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The bee family Halictidae (Hymenoptera: Apoidea) collected from Gorgan county, northern Iran

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ABSTRACT. Collecting data of the family Halictidae are reported in Gorgan county, Golestan province, northern Iran. We collected 30 species belonging to 5 genera in 3 subfamilies. Among them, *Lasioglossum* (*Hemihalictus*) *croceipes* (Morawitz, 1876) and *Halictus* (*Seladonia*) *confusus* Smith, 1853 are recorded from Iran for the first time and 18 species are new for Gorgan county. Among 112 collected specimen, the subfamily Halictinae (27 species), genus *Lasioglossum* (14 species) and subgenus *Lasioglossum* (5 species), representing the major groups of halictid bee and *Halictus* (*Halictus*) *brunnescens* (Eversmann, 1852) was the most abundant species in the study areas. Knapweed flowers (*Centaura* spp.) had higher halictid bee taxa richness. An updated checklist of halictid bees of Gorgan county is provided.

Key words: Halictinae, *Halictus*, *Lasioglossum*, Iran, Fauna.

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Introduction

The bee family Halictidae includes numerically the second largest group with over 4,400 species worldwide (Ascher and Pickering, 2016). It is classified into four subfamilies: Halictinae, Nomioidinae, Nomiinae, and Rophitinae (Michener, 2007). Many species are small-sized and black, but some have brilliantly metallic colours or red integument, and a few are as large as 18 mm (Pesenko *et al*., 2000). Most halictid bees are polylectic, but the vast majority species are host-plant specialists in the subfamily Rophitinae (Danforth *et al*., 2013). Some halictid bees, which visit crop plants, are important pollinators of lowbush blueberry, onion and alfalfa in crop production system (Peterson and Artz, 2014; Delaplane and Mayer, 2000). Of theses, the alkali bee (*Nomia melanderi* Cockerell), which is paramount importance especially in the pollination of alfalfa, have been employed as managed pollinators in the United States (Peterson and Artz, 2014; Delaplane and Mayer, 2000).

In Iran, located in Palearctic region, the bee fauna has been little studied and is still poorly known. Primary studies of bee fauna including halictid bees, were published by the following non-native researchers: Pérez (1907), Morice (1921a, 1921b), Blüthgen (1931, 1936, 1955), Alfken (1927), Alfken and Blüthgen (1937), and Popov (1967). Most comprehensive study of Iranian halictid bee fauna was published by Ebmer (1978), who

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listed nearly 180 species. Some subsequently published records were done by the following native researchers: Esmaili and Rastegar (1974), Talebi *et al*. (1995), Izadi *et al*. (1998), Tavakoli *et al*. (2012), Khaghanina *et al*. (2013), and Khodaparast and Monfared (2012). According to Ascher and Pickering (2016), 210 halictid bee species are listed from Iran. Publication of Ebmer (1978) contains 16 species from Gorgan county.

Material and methods

This study of the halictid bees of Gorgan county, Golestan province (Iran) follows the same approach as previous surveys of the bee fauna in this area (Allahverdi *et al*., 2016; Allahverdi *et al*., 2015; Pezeshk *et al*., 2015a, 2015b).The sampling in the field was conducted at eight localities in Gorgan county during 2014 to 2015. The county is situated in the northeastern part of Iran; the northern and southern borders follow Gorgan Plain and Alborz Mountains, respectively (Fig. 1). The surveyed area has six various climates, including Arid, Semi Arid, Mediterranean, Semi Humid, Humid and Ultra Humid (Lashkari *et al*., 2009). All samples were pinned, labeled, and deposited in the insect collection of the Department of Plant Protection, Gorgan University of Agricultural Sciences and Natural Resources. We identified all specimens using some taxonomic keys published by Ebmer, (1971, 1975), Pesenko *et al*. (2000), Michener (2007), and Pauly (2014). After that, identified specimens were checked by Dr. Alain Pauly (Royal Belgian Institute of Natural Sciences, Brussels).

Results

Thirty species belonging to 5 genera in 3 subfamilies were recognized from Gorgan county through our survey. Among them, *lasioglossum* (*Hemihalictus*) *croceipes* (Morawitz, 1876) and *Halictus* (*Seladonia*) *confuses* (Smith, 1853), are new to the Iranian bee fauna. Eighteen species are newly recorded from Gorgan county (Table 1). Subfamily Halictinae (90%), genus *Lasioglossum* (47%) and subgenera *Lasioglossum* (21%), *Seladonia* (17%), and *Sphecodogastra* (17%), were most diverse taxa (Fig. 2). Among 112 collected specimens, *Halictus* (*Halictus*) *brunnescens* (n=17) was the most abundant species in the study areas. Flowering plants of *Centaura* spp. (Asteraceae), with hosting about 30% visiting bees, were highly attractive flowers for the halictids (Fig. 3).

The subfamily Rophitinae

1. *Rophites* (*Rophitiodes*) *canus* Eversmann, 1852

Material examined (n = 2): Iran, Golestan province, Gorgan county, Chahar bagh village (36°34′3.59″N, 54°30′7.17″E), 7.VII.2014, 2♀♀, on *Centaurea cyanus* (Asteraceae).

Published record: Ebmer (1988).

Distribution in Iran: Isphahan.

General distribution: Europe to east Asia (Ebmer, 1988; Pesenko *et al*., 2000; Niu *et al*., 2005; Pesenko and Astafurova, 2006; Astafurova, 2013; Ascher and Pickering, 2016).

The subfamily Nomiinae

1. *Pseudapis* (*Nomiapis*) *bispinosa* (Brullé, 1832)

Material examined (n = 4): Iran, Golestan province, Gorgan county, Karim abad (36°52′30.27″N, 54°25′6.84″E), 29.VII.2015, 1♀, on *Ctrulus colocinthis*; Sorkhankalate, (36°53′11.79″N, 54°34′2.43″E), 28.VII.2015, 1♀,1♂, on *Centaurea sp*. (Asteraceae); Chahar bagh village, (36°34′3.59″N, 54°30′7.17″E), 30.VII.2015,1♀, on *Astragalus* sp. (Fabaceae).

Published record: Talebi *et al.* (1995); Pesenko *et al.* (2006); Güler *et al.* (2011); Khodaparast and Monfared (2012).

Distribution in Iran: Fars province (Neyriz, Daarabad, Firuzabad, Kazerun, Nurabad), Alborz province (Karaj).

General distribution: Europe to east Asia, North Africa (Ebmer, 1988; Pesenko *et al*., 2000; Astafurova and Pesenko, 2005; Astafurova and Pesenko, 2006; Astafurova, 2008; Astafurova, 2013; Ascher and Pickering, 2016).

2. ***Pseudapis* (*Nomiapis*) *diversipes* (Latrellie, 1806)**

Material examined (n = 11): Iran, Golestan province, Gorgan county, Shahkuh sofla village, (36°34′18.08″N, 54°27′55.20″E), 30.VII.2014, 2♀♀; 2.VIII.2015, 1♀,1♂, on *Eryngium planum* (Apiaceae) ; Alofen village (36°41′N, 54°20′E), 30.VII.2014, 2♀♀, on *Rubus caesius* (Rosaceae); Chahar bagh village, (36°34′3.59″N, 54°30′7.17″E), 30.VII.2015, 1♀ 1♂, on *Centaurea cyanus* (Asteraceae); Hashem abad (36°53′28.15″N, 54°20′51.53″E), 10.VII.2015, 3♀♀, on *Centaurea* sp. (Asteraceae).

Published record: Morice (1921b); Popov (1967); Ebmer (1978, 1988); Talebi *et al.* (1995); van der Zanden (1997); Pesenko *et al.* (2000); Khodaparast and Monfared (2012).

Distribution in Iran: Alborz province (Karaj), North Khorasan (Bojnurd), Qazvin province (Qazvin, Evan), East Azarbaijan (Tabriz), Kerman province (Bam), Fars province (Firuzabad, Sepidan, Eqlid, Kherameh, Kazerun, Nurabad), Tehran province (Tehran, Sorkheh Hesar).

General distribution: Europe to east Asia (Ebmer, 1988; Pesenko *et al*., 2000; Astafurova and Pesenko, 2005; Astafurova and Pesenko, 2006; Astafurova, 2008; Astafurova, 2013; Ascher and Pickering, 2016).

The subfamily Halictinae

1. *Halictus* (*Halictus*) *brunnescens* (Eversmann, 1852)

Material examined (n = 17): Iran, Golestan province, Gorgan county, Chahar bagh village (36°34′3.59″N, 54°30′7.17″E), 7.VIII.2014, 1♀,1♂, on *Centaurea cyanus* (Asteraceae); Shahkuh sofla village, (36°34′18.08″N, 54°27′55.20″E), 7.VIII.2014, 4♀♀, on *Centaurea* sp. (Asteraceae), 1♀, on Asteraceae gen. t sp., 2♀♀, on *Centaurea cyanus* (Asteraceae), 1♀, on *Astragalus* sp. (Fabaceae), 2♀♀, on *Eryngium planum* (Apiaceae); Jahannama, (36°37′3″N, 54°19′29.48″E), 2.VIII.2014, 2♀♀, on *Centaurea* sp. (Asteraceae); Hashem abad (36°53′28.15″N 54°20′51.53″E), 30.V.2015, 2♀♀, on *Centaurea cyanus* (Asteraceae), 1♀, on *Astragalus* sp. (Fabaceae).

Published record: Blüthgen (1937); Warncke (1982); Ebmer (1978); Izadi *et al.* (1998); Pesenko (2005); Khodaparast and Monfared (2012).

Distribution in Iran: Fars province (Firuzabad, Neyriz, Eqlid, Kazerun Ghaleh seyyed). Golestan province (Minudasht), North Khorasan province (Bojnurd).

General distribution: Europe to Eastern Asia (Pesenko, 2005; Dikmen and Aytekin 2011; Güler *et al*., 2011; Ascher and Pickering, 2016).

2. *Halictus* (*Halictus*) *quadricinctus* (Fabricius, 1776)

Material examined (n = 7): Iran, Golestan province, Gorgan county, Hashem abad (36°53′28.15″N, 54°20′51.53″E), 30.VI.2015, 2♂♂, on *Centaurea cyanus* (Asteraceae), 1♀, on *Lathyrus* sp. (Fabaceae); Jahannama, (36°37′3″N, 54°19′29.48″E), 2.VIII.2015, 1♂,1♀, on *Centaurea cyanus* (Asteraceae); Tuskestan Babaei garden, (36°50′51.92″N, 54°30′13.89″E), 19.VIII. 2015, 1♀, on Asteraceae; Chahar bagh village (36°34′3.59″N, 54°30′7.17″E), 7.VIII.2014, 1♀, on *Lathyrus* sp. (Fabaceae).

Published record: Morice (1921a); Alfken and Blüthgen (1937); Ebmer (1978); Warncke (1982); Pesenko (2005); Rasekh Adel *et al.* (2012).

Distribution in Iran: Guilan province (Talesh), Mazandaran province (Nowshahr), Razavi Khorasan province (Mashhad, Chenaran), Tehran province (Damavand).

General distribution: Europe to Eastern Asia (Özbek, 1979; Pesenko, 2005; Dikmen, *et al.* 2011; Ascher and Pickering, 2016).

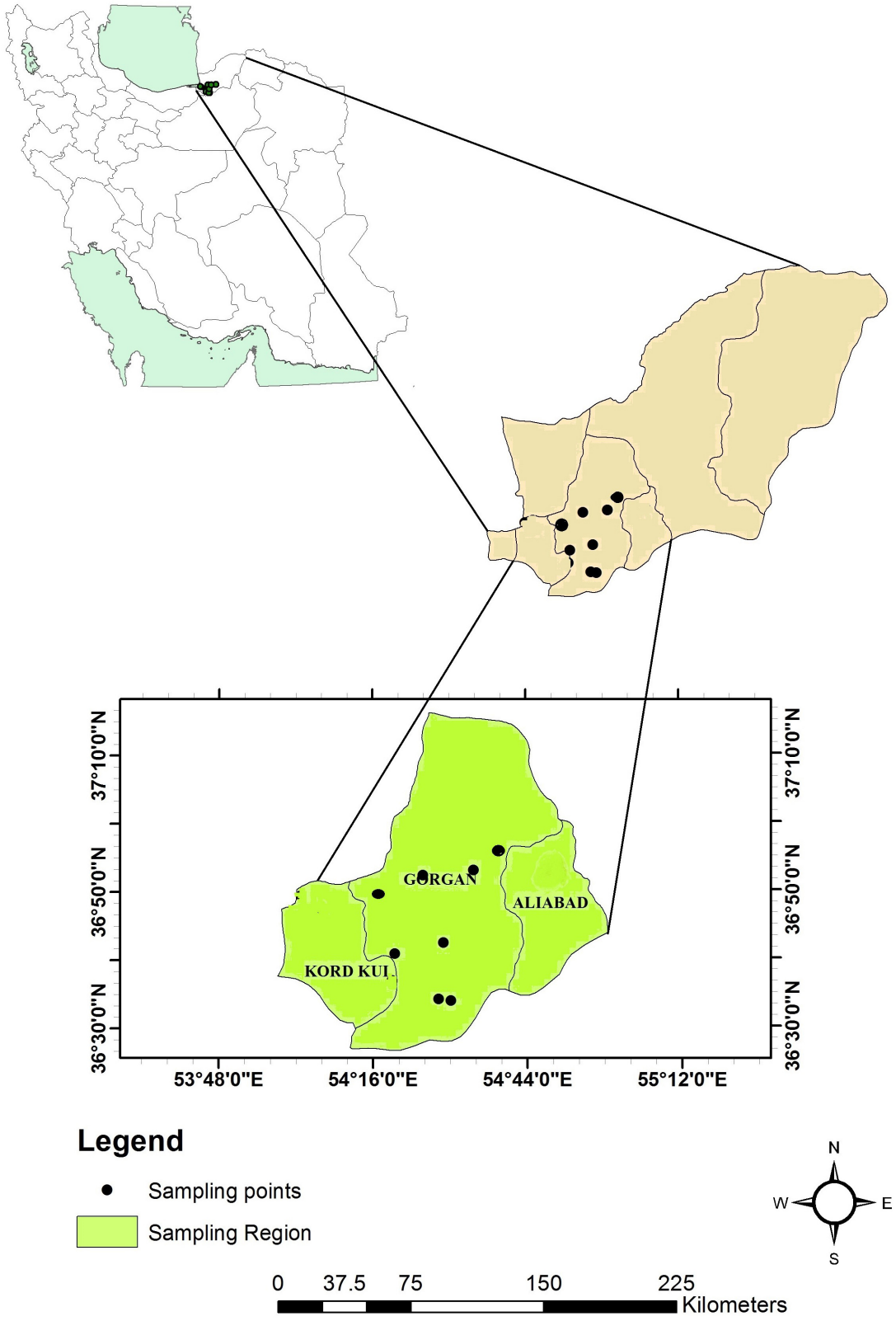

Figure 1. A map of collecting site in Gorgan county, Iran

Table 1. Updated checklist of family Halictidae known from Gorgan county (Iran).

	Species	**Published record(s)**
1	*Rophites* (*Rophitiodes*) *canus*	Current study
2	*Pseudapis* (*Nomiapis*) *bispinosa*	Current study
3	*Pseudapis* (*Nomiapis*) *divercipes*	Current study
4	*Halictus* (*Halictus*) *brunnescens*	Ebmer, 1978; Current study
5	*Halictus* (*Halictus*) *quadricinctus*	Current study
6	*Halictus* (*Hexataenites*) *resurgens*	Current study
7	*Halictus* (*Hexataenites*) *squamosus*	Current study
8	*Halictus* (*Hexataenites*) *turkomannus*	Ebmer, 1978
9	*Halictus* (*Monilapis*) *simplex*	Current study
10	*Halictus* (*Mucoreohalictus*) *pollinosus*	Current study
11	*Halictus* (*Seladonia*) *cephalicus*	Current study
12	*Halictus* (*Seladonia*) *confusus*	Current study
13	*Halictus* (*Seladonia*) *smaragdulus*	Current study
14	*Halictus* (*Seladonia*) *subauratus*	Ebmer, 1978; Current study
15	*Halictus* (*Tytthalictus*) *maculatus*	Ebmer, 1978
16	*Lasioglossum* (*Dialictus*) *aeratum*	Ebmer, 1978; Current study
17	*Lasioglossum* (*Hemihalictus*) *crassepunctatum*	Ebmer, 1978; Current study
18	*Lasioglossum* (*Hemihalictus*) *croceipes*	Current study
19	*Lasioglossum* (*Hemihalictus*) *griseolum*	Ebmer, 1978
20	*Lasioglossum* (*Hemihalictus*) *punctatissimum*	Ebmer, 1978
21	*Lasioglossum* (*Lasioglossum*) *aegyptiellum*	Ebmer, 1978; Current study
22	*Lasioglossum* (*Lasioglossum*) *cristula*	Current study
23	*Lasioglossum* (*Lasioglossum*) *fallax*	Ebmer, 1978
24	*Lasioglossum* (*Lasioglossum*) *laevignatum*	Ebmer, 1978; Current study
25	*Lasioglossum* (*Lasioglossum*) *lativentre*	Ebmer, 1978; Current study
26	*Lasioglssum* (*Lasioglossum*) *quadrinotatum*	Ebmer, 1978
27	*Lsioglossum* (*Lasioglossum*) *xanthopus*	Current study
28	*Lasioglossum* (*Leuchalictus*) *discum*	Current study
29	*Lasioglossum* (*Leuchalictus*) *leucozonium*	Ebmer, 1978; Current study
30	*Lasioglossum* (*Leuchalictus*) *zonulum*	Ebmer, 1978
31	*Lasioglossum* (*Sphecodogastra*) *laticeps*	Ebmer, 1978
32	*Lasioglossum* (*Sphecodogastra*) *malachurum*	Current study
33	*Lasiogossum* (*Sphecodogastra*) *marginatum*	Ebmer, 1978; Current study
34	*Lasioglossum* (*Sphecodogastra*) *mediterraneum*	Ebmer, 1978
35	*Lsioglossum* (*Sphecodogastra*) *nigripes*	Current study
36	*Lasioglossum* (*Sphecodogastra*) *orpheum*	Ebmer, 1978
37	*Lasioglossum* (*Sphecodogastra*) *pauxillum*	Current study
38	*Sphecodes albilabris*	Warncke, 1992; Current study
39	*Sphecodes alternatus*	Warncke, 1992; Current study
40	*Sphecodes gibbus*	Warncke, 1992; Current study

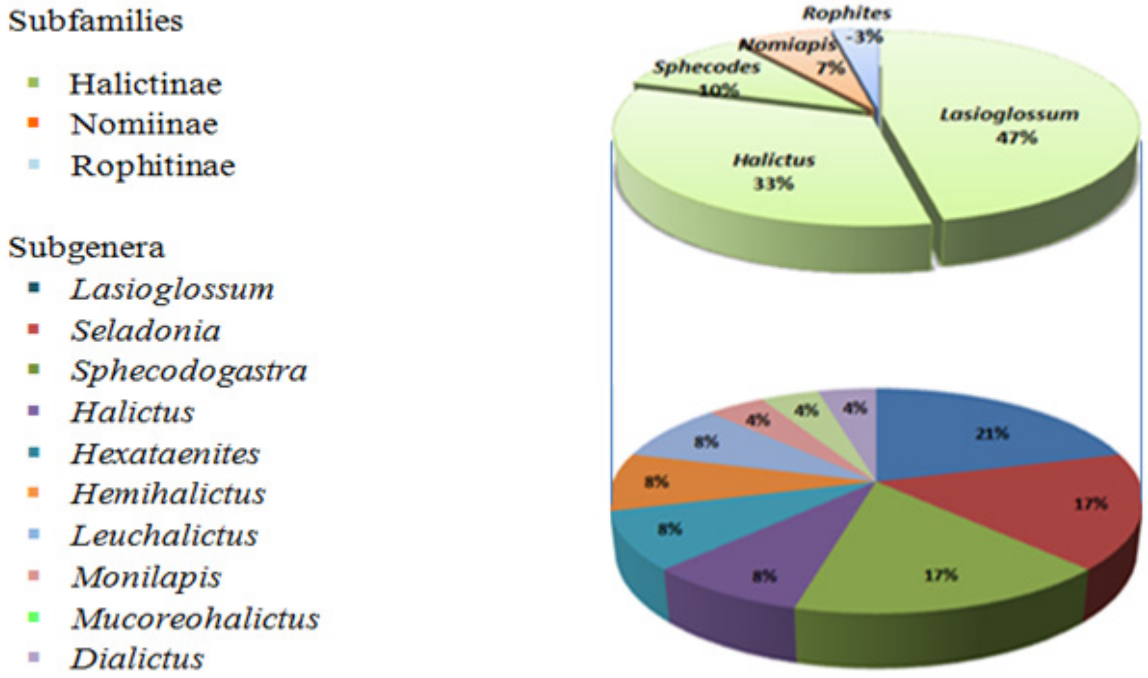

Figure 2. The ratio of number of species for each taxon in family Halictidae collected from Gorgan county.

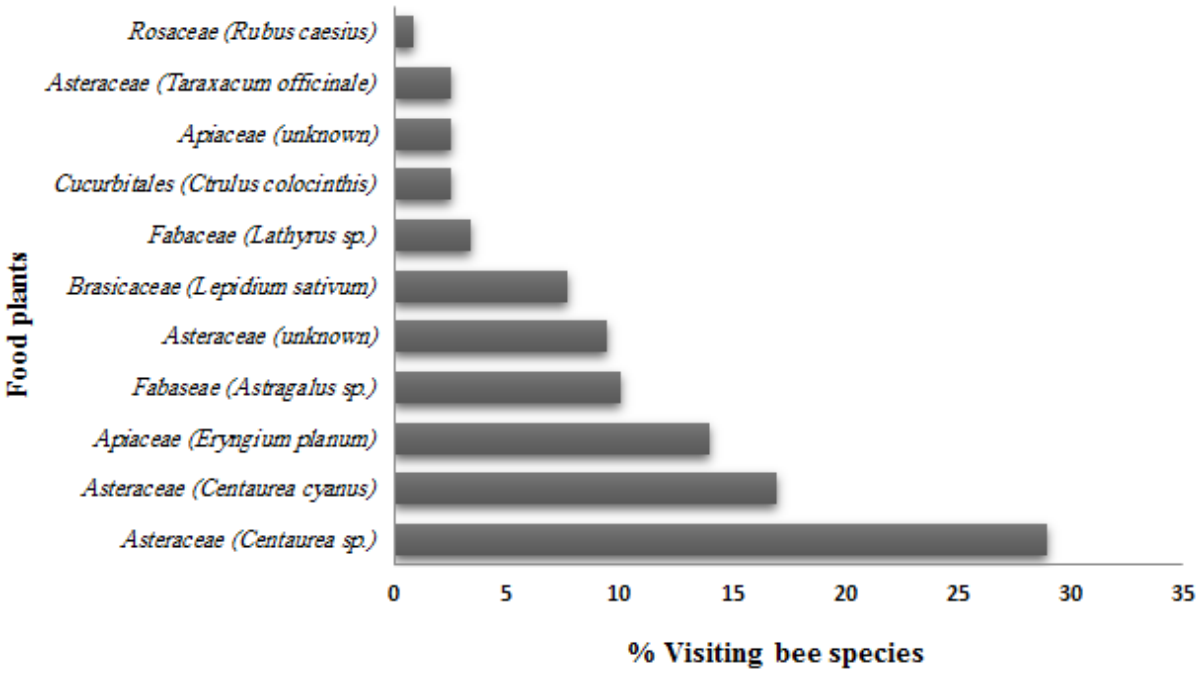

Figure 3. The ratio of number of species on each flowering plants.

3. *Halictus* (*Hexataenites*) *resurgens* Nurse, 1903

Material examined (n = 1): Iran, Golestan province, Gorgan county, Ziarat vollage (36°42′36.83″N, 54°28′49.56″E), 29.VII.2015, 1♀, on *Eryngium planum* (Apiaceae).

Published record: Izadi *et al*. (1998); Pesenko (2005).

Distribution in Iran: Iran (North of Fars province).

General distribution: Europe to eastern Asia (Pesenko, 2005; Dikmen *et al*., 2011; Ascher and Pickering, 2016).

4. *Halictus* (*Hexataenites*) *squamosus* Lebedev, 1911

Material examined (n = 2): Iran, Golestan province, Gorgan county, Chahar bagh village (36°34′3.59″N, 54°30′7.17″E), 24.VIII.2014, 1♀, on *Lathyrus* sp. (Fabaceae); Shahkuh sofla village, (36°34′18.08″N, 54°27′55.20″E), 7.VIII.2014, 1♂, on *Centaurea cyanus* (Asteraceae).

Published record: Alfken and Blüthgen (1937); Ebmer (1987); Izadi *et al*. (1998); Güler *et al*. (2011); Khaghaninia *et al*. (2013).

Distribution in Iran: East Azarbaijan province (Horand, Horand forests), Fars province, Mazandaran (Polur), North Khorasan province (Chaman Bid), Semnan province (Damghan, Dibaj), Tehran province (Damavand, Elburz).

General distribution: Middle East to central Asia (Warnke, 1975, Pauly and Pesenko, 2007; Ascher and Pickering, 2016).

5. *Halictus* (*Monilapis*) *simplex* Blüthgen, 1923

Material examined (n = 1): Iran, Golestan province, Gorgan county, Tuskestan Babaei garden, (36°50′51.92″N, 54°30′13.89″E), 20.VIII.2015, 1♀, on Asteraceae.

Published record: Warncke (1982); Pesenko (2005).

Distribution in Iran: Guilan province (Talesh), Mazandaran (30km Chalus).

General distribution: Europe to eastern Asia (Pesenko *et al*., 2000; Dikmen *et al*., 2011; Ascher and Pickering, 2016).

6. *Halictus* (*Mucoreohalictus*) *pollinosus* Sichel, 1860

Material examined (n = 14): Iran, Golestan province, Gorgan county, Jahannama, (36°37′3″N, 54°19′29.48″E), 11.VIII.2015, 3♀♀, on *araxacum officinale* (Asteraceae), 3♀♀, on Asteraceae, 1♀, on *Astragalus* sp. (Fabaceae), 1♂, on *Centaurea* sp. (Asteraceae); Chahar bagh village (36°34′3.59″N, 54°30′7.17″E), 7.VIII.2014, 3♀♀, on Apiaceae ; Shahkuh sofla village, (36°34′18.08″N, 54°27′55.20″E), 24.VIII.2015, 3♀♀, on *Eryngium planum* (Apiaceae).

Published record: Ebmer (1978); Talebi *et al.* (1995); Khodaparast and Monfared (2012).

Distribution in Iran: Alborz province (Karaj), Fars province (Estahban, Fasa, Kazerun, Sepidan, Nurabad), Golestan province (Minudasht), Kermanshah province (Gilan-e- gharb), Lorestan province (30km Khorramabad), Mazandaran province (polur), North Khorasan province (Chaman Bid), Tehran province (Damavand).

General distribution: Europe to eastern Asia (Güler *et al*., 2011; Ascher and Pickering, 2016).

7. *Halictus* (*Seladonia*) *cephalicus* Morawitz, 1873

Material examined (n = 1): Iran, Golestan province, Gorgan county, Hashem abad (36°53′28.15″N, 54°20′51.53″E), 28.VII.2015, 1♀, on *Centaurea* sp. (Asteraceae).

Published record: Ebmer (1978); Talebi *et al.* (1995); Khodaparast and Monfared (2012).

Distribution in Iran: Alborz province (Karaj), Azarbaijan province (9km Marand), Fars province (Nurabad, Sepidan, Bidzard), Guilan province (Rasht), Lorestan province

(Khorramabad), Mazandaran province (Chalus), 65km NW Qazvin province.

General distribution: Eastern Europe to central Asia (Pauly and Pesenko, 2007; Güler *et al*., 2011; Ascher and Pickering, 2016).

8. *Halictus* (*Seladonia*) *confusus* Smith, 1853

Material examined (n = 1): Iran, Golestan province, Gorgan county, Jahannama, (36°37′3″N, 54°19′29.48″E), 2.VIII.2015, 1♀, on *Centaurea* sp. (Asteraceae).

Published record: current study.

Distribution in Iran: Golestan province (Gorgan), new record for Iran.

General distribution: Europe to East Asia, Australia and North America (Ebmer, 1988; Niu *et al*., 2004; Ascher and Pickering, 2016).

9. *Halictus* (*Seladonia*) *smaragdulus* Vachal, 1895

Material examined (n = 4): Iran, Golestan province, Gorgan county, Hashem abad, (36°53′28.15″N, 54°20′51.53″E), 28.V.2015, 2♀, on *Centaurea* sp. (Asteraceae); Shahkuh sofla village, (36°34′18.08″N, 54°27′55.20″E), 28.VII.2015, 1♀, on *Centaurea* sp. (Asteraceae); Sorkhankalate (36°53′11.79″N, 54°34′2.43″E), 28.VII.2015, 1♂, on *Eryngium planum* (Apiaceae).

Published record: Ebmer (1978); Khodaparast and Monfared (2012).

Distribution in Iran: Fars province (Nurabad), Golestan province (Tilabad), Hamadan province, Mazandaran province (Polur, Babol sar), North Khorasan province (15km Quchan, Chaman Bid), Tehran province (Damavand).

General distribution: Europe to central and south Asia, Australia (Warncke, 1975; Pesenko *et al*., 2000; Güler *et al*., 2011; Ascher and Pickering, 2016).

10. *Halictus* (*Seladonia*) *subauratus* (Rossi, 1792)

Material examined (n = 1): Iran, Golestan province, Gorgan county, Ziarat village, (36°42′36.83″N, 54°28′49.56″E), 29.07.2015, 1♀, on *Centaurea* sp. (Asteraceae).

Published record: Ebmer (1978).

Distribution in Iran: Alborz province (Karaj), Guilan province (Talesh, Lahijan), Golestan province (Minudasht), North Khorasan province (Bojnurd, Chaman Bid), Mazandaran province (5 km Nowshahr, Babol sar), Tehran province (Damavand).

General distribution: Europe to East Asia (Ebmer, 1988; Pesenko *et al*., 2000; Niu *et al*., 2004; Ascher and Pickering, 2016).

11. *Lasioglossum* (*Dialictus*) *aeratum* (Kirby, 1802)

Material examined (n = 1): Iran, Golestan province, Gorgan county, Jahannama, (36°37′3″N, 54°19′29.48″E), 30.VII.2015, 1♀, on *Eryngium planum* (Apiaceae).

Published record: Ebmer (1978); Murao *et al*. (2015).

Distribution in Iran: Guilan province (Rasht), Golestan province (Gorgan, Minudasht, Azadshahr), Mazandaran province (Nowshahr, Chalus), Qazvin province (Qazvin), Tehran province (Damavand).

General distribution: Europe to central Asia, North Africa (Ebmer, 1988; Feitz *et al*., 2003; Pesenko *et al*., 2000; Nobile and Turrisi, 2015; Ascher and Pickering 2016).

12. *Lasioglossum* (*Hemihalictus*) *crassepunctatum* (Blüthgen, 1923)

Material examined (n = 1): Iran, Golestan province, Gorgan county, Hashem abad (36°53′28.15″N, 54°20′51.53″E), 17.VI.2014, 1♀, on *Centaurea* sp. (Asteraceae).

Published record: Blüthgen (1931); Ebmer (1978); Güler *et al*. (2011).

Distribution in Iran: Golestan province (Gorgan, Minudasht, Azadshahr), Mazandaran province (Sari).

General distribution: Europe to Middle East (Ebmer, 1988; Pauly and Pesenko, 2007; Güler *et al*., 2011; Ascher and Pickering, 2016).

13. *Lasioglossum* (*Hemihalictus*) *croceipes* (Morawits, 1876)

Material examined (n = 1): Iran, Golestan province, Gorgan county, Chahar bagh village, (36°34′3.59″N, 54°30′7.17″N), 17.VII.2015, 1♀, on *Astragalus* sp. (Fabaceae).

Published record: current study.

Distribution in Iran: Golestan province (Gorgan), new record for Iran.

General distribution: Central Asia (Ebmer, 1997; Ascher and Pickering, 2016).

14. *Lasioglossum* (*Lasioglossum*) *aegyptiellum* (Strand, 1909)

Material examined (n = 3): Iran, Golestan province, Gorgan county, Jahannama, (36°37′3″N, 54°19′29.48″E), 30.VII.2015, 2 ♀, on *Lathyrus* sp. (Fabaceae); Alofen village (36°41′N, 54°20′E), 27.VI.2015, 1♀, on *Rubus caesius* (Rosaceae).

Published record: Ebmer (1978, 1988); Khodaparast and Monfared (2012).

Distribution in Iran: Fars province (Eqlid, Kazerun, Nurabad), Guilan province (Rasht), Golestan province (Gorgan), Hamadan province (Hamadan), Kermanshah province (Qasr-e- Shirin), Lorestan (Khorramabad), Mazandaran province (Sari, Babol sar), Qazvin province (Qazvin).

General distribution: Europe to Middle East, North Africa (Ebmer, 1988; Güler *et al*., 2011; Ascher and Pickering, 2016).

15. *Lasioglossum* (*Lasioglossum*) *cristula* (Pérez, 1896)

Material examined (n = 1): Iran, Golestan province, Gorgan county, Jahannama, (36°37′3″N, 54°19′29.48″N), 3.VI.2015, 1♀, on *Lepidium sativum* (Brassicaceae).

Published record: Ebmer (1978).

Distribution in Iran: East Azarbaijan (Mahabad), Fars province (Eqlid), Hamadan province (Razan), Guilan province (100 km Rasht), Golestan province (Tilabad), Lorestan province (Khorramabad), Mazandaran province (Nowshahr).

General distribution: Europe to Middle East, North Africa (Ebmer, 1988; Ascher and Pickering, 2016).

16. *Lasioglossum* (*Lasioglossum*) *laevignatum* (Kirby, 1802)

Material examined (n = 6): Iran, Golestan province, Gorgan county, Shahkuh sofla, (36°34′18.08″N, 54°27′55.20″E), 27.IV.2015, 1♂1♀, on *Lepidium sativum* (Brassicaceae); Shastkalate (36°50′19.94″N, 54°27′6.79″E) 4.VI.2015, 1♀, on *Astragalus* sp. (Fabaceae), 3♀, on *Centaurea* sp. (Asteraceae).

Published record: Ebmer (1978).

Distribution in Iran: Golestan province (Gorgan, Azadshahr), Kermanshah province (Paveh), Mazandaran province (Chalus, 5 km Nowshahr).

General distribution: Europe to Iran (Ebmer, 1988; Pesenko *et al*., 2000; Ascher and Pickering, 2016).

17. *Lasioglossum* (*Lasioglossum*) *lativentre* (Schenck, 1853)

Material examined (n = 3): Iran, Golestan province, Gorgan county, Chahar bagh village (36°34′3.59″N, 54°30′7.17″E), 10.VI.2015, 2♀♀, on *Centaurea* sp. (Asteraceae). Shastkalate (36°50′19.94″N, 54°27′6.79″E) 4.VI.2015, 1♀, on *Astragalus* sp. (Fabaceae).

Published record: Ebmer (1978); Güler *et al*. (2011).

Distribution in Iran: Guilan province (Rasht), Mazandaran province (Nowshahr), Golestan province (Gorgan).

General distribution: Europe to central Asia (Warncke, 1975; Ebmer, 1988; Pesenko *et al*., 2000; Ascher and Pickering, 2016).

18. *Lasioglossum* (*Lasioglossum*) *xanthopus* (Kirby, 1802)

Material examined (n = 5): Iran, Golestan province, Gorgan county, Chahar bagh village, (36°34′3.59″N, 54°30′7.17″E), 19.VI.-2014, 2♀♀, on *Lepidium sativum* (Brassicaceae), 1♀, on *Astragalus* sp. (Fabaceae); Jahannama (36°37′3″N, 54°19′29.48″E), 3.VI.2014, 2♀, on *Astragalus* sp. (Fabaseae)

Published record: Alfken and Blüthgen (1937); Ebmer (1978); Khaghaninia *et al.* (2013).

Distribution in Iran: East Azarbaijan (Horand, Horand forests); Golestan province (Minudasht); Mazandaran province (Chalus, Nowshahr); 35 km Qazvin province.

General distribution: Europe to eastern Asia, North Africa (Warncke, 1984; Ebmer, 1988; Pesenko *et al*., 2000; Ascher and Pickering, 2016).

19. *Lasioglossum* (*Leuchalictus*) *discum* (Smith, 1853)

Material examined (n = 5): Iran, Golestan province, Gorgan county, Alofen village, (36°42′N, 54°21′E), 27.VI.2014, 1♀, on *Eryngium planum* (Apiaceae); Hashem abad, (36°53′28.15″N, 54°20′51.53″E), 10.VII.2015, 1♀, on *Centaurea* sp. (Asteraceae), 1♀, on Asteraceae; Shahkuh sofla village (36°34′18.08″N, 54°27′55.20″E), 10.VII.2015, 1♀ 1♂, on *Astragalus* sp. (Fabaceae).

Published record: Ebmer (1978); Izadi *et al.* (1998); Khodaparast and Monfared (2012); Khaghaninia *et al*. (2013).

Distribution in Iran: East Azarbaijan province (Horand, Horand forests), Fars province (Shiraz, Neyriz, Nurabad, Kazerun), Guilan province (Rasht), Golestan province (Minudasht), Kermanshah province (Paveh, Gilan-e-gharb), Mazandaran province (Sari, Babol sar), North Khorasan (Bojnurd, Chaman Bid), Tehran province (Damavand).

General distribution: Europe to central Asia, North Africa (Ebmer, 1988; Pauly and Pesenko, 2007; Ascher and Pickering, 2016).

20. *Lasioglossum* (*Leuchalictus*) *leucozonium* (Schrack, 1781)

Material examined (n = 6): Iran, Golestan province, Gorgan county, Chahar bagh village, (36°34′3.59″N, 54°30′7.17″E), 10.VI.2015, 4♀♀, on *Centaurea* sp. (Asteraceae); Hashem abad, (36°53′28.15″N, 54°20′51.53″E), 7.VI.2015, 1♀, on *Centaurea cyanus* (Asteraceae), 10.VII.2015, 1♀, on *Centaurea* sp. (Asteraceae).

Published record: Morice (1921a); Ebmer (1978); Khodaparast and Monfared (2012).

Distribution in Iran: Fars province (Shiraz); Golestan province (Gorgan, Minudasht, Azadshahr, Tilabad), Mazandaran province (Chalus, Nowshahr), Qazvin province (Qazvin).

General distribution: Holarctic (Ebmer, 1988; Pesenko *et al*., 2000; Güler *et al*., 2011; Ascher and Pickering, 2016).

21. *Lasioglossum* (*Sphecodogastra*) *malachurum* (Kirby, 1802)

Material examined (n = 2): Iran, Golestan province, Gorgan county, Chahar bagh village, (36°34′3.59″N, 54°30′7.17″E), 20.IV.-2015, 1♀, on *Lathyrus* sp. (Fabaceae); 7.VI.2015, 1♀, on *Centaurea* sp. (Asteraceae).

Published record: Ebmer (1978, 1988); Pesenko *et al*. (2000); Khodaparast and Monfared (2012).

Distribution in Iran: Fars province (Shiraz, Sepidan, Eqlid, Nurabad), Mazandaran (Nowshahr, Sari).

General distribution: Europe to Middle East, North Africa (Ebmer, 1988; Pesenko *et al*., 2000; Güler *et al*., 2011; Ascher and Pickering, 2016).

22. *Lasioglossum* (*Sphecodogastra*) *marginatum* (Brullé, 1832)

Material examined (n = 4): Iran, Golestan province, Gorgan county, Hashem abad (36°53′28.15″N, 54°20′51.53″E), 28.VII.2015, 2♀♀, on *Centaurea* sp. (Asteraceae); Jahannama,

(36°37′3″N, 54°19′29.48″E), 30.VII.2015, 1♀, on *Centaurea cyanus* (Asteraceae), 1♀, on Asteraceae.

Published record: Ebmer (1978); Khodaparast and Monfared (2012).

Distribution in Iran: Fars province (Shiraz, Eqlid, Estahban, Nurabad), Golestan province (Gorgan, Minudasht), Hamadan province (Hamadan), Kermanshah (Paveh, Qasr-e-Shirin), Lorestan province (Khorramabad), Mazandaran province (Chalus), Alborz province (Karaj), Qazvin province (Qazvin), Kordestan province (Sanandaj), Western Azarbaijan (Mianeh).

General distribution: Europe to central and south Asia, North Africa (Ebmer, 1988; Pesenko *et al*., 2000; Güler *et al*., 2011; Ascher and Pickering, 2016).

23. *Lasioglossum* (*Sphecodogastra*) *nigripes* (Lepeletier, 1941)

Material examined (n = 1): Iran, Golestan province, Gorgan county, Chahar bagh village, (36°34′3.59″N, 54°30′7.17″E), 31.V.-2015, 1♀, on *Astragalus* sp. (Fabaceae).

Published record: Alfken and Blüthgen (1937); Ebmer (1978); Izadi *et al.* (1998); Pesenko *et al.* (2000).

Distribution in Iran: Fars province; Golestan province (Minudasht); Mazandaran province (30 km Chalus, Nowshahr).

General distribution: Europe to central Asia (Ebmer, 1988; Pesenko *et al*., 2000; Güler *et al*., 2011; Ascher and Pickering, 2016).

24. *Lasioglossum* (*Sphecodogastra*) *pauxillum* (Scheneck, 1853)

Material examined (n = 2): Iran, Golestan province, Gorgan county, Chahar bagh village, (36°34′3.59″N, 54°30′7.17″E), 20.IV.2015, 1♀, on *Centaurea* sp. (Asteraceae); Jahannama, (36°37′3″N, 54°19′29.48″E), 02.VIII.2015, 1♀, on *Astragalus* sp. (Fabaceae).

Published record: Ebmer (1978); Pesenko *et al.* (2000); Khodaparast and Monfared (2012).

Distribution in Iran: East Azarbaijan (Tabriz), Fars province (Sepidan, Evaz), Guilan province (Rasht), Mazandaran (Chalus), Qazvin province (Qazvin).

General distribution: Europe to central Asia, North Africa (Ebmer, 1988; Pesenko *et al*., 2000; Güler *et al*., 2011; Ascher and Pickering, 2016).

25 . *Sphecodes albilabris* (Fabricius, 1793)

Material examined (n = 3): Iran, Golestan province, Gorgan county, Chahar bagh village, (36°34′3.59″N, 54°30′7.17″E), 30.VII.-2015, 3♂♂, on *Centaurea* sp. (Asteraceae).

Published record: Warncke (1992).

Distribution in Iran: West and East Azerbaijan province, Golestan province.

General distribution: Europe to central Asia, India, North Africa (Warncke, 1992; Astafurova *et al*., 2014; Ascher and Pickering, 2016).

26. *Sphecodes alternatus* Smith, 1853

Material examined (n = 3): Iran, Golestan province, Gorgan county, Shahkuh sofla village, (36°34′18.08″N, 54°27′55.20″E), 30.VII.2015, 3♂♂, on *Lepidium sativum* (Brassicaceae).

Published record: Warncke (1992).

Distribution in Iran: West and East Azerbaijan province, Golestan province.

General distribution: Europe to central Asia, North Africa (Warncke, 1992; Astafurova *et al*., 2014; Ascher and Pickering, 2016).

27. *Sphecodes gibbus* (Linnaeus 1758)

Material examined (n = 1): Iran, Golestan province, Gorgan county, Shahkuh sofla village, (36°34′18.08″N, 54°27′55.20″E), 30.VII.-2015, 1♀, on *Lepidium sativum* (Brassicaceae).

Published record: Warncke (1992).

Distribution in Iran: West and East Azerbaijan province, Golestan province.

General distribution: Europe to east Asia, North Africa (Warncke, 1992; Astafurova *et al*., 2014; Astafurova and Proshchalykin, 2015; Ascher and Pickering, 2016).

Discussion

Based on present study, the number of Iranian halictid bees has increased to 212 species. Thirty species were collected, representing about 19% of all halictid species listed for Iranian bee fauna (Morice, 1921a, 1921b; Alfken, 1927; Blüthgen, 1931, 1936, 1965; Alfken and Blüthgen, 1937; Popov, 1967; Ebmer, 1978; Warncke, 1982; Pesenko, 2005; Khodaparast and Monfared, 2012; Ascher and Pickering, 2016). The subfamily Halictinae (27 species), genus *Lasioglossum* (14 species) and subgenus *Lasioglossum* (5 species), representing the major groups of Halictid bee in the study area. *Halictus brunnescens*, which captured mainly on *Centaurea* flowers, was the most abundant species and was represented about 15% of all bees collected in the study areas. The bee was found in various areas, including lowland Gorgan plain and highlands, and did not show altitudinally specific distribution patterns. Both *Halictus confusus* and *Lasioglossum croceipes,* two new records for Iranian bee fauna, were collected from mountainous pasture and rangeland ecosystems with Ultra Humid climate. It seems that *L. croceipes*, which have minimal reports in the literatures, is a native bee of Central Asia. Our results showed that *Centaurea* spp. attracted many bees. Although different factors (e.g. nectar and pollen resources) may affect on plant attractiveness, the higher halictid bee taxa richness is likely due to greater floral abundance of knapweed flowers in the collecting sites. Current study can provide a useful baseline for future studies. Despite some faunistic works, there are still major gaps in our knowledge of the bee fauna of Iran. We hope that our survey will provide groundwork for efforts to better document and conserve Iranians bee diversity, particularly those native which probably vulnerable because of the loss of habitat and competition.

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مطالعه زنبورهای خانواده Halictidae (Hymenoptera: Apoidea) در گرگان، شمال ایران

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چکیده: فون حشرات گرده‌افشان خانواده‌ی Halictidae (Hymenoptera: Apidae) در شهرستان گرگان، استان گلستان واقع در شمال ایران مورد بررسی قرار گرفت. در مطالعه حاضر ۳۰ گونه از ۵ جنس متعلق به سه زیرخانواده مختلف جمع‌آوری و شناسایی شد. از این میان دو گونه (*Hemihalictus*) *Lasioglossum croceipes* (Morawitz, 1876) و (*Seladonia*) *Halictus confusus* Smith 1853 برای اولین بار از ایران گزارش می‌شود. هجده گونه نیز برای فون شهرستان گرگان جدید بود. از میان ۱۱۲ نمونه جمع‌آوری شده، زیرخانواده Halictinae (۲۷ گونه)، جنس *Lasioglossum* (۱۴ گونه) و زیرجنس *Lasioglossum* (۶ گونه) عمده‌ترین گروه جمع‌آوری شده در مناطق مورد مطالعه بود. زنبور (*Halictus*) *Halictus brunnescens* (Eversmann, 1852) بیشترین فراونی و گونه‌های مختلف گیاه گل گندم بیشترین تعداد گونه‌ی زنبورهای بازدید کننده را به خود اختصاص داد. فهرست به‌روز شده زنبورهای خانواده Halictidae در شهرستان گرگان ارایه شده است.

واژگان کلیدی: Halictinae، *Halictus*، *Lasioglossum*، ایران، فون