, Poland, Spain, France, Switzerland, Germany, Moravia, United Kingdom, Slovenia (Ascher & Pickering, 2015; Grace, 2010).

***-Andrena* (*Melanapis*) *fuscosa* (Erichson, 1835)**
Material examined: Iran, Golestan province, Gorgan County, Near to Choharbagh village (N= 36° 36.755 E= 054° 29.969 H= 2127 M), 24.V.2014, 1♂; Sorkhankalate road (N= 36° 8422 E= 54° 4395), 2015.VII.27, 4♂. **Host plant:** *Campanula* sp. & *Rubus fruiticosis.*
General distribution: Mauritania, Canary Islands, Morocco, Spain, Tunisia, Libya, Switzerland, Sicily, Slovakia, Greece, Ukraine, Egypt, Israel, Syria, Iran, Georgia, India, Pakistan, Afghanistan, Turkmenistan, Uzbekistan, Kazakhstan, Russia (Ascher & Pickering, 2015; Hazir et al., 2014;

Khodaparast & Monfared, 2012; Grace, 2010; Osytshnjuk et al., 2008; Tadauchi, 2008; Popove, 1967).
Distribution in Iran: East Azerbaijan, Karadj, Fars (Kazerun) (Ascher & Pickering, 2015; Khodaparast & Monfared, 2012; Tadauchi, 2008; Popove, 1967).

***-Andrena* (*Melandrena*) *albopunctata* (Rossi, 1792)**
Material examined: Iran, Golestan province, Gorgan County, Chelcheli (N= 36° 39.988 E= 54° 32.758 H= 2316 M), 24.VII.2014, 2♀ & 1♂; 5 km to Shahkuh sofla village (N= 36° 36.085 E= 054° 28.842 H= 2113 M), 09.VI.2014 & 24.VII.2014, 4♀ & 1♂; **Host plant**: *Centaurea cyanus* & Asteraceae.
General distribution: Morocco, Spain, Tunisia, France, Corsica, Italy, Slovenia, Czech Republic, Poland, Crete, Bulgaria, Romania, Ukraine, Turkey, Russia, Georgia, Kazakhstan, Azerbaijan, Iran, Pakistan, Afghanistan, Turkmenistan, Uzbekistan, Sicily (Ascher & Pickering, 2015; Hazir et al., 2014; Grace, 2010; Tadauchi, 2008; Osytshnjuk et al,. 2008; Popove, 1967).
Distribution in Iran: Unknown (Ascher & Pickering, 2015; Grace, 2010; Popove, 1967).

-***Andrena* (*Melandrena*) *morio* (Brullé, 1832)**
Material examined: Iran, Golestan province, Gorgan County, Near to Shahkuh sofla village (N= 36° 34.095 E= 054° 25.593 H= 2176 M), 13.VII.2014, 4♀; Near to Choharbagh village (N= 36° 36.755 E= 054° 29.969 H= 2127 M), 09.VI.2014, 6♀, **Host plant:** *Reseda lutea* & *Centaurea* sp.
General distribution: Mexico, Kazakhstan, Morocco, Algeria, Tunisia, Libya, Egypt, Portugal, Spain, Balearic Islands, France, Corsica, Italy, Germany, Austria, Bohemia, Croatia, Poland, Slovakia, Romania, Greece, Bulgaria, Ukraine, European Russia, Turkey, Georgia, Azerbaijan, Syria, Lebanon, Israel, Iran (Ascher & Pickering, 2015; Hazir et al., 2014; Grace, 2010; Osytshnjuk et al., 2008; Popove, 1967; Alfken, 1935; Strand, 1921).
Distribution in Iran: Mazandaran (Chalus) (Ascher & Pickering, 2015; Popove, 1967; Alfken, 1935).

***-Andrena* (*Melandrena*) *nitida* (Müller, 1776)**
Material examined: Iran, Golestan province, Gorgan County, Near to Shahkuh sofla village (N= 36° 34.095 E= 054° 25.593 H= 2176 M), 13.VII.2014, 24.VII.2014 & 07.VII.2014, 6♀ & 1♂. **Host plant**: *Echinops* sp., *Cichorium intybus, Eryngium planum, Rhaponticum repense* & *Centaurea* sp.
General distribution: Germany, Kazakhstan, Iran, Turkey, Georgia, Spain, Sardinia, Italy, United Kingdom, Germany (Ascher & Pickering, 2015; Grace, 2010; Osytshnjuk et al., 2008).
Didtribution in Iran: Mazandaran (Ascher & Pickering, 2015).

-Andrena* (*Melandrena*) *vaga* (Panzer, 1799)
Material examined: Iran, Golestan province, Gorgan County, Barankuh forest (N= 36° 42.02 E= 054° 21.44), 1♀. **Host plant:** unknown.
General distribution: Kyrgyzstan, Kazakhstan, Russia, Armenia, Georgia, Eastern Turkey, Ukraine, Macedonia, Romania, Belarus, Spain, United Kingdom, Belgium, France, Germany, Austria, Czech Republic, Italy, Slovakia, Poland, Slovakia, Norway, Sweden, Lithuania, Finland (Ascher & Pickering, 2015; Grace, 2010; Osytshnjuk et al., 2008; Tadauchi, 2008).

-***Andrena* (*Micrandrena*) *falsifica* (Perkins, 1915)****
Material examined: Iran, Golestan province, Gorgan County, Choharbagh village (N= 36° 36.135 E= 054° 34.144 H= 2147 M), 24.V.2014, 1♀; Jahannama road (N= 36° 38.006 E= 054° 30.787 H= 2240 M), 24.V.2014, 4♀; Near to Choharbagh village (N= 36° 36.755 E= 054° 29.969 H= 2127 M), 09.VI.2014, 1♀. **Host plant**: *Lepidium draba, Lepidium sativum, Acanthophyllum* sp. & *Reseda lutea.*

General distribution: European Russia, Ukraine, Romania, Bosnia and Herzegovina, Hungary, Slovakia, Poland, Czech Republic, Austria, Slovenia, Italy, Spain, France, United Kingdom, Belgium, Netherlands, Germany, Norway, Lithuania, Latvia, Greece (Ascher & Pickering, 2015; Grace, 2010).

-Andrena* (*Micrandrena*) *magunta* (Warncke, 1965)
Material examined: Iran, Golestan province, Gorgan County, Choharbagh village (N= 36° 36.135 E= 054° 34.144 H= 2147 M), 24.V.2014, 1♀; Jahannama road (N= 36° 38.006 E= 054° 30.787 H= 2240 M), 24.V.2014, 2♀. **Host plant**: *Lepidium draba* & *Ixiolirion tataricum*.
General distribution: Azerbaijan, Georgia, Turkey, Greece (Kirkitadze & Japoshvili, 2015; Ascher & Pickering, 2015; Hazir et al., 2014; Grace, 2010).

***-Andrena* (*Micrandrena*) *rugulosa* (Stoeckhert, 1935)**
Material examined: Iran, Golestan province, Gorgan County, Jahannama road (N= 36° 38.006 E= 054° 30.787 H= 2240 M), 24.V.2014, 2♀. **Host plant**: *Lepidium sativum* & *Tragopogon* sp.
General distribution: Georgia, Far eastern Turkey, Greece, Macedonia, Romania, Ukraine, Italy, Slovenia, Hungary, France, Switzerland, Germany, Czech Republic, Moravia, Poland, Lithuania, Iran (Ascher & Pickering, 2015; Khodaparast & Monfared, 2012; Grace, 2010).
Distribution in Iran: Fars (Sepidan) (Khodaparast & Monfared, 2012).

-Andrena* (*Micrandrena*) *semilaevis* (Pérez, 1903)*
Material examined: Iran, Golestan province, Gorgan County, Between Shastkalate forest & Alofen village (N= 36° 41 E= 54° 20), 17.V.2014, 1♂. **Host plant**: *Punica granatum*.
General distribution: European Russia, Ukraine, Bulgaria, Italy, Spain, Hungary, Slovakia, Bohemia, Belarus, France, Switzerland, United Kingdom, Netherlands, Germany, Croatia, Austria, Moravia, Czech Republic, Poland, Lithuania, Denmark, Norway, Sweden, Finland, Latvia (Ascher and Pickering, 2015; Grace, 2010).

-Andrena* (*Nobandrena*) *flavobila* (Warncke, 1965)
Material examined: Iran, Golestan province, Gorgan County, 1 km to Choharbagh village (N= 36° 34.490 E= 054° 25.295), 13.VII.2014, 1♂, **Host plant**: *Rhaponticum repense*.
General distribution: Southern central Turkey, Greece, Ukraine (Ascher & Pickering, 2015; Hazir et al., 2014; Grace, 2010).

- Andrena* (*Notandrena*) *azerbaidshanica* (Lebedev, 1932)
Material examined: Iran, Golestan province, Gorgan County, Jahannama road (N= 36° 38.006 E= 054° 30.787 H= 2240 M), 24.V.2014, 1♂; 1 km to Choharbagh (N= 36° 34.490 E= 054° 25.295), 07.VII.2014, 1♂. **Host plant:** *Lepidium sativum* & *Rhaponticum repense*.
General distribution: Azerbaijan (Ascher & Pickering, 2015).

***Andrena* (*Plastandrena*) *pilipes* (Fabricius, 1781)**
Material examined: Iran, Golestan province, Gorgan County, Near to Shahkuh sofla village (N= 36° 34.095 E= 054° 25.593 H= 2176 M), 13.VII.2014, 1♂, **Host plant:** *Medicago sativa*.
General distribution: U.S.A, Libya, Algeria, Spain, Israel, Greece, Italy, Switzerland, United Kingdom, Netherlands, Norway, Slovakia, Poland, Ukraine, Turkey, Georgia, Azerbaijan, Iran, Turkmenistan, Uzbekistan, Afghanistan, Pakistan, India, Tajikistan, Kyrgyzstan, Kazakhstan, China, Mongolia, Russia (Ascher & Pickering, 2015; Hazir et al., 2014; Khodaparast & Monfared, 2012; Grace, 2010; Tadauchi, 2008; Popove, 1967).

Distribution in Iran: Alborz, Fars (Sepidan) (Ascher & Pickering, 2015; Khodaparast & Monfared, 2012; Popove, 1967).

***-Andrena* (*Plastandrena*) *tibialis* (Kirby, 1802)**
Material examined: Iran, Golestan province, Gorgan County, Near to Shahkuh sofla village (N= 36° 34.095 E= 054° 25.593 H= 2176 M), 24.VII.2014, 1♂; Jahannama road (N= 36° 38.006 E= 054° 30.787 H= 2240 M), 24.V.2014, 1♂. **Host plant:** *Eryngium planum* & *Astragalus* sp.
General distribution: Russia, China, Kyrgyzstan, Kazakhstan, Iran, Georgia, Armenia, Turkey, Russia, Germany, Greece, Malta, Macedonia, Romania, Ukraine, Bosnia and Herzegovina, Italy, Belarus, Spain, France, United Kingdom, Netherlands, Czech Republic, Austria, Slovakia, Hungary, Norway, Sweden, Denmark, Estonia, Lithuania (Ascher & Pickering, 2015; Hazir et al., 2014; Grace, 2010; Tadauchi, 2008; Alfken, 1935).
Distribution in Iran: Mazandaran (Chalus) (Ascher & Pickering, 2015; Alfken, 1935).

***-Andrena* (*Simandrena*) *transitoria* (Morawitz, 1871)**
Material examined: Iran, Golestan province, Gorgan County, 1km to Choharbagh village (N= 36° 34.490 E= 054° 25.295), 13.VII.2014, 07.VII.2014, 3♀; Near to Choharbagh village (N= 36° 36.755 E= 054° 29.969 H= 2127 M), 7♀; Chelcheli (N= 36° 39.988 E= 54° 32.758 H= 2316 M), 24.VII.2014, 1♀. **Host plant:** *Melilotus officinalis* & *Matricaria* sp.
General distribution: China, Afghanistan, Iran, Azerbaijan, Georgia, Jordan, Israel, Syria, Turkey, Cyprus, Greece, Sicily, Romania, European Russia, Ukraine, Hungary, Slovakia, Germany, Austria, Poland, Moravia (Ascher & Pickering, 2015; Hazir et al., 2014; Grace, 2010).
Distribution in Iran: Unknown (Ascher & Pickering, 2015; Grace, 2010).

***- Andrena* (*Truncandrena*) *derbentina* (Morawitz, 1886)**
Material examined: Iran, Golestan province, Gorgan County, Jahannama road (N= 36° 38.006 E= 054° 30.787 H= 2240 M), 24.V.2014, 1♀; Near to Choharbagh village (N= 36° 36.755 E= 054° 29.969 H= 2127 M), 09.VI.2014, 1♀. **Host plant:** *Lepidium sativum* & *Acanthophyllum* sp.
General distribution: Iran, Russia, Israel, Turkey, Tunisia (Ascher & Pickering, 2015; Hazir et al., 2014; Grace, 2010).
Distribution in Iran: Mazandaran (Ascher & Pickering, 2015).

***-Andrena* (*Zonandrena*) *flavipes* (Panzer, 1799)**
Material examined: Iran, Golestan province, Gorgan County, 1km to Choharbagh village (N= 36° 34.490 E= 054° 25.295), 07.VII.2014, Gorgan University of Agricultural Sciences and Natural Resources (Pardis) (N= 36° 8422 E= 54° 4395), 09.VI.2014, 2♂; Jahannama road (N= 36° 38.006 E= 054° 30.787 H= 2240 M), 2015.VII.29, 1♂; Near to Shahkuh sofla village (N= 36° 34.095 E= 054° 25.593 H= 2176 M), 2015.VIII.02, 3♀. **Host plant:** *Lathyrus* sp. & *Euonymus japonicas,Cirsium vulgar* & Apiaceae.
General distribution: U.S.A., Nepal, India, Afghanistan, Kyrgyzstan, Uzbekistan, Turkmenistan, Kazakhstan, Russia, Armenia, Georgia, Turkey, Egypt, Jordan, Israel, Lebanon, Syria, Cyprus, Greece, Bulgaria, Romania, Albania, Ukraine, Moldova, Sicily, Italy, Bosnia and Herzegovina, Croatia, Austria, Slovakia, Poland, Morocco, Germany, Algeria, Tunisia, Spain, France, United Kingdom, Ireland, Belgium, Netherland, Denmark, Norway, Belarus, Slovakia, Hungary, China, Iran (Ascher & Pickering, 2015; Hazir et al., 2014; Khodaparast & Monfared, 2012; Grace, 2010; Osytshnjuk et al., 2008; Tadauchi, 2008; Talebi et. al., 1995; Esmaili & Rastegar, 1974; Alfken, 1935; Morice, 1921).
Distribution in Iran: Golestan (Gorgan), Guilan, Kermanshah, Kurdistan, East Azarbaijan, Qazvin, Tehran, Mazandaran (Sisangan Park), Zandjan, Fars (Kharame, Shiraz, Estahbod, Eghlid,

Sarvestan, Nurabad, Sepidan) (Ascher & Pickering, 2015; Khodaparast & Monfared, 2012; Talebi et. al., 1995; Esmaili & Rastegar, 1974; Alfken, 1935; Morice, 1921).

-Andrena* (*Zonandrena*) *gravida* (Imhoff, 1832)

Material examined: Iran, Golestan province, Gorgan County, 15 km to Tuskestan (N= 36° 48.562 E= 054° 34.226 H= 418 M), 24.V.2014, 1♀; Near to Shahkuh sofla village (N= 36° 34.095 E= 054° 25.593 H= 2176 M), 24.VII.2014 & 09.VI.2014, 3♀; Jahannama road (N= 36° 38.006 E= 054° 30.787 H= 2240 M), 24.V.2014, 1♀; Near to Choharbagh village village (N= 36° 36.755 E= 054° 29.969 H= 2127 M), 07.VII.2014, 1♀; Between Shastkalate forest & Alofen village (N= 36° 41 E= 54° 20), 17.V.2014, 1♀. **Host plant:** *Rubus fruticosis, Eryngium planum, Ixiolirion tataricum, Medicago sativa* & *Cirsium vulgare.*

General distribution: Tajikistan, Armenia, Turkey, Greece, Tunisia, Sicily, Italy, France, United Kingdom, Belgium, Germany, Switzerland, Austria, Poland, Czech Republic, European Russia, Ukraine, Romania, Sweden, Denmark, Moravia, Slovakia, Hungary, Serbia, Bosnia and Herzegovina, Romania (Ascher & Pickering, 2015; Hazir et al., 2014; Grace, 2010; Osytshnjuk et al., 2008; Tadauchi, 2008).

***-Melitturga* (*Melliturga*) *clavicornis* (Latreille, 1808)**

Material examined: Iran, Golestan province, Gorgan County, Near to Choharbagh village (N= 36° 36.755 E= 054° 29.969 H= 2127 M), 07.VII.2014, 49♀ & 8♂; 1 km to Choharbagh village (N= 36° 34.490 E= 054° 25.295), 07.VII.2014, 8♀ & 1♂; Near to Shahkuh sofla (N= 36° 34.095 E= 054° 25.593 H= 2176 M), 09.VI.2014, 1♀ & 2♂; Chelcheli (N= 36° 39.988 E= 54° 32.758 H= 2316 M), 24.VII.2014, 1♀. **Host plant:** *Medicago sativa, Centaurea* sp. & Asteraceae.

General distribution: Spain, France, Germany, Switzerland, Italy, Austria, Croatia, Czech Republic, Hungary, Slovakia, Poland, Lithuania, Estonia, Romania, Moldova, Ukraine, European Russia, Turkey, Georgia, Azerbaijan, Kazakhstan, Uzbekistan, Kyrgyzstan, China, Armenia, Afghanistan, Iran (Ascher and Pickering, 2015; Grace, 2010).

Distribution in Iran: Ardebil, Tehran, Kermanshah, Lorestan, Alborz (Karadj) (Ascher & Pickering, 2015).

DISCUSSION

Ascher and Pickering (2015) listed about 125 Andrenid bees including 97 Andrenini and 28 Panurgini species in "Discover Life's bee species guide and world checklist". In the current study, 158 specimens representing 23 species of family Andrenidae were collected and identified from various ecosystems of Gorgan County. Based on the present study which resulted in eight new record bees, the number of Iranian Andrenid bees has increased to 133 species. Iranian andreind bee fauna are rich and second most diverse in comparison with neighboring countries in West and South-West Asia (Table 2).

Andrena ferox is a rare but widely distributed species in Europe (Ayasse et al. 1990). *A. ferox* is polylectic bee (Gogala, 2015) that collects pollen mainly from oak catkins (Leys, 1978). We collected the bee from flowers of *Melilotus officinalis* and *Reseda lutea*. *Andrena vaga* is Eurosiberian species (Gogala, 2015) and occurs mainly in riverine meadows (Westrich, 1990). *A. vaga* is an oligolectic bee, specialized on *Salix* (Salicaceae), and active in early spring (Gogala, 2015; Bischoff, 2003). *Andrena falsifica* is an European and polylectic species, favouring *Potentilla* (Rosaceae) (Gogala, 2015). Moroń et al. (2008) evaluated *A. falsifica* as vulnerable species for polish bee fauna. *Andrena gravida* is an European and polylectic species. According to Red List Categories, *A. gravida* is a very common and least important species in Germany (Dathe and Saure, 2000; Westrich et al., 2008). Campolo et al. (2015) showed that *A. gravida* were the second most abundant solitary bees among 29 solitary bees

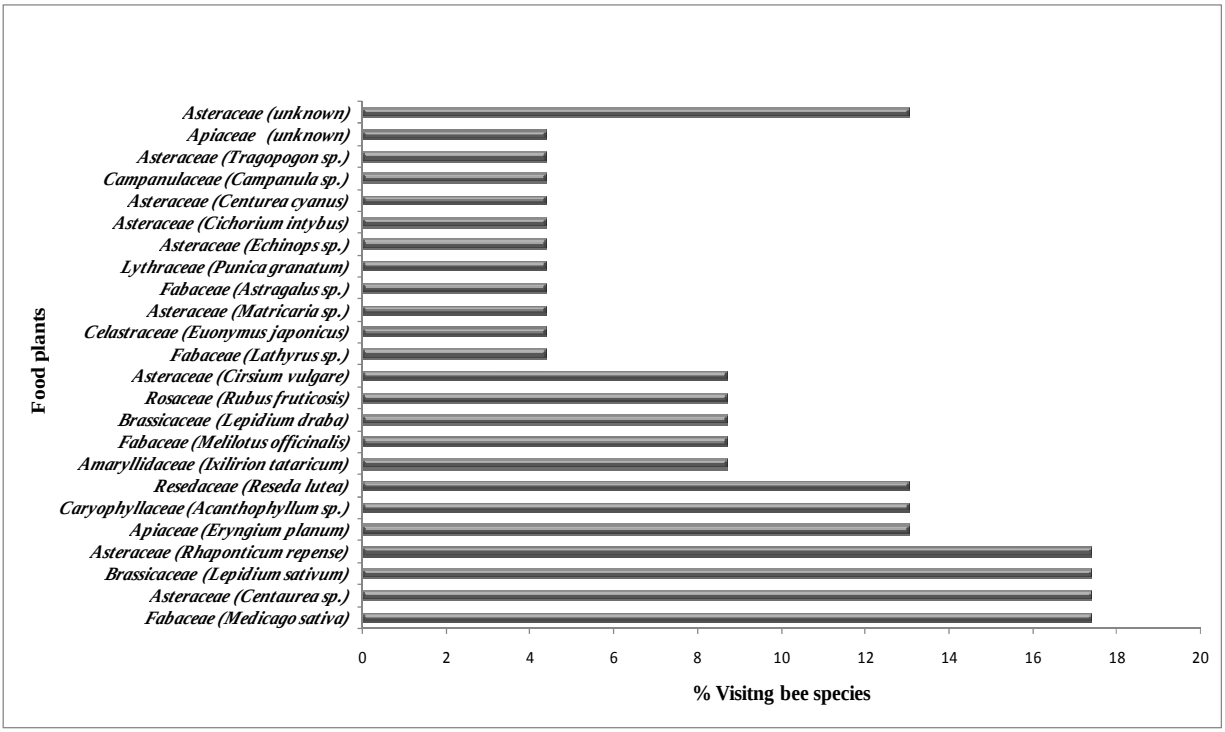

FIGURE 2. Percentage of bee fauna foraging on host plants collected during the survey.

foraging on *Thymus longicaulis* (Lamiaceae), suggesting that this bee may play an important role in the pollination of the medicinal plant. *A. ferox*, *A. vaga*, *A. falsifica* and *A. gravida* nest in burrows in the ground, excavated by theirself (Gogala, 2015).

Recently, Bate et al (2011) showed that many pollinators were less prevalent at urban and suburban sites such as *Andrena semilaevis*. They also showed that *A. semilaevis* was negatively associated with percentage built space. *Andrena magunta*, *Andrena flavobila* and *Andrena azerbaidshanica* have a narrow distribution restricted to south-east Europe (Ascher and Pickering, 2015; Gusenleitner and Schwarz, 2002), thus the present records are eastern extremity observation of these species in their ranges.

Of all collected bees, the highest abundance was found for *Melitturga clavicornis* (n=70). This bee visited flowers of *Medicago sativa* and *Centaurea* in study area. Presence of 48% Andrenid bees foraging on flowers belong to family Asteraceae (Fig. 2), suggests that these bees play an essential role in protecting this plant family in the study area.

Bees are undoubtedly keyston species, because loss of their critical ecological functions could collapse ecosystems homeostasis. Knowledge of exact geographic distributions of bees results in conserving and managing their biodiversity. As a result, determining geographic records of bee species can provide useful data for these purposes.

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LITERATURE CITED

Alfken, J.D., 1935. Beitrag zur Kenntnis der Bienenfauna von Persien. Mitteilungen aus dem Entomologischen Verein in Bremen 23, 21-24.

Antonini, Y., Martins, R.P., 2003. The flowering-visiting bees at the ecological station of the Universidade Federal de Minas Gerais, Belo Horizonte, MG, Brazil. Neotropical Entomology 32, 565-575.

Ascher, J.S., Pickering, J., 2015. (Cited 1 October 2015). Discoverlife. Available on: http://www.discoverlife.org/nh/cl/IR/Apoidea_speci.txt.

Ayasse, A., Leys, R., Pamilo, P., Tengö, J., 1990. Kinship in communally nesting *Andrena* (Hymenoptera; Andrenidae) bees is indicated by composition of dufour's gland secretions. Biochemical Systematics and Ecology 18(6), 453-460.

Bates, A.J., Sadler, J.P., Fairbrass, A.J., Falk, S.J., Hale, J.D., Matthews, T.J., 2011 changing bee and hoverfly pollinator assemblages along an urban-rural gradient. Plos One 6:e23459. doi:10.1371/journal.pone.0023459

Bischoff, I., 2003. Population dynamics of the solitary digger bee *Andrena vaga* Panzer (Hymenoptera, Andrenidae) studied using mark-recapture and nest counts. Population Ecology 45(3), 197-204.

Campolo, O., Zappalà, L., Malacrinò, A., Laudani, F., Palmeri, V., 2015. Bees visiting flowers of *Thymus longicaulis* (Lamiaceae). Plant Biosystems (ahead-of-print), 1-7.

Committee on the Status of Pollinators in North America. 2007. Status of pollinators in North America. The National Academies Press, Washington, D.C., USA.

Danforth, B.N., Sipes S., Fang, J., Brady, S.G., 2006. The history of early bee diversification based on five genes plus morphology. Proceedings of the National Academy of Sciences103, 15118–15123.

Dathe, H., Saure, C., 2000. Rote Liste und Artenliste der Bienen des Landes Brandenburg (Hymenoptera: Apidae). – Naturschutz und Landschaftpflege in Brandenburg 9(1), 35pp.

Dehghan Dehnavi, L., Talebi, A.A., Goldasteh, Sh., Vafaei Shooshtari, R., Nadimi, A., 2015. Contribution to the knowledge of Megachilidae (Hymenoptera: Apoidea) in the Yazd province, Iran. Journal of Entomological Research 7, 1-21.

Delaplane, K.S., Daniel R.M., Daniel, F.M., 2000. Crop Pollination by Bees. Cabi, 344 pp.

Esmaili, M., Rastegar, R., 1974. Identified species of Aculeate Hymenoptera of Iran. Journal of Entomological Society of Iran 2, 41-52.

Gogala, A., 2015. (Cited 7 October 2015). Bee Fauna of Slovenia: Checklist of Species. Available on: http://www2.pms-lj.si/andrej/apoidea.htm#_Andrenidae.

Grace, A., 2010. Introductory biogeography to bees of the Eastern Mediterranean and Near East. Bexhill Museum.

Gusenleitner, F., Schwarz, M., 2002. Weltweite checkliste der bienengattung *Andrena*: mit bemerkungen und ergänzungen zu paläarktischen arten (Hymenoptera, Apidae, Andreninae, *Andrena*). Entomofauna, Supplement 10-1280 pp.

Hazir, C., Keskin, N., Scheuchl, E., 2014. Faunistic, geographical and biological contributions to the bee genus *Andrena* (Hymenoptera, Andrenidae, Andreninae) from Turkey. Journal of Hymenoptera Research 38, 59-133.

Heshmati, G.A., 2007. Vegetation characteristics of four ecological zones of Iran. International Journal of Plant Production 1, 215-224.

Khodaparast, R., Monfared, A., 2012. A survey of bees (Hymenoptera: Apoidea) from Fars province, Iran. Zootaxa 3445, 37-58.

Kirkitadze, G.J., Japoshvili, G.O., 2015. Renewed checklist of bees (Hymenoptera: Apoidea) from Georgia. Annals of Agrarian Science 13, 20-32.

Leys, R., 1978. On the biology of *Andrena ferox* Smith (Hymenoptera Aculeata: Andrenidae). Entomologische Berichten 38, 58-60.

Michener, C.D., 2007. The Bees of the World. Second edition. Baltimore: Johns Hopkins University Press, 953 pp.

Morice, F.D., 1921. Annotated lists of Aculeate Hymenoptera (except Heterogyna) and Chrysids recently collected in Mesopotamia and north-west Persia. II. Journal-Bombay Natural History Society 28, 192-199.

Moroń, D., Szentgyörgyi, H., Wantuch, M., Celary, W., Westphal, C., Settele, J., Woyciechowski, M., 2008. Diversity of wild bees in wet meadows: implications for conservation. Wetlands 28, 975-983.

Nadimi, A., Talebi, A.A., Fathipour, Y., 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., Fathipour, Y., 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., Fathipour, Y., 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.

Osytshnjuk, A.Z., Romasenko, L., Banaszak, J., Motyka, E., 2008. Andreninae of the Central and Eastern Palaearctic, Part 2. Entomological Society of Ontario, Poznań, Bydgoszcz, 233 pp.

Osytshnjuk, A.Z., Romasenko, L., Banaszak, J., Cierzniak, T., 2005. Andreninae of the Central and Eastern Palaearctic, Part 1. Polish Entomological Society, Poznań, Bydgoszcz, 426 pp.

Popov, V.B., 1967. The bees (Hymenoptera: Apoidea) of Iran. Trudy Zoologicheskogo Instituta Leningrad 43, 184-215.

Strand, E., 1921. Apidologisches, insbesondere über paläarktische Halictus-Arten, auf Grund von Material des Deutschen entomologischen Museums. Archiv für Naturgeschichte 87, 305-322.

Tadauchi, O., 2008. The Genus *Andrena* from Kazakhstan and Kyrgyzstan (Hymenoptera, Andrenidae) (2). Esakia 48, 1-18.

Talebi, A.A., Esmaili, M., Tirgari, M.A., 1995. Bee fauna of Alfalfa and.Karadj Proceedings of the 12th Iranian Plant Protection Congress; 2-7 September.1995 93 pp.

Westrich, P., 1990. Die Wildbienen Baden-Württembergs**,** vol 1/2, 2nd edn. Ulmer, Stuttgart.

Westrich, P., Frommer, U., Mandery, K., Riemann, H., Ruhnke, H., Saure, C., Voith, J., 2008. Rote Liste der Bienen Deutschlands (Hymenoptera: Apidae). Eucera 3, 33-89.