

Halictus Latreille (Halictidae: Apoidea: Hymenoptera) Fauna of Hacettepe University Beytepe Campus (Ankara)

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ABSTRACT

The genus *Halictus* Latreille, 1804 belongs to the family Halictidae. It contains over 300 species in the world and 35 of these species are distributed in Turkey. Faunistic studies on this genus are limited in Turkey and new local studies of the taxa are needed to be established. In the study, 205 individuals collected from Hacettepe University Beytepe Campus were identified as 12 species and among them *H. grossellus* Ebmer, 1978 was the new record for Ankara province. The diagnostic key for females of *Halictus* species which were distributed in the field is given in this study. Also, it was found that species of the family Asteraceae were the most frequently visited plants by *Halictus* species in this area.

Keywords: Halictidae, pollinator, fauna, phenology, diagnostic key, Turkey

Introduction

The family Halictidae (Apoidea: Hymenoptera) is represented with 72 genera and nearly 3500 species in the world [1]. According to Michener [2] this family can be divided into four subfamilies which are Halictinae, Nomiodinae, Nomiinae, and Rophitinae. Among, Halictinae is one of the very large and nearly cosmopolitan subfamily [3].

Genus *Halictus* Latreille, 1804 is one of the most common genera of Halictinae and it was divided into 12 subgenera by Pesenko [4, 5]. The genus contains almost 90 species in the Palaearctic Region [1] and 35 of these species belonging to

8 subgenera are distributed in Turkey [6]. *Halictus* species are pollinators or at least visitors of economically important plant species such as *Helianthus annuus* L. [7], *Medicago sativa* L. [8], *Eriobotrya japonica* Lindl. [9], *Malus* sp. [10], *Capsicum annuum* L. [11], and *Prunus avium* L. [12]. They are also visitors and may be potential pollinators of natural vegetation such as the members of Asteraceae, Boraginaceae, Fabaceae, Lamiaceae, Ranunculaceae, and Salicaceae [8, 13, 14]. The unique features of *Halictus* species are coming from not because of their great help in this pollination service [15], but also from their social plas-

ticity [16].

Although some recent faunistic studies [6, 14] on the genus *Halictus* of Turkey had been reported before, new local studies of the taxa are needed to be established. Since there were only few studies [17, 18] that had mainly focused on the halictid fauna of Ankara province, our study aimed to make contribution to this issue.

Materials and Methods

In this study, we used the collection material deposited in the Apoidea collection of Morphometry Laboratory of Hacettepe University's Department of Biology in Ankara, Turkey. From this collection, we only focused on the specimens that have been collected by various researchers with pan traps (yellow, blue and white) and sweep net between 2005 and 2013 from Beytepe campus of Hacettepe University, Ankara (39° 52' 16" N, 32° 44' 11" E; 1050 m). That area is nearly 100 km² and two sides of the campus were also delimited by small valley which sometimes poses weak

stream. Area is surrounded by artificially planted *Pinus nigra* J.F. Arnold woods, and open areas between woods display typical step vegetation. The campus flora contains 510 taxa, which 65 of them endemic, belonging to 57 family and also 145 cultured plants [19].

Identification of the bee species was made by according to works of Pesenko *et al.* [8], Pesenko [20], Dikmen and Aytekin [14] and Dikmen *et al.* [6].

Results

After the examination of 205 specimens, 12 *Halictus* species were determined from Beytepe Campus. *H. resurgens* and *H. patellatus* are the most abundant species and the other species are the rarest ones, except *H. pentheri* and *H. maculatus*, in that area (Table 1). Females were found between April and September whereas male ones had been observed between July and September (Table 2).

Table 1. Numbers of female and male specimens for each species in the collection.

Species	Females	Males	Total
<i>H. patellatus</i> Morawitz, 1874	39	4	43
<i>H. luganicus</i> Blüthgen, 1936	4	1	5
<i>H. brunnescens</i> (Eversmann, 1852)	1	6	7
<i>H. quadricinctus</i> (Fabricius, 1776)	-	1	1
<i>H. cochlearitarsis</i> (Dours, 1872)	2	-	2
<i>H. resurgens</i> Nurse, 1903	90	24	112
<i>H. grossellus</i> Ebmer, 1978	-	1	1
<i>H. pentheri</i> Blüthgen, 1923	12	1	13
<i>H. sajoii</i> Blüthgen, 1923	3	-	3
<i>H. tetrazonianellus</i> Strand, 1909	4	-	4
<i>H. asperulus</i> Pérez, 1895	1	-	1
<i>H. maculatus</i> Smith, 1848	11	-	11
Total	167	38	205

Table 2. Female and male specimens were collected by months.

Species	April	May	June	July	August	September
<i>H. patellatus</i>	-	+ ♀	+ ♀	+ ♀, ♂	+ ♀	-
<i>H. luganicus</i>	-	-	-	+ ♀, ♂	-	-
<i>H. brunnescens</i>	-	-	-	+ ♀, ♂	+ ♂	-
<i>H. quadricinctus</i>	-	-	-	-	+ ♂	-
<i>H. cochlearitarsis</i>	+ ♀	+ ♀	-	-	-	-
<i>H. resurgens</i>	+ ♀	+ ♀	+ ♀	+ ♀, ♂	+ ♀, ♂	-
<i>H. grossellus</i>	-	-	-	+ ♂	-	-
<i>H. pentheri</i>	-	+ ♀	+ ♀	+ ♀	-	+ ♀, ♂
<i>H. sajo</i>	-	+ ♀	+ ♀	+ ♀	-	-
<i>H. tetrazonianellus</i>	-	+ ♀	-	+ ♀	-	-
<i>H. asperulus</i>	-	-	+ ♀	-	-	-
<i>H. maculatus</i>	-	+ ♀	+ ♀	+ ♀	-	-

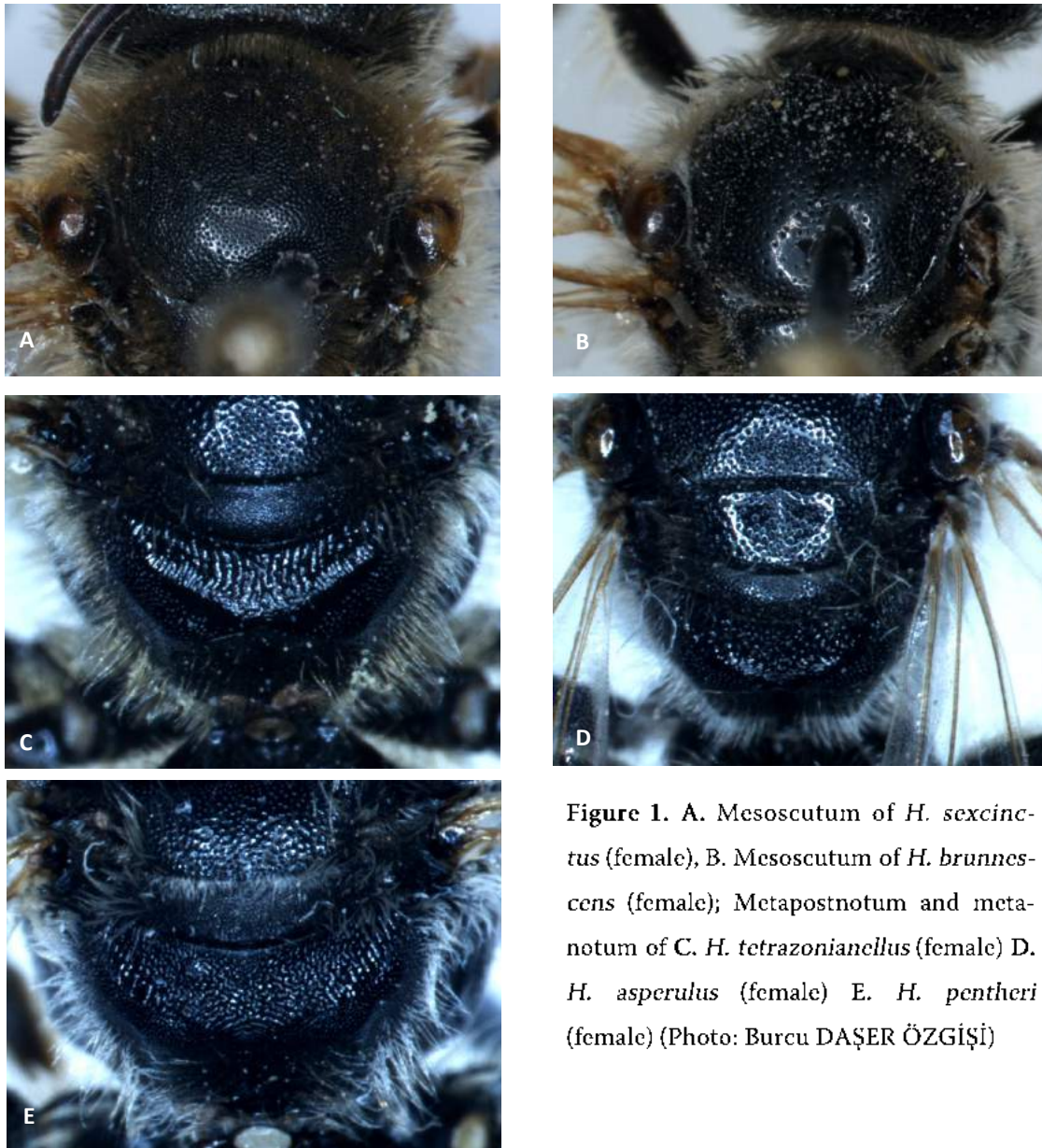


Figure 1. A. Mesoscutum of *H. sexcinctus* (female), B. Mesoscutum of *H. brunnescens* (female); Metapostnotum and metanotum of C. *H. tetrazonianellus* (female) D. *H. asperulus* (female) E. *H. pentheri* (female) (Photo: Burcu DAŞER ÖZGİŞİ)

Diagnostic Key for *Halictus* Species (Female)

1- Mesoscutum densely and in general regularly punctured (Fig. 1.A)	2
1'- Mesoscutum very sparsely and irregularly punctured (Fig. 1.B)	<i>H. brunnescens</i>
2- Apical parts of metatibia and metatarsus light brown to yellow	<i>H. patellatus</i>
2'- All legs completely dark	3
3- All posterior hair bands of terga complete (Fig. 2.B)	4
3'- T1-2 or all posterior hair bands of terga interrupted medially (Fig. 2.C-D)	5
4- T1 with brownish and less appressed furca-like hairs proximally (Fig. 2.A)	
.....	<i>H. cochlearitarsis</i>
4'- T1 without furca-like hairs proximally	<i>H. resurgens</i>
5- All posterior hair bands of terga broadly interrupted (Fig. 2.D)	<i>H. maculatus</i>
5'- T4-5 posterior hair bands complete and T3 sometimes interrupted or narrowed medially	6
6- Posterior marginal fields of terga hyaline (yellowish); posterior hair bands of terga coarse.....	
.....	<i>H. luganicus</i>
6'- Posterior marginal fields of terga dark; posterior hair bands of terga relatively fine in structure	7
7- Metapostnotum triangular (Fig. 1.C)	<i>H. tetrazonianellus</i>
7'- Metapostnotum crescent-shaped (Fig. 1.D-E)	8
8- Metapostnotum as long as or a little longer than metanotum (Fig. 1.D)	<i>H. asperulus</i>
8'- Metapostnotum barely 1,5 times longer than metanotum (Fig. 1.E)	9
9- Lateral surface of propodeum sparsely punctured, slightly shiny	<i>H. sajoii</i>
9'- Lateral surface of propodeum densely punctured, dull	<i>H. pentheri</i>

Discussion

Even though current faunistic study on the genus *Halictus* of Turkey were reported [6, 14], local faunistic studies on this genus are limited in Turkey. Because of the data deficiency in this topic, it is important to make contribution on the distribution of the local bee populations in understand-

ing the potential pollinator bee diversity of Turkey. One of the first faunistic studies on this genus was reported 28 taxa and 12 of them recorded in Ankara province [21] whereas the latest faunistic study on this genus was reported 35 taxa and Ankara province showed the highest species diversity with, 18 records (Table 3) [6, 14]. In this



Figure 2. A. Furca-like hairs, *H. cochlearitarsis* (female). Abdominal terga of B. *H. cochlearitarsis* (female) C. *H. tetrazonianellus* (female) D. *H. maculatus* (female) (Photo: Burcu DAŞER ÖZGİŞİ)

study, we determined 12 *Halictus* species from Beytepe, Ankara and *H. grossellus* reported for the first time from Ankara. According to studies which were done so far indicate that *H. asperulus*, *H. brunnescens*, *H. cochlearitarsis*, *H. quadricinctus*, *H. maculatus*, *H. patellatus*, *H. pentheri*, *H. sajoii*, *H. tetrazonianellus*, and *H. resurgens* can be found in every region of Turkey and *H. luganicus* is distributed in Western part of Turkey [14]. *H. grossellus* was recorded just from Southeastern Turkey before [14]. Because of that our study suggested its distribution area to be broader than previously known.

According to our data from collected materials, although density is low, earliest female specimens of *Halictus* can be seen in April whereas earliest males can be seen in June. Female specimens between May and July are much denser than August and September. On the other hand, male's density is highest in August. Our observations confirm the data reported by the authors [8, 22, 23]. Also, our observation for the flower-visits of *Halictus* species suggested that species of the family Asteraceae were the most frequently visited plants.

Table 3. *Halictus* species are found in Turkey. "+" demonstrates the presence and "-" demonstrates the absence of relevant species. All data mentioned here according to Dikmen *et al.* [6].

	Ankara	Beytepe
<i>H. adjikenticus</i>	-	-
<i>H. aegypticola</i>	-	-
<i>H. alfenellus</i>	+	-
<i>H. asperulus</i>	+	+
<i>H. berlandi</i>	-	-
<i>H. beytueschebapensis</i>	-	-
<i>H. brunnescens</i>	+	+
<i>H. cochlearitarsis</i>	+	+
<i>H. compressus</i>	+	-
<i>H. dschulfensis</i>	-	-
<i>H. falcinellus</i>	-	-
<i>H. fatsensis</i>	-	-
<i>H. georgicus</i>	-	-
<i>H. gordius</i>	-	-
<i>H. graecus</i>	-	-
<i>H. grossellus</i>	-	+
<i>H. luganicus</i>	+	+
<i>H. maculatus</i>	+	+
<i>H. patellatus</i>	+	+
<i>H. pentheri</i>	+	+
<i>H. ponticus</i>	-	-
<i>H. quadricinctoides</i>	-	-
<i>H. quadricinctus</i>	+	+
<i>H. resurgens</i>	+	+
<i>H. rubicundus</i>	-	-
<i>H. sajoii</i>	+	+
<i>H. scabiosae</i>	+	-
<i>H. senilis</i>	-	-
<i>H. sexcinctus</i>	+	-
<i>H. simplex</i>	+	-
<i>H. squamosus</i>	+	-
<i>H. submodernus</i>	-	-
<i>H. tetrazonianellus</i>	+	+
<i>H. tetrazonius</i>	+	-
<i>H. xanthopyrnus</i>	-	-
Total number of species	18	12

Conclusion

Halictus species are pollinators or at least visitors of economically important species and natural vegetation. In this study, 205 *Halictus* specimens were collected and identified as 12 species from Beytepe and *H. grossellus* was the new record for Ankara province. Also, it was found that species of the family Asteraceae were the most frequently visited plants by *Halictus* species in this area. Since the landscape of Beytepe do not contain many different habitats and it is relatively small area, the proportion of the species richness might be found lower than expected. In spite of the fact that the study reports few species numbers, the proportional comparison would be more informative. Beytepe with 12 *Halictus* species reflects nearly 67% of this genus species in Ankara and almost 35% of this genus species in Turkey (Table 3).

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Hacettepe Üniversitesi Beytepe Kampüsü (Ankara) *Halictus* Latreille (Halictidae: Apoidea: Hymenoptera) Cinsi Faunası

ÖZ

Halictus Latreille, 1804 cinsi Halictidae familyasında bulunmaktadır. Dünyada 300'den fazla türe sahiptir ve bunlardan 35'i Türkiye'de yayılış göstermektedir. Türkiye'de bu cins üzerine faunistik çalışmaları sınırlıdır ve bu cins ile ilgili yeni yerel çalışmalara ihtiyaç duyulmaktadır. Çalışmada Beytepe'den toplanan 205 bireyin 12 türe ait olduğu tespit edilmiş olup, *H. grossellus* Ebmer, 1978 Ankara için yeni kayıt duru-

mundadır. Bu çalışmada alanda yayılış gösteren *Halictus* türlerinin dişileri için teşhis anahtarı verilmiştir. Aynı zamanda, alanda bulunan *Halictus* türlerinin en çok Asteraceae familyası türleri bitkileri ziyaret ettiği de tespit edilmiştir.

Anahtar kelimeler: Halictidae, polinatör, fauna, fenoloji, teşhis anahtarı, Türkiye

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