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Additional knowledges on Megachilidae and Halictidae (Hymenoptera: Apoidea) fauna of Türkiye

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Abstract

An investigation was conducted to identify the part Anthidiini (Megachilidae) and Halictidae in the Bingol and Diyarbakır provinces located in eastern of Türkiye during 2017–2021. In total, 23 species were recorded using insect net from different habitats. As a result six species belonging to five genera in Anthidiini and 17 species belonging to three genera in Halictidae were identified. Collection localities and photographs of identified this species are provided.

Keywords: Hymenoptera, Megachilidae, Anthidiini, Halictidae, fauna, Türkiye

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Türkiye'den Megachilidae ve Halictidae (Hymenoptera: Apoidea) faunası hakkında ilave bilgiler

Özet

Bu araştırma Türkiye'nin doğusunda bulunan Bingöl ve Diyarbakır illerinde 2017-2021 yılları arasında Anthidiini (Megachilidae) ve Halictidae faunasını tespit etmek amacıyla yapılmıştır. Toplamda, farklı habitatlardan atrap kullanılarak 23 tür kaydedilmiştir. Sonuç olarak Anthidiini'de beş cinse ait altı tür ve Halictidae'de üç cinse ait 17 tür tespit edilmiştir. Bu türlerin toplanma yerleri verilmiş ve fotoğrafları çekilmiştir.

Anahtar kelimeler: Hymenoptera, Megachilidae, Anthidiini, Halictidae, fauna, Türkiye

1. Introduction

The bees (Hymenoptera: Apoidea: Apiformes) represent one of the richest groups of Hymenoptera in terms of species [1]. Apidae, Anthophoridae, Megachilidae, Colletidae, Andrenidae, Halictidae and Melittidae can be counted as the Palaearctic bee families [2]. Halictidaeis one of the most diverse and most abundant group and contains approximately 4500 species in the world [3]. Turkey's Halictidae fauna is represented by 293 species [3]. Anthidiini bees (Megachilidae) occur almost worldwide, except in Antarctica and Australia (except for one introduced species), in many different habitats [4]. Species of the tribe Anthidiini can be differentiated from other megachilids in Asia by usually the presence of conspicuous yellow or red markings on integument and the short stigma [5, 6]. Anthidiini bees are commonly known as ‘resin and carder bees’ due to materials like resin, leaf pieces, plant hairs, pebbles and soil particles are used in the construction of nests [5]. The tribe Anthidiini currently consists of 894 valid species belonging to 40 genera worldwide [7]. According to Fateryga et al. [8], 93 Anthidiini species have been reported from Turkey up to now.

Southwest Asia, included Anatolia (Turkey), is a zone of high morphological diversification and evolution for bees [9]. Turkey is one of the important centers of bee diversity in the Palearctic Region due to its geographical location, climate and habitat richness. However, the faunistic studies on the bee fauna of eastern Turkey are limited.

In this study, it was aimed to evaluate bee samples collected from Bingöl and Diyarbakır provinces. As a result, six Anthidiini species and 17 Halictid species are listed from these provinces.

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2. Materials and methods

The materials were collected in the Bingol and Diyarbakır provinces located in eastern of Turkey between 2017–2021 (Figure 1). All the bee samples were collected using insect net in various localities. After sampling bees were killed using ethyl acetate and then pinned in the laboratory. Meanwhile, all samples were collected by Emin Kaplan and identified by Max Kasparek (Anthidiini) and P. Andreas Werner Ebmer (Halictidae). Terminology follows [5]. Photographs of all species were taken with a digital camera attached to a stereomicroscope. The material is stored in Emin Kaplan's individual collection of the Department of Plant Protection, Faculty of Agriculture, Bingol University (Bingöl, Türkiye).

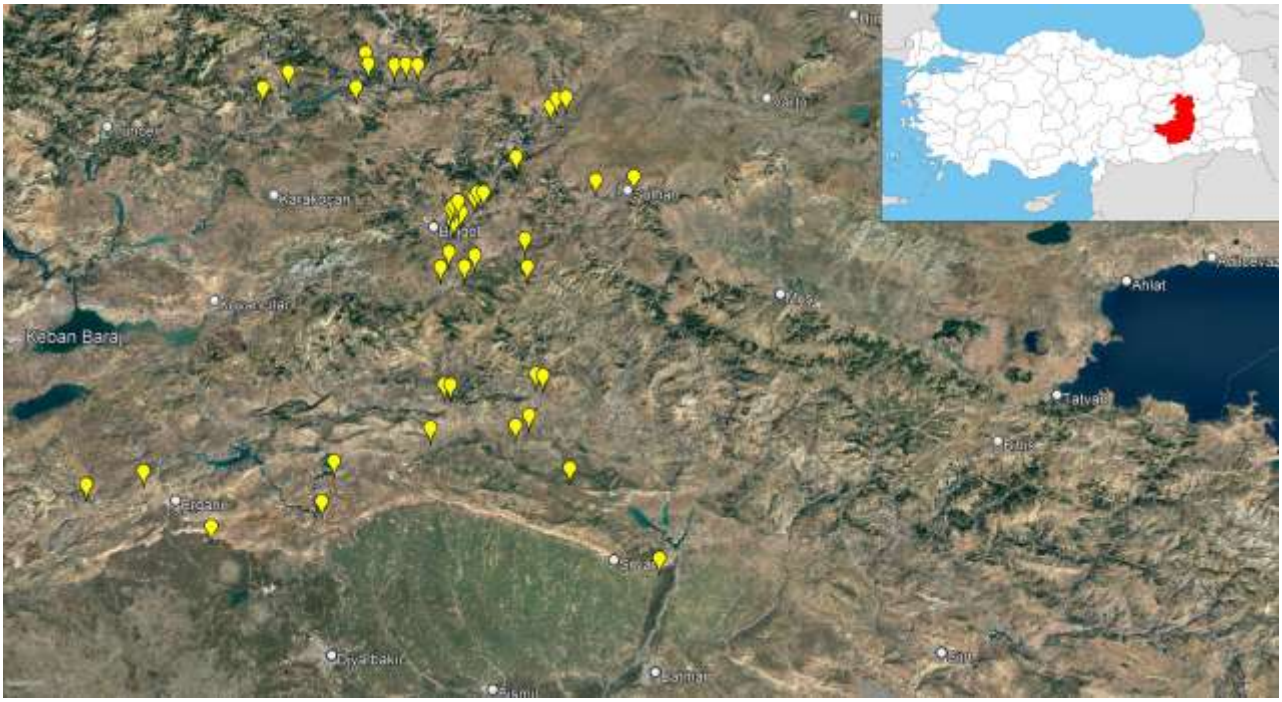

Figure 1. Map of the investigated area in Turkey

3. Results

Family Megachilidae Latreille, 1802
Tribe Anthidiini Ashmead, 1899
Genus *Afranthidium* Michener, 1948

***Afranthidium carduele* (Morawitz, 1876) (Figure 2a, 3a)**

Material examined: Diyarbakır: Çüngüş, Akbaşak, N 38º 15' 58.97", E 39º 18' 26.90", 1385 m, 28.IV.2017, ♂; Lice, Çıralı, N 38º 26' 16.85", E 40º 47' 25.57", 894 m, 20.V.2017, ♂.
Remark: New record for the fauna of Diyarbakır province.

Genus *Anthidiellum* Cockerell, 1904

***Anthidiellum strigatum* (Panzer, 1805) (Figure 2b, 3b)**

Material examined: Bingöl: Çeltiksuyu, N 38º 51' 37.39", E 40º 34' 03.65", 1013 m, 05.VI.2021, ♀; Solhan, N 38º 57' 55.49", E 41º 05' 11.08", 1486 m, 31.V.2017, ♂; **Diyarbakır:** Ergani, Yapraklı, N 38º 16' 32.57", E 39º 38' 39.00", 977 m, 12.V.2017, ♀; Lice, Budak, N 38º 24' 02.06", E 40º 44' 59.33", 830 m, 20.V.2017, ♂; Silvan, Yeşilköy, N 38º 06' 50.15", E 41º 08' 51.27", 696 m, 15.V.2017, ♀.
Remark: New record for the fauna of Bingöl and Diyarbakır provinces.

Genus *Anthidium* Fabricius, 1804

***Anthidium diadema* Latreille, 1809 (Figure 2c, 3c)**

Material examined: Bingöl: Solhan, Dilektepe, N 38º 57' 18.96", E 40º 59' 35.60", 1306 m, 20.VII.2017, ♀.
Remark: New record for the fauna of Bingöl province.

***Anthidium undulatiforme* Friese, 1917 (Figure 2d, 3d)**

Material examined: Bingöl: Genç, Yağızca, N 38º 48' 35.03", E 40º 45' 36.73", 1140 m, 09.V.2021, ♀.
Remark: New record for the fauna of Bingöl province.

Genus *Pseudoanthidium* Friese, 1898

***Pseudoanthidium polestinicum* (Mavromoustakis, 1938) (Figure 2e, 3e)**

Material examined: Bingöl: Garip, N 38º 47' 20.82", E 40º 33' 24.93", 995 m, 05.VI.2021, ♂; Adaklı, Donattepe, N 39º 12' 18.88", E 40º 28' 01.49", 1321 m, 21.V.2017, ♂.
Remark: New record for the fauna of Bingöl province.

Genus *Stelis* Panzer, 1806

***Stelis signata* (Latreille, 1809) (Figure 2f, 3f)**

Material examined: Bingöl: Yayladere, Batıayaz, N 39º 11' 14.81", E 40º 06' 16.49", 1383 m, 30.V.2017, ♀.
Remark: New record for the fauna of Bingöl province.

Family Halictidae Thomson, 1869
Subfamily Halictinae Thomson, 1869
Tribe Halictini Thomson, 1869
Genus *Halictus* Latreille, 1804

***Halictus* (*Halictus*) *asperulus* Pérez, 1895 (Figure 2g, 3g)**

Material examined: Bingöl: Ekinyolu, N 38º 54' 00.00", E 40º 34' 17.58", 1036 m, 22.V.2021, ♀; Sarıçiçek, N 38º 55' 28.42", E 40º 35' 44.57", 1040 m, 06.VI.2021, 2♀♀; Kiğı, Demirkanat, N 39º 13' 03.85", E 40º 19' 55.88", 1289 m, 29.V.2021, 2♀♀; **Diyarbakır:** Dicle, Sergenli, N 38º 19' 30.64", E 40º 13' 38.46", 750 m, 24.IV.2021, ♀; Hani, Serenköy, N 38º 24' 58.07", E 40º 29' 41.13", 994 m, 25.IV.2021, ♀; Kulp, Çağlayan, N 38º 30' 47.41", E 40º 48' 47.46", 874 m, 29.IV.2021, ♀.
Remark: New record for the fauna of Bingöl and Diyarbakır provinces.

***Halictus* (*Halictus*) *brunnescens* (Eversmann, 1852) (Figure 2ğ, 3ğ)**

Material examined: Bingöl: Karlıova, Derinçay, N 39º 08' 13.50", E 40º 51' 53.21", 1697 m, 27.V.2021, ♀.
Remark: New record for the fauna of Bingöl province.

***Halictus* (*Halictus*) *cochleariatarsis* Dours, 1872 (Figure 2h, 3h)**

Material examined: Bingöl: Karlıova, Darköprü, N 39º 11' 34.35", E 40º 17' 58.73", 1301 m, 29.V.2017, ♂.
Remark: New record for the fauna of Bingöl province.

***Halictus* (*Halictus*) *graecus* Blüthgen, 1933 (Figure 2i, 3i)**

Material examined: Bingöl: Kardeşler, N 38º 54' 39.23", E 40º 38' 29.93", 1099 m, 21.V.2021, ♀; Sarıçiçek, N 38º 55' 28.42", E 40º 35' 44.57", 1040 m, 12.VI.2021, ♀.
Remark: New record for the fauna of Bingöl province.

Figure 2. Dorsal view, a) *Afranthidium carduele*, ♂; b) *Anthidiellum strigatum*, ♀; c) *Anthidium diadema*, ♀; d) *A. undulatiforme*, ♀; e) *Pseudoanthidium polestinicum*, ♂; f) *Stelis signata*, ♀; g) *Halictus asperulus*, ♀; ğ) *H. brunnescens*, ♀; h) *H. cochlearitarsis*, ♂; i) *H. graecus*, ♀; ı) *H. resurgens*, ♂; j) *H. tetrazonianellus*, ♀; k) *H. cephalicus*, ♀; l) *H. smaragdulus*, ♀; m) *H. subauratus*, ♀; n) *H. pulvereus*, ♀; o) *Lasioglossum laticeps*, ♀; ö) *L. marginatum*, ♀; p) *L. politum*, ♀; r) *L. sobrinum*, ♀; s) *L. bicallosum*, ♀; ş) *L. discum*, ♀; t) *Pseudapis diversipes*, ♀

Figure 3. Frontal view, a) *Afranthidium carduele*, ♂; b) *Anthidiellum strigatum*, ♀; c) *Anthidium diadema*, ♀; d) *A. undulatiforme*, ♀; e) *Pseudoanthidium polestinicum*, ♂; f) *Stelis signata*, ♀; g) *Halictus asperulus*, ♀; ğ) *H. brunnescens*, ♀; h) *H. cochlearitarsis*, ♂; i) *H. graecus*, ♀; ı) *H. resurgens*, ♂; j) *H. tetrazonianellus*, ♀; k) *H. cephalicus*, ♀; l) *H. smaragdulus*, ♀; m) *H. subauratus*, ♀; n) *H. pulvereus*, ♀; o) *Lasioglossum laticeps*, ♀; ö) *L. marginatum*, ♀; p) *L. politum*, ♀; r) *L. sobrinum*, ♀; s) *L. bicallosum*, ♀; ş) *L. discum*, ♀; t) *Pseudapis diversipes*, ♀

***Halictus* (*Halictus*) *resurgens* Nurse, 1903 (Figure 2ı, 3ı)**

Material examined: Bingöl: Yayladere, Kalkanlı, N 39º 09' 03.20", E 40º 02' 16.09", 1267 m, 30.V.2017, ♂; **Diyarbakır:** Ergani, Sürekli, N 38º 13' 40.55", E 39º 39' 38.02", 881 m, 12.V.2017, ♂.

Remark: New record for the fauna of Bingöl province and additional record for the fauna of Diyarbakır province.

***Halictus* (*Halictus*) *tetrazonianellus* Strand, 1909 (Figure 2j, 3j)**

Material examined: Bingöl: Ekinyolu, N 38º 54' 00.00", E 40º 34' 17.58", 1036 m, 22.V.2021, ♀.
Remark: New record for the fauna of Bingöl province.

***Halictus* (*Seladonia*) *cephalicus* Morawitz, 1873 (Figure 2k, 3k)**

Material examined: **Bingöl:** Karlıova, Derinçay, N 39º 08' 13.50", E 40º 51' 53.21", 1697 m, 27.V.2021, ♀.
Remark: New record for the fauna of Bingöl province.

***Halictus* (*Seladonia*) *smaragdulus* Vachal, 1895 (Figure 2l, 3l)**

Material examined: **Bingöl:** Adaklı, Gökçeli, N 39º 13' 09.97", E 40º 24' 18.24", 1195 m, 29.V.2021, ♀; **Diyarbakır:** Lice, Ergin, N 38º 30' 09.96", E 40º 32' 21.33", 1016 m, 25.IV.2021, ♀.
Remark: New record for the fauna of Bingöl province and additional record for the fauna of Diyarbakır province.

***Halictus* (*Seladonia*) *subauratus* (Rossi, 1792) (Figure 2m, 3m)**

Material examined: **Bingöl:** Ekinyolu, N 38º 54' 00.00", E 40º 34' 17.58", 1036 m, 22.V.2021, ♀; Kiğı, Bakalı, N 39º 14' 18.36", E 40º 26' 25.80", 1126 m, 30.V.2021, ♀.
Remark: New record for the fauna of Bingöl province.

***Halictus* (*Vestitohalictus*) *pulvereus* Morawitz, 1873 (Figure 2n, 3n)**

Material examined: **Diyarbakır:** Kulp, Çağlayan, N 38º 30' 47.41", E 40º 48' 47.46", 874 m, 29.IV.2021, ♀.
Remark: New record for the fauna of Diyarbakır province.

Genus *Lasioglossum* Curtis, 1833

***Lasioglossum* (*Evylaeus*) *laticeps* (Schenck, 1868) *hellenicum* (Blüthgen, 1937) (Figure 2o, 3o)**

Material examined: Bingöl: Beyaztoprak, N 38º 54' 53.68", E 40º 37' 25.71", 1067 m, 22.V.2021, ♀
Remark: New record for the fauna of Bingöl province.

***Lasioglossum* (*Evylaeus*) *marginatum* (Brullé, 1832) (Figure 2ö, 3ö)**

Material examined: Bingöl: Beyaztoprak, N 38º 54' 53.68", E 40º 37' 25.71", 1067 m, 06.VI.2021, ♀; Genç, Sürekli, N 38º 46' 01.97", E 40º 35' 51.85", 1036 m, 08.V.2021, ♀; **Diyarbakır:** Eğil, Meşeler, N 38º 14' 13.79", E 40º 11' 33.11", 845 m, 24.IV.2021, ♀; Lice, Ergin, N 38º 30' 09.96", E 40º 32' 21.33", 1016 m, 25.IV.2021, ♀.
Remark: New record for the fauna of Bingöl and Diyarbakır provinces.

***Lasioglossum* (*Evylaeus*) *politum* (Schenck, 1853) (Figure 2p, 3p)**

Material examined: Bingöl: Adaklı, Gökçeli, N 39º 12' 32.51", E 40º 24' 12.60", 1292 m, 12.VI.2019, ♀; **Diyarbakır:** Silvan, Dolapdere, N 38º 18' 30.36", E 40º 53' 09.11", 910 m, 05.IV.2019, ♀.
Remark: New record for the fauna of Bingöl and Diyarbakır provinces.

***Lasioglossum* (*Evylaeus*) *sobrinum* (Warncke, 1982) (Figure 2r, 3r)**

Material examined: Bingöl: Garip, N 38º 47' 20.82", E 40º 33' 24.93", 995 m, 05.VI.2021, ♀.
Remark: New record for the fauna of Bingöl province.

***Lasioglossum* (*Lasioglossum*) *bicallosum* (Morawitz, 1873) (Figure 2s, 3s)**

Material examined: Bingöl: Genç, Dilektaşı, N 38º 46' 06.45", E 40º 46' 27.64", 1653 m, 09.V.2021, ♀.
Remark: New record for the fauna of Bingöl province.

***Lasioglossum* (*Lasioglossum*) *discum* (Smith, 1853) (Figure 2ş, 3ş)**

Material examined: Bingöl: Genç, Meşedalı, N 38º 47' 51.80", E 40º 38' 13.05", 1004 m, 08.V.2021, ♀.
Remark: New record for the fauna of Bingöl province.

Subfamily Nomiinae Robertson, 1904
Tribe Nomiini Robertson, 1904
Genus *Pseudapis* W. F. Kirby, 1900

***Pseudapis* (*Nomiapis*) *diversipes* (Latreille, 1806) (Figure 2t, 3t)**

Material examined: Bingöl: Karlıova, Derinçay, N 39º 08' 13.50", E 40º 51' 53.21", 1697 m, 27.V.2021, ♀.
Remark: New record for Bingöl province fauna.

4. Conclusions and discussion

In this study, six species belonging to five genera in Anthidiini (Megachilidae) and 17 species belonging to three genera in Halictidae were identified from Bingol and Diyarbakır provinces of eastern Turkey. Among them, six species (*A. carduele*, *A. strigatum*, *H. asperulus*, *H. pulvereus*, *L. marginatum* & *L. politum*) are the first record for the provincial fauna of Diyarbakır, while two species (*H. resurgens* & *H. smaragdulus*) are additional records. In the previous study, 11 species from the families Halictidae and Megachilidae were identified from Diyarbakır province [10]. Thus, the number of species of Halictidae and Megachilidae families reported from Diyarbakır is increased to 17 by the current study. In addition, 21 species (*A. strigatum*, *A. diadema*, *A. undulatiforme*, *P. polestinicum*, *S. signata*, *H. asperulus*, *H. brunnescens*, *H. cochlearitarsis*, *H. graecus*, *H. resurgens*, *H. tetrazonianellus*, *H. cephalicus*, *H. smaragdulus*, *H. subauratus*, *L. laticeps*, *L. marginatum*, *L. politum*, *L. sobrinum*, *L. bicallosum*, *L. discum* & *P. diversipes*) are new records for the fauna of Bingol province. The number of Halictidae and Megachilidae in Bingol is currently 21 species in seven genera. By this study, a significant contribution has been made to the bee fauna in the region with new and additional records. The fact that many of the added species are new records for the studied provinces shows the bee richness of the region. As a result, this richness can be revealed even more with the comprehensive and planned field studies to be carried out in the future.

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