Notes on the *Halictus* Latreille (Hymenoptera: Halictidae) fauna of Turkey

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Abstract: The Halictidae collections of the Natural History Museum of Vienna (Austria), the Oberösterreichisches Landesmuseum of Linz (Austria), and the Université de Mons-Hainaut (Belgium) were inspected in order to review the *Halictus* Latreille (Halictidae: Hymenoptera) fauna of Turkey. Added to this were data from the literature as well as data collected during our personal field studies in the central Anatolian and Mediterranean regions of Turkey between the years 2000 and 2009. Distribution maps are presented of 34 species from Turkey. In addition, information on world distributions and foraged flowers is given. This study reviews the status of the genus in Turkey and provides a base for future taxonomic studies.

Key words: Halictidae, *Halictus*, fauna, distribution, Turkey

Introduction

Halictidae (Apiformes: Apoidea: Hymenoptera) is one of the greatest families of all bees (Michener, 2000; Pesenko et al., 2000). As it is known that bees play an important role in the pollination of angiosperms, members of Halictidae also have great influence in this service. Çalmaşur and Özbek (1999) reported *Halictus quadricinctus* (Fabricius, 1776) to be one of the most abundant pollinators of sunflowers (*Helianthus annuus* L.). According to Goubara and Takashi (2004), the only pollinator that leads to successful F₁ hybrid seed production in *Lactuca sativa* L. is *Lasiosglossum villosulum trichopse* (Strand, 1914). Al-Ghazwi et al. (2006) reported Halictidae as the most abundant of the pollinator bee families in the orchards of Jordan. Özbek (2008a) indicated that

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the Halictidae species are some of the most abundant bees found in fruit gardens. In addition, Özbek (2008b) remarked that *Rophites canus* Eversmann, 1852 is one of the significant pollinators of *Medicago sativa* L. (alfalfa). Other pollination studies (Nabhan, 1998; Shelly, 2000; Kremen, 2001; Klein et al., 2003) have also indicated that Halictidae includes important pollinators.

The family Halictidae includes 72 genera and nearly 3500 species (Pesenko, 2007a) throughout the world. Of these genera, *Halictus* Latreille, 1804 is among the largest, containing nearly 90 species in the Palaearctic region; most of these species are Mediterranean and central Asian in occurrence (Pesenko, 2005a). Studies on the establishment of *Halictus* fauna in Turkey are limited, however, and information on the issue is surprisingly deficient. Current data remain insufficient on both the number of *Halictus* species found in Turkey and the distributions of these species. The main studies on the subject were conducted by Warncke (1975 and 1984) and Özbek (1979a).

Another problem regarding the systematics of *Halictus* is the presence of different opinions on its generic status. Michener (2000) reported that the first attempt to unite all Halictinae members in one genus of *Halictus* was made by Vachal in 1911. Ebmer (1969, 1988) and Warncke (1973, 1975, 1984) supported this application and classified all the nonparasitic Halictini members under the 2 genera of *Lasioglossum* Curtis and *Halictus*. However, Michener (2000) emphasized that such application of simplifications or unifications on a group as large as Halictidae is useless. In addition, Pesenko et al. (2000) and Pesenko (2004, 2007b) found these approaches impractical and claimed that these classifications were not able to accurately reflect the phylogenetic relationships (Pesenko, 2007b). Even today, members of Halictinae or Halictini (with the exception of the kleptoparasitic genus *Sphecodes* Latreille) are discussed either under the name of *Halictus* or *Lasioglossum* and *Halictus* (Polaszek, 2004; TÜBİTAK, 2005; Pauly and Pesenko, 2007; Ascher et al., 2009). It might be useful for a database to unite such groups, but these approaches hide the subgeneric relations that can be very useful for taxonomy.

Because of these problems, data on the number of species and their distribution in Turkey need to be updated. With this goal in mind, this study aims to review the status of the genus in Turkey. Here we report a total number of 34 species belong to 8 subgenera found in Turkey. Regional distribution of these species is presented in 7 maps. Global and regional distributions are discussed and synonyms and foraging flower information are also given.

**Materials and methods**


Some of the distribution data were taken from label data of museum materials belonging to the collections of the Natural History Museum of Vienna, Austria (NHMW); the Oberösterreichisches Landesmuseum/Biologiezentrum of Linz, Austria (OLML); and the Université de Mons-Hainaut, Laboratoire de Zoologie, Mons, Belgium (UMH). Other data on distribution were generated from our personal field studies between the years 2000 and 2009. Some materials used by Dikmen and Çağatay (2007) were also included. As the field studies were generally performed around the central Anatolia and Mediterranean regions of Turkey, this part of the data mainly reflects the fauna of these regions. All captured materials were properly prepared for collection and deposited in the Apoidea collection of the Morphometry Laboratory of Hacettepe University's Department of Biology in Ankara, Turkey. GPS coordinates were taken using the Garmin Etrex H®. Specimens were examined with stereoscopic microscopes for diagnosis. Identification of the species was made according to the works of Ebmer (1969), Pesenko (1978, 1984, 1985, 1986), Pesenko et al. (2000), and Amiet et al. (2001) and by comparing the specimens with the aforementioned museum collections. Distribution maps were prepared with CFF 2.0 (Carto Fauna-Flora; Barbier & Rasmont, 2000) and modified with the software Paint.NET v3.36 for better visualization. Since the coordinate data for maps were absent on the labels of the museum materials and in the literature, indicator...
points on the maps were arranged according to city centers. Examples from Pesenko (1984, 2004, 2005a) and Pesenko et al. (2000) were followed for the genera and subgenera ranks and names. The species are listed below in alphabetical order within subgenera.

Results

1. **Halictus (Acalcaripes) falcinellus** Warncke, 1982
   
   **World Distribution:** Iran, Turkey (Warncke, 1984).

   **Turkey Distribution:** Bitlis (OLML; 1 ♀); Şırnak (formerly part of Hakkari), Hakkari (Warncke, 1984) (Figure 1).

2. **Halictus (Acalcaripes) patellatus** Morawitz, 1874

   *Halictus wagneri* Blüthgen, 1937; *Halictus ifranicola* Cockerell, 1937

   **World Distribution:** Mainly Mediterranean. This species is represented by 2 subspecies in the Palaearctic: *H. patellatus taorminicus* Strand, 1921 is the western subspecies and *H. patellatus patellatus* Morawitz, 1874 is the eastern subspecies (Pesenko, 2005a). Austria, Azerbaijan, Belgium, Caucasia, France, Israel, Italy, Lebanon, Macedonia, Russia, Slovakia, Slovenia (Polaszek, 2004), Morocco, northern Iran, Syria, Turkey, and southwestern Turkmenistan (Pesenko, 2005a).

   **Turkey Distribution:** Karaman (formerly part of Konya), Erzurum, Kütahya (Warncke, 1975); Erzurum (Özbek, 1979a); Ardahan, Hakkari, Niğde (Pesenko, 2005a); Ankara (1 ♀, 1 ♂) (Dikmen and Çağatay, 2007); Konya (2 ♀♀), Kahramanmaraş (37°38′56″N, 36°55′97″E; 1 ♀) (Figure 1).

   **Flowers Visited:** *Alyssum* sp., *Anthericum* sp., *Globularia* sp., *Jurinea* sp., *Thymus* sp., *Veronica* sp. (Knerer, 1968); *Anchusa* sp., *Carduus* sp., *Prunus* sp., *Ranunculus* sp., *Salix* sp., *Salvia* sp., *Taraxacum* sp. (Özbek, 1979a); *Centaurea iberica* Trever. ex Spreng., 1826.

3. **Halictus (Argalictus) dschulfensis** Blüthgen, 1936

   **World Distribution:** Eastern Mediterranean; Armenia, Azerbaijan, Iran, Turkey (Pesenko, 2005a).

   **Turkey Distribution:** Southeastern Turkey; Hakkari (Pesenko, 2005a) (Figure 1).

   **Flowers Visited:** *Tamarix* sp. (Pesenko, 2005a).

4. **Halictus (Argalictus) fatsensis** Blüthgen, 1936

   **World Distribution:** Eastern Mediterranean; Cyprus, Iraq, Israel, Jordan, Turkey (Pesenko, 2005a).

   **Turkey Distribution:** Urfa (Ebmer, 1975); Sivas (NHMW; 1 ♀) (Figure 1).

5. **Halictus (Argalictus) luganicus** Blüthgen, 1936

   **World Distribution:** Ukraine (Ebmer, 1975); mainly distributed around the Black Sea region, Azerbaijan, Georgia, Turkey (Pesenko, 2005a).

   **Turkey Distribution:** Çanakkale, Mersin (Ebmer, 1975); Kayseri (Radchenko, 2007; personal communication); Ankara (1 ♀, 1 ♂) (Dikmen and Çağatay, 2007); Afyon (4 ♂, 6 ♀♀), Denizli (37°48′83″N, 29°17′35″E; 2 ♀♀) (Figure 1).

   **Flowers Visited:** *Pisum sativum* L. (Pesenko, 2005a); *Onopordum* sp., *Peganum harmala* L.

6. **Halictus (Argalictus) senilis** (Eversmann, 1852)

   *Hylaeus senilis* Eversmann, 1852; *Halictus fucosus* Morawitz, 1876; *Halictus albarius* Pérez, 1895; *Halictus bivinctus* Vachal, 1902

   **World Distribution:** Afghanistan, northern Africa, Egypt, Iraq, Israel, Pakistan, southern Spain, Turkestan (Ebmer, 1975).

   **Turkey Distribution:** Ağrı, Urfa (Warncke, 1975); Afyon (1 ♀), Konya (2 ♀♀) (Figure 1).

7. **Halictus (Argalictus) submodernus** Blüthgen, 1936

   **World Distribution:** Iran, Turkey (Pesenko, 2005a).

   **Turkey Distribution:** Hakkari (Warncke, 1984); Şırnak (formerly part of Hakkari) (Pesenko, 2005a) (Figure 1).

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

   *Hylaeus brunnescens* Eversmann, 1852; *Halictus quadricinctus* var. *maximus* Friese, 1916; *H. quadricinctus* var. *aegyptiacus* Friese, 1916

   **World Distribution:** Southern Palaearctic;
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Afghanistan, Armenia, Austria, Azerbaijan, northern China, Czech Republic, Egypt, Georgia, northern India, Iran, Israel, Kazakhstan, Kyrgyzstan, Morocco, Pakistan, Spain, Tunisia, Turkmenistan, Uzbekistan (Pesenko, 2005a).

**Turkey Distribution:** Hakkari, Kahramanmaraş, Sivas (OLML, 5♀); Bayburt, Muğla (OLML, 2♀); Afyon, Ankara, Erzincan, Erzurum, Esşihehir, Hatay, İstanbul, Konya (as *H. quadricinctus* subsp. *aegyptiacus*, NHMW; 10♀); Ankara (39°51’89”N, 32°43’42”E; 2♂), Denizli (37°48’83”N, 29°17’35”E; 1♂) (Figure 2).

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**Figure 1.** Distribution of the members of the subgenera *Acalcaripes* and *Argalictus* (*H. dschulfensis*, *H. fatsensis*, *H. falcinellus*, *H. luganicus*, *H. patellatus*, *H. senilis*, and *H. submodernus*) in Turkey.

**Figure 2.** Distribution of the members of the subgenus *Halictus* (*H. brunescens* and *H. quadricinctus*) in Turkey.
Flowers Visited: Onopordum sp.

9. Halictus (Halictus) quadricinctus (Fabricius, 1776)

Apis quadricincta Fabricius, 1776; Apis hortensis Geoffroy, 1785; Halictus quadristrigatus Latreille, 1805; Hylaeus grandis Illiger, 1896

World Distribution: Palaearctic, from Finland to northern China (Pesenko, 2005a).

Turkey Distribution: Afyon, Ankara, Artvin, Denizli, Erzurum, Erzincan, Hatay, İstanbul, Karaman, Kars, Konya, Nevşehir, Samsun, Trabzon (Warncke, 1975); Ağrı, Gümüşhane (Özbek, 1979a); Niğde, Antalya, Bitlis, Konya (OLML; 6 ♀); Ankara (25 ♀, 8 ♂); Kastamonu (2 ♀) (Figure 2).

Flowers Visited: Taraxacum spp. (Adolph, 1934); Centaurea scabiosa L., Cirsium vulgare (Savi) Ten., 1835 (Aerts, 1960); Anchusa sp., Tragopogon sp. (Knerer, 1968); Medicago sativa L., Oryza sativa L., Rosa sp., Salvia sp., Trifolium spp., Vicia sp. (Özbek, 1979a); Carduus spp., Centaurea spp., Cirsium spp., Onopordum spp. (Pesenko et al., 2000); Glacium sp.

10. Halictus (Hexataenites) berlandi Pérez, 1903

World Distribution: Mediterranean (Pauly and Pesenko, 2007).

Turkey Distribution: Mersin, Adana (Warncke, 1975; as H. cochlearitarsis subsp. berlandi) (Figure 3).

11. Halictus (Hexataenites) cochlearitarsis (Dours, 1872)

Lucasius cochlearitarsis Dours, 1872; Halictus anomalipes Lebedev, 1910

World Distribution: Western Palaearctic (Polaszek, 2004) and Mediterranean; Austria, Armenia, Azerbaijan, Bulgaria, Greece, Macedonia, Romania, Spain, Turkey, Ukraine (Pesenko, 2005a).

Turkey Distribution: Ankara, Antalya, Çankırı, Edirne, Konya, İstanbul (Warncke, 1975); Erzurum (Özbek, 1979a); Ankara (2 ♀) (Dikmen and Çağatay, 2007); Adana, Ağrı, Erzincan, Hakkari, Kars (OLML; 3 ♂, 8 ♀); Mersin (36°39’00”N, 33°06’27”E; 2 ♂, 1 ♀), Kastamonu (4 ♀) (Figure 3).

Flowers Visited: Malus sp., Salix sp. (Özbek, 1979a); Onopordum sp. (Dikmen and Çağatay, 2007); Echinops ritro L.

12. Halictus (Hexataenites) resurgens Nurse, 1903

Halictus turkomannus Perez, 1903; H. holtzi Schulz, 1906; H. asiaeminoris Strand, 1921.
World Distribution: Northeastern Africa to central Asia (Pesenko, 2005a).

Turkey Distribution: Adana, Adıyaman, Ankara, Antalya, Balıkesir, Bilecik, Gaziantep, Hakkari, Hatay, İstanbul, Konya, Mardin, Siirt, Şırnak, Urfa, Van (OLML; 3♂♂, 12♀♀); Şırnak (NHMW; 1♀); Ankara (12♂♂, 15♀♀), Afyon (2♂♂, 5♀♀), Burdur (37°33’46”N, 30°42’25”E; 3♀♀), Hatay (36°34’81”N, 36°15’72”E; 1♂, 2♀♀), Denizli (37°48’83”N, 29°17’35”E; 1♂, 2♀♀) (Figure 3).

Flowers Visited: Echinops pungens Trautv., 1833; Onopordum sp.

13. Halictus (Hexataenites) scabiosae (Rossi, 1790)

Apis scabiosae Rossi, 1790; Hylaeus alternans Fabricius, 1793; Halictus zebrus Walckenaer, 1817; H. griseozonatus Dours, 1872; H. scabiosae subsp. powelli Cockerell, 1931

World Distribution: All Europe and northern Africa (Polaszek, 2004).

Turkey Distribution: Bursa, İstanbul (Warncke, 1975); Erzurum, Kars, Iğdır (Özbek, 1979a); Ankara (31♀♀) (Dikmen and Çağatay, 2007) (Figure 3).

Flowers Visited: Centaurea sp., Cichorium sp., Jurinea sp. (Knerer, 1968); Asteraceae, Cucurbitaceae, Leguminosae, Ranunculaceae, Rosaceae (Özbek, 1979a); Onopordum sp., Cirsium sp. (Dikmen and Çağatay, 2007).

14. Halictus (Hexataenites) sexcinctus (Fabricius, 1775)

Apis sexcincta Fabricius, 1775; Apis ichneumonea Christ, 1791; Hylaeus sexcinctus Fabricius, 1793; Hylaeus arbustorum Panzer, 1797; Andrena rufipes Spinola, 1806

World Distribution: This species is represented by 2 subspecies: H. sexcinctus sexcinctus (Fabricius, 1775) is the European subspecies and H. sexcinctus albohispidus Blüthgen, 1923 is the southern-southeastern (Armenia, Israel, Iran, and Turkey) subspecies. Georgia and Dagestan are reported as the transgression zone of these subspecies (Pesenko, 2005a).

Turkey Distribution: Afyon, Ankara, Antalya, Bursa, Balıkesir, Erzurum, Karaman, Kars, Kayseri, Kahramanmaras, İstanbul, Samsun (Warncke, 1975); Kayseri (OLML; 1♀); Kahramanmaras (37°38’56”N, 36°55’97”E; 2♀♀), Denizli (37°48’83”N, 29°17’35”E, 2♂♂, 4♀♀); Tokat (1♀), Afyon (1♂, 3♀♀) (Figure 3).

Flowers Visited: Carduus sp., Centaurea sp., Cichorium sp., Cirsiump sp., Jurinea sp., Onopordum sp., Tragopogon sp. (Knerer, 1968); Centaurea iberica Trevir. ex Sprengel, 1826; Onopordum sp.

15. Halictus (Hexataenites) squamosus Lebedev, 1911

World Distribution: Iran, Lebanon, Turkmenistan, Turkey (Pauly and Pesenko, 2007).

Turkey Distribution: Ankara, Kahramanmaras, Konya (Warncke, 1975); Urfa (Warncke, 1984); Malatya, Niğde (38°00’24”N, 38°45’38”E) (UMH; 1♂, 1♀), Erzincan (39°49’38”N, 39°31’26”E; 1♂), Afyon (1♂), Kahramanmaras (37°38’56”N, 36°55’97”E; 1♂, 1♀) (Figure 3).

Flowers Visited: Centaurea kotschyi Boiss. et Heldr. (UMH); Centaurea virgata Lam., Centaurea iberica Trevir. ex Sprengel, 1826.

16. Halictus (Monilapis) adjikenticus Blüthgen, 1923

Halictus scardicus Blüthgen 1936

World Distribution: Armenia (as H. scardicus) (Ehmer, 1975); Azerbaijan, Yugoslavia/Macedonia (as H. scardicus) (Ehmer, 1988); Caucasus, France (Pauly and Pesenko, 2007).

Turkey Distribution: Artvin, Ardahan, Kars (as H. scardicus) (Warncke, 1975); Hakkari (OLML; as H. scardicus, 1♀); Hatay (36°30’08”N, 36°12’04”E; 2♀♀) (Figure 4).

Flowers Visited: Centaurea iberica Trevir. ex Sprengel, 1826.

17. Halictus (Monilapis) aegyptiola Strand, 1909

World Distribution: East Mediterranean (Pauly and Pesenko, 2007).

Turkey Distribution: Southern Turkey; Hatay (Warncke, 1975), Kahramanmaras (Warncke, 1984) (Figure 4).

18. Halictus (Monilapis) beytueschebapensis Warncke, 1984

**World Distribution:** Iran, Turkey (Warncke, 1984), Turkey (Pesenko, 2005a).

**Turkey Distribution:** Adıyaman, Gaziantep, Hakkari (Warncke, 1984; as *H. senex* subsp. *beytueschebapensis*); mainly southeastern Turkey, Şırnak (formerly part of Hakkari) (Pesenko, 2005a) (Figure 4).

19. *Halictus (Monilapis) compressus* (Walckenaer, 1802)

*Apis flavipes* Panzer, 1798; *Hylaeus tomentosus* Herrich-Schäffer, 1840; *Halictus senex* Förster, 1860; *H. eurygnathus* Blüthgen, 1931; *H. eurygnathopsis* Blüthgen, 1936; *H. veneticus* Ebmer, 1969

**World Distribution:** Widely distributed throughout the Palaearctic, especially from the Atlantic to Baikal (Pesenko et al., 2000). It is represented with 4 subspecies: *H. compressus compressus*, found from Europe to the Near East, except in Ireland, Norway, and Finland; *H. compressus transvolgensis* Pesenko, 1985, found in more eastern regions; *H. compressus lunatus* Warncke, 1975, found in eastern Turkey and northwestern Iran; and *H. compressus gissaricus* Pesenko, 1985 from Tajikistan (Pesenko, 2005a).

**Turkey Distribution:** *H. compressus lunatus* is the eastern subspecies and *H. compressus compressus* is the western subspecies (Pesenko, 2005a). Hakkari (Warncke, 1984; as *H. senex* subsp. *lunatus*); Erzurum, Kars, Samsun (OLML; as *H. senex* subsp. *eurygnathosis*, 3♀♂); Ankara (1♂) (Dikmen and Çağatay, 2007) (Figure 5).


20. *Halictus (Monilapis) gordius* Warncke, 1975

**World Distribution:** Turkey (Ascher et al., 2009). It is probably endemic to Turkey.

**Turkey Distribution:** Hakkari (Warncke, 1975) (Figure 4).


**World Distribution:** Turkey (Warncke, 1984); Greece (Pauly and Pesenko, 2007).

**Turkey Distribution:** Karaman (formerly part of Konya), Hakkari (Warncke, 1984) (Figure 4).
22. *Halictus (Monilapis) penterhi* Blüthgen, 1923

**World Distribution:** Turkey (Warncke, 1975). It is probably endemic to Turkey.

**Turkey Distribution:** Ağrı, Ankara, İzmir, Kayseri, Konya, Nevşehir, Samsun, Sivas, Erzurum (Warncke, 1975; as *H. tetrazonius* subsp. *pentheri*); Ağrı, Ardahan, Bayburt, Erzincan, Erzurum, Muş, Sinop (Özbek, 1979a; as *H. tetrazonius* subsp. *pentheri*); Kayseri (NMHW; 1 ♀); Kars (OLML; as *H. tetrazonius* subsp. *pentheri*; 1 ♀) (Figure 4).

23. *Halictus (Monilapis) quadricinctoides* Blüthgen, 1909

**World Distribution:** Caucasia and Turkey (Ascher et al., 2009).

**Turkey Distribution:** Mersin (Warncke, 1975), Adana (Warncke, 1984) (Figure 4).

24. *Halictus (Monilapis) sajoi* Blüthgen, 1923

**World Distribution:** Austria, Germany, Hungary, Italy, northwestern Russia, Slovenia, eastern Palaearctic (Polaszek, 2004).

**Turkey Distribution:** Adana, Ağrı, Ankara, Ardahan, Erzurum, Konya, Giresun (Warncke, 1975); Erzurum (Özbek, 1979a); Antalya, Hakkari, Şırnak, Van (Warncke, 1984); Ankara (1 ♀, 1 ♂) (Dikmen and Çağatay, 2007); Bitlis, Kars, Niğde (OLML, as *H. bifidus*; 18 ♀, 15 ♂), Erzincan (OLML; 1 ♀) (Figure 5).

**Flowers Visited:** Carduus sp., Centaurea sp., Cirsium sp., Crataegus sp., Cynoglossum sp., Euphorbia sp., Geranium sp., Lepidium sp., Lycium sp., Melilotus sp., Onopordum sp., Reseda sp., Rhamnus sp., Salvia sp., Senecio sp., Tragopogon sp. (Knerer, 1968); Salix sp. (Özbek, 1979a); Taraxacum sp. (Dikmen and Çağatay, 2007).

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

**World Distribution:** Western Palaearctic, from Spain to eastern Kazakhstan (Pesenko et al., 2000).

**Turkey Distribution:** Erzurum (Özbek, 1979a); Hakkari (as *H. marchali* (Warncke, 1984); Ankara (Dikmen and Çağatay, 2007) (Figure 5).

**Flowers Visited:** Carduus sp., Centaurea sp., Cornus sp., Crataegus sp., Daucus sp., Dictamnus sp., Euphorbia sp., Geranium sp., Lepidium sp., Lycium sp., Melilotus sp., Onopordum sp., Reseda sp., Rhamnus sp., Salvia sp., Senecio sp., Tragopogon sp. (Knerer, 1968); Salix sp. (Özbek, 1979a); Taraxacum sp. (Dikmen and Çağatay, 2007).

26. Halictus (Monilapis) tetrazonianellus Strand, 1909

Halictus gusenleitneri Ebmer, 1975

World Distribution: Azerbaijan, Caucasia, Lebanon, northern Russia, Turkey (Polaszek, 2004).

Turkey Distribution: Adana, Denizli, Hatay, İstanbul, İzmir, Karaman (Warncke, 1975); Erzurum (Özbek, 1979a); Urfa (Warncke, 1984); Ankara (♂) (Dikmen and Çağatay, 2007); Kayseri, Şırnak (OLML; 1♀, 1♂); Mersin (35°55′74″N, 34°47′59″E; 2♂♂), Muğla (35°48′31″N, 27°53′65″E; 2♂♂), Denizli (37°48′83″N, 29°17′35″E; 2♂♂) (Figure 5).


27. Halictus (Monilapis) tetrazonius (Klug, 1817)

Hylaeus tetrazonius Klug, 1817; Halictus furcatus Blüthgen, 1925; H. galileus Blüthgen, 1955; H. pannonicus Ebmer, 1969

World Distribution: Eastern Austria, Bulgaria, Croatia, Georgia, Greece, Hungary, northwestern Italy, Iran, Israel, Macedonia, Moldova, Romania, Slovenia, southeastern Turkey, Ukraine (Pesenko, 2005a).

Turkey Distribution: Ankara, Antalya, Erzurum, Hakkari, Kahramanmaraş, Kars, Kayseri, Konya, Nevşehir (OLML; 6♂♂, 10♀;); Mersin (36°55′74″N, 34°47′59″E; 1♂) (Figure 5).

28. Halictus (Monilapis) xanthoprymnus Warncke, 1984

World Distribution: Turkey (Warncke, 1984). It is probably endemic to Turkey.

Turkey Distribution: Hakkari (Warncke, 1984) (Figure 5).

29. Halictus (Platyhalictus) alfkenellus Strand, 1909

World Distribution: Greece, Iran, Italy, Kazakhstan, Russia, Turkmenistan (Pauly and Pesenko, 2007).

Turkey Distribution: Ankara, Konya, Kütahya, Mersin (Warncke, 1975); Konya (OLML; 1♂) (Figure 6).

30. Halictus (Platyhalictus) graecus Blüthgen, 1933

World Distribution: Croatia, Greece, Turkey (Pauly and Pesenko, 2007).

Turkey Distribution: Karaman, Kayseri, Mersin, Nevşehir (Warncke, 1975) (Figure 6).

31. Halictus (Protohalictus) georgicus Blüthgen, 1936


Turkey Distribution: Sivas (Warncke, 1975) (Figure 6).

32. Halictus (Protohalictus) rubicundus (Christ, 1791)

Apis rubicunda Christ, 1791; Halictus nidulans Walckenaer, 1817; H. lerouxii Lepeltier, 1841; H. quadrifranciatus Smith, 1870; H. lupinelli Cockerell, 1939

World Distribution: Holoarctic.

Turkey Distribution: Giresun, İstanbul (Warncke, 1975); Artvin, Bolu, Kars (OLML; 1♂, 2♀♀) (Figure 6).


33. Halictus (Tythhalictus) asperulus Pérez, 1895

Hylaeus rugosulus Schenck, 1853; Halictus rugosulus Perez, 1895

World Distribution: Armenia, Austria, Azerbaijan, Cyprus, Georgia, Iran, Israel, Syria, Spain, Turkey, Ukraine (Pesenko, 2005a).

Turkey Distribution: Ağrı, Ankara, Antalya, Balıkesir, Bitlis, Erzincan, Gümüşhane, Hatay, Konya, Niğde, Karaman (OLML; 7♂♂, 15♀♀);
Adana (NHMW; 3♂♂, 2♀♀); Adana (37°11′43″N, 34°48′27″E; 2♀♀), Afyon (3♀♀) (Figure 7).

**Flowers Visited:** *Onopordum carduchorum* Bornm. & Beauverd.

**34. *Halictus* (Tytthalictus) *maculatus* Smith, 1848**

*Halictus interruptus* Lepeletier, 1841

**World Distribution:** Widely distributed throughout the western Palaearctic from Spain to eastern Kazakhstan (Pesenko et al., 2000).

**Turkey Distribution:** Adana, Afyon, Ağrı, Ankara, Bursa, Edirne, Erzurum, Karaman, Konya, Kütahya, Istanbul, Trabzon, Tunceli (Warncke, 1975); Balıkesir, Bitlis, Eskişehir, Hakkari, Isparta, Kars.
Kayseri, Mersin, Samsun, Sivas, Siirt, Van (OLML; 15♂ 10♀); Bartın (3♀), Niğde (2♀) (Figure 7).


Discussion

Faunistic studies on the genus Halictus of Turkey are limited. First, Warncke (1975) reported 28 taxa from this genus. Soon after, Özbek (1979a) cited 20 taxa from eastern Anatolia. Özbek (1979b) also reported 3 Halictus species (H. quadricinctus, H. simplex, and H. tetrazonianellus) that are related to the pollination of Medicago sativa L. and Onobrychis sativa L. in Erzurum Province. Following this, Warncke (1984) published the latest checklist on this issue and contributed 6 more species (1 of which, H. xanthoprymnus, was new) to the list. In recent years, Pesenko (2005a) noted some additional data on the distribution of Palaeartic Halictus members and reported 20 species from Turkey.

As for the Palaeartic distribution of Halictus, there are approximately 90 species found in the region (Pesenko, 2005a). Unfortunately, an updated checklist of Halictus species of the western Palaeartic that also includes information on Turkey does not exist. One of the main databases of Europe, Fauna Europaea (Polaszek, 2004), also fails to provide sufficient data on the European distribution of the genus. Pesenko (2005b) reported that members of Halictus are mostly distributed throughout the Mediterranean basin and in fore and middle Asia and are represented in the eastern Palaeartic region by only 10 species. Therefore, we can suppose that there are nearly 80 species found in the western Palaeartic region, a region whose borders (in the broad sense) have been described well by Patiny et al. (2009). Of the 80 anticipated species in the region, 34 belong to 8 subgenera that are found in Turkey. According to the presence data of these 34 species, the Halictus fauna of Turkey shares 23 species with Middle East, 20 species with Europe, 8 species with North Africa, and 23 species with Caucasus (Table). Furthermore, 3 species (H. gordius, H. pentheri, and H. xanthoprymnus) are probably endemic to Turkey.

In an evaluation of all of the presented data, H. maculatus can be seen as the most frequently encountered species, with 27 records. It is also one of the most widely distributed species and can be found throughout Turkey. Similarly, H. asperulus, H. brunnescens, H. cochlearitarsis, H. compressus, H. patellatus, H. pentheri, H. quadricinctus, H. resurgens, H. sajoi, H. sexcinctus, H. simplex, H. tetrazonius, and H. tetrazonianellus can be found in various parts of Turkey and do not show specific distribution patterns. On the other hand, the rest of the species display very restricted distributions within Turkey and are collected only occasionally. Of these, H. beytueschebapensis, H. dschulfensis, H. falcinellus, H. fatsensis, H. gordius, H. grossellus, H. submodernus, and H. xanthoprymnus were distributed in southeastern Turkey; H. adjikenticus, H. aegyptiaca, and H. quadricinctoides in the eastern Mediterranean part of Turkey; H. scabiosae and H. rubicundus in the northern part of Turkey; and H. alfkenellus and H. luganicus in the western part of Turkey. In addition, H. graecus and H. georgicus were recorded only from the province of Sivas.

The information taken from the distribution data allows us to conclude that Halictus species were recorded mostly in the Ankara and Hakkari provinces, with 18 and 14 records, respectively. However, there were many provinces from which records were unavailable, including Aksaray, Amasya, Aydın, Batman, Bilecik, Bingöl, Çorum, Diyarbakır, Düzce, Elazığ, Karabük, Kirikkale, Kırklareli, Kırşehir, Kils, Kocaeli, Manisa, Ordu, Osmaniyê, Rize, Sakarya, Tekirdağ, Uşak, Yalova, Yozgat, and Zonguldak. Exposing the faunistic compositions of these provinces is a crucial step in understanding and clarifying the status and distribution of the members of Halictus in Turkey.
Table. Western Palaearctic distribution of *Halictus* species that are found in Turkey (TR). “+” indicates the presence and “−” indicates the absence of relevant species. All data mentioned here were discussed according to our study, Pauly and Pesenko (2007), and Ascher et al. (2009).

<table>
<thead>
<tr>
<th>Species</th>
<th>TR</th>
<th>Middle East</th>
<th>Europe</th>
<th>North Africa</th>
<th>Caucasia</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>H. adjikenticus</em></td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>H. aegyptica</em></td>
<td>+</td>
<td>(Eastern Mediterranean)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>H. alfenellus</em></td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>H. asperulus</em></td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><em>H. berlandi</em></td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>H. beytueschebapensis</em></td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>H. brunnescens</em></td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><em>H. cochlearitarsis</em></td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>H. compressus</em></td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>H. dschulfensis</em></td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>H. falcinellus</em></td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>H. fatsensis</em></td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>H. georgicus</em></td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>H. gordius</em></td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>H. graecus</em></td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>H. grosselius</em></td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>(Greece)</td>
<td>-</td>
</tr>
<tr>
<td><em>H. luganicus</em></td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>H. maculatus</em></td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>H. patellatus</em></td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><em>H. pentheri</em></td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>H. quadricinctoides</em></td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>H. quadricinctus</em></td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><em>H. resurgens</em></td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+ (Northeastern Africa)</td>
<td>+</td>
</tr>
<tr>
<td><em>H. rubicundus</em></td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><em>H. sajoi</em></td>
<td>+</td>
<td>+ (Iran)</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>H. scabiosae</em></td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>H. senilis</em></td>
<td>+</td>
<td>+</td>
<td>? (Southern Spain)</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><em>H. sexcinctus</em></td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>H. simplex</em></td>
<td>+</td>
<td>+ (Iran)</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>H. squamosus</em></td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>H. submoderus</em></td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>H. tetrazonianellus</em></td>
<td>+</td>
<td>(Eastern Mediterranean)</td>
<td>+ (Eastern Europe)</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>H. tetrazonius</em></td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>H. xanthoprymnus</em></td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Total number of species 34  23  20  8  23
Evaluation of the flower-visit records for Halictus revealed that Centaurea sp., Carduus sp., and Onopordum sp. were the most frequently visited plants with 11, 9, and 9 records, respectively. Members of subgenera Halictus s. str. Latreille, Hexataenites Pesenko (except H. berlandi), and Monilapis Cockerell generally forage on Asteraceae members and especially on Centaurea sp., Carduus sp., Onopordum sp., and Echinops sp. In addition, H. luganicus seems to forage more commonly on Onopordum sp. and Peganum harmala L. On the other hand, H. simplex and H. rubicundus show a wide range of plant taxa preference. Moreover, the highest records belong to H. maculatus, which prefers to forage on 43 different plant taxa.

The authors are hopeful that the information and suggestions offered here will be helpful and provide a base for further research that will revise our knowledge of the whole genus. The species richness (N: 34/90) represents about one-half of the whole genus and reflects a high diversity in the region. The reasons for this regional diversity are worth considering in future studies. Improvements in the understanding of bee biogeography and taxonomy and the continued exploration of the bee fauna of Turkey may be very helpful in this respect.

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Notes on the *Halictus* Latreille (Hymenoptera: Halictidae) fauna of Turkey


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