



Original article (Orijinal araştırma)

A faunistic study on the family Sphecidae (Hymenoptera) in the Upper Kelkit Valley with two new records and a checklist for Turkey¹

Yukarı Kelkit Vadisi'nde Sphecidae (Hymenoptera) familyası üzerine faunistik bir çalışma, Türkiye için iki yeni kayıt ve tür kontrol listesi

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Abstract

This paper reports a study of Sphecidae (Insecta: Hymenoptera) fauna of the Upper Kelkit Valley, one of the important natural areas of Turkey. In total, 316 adult sphecid specimens were collected by insect net from various habitats in Erzincan, Giresun, Gümüşhane and Sivas Provinces between 2015-2018. The specimens were stored in Tokat Gaziosmanpaşa University Entomology Research Laboratory, Tokat, Turkey. Thirty-two taxa were identified. Of these, 12 species and subspecies are new records for the fauna of the study area, and *Ammophila gussakovskii* (Dollfuss, 2013) and *Podalonia nigrohirta* (Kohl, 1888) are recorded for the first time from Turkey. Currently, 34 species of five genera of Ammophilinae, 13 species and one subspecies of two genera of Sceliphrinae and 29 species and two subspecies of five genera of Sphecinae of Sphecidae, giving 76 species and three subspecies belonging to 12 genera, are known from Turkey. A distributional checklist of the Turkish Sphecidae is included.

Keywords: Fauna, Hymenoptera, new record, Sphecidae, Turkey

Öz

Bu makale, Türkiye'nin önemli doğal alanlarından biri olan Yukarı Kelkit Vadisi'nin Sphecidae (Insecta: Hymenoptera) faunası üzerine bir çalışmayı bildirmektedir. 2015-2018 yılları arasında Erzincan, Giresun, Gümüşhane ve Sivas illerinde çeşitli habitatlardan toplam 316 ergin sphecid örneği atrap ile toplanmıştır. Örnekler Tokat Gaziosmanpaşa Üniversitesi Entomoloji Araştırma Laboratuvarı'nda saklanmaktadır. 32 takson teşhis edilmiştir. Bunlardan 12 tür ve alttür araştırma bölgesinin faunası için yeni kayıt olup *Ammophila gussakovskii* (Dollfuss, 2013) ve *Podalonia nigrohirta* (Kohl, 1888) Türkiye'den ilk kez kaydedilmiştir. Şu anda, Türkiye'den Ammophilinae altfamilyasından beş cinse ait 34 tür, Sceliphrinae altfamilyasından 2 cinse ait 13 tür ve bir alttür ve Sphecinae altfamilyasından 5 cinse ait 29 tür ve iki alttür, toplamda ise 12 cinse ait 76 tür ve üç alttür bilinmektedir. Türkiye Sphecidae familyasına ait dağılışsal bir kontrol listesi dahil edilmiştir.

Anahtar sözcükler: Fauna, Hymenoptera, yeni kayıt, Sphecidae, Türkiye

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Introduction

Sphecidae includes medium to large-bodied solitary wasps belonging to the superfamily Apoidea (Hymenoptera) with 791 species identified worldwide (Pulawski, 2021). The members of this family are found in all zoogeographical regions except glaciers and they are particularly common and diverse in temperate regions. Most of the species belonging to this family are important to ecosystems in at least two ways. Firstly, they control insect and spider populations by hunting them in order to gather food for their larvae and secondly, they contribute to the pollination of flowering plants as they feed on nectar (Bohart & Menke, 1976).

Many studies have been conducted on the Turkish Sphecidae, starting from a study by Lepeletier de Saint Fargeau (1845) and other studies followed (Kohl, 1890; Fahringer & Friese, 1921; Bytinski-Salz, 1957; de Beaumont, 1967, 1969; Guichard & Harvey, 1967). The family has been extensively studied mostly faunistically by both local and international researchers over the past two decades (Gayubo & Özbek, 2005; Yıldırım & Ljubomirov, 2005, 2007; Ljubomirov & Yıldırım, 2008; Yıldırım, 2012; Bayındır et al., 2013; Dollfuss, 2013b; Gülmez & Can, 2015; Gülmez & Dizer, 2016; Yıldırım et al., 2016; Can & Gülmez, 2019). Recently, a checklist was prepared by Yıldırım (2014), in which 67 species and subspecies were given. Following this study, new taxa have been added to the fauna and the status of some taxa have changed (Bayındır et al., 2013; Dollfuss, 2013a,b, 2015, 2016; Gülmez & Can, 2015; Can & Gülmez, 2019; Danilov & Byvaltsev, 2020). Therefore, it will be useful to present the current status of the fauna in the light of previous and recent studies.

Having a range of elevations and a variety of insect habitats, Kelkit Valley is one of the most important natural areas in Turkey (Kurt, 2006). Despite the rapid expansion of urbanization and intensive agricultural activities in the region, there are still natural areas that have not been destroyed. The upper part of the valley includes many districts of four provinces, Erzincan, Giresun, Gümüşhane, and Sivas. Since the valley is located at the intersection of three geographical regions, namely the Black Sea, Central Anatolia, and Eastern Anatolia, it has both humid and arid climatic characteristics. The valley contains Euro-Siberian vegetative elements close to the Black Sea coast, while it has Iranian-Turanian elements in the interior. Karaer & Kılınç (2001) recorded 1316 plant taxa in Kelkit Valley and reported that 132 of them were endemic species and subspecies. The diversity of climate and vegetation means that the region is also rich in insect diversity. Many species are known as endemics in the studied area (e.g. Assing, 2009; Anlaş, 2019, 2020, 2021). Also, *Prionyx radoszkowskyi* Kohl, 1888 (Sphecidae), *Lestiphorus egregius* (Handlirsch, 1893), *Crossocerus heydeni* Kohl, 1880, *Lestica eurypus* (Kohl, 1898), *Parapiagetia tridentata* Tsuneki, 1972, and *Diodontus major* Kohl, 1901 (Crabronidae) were recorded only from upper part of Kelkit Valley (Erzincan and Sivas provinces) in Turkey (Can & Gülmez, 2019; Kaplan & Yıldırım, 2021).

Despite the rich fauna of the Kelkit Valley and the presence of intensive studies in other parts of Turkey, the family Sphecidae had not been studied sufficiently in that region. Most of the previous studies are based on a limited number of specimens collected locally during short visits by scientists (de Beaumont, 1967; Gayubo & Özbek, 2005; Yıldırım & Ljubomirov, 2005, 2007; Yıldırım, 2012; Yıldırım et al., 2016; Gülmez et al., 2015; Gülmez, 2016, 2019; Can & Gülmez, 2019), so they cannot adequately represent the fauna.

The aim of the study was to determine the species of the Sphecidae family in Kelkit Valley and therefore to update the fauna of the region. This paper also presents an updated list of species in Turkey.

Materials and Methods

Field studies were conducted at locations within the boundaries of Suşehri, Akıncılar, Gölova, Zara, İmranlı, Şebinkarahisar, Çamoluk, Alucra, Şiran, Kelkit, Refahiye which constitute the Upper Kelkit Valley of Erzincan, Giresun, Gümüşhane and Sivas Provinces (Figure 1, Table 1). Adult insect specimens were

collected from their natural habitats with an insect net between 2015 and 2018. All specimens were deposited in the Entomology Research Laboratory of the Biology Department in Tokat Gaziosmanpaşa University. Specimens were identified according to Bitsch et al. (1997), Schmid-Egger (2005), Dollfuss, (2010a; 2013a). Geographical distribution of species is given according to Pulawski (2021). A list of the species is given below along with the collection date, locations, specimen numbers of each sex and global distribution. Photographs of the samples were taken with a Canon 650D camera using Sigma 105 mm F2.8 Ex Dg macro lens.

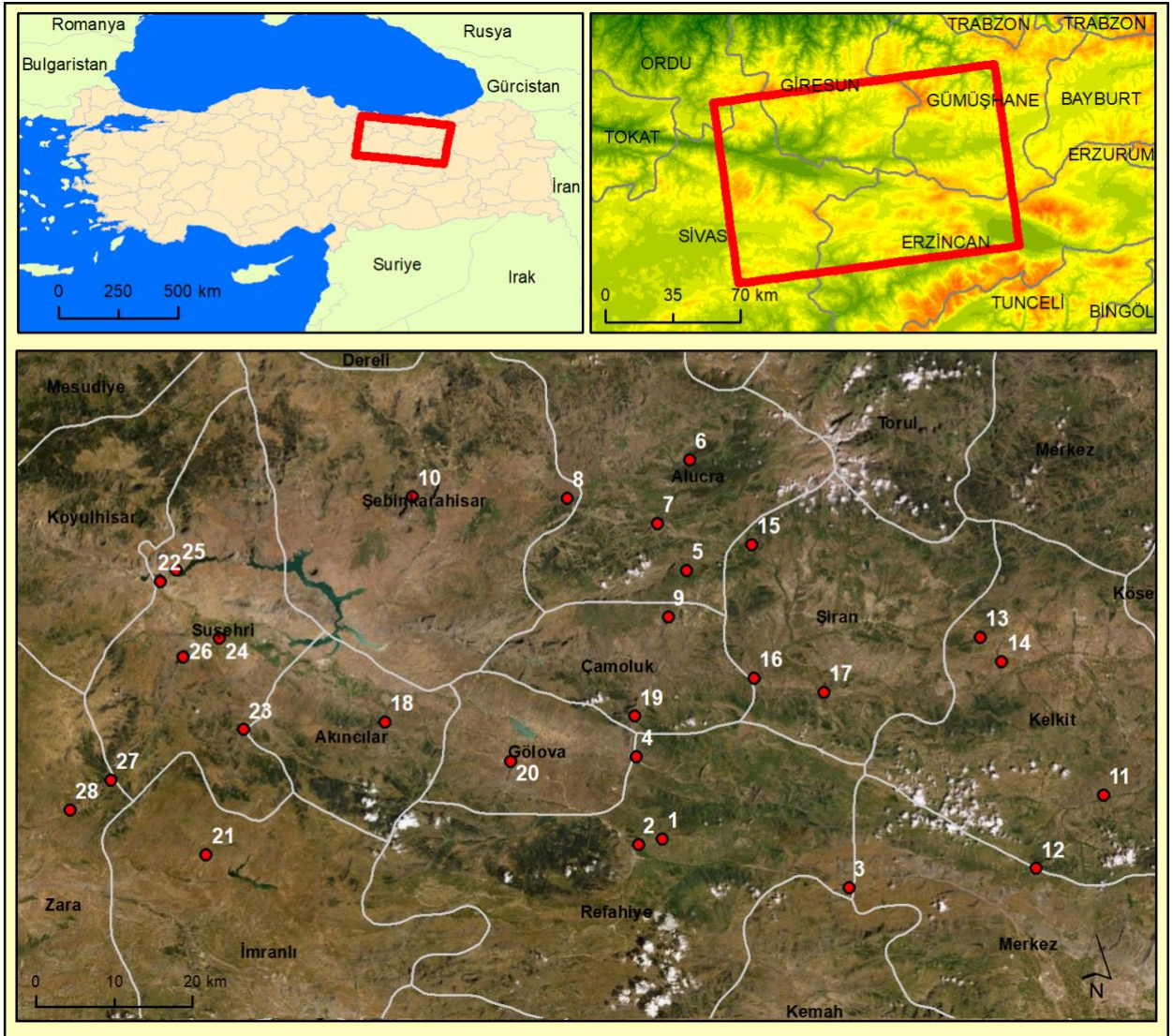


Figure 1. Map of the study area.

Table 1. Coordinates, altitude and habitat types of the collection localities in the Upper Kelkit Valley

Loc. No	Localities	Coordinates	Altitude (m)	Habitat Type
1	Erzincan, Refahiye, Akçiğdem	39°55'33" N, 38°48'46" E	1700	steppe
2	Erzincan, Refahiye, Sağlık	39°55'12" N, 38°46'37" E	1660	steppe
3	Erzincan, Refahiye, Sakaltutan	39°52'12" N, 39°05'31" E	1970	steppe
4	Erzincan, Refahiye, Çat	40°01'15" N, 38°46'26" E	1250	steppe, scrub
5	Giresun, Alucra, Arda	40°14'09" N, 38°50'56" E	1600	settlement
6	Giresun, Alucra, Gökçebel	40°21'50" N, 38°51'10" E	1610	coniferous forest
7	Giresun, Alucra, Gürbulak	40°17'24" N, 38°48'18" E	1560	steppe, scrub
8	Giresun, Alucra, Mesudiye	40°19'08" N, 38°40'08" E	1440	gallery forest
9	Giresun, Çamoluk, Hacıören	40°10'58" N, 38°49'15" E	1410	steppe, scrub
10	Giresun, Şebinkarahisar	40°19'12" N, 38°26'06" E	1250	scrub
11	Gümüşhane, Kelkit, Ağıl	39°58'33" N, 39°28'26" E	1660	steppe
12	Gümüşhane, Kelkit, Ahmediye	39°53'31" N, 39°22'19" E	2100	steppe
13	Gümüşhane, Kelkit, Çilhoroz	40°09'32" N, 39°17'24" E	1550	steppe, scrub
14	Gümüşhane, Kelkit, Kılıçtaşı	40°07'51" N, 39°19'19" E	1390	steppe
15	Gümüşhane, Şiran, Fındıkbeli	40°15'57" N, 38°56'45" E	1675	steppe
16	Gümüşhane, Şiran, Güreşküy	40°06'43" N, 38°57'00" E	1190	scrub
17	Gümüşhane, Şiran, Seydibaba	40°05'45" N, 39°03'18" E	1450	gallery forest
18	Sivas, Akıncılar, Şenbağlar	40°03'36" N, 38°23'45" E	1110	steppe
19	Sivas, Gölova, Arslanca	40°04'04" N, 38°46'15" E	1190	scrub
20	Sivas, Gölova, Çobanlı	40°00'54" N, 38°35'06" E	1290	steppe, scrub
21	Sivas, İmranlı, Aşağıçulha	39°54'18" N, 38°07'48" E	1830	steppe
22	Sivas, Suşehri, Akçaağıl	40°13'12" N, 38°03'25" E	770	steppe
23	Sivas, Suşehri, Akşar	40°02'60" N, 38°11'02" E	1110	steppe
24	Sivas, Suşehri, Aşağısarıca	40°09'18" N, 38°08'49" E	930	steppe
25	Sivas, Suşehri, Çamlığöze	40°13'60" N, 38°04'52" E	830	steppe, scrub
26	Sivas, Suşehri, Çokrak	40°07'59" N, 38°05'35" E	1040	steppe
27	Sivas, Suşehri, Geminbeli	39°59'24" N, 37°59'10" E	2010	gallery forest
28	Sivas, Zara, Kumoğlu	39°57'18" N, 37°55'30" E	1660	steppe

Results

Subfamily Ammophilinae André, 1886

Ammophila campestris Latreille, 1809 (Figure 2a, b)

Material examined. Erzincan: Refahiye, Sağlık, 1660 m, 12.VII.2018, ♂; Refahiye, Sakaltutan, 2010 m, 27.VII.2018, ♂; Giresun: Alucra, Gürbulak, 1600 m, 13.VII.2016, ♂; Gümüşhane: Kelkit, Ağıl, 1700 m, 13.VII.2016, ♀, 8 ♂♂; Şiran, Fındıkbeli, 1875 m, 24.VII.2016, ♂; 08.VI.2017, ♂; 02.VII.2018, ♀; Sivas: Zara, Kumoğlu, 1660 m, 13.VI.2017, ♂.

Global distribution. Central and East Asia, Europe, North Africa, Siberia, Turkey (Pulawski, 2021).

Ammophila gussakovskii Dollfuss, 2013 (Figure 2c, d)

Material examined. Erzincan: Refahiye, Sakaltutan, 1970 m, 29.VI.2017, 2 ♂♂; 11.VII.2018, ♀.

Global distribution. Central Asia and Caucasus (Pulawski, 2021).

Remark: New record for Turkish fauna.

Ammophila haladai Dollfuss, 2013 (Figure 2e)

Material examined. Giresun: Çamoluk, Hacıören, 1410 m, 24.VII.2016, ♀; Sivas: Suşehri, Geminbeli, 2010 m, 29.VI.2018, ♀.

Global distribution. Russia, Turkey (Pulawski, 2021).

***Ammophila heydeni* Dahlbom, 1845 (Figure 2f, g)**

Material examined. Erzincan: Refahiye, Çat, 1250 m, 11.VIII.2016, 2 ♂♂; 01.VIII.2017, ♂; Refahiye, Sakaltutan, 1970 m, 11.VII.2018, 4 ♂♂; 27.VII.2018, ♂; Giresun: Alucra, Arda, 1600 m, 24.VII.2016, 2 ♂♂; Alucra, Gürbulak, 1600 m, 13.VII.2016, ♀, 14 ♂♂; 24.VII.2016, 10 ♂♂; 28.VI.2017, ♂; 07.VIII.2017, 3 ♂♂; 11.VI.2018, ♂; 02.VII.2018, ♂; Alucra, Mesudiye, 1470 m, 03.IX.2015, ♀; 11.VIII.2016, ♂; Çamoluk, Hacıören, 1420 m, 11.VIII.2016, ♀; Şebinkarahisar, 1300 m, 03.IX.2015, ♂; 13.VII.2016, 3 ♂♂; 24.VII.2016, ♂; 28.VI.2017, ♂; 07.VIII.2017, ♀, ♂; Gümüşhane: Kelkit, Ağıl, 1700 m, 13.VII.2016, 7 ♂♂; Kelkit, Ahmediye, 2100 m, 13.VII.2016, 2 ♂♂; Kelkit, Çilhoroz, 1550 m, 26.VII.2017, ♂; 02.VII.2018, ♂; Kelkit, Kılıçtaşı, 1390 m, 29.VI.2017, ♂; Şiran, Fındıkbeli, 1875 m, 13.VII.2016, 5 ♂♂; 24.VII.2016, ♀, 7 ♂♂; 28.VI.2017, 4 ♂♂; 11.VII.2017, ♀; Şiran, Güreşküy, 1190 m, 11.VIII.2016, ♂; 26.VII.2017, ♀, 3 ♂♂; Sivas: Akıncılar, Şenbağlar, 1110 m, 02.VII.2017, ♂; 12.VIII.2017, ♂; Gölova, Çobanlı, 1290 m, 01.VIII.2017, 3 ♀♀, 3 ♂♂; 12.VIII.2017, ♀; İmranlı, Aşağıçulha, 1830 m, 29.VI.2018, ♂; Suşehri, Akşar, 1110 m, 02.VII.2017, ♂; Suşehri, Aşağısarıca, 930 m, 17.V.2018, ♂; Suşehri, Çamlıgöze, 830 m, 06.VIII.2015, ♂; 13.V.2017, ♂; 05.VI.2017, ♀; 08.VI.2017, ♂; 07.VIII.2017, ♂; 02.VI.2018, ♀; Suşehri, Geminbeli, 2010 m, 18.VII.2017, ♂; 24.VII.2017, ♂; 01.VIII.2017, ♂; 17.VII.2018, 6 ♂♂.

Global distribution. Asia, Europe, North Africa and Turkey (Pulawski, 2021).

***Ammophila mongolensis* Tsuneki, 1971 (Figure 2h)**

Material examined. Giresun: Şebinkarahisar, 1300 m, 03.IX.2015, ♀.

Global distribution. Central and Eastern Asia, Turkey (Pulawski, 2021).

***Ammophila sabulosa* (L., 1758) (Figure 2i, j)**

Material examined. Erzincan: Refahiye, Sakaltutan, 1970 m, 11.VII.2018, ♂; Giresun: Alucra, Gökçebel, 1600 m, 03.IX.2015, ♂; Alucra, Gürbulak, 1560 m, 13.VII.2016, 2 ♂♂; 11.VI.2018, 2 ♂♂; Çamoluk, Hacıören, 1410 m, 24.VII.2016, ♂; Şebinkarahisar, 1300 m, 13.VII.2016, ♂; 24.VII.2016, ♀; 07.VIII.2017, 3 ♂♂; 24.VII.2018, ♀; Gümüşhane: Şiran, Fındıkbeli, 1875 m, 08.VI.2017, ♂; Sivas: Akıncılar, Şenbağlar, 1110 m, 05.VI.2017, 2 ♂♂; Gölova, Çobanlı, 1290 m, 12.VIII.2017, 3 ♂♂; Suşehri, Akçaağıl, 770 m, 12.VIII.2017, ♂; Suşehri, Akşar, 1110 m, 08.VI.2017, ♂; Suşehri, Aşağısarıca, 930 m, 17.V.2018, ♂; Suşehri, Çamlıgöze, 830 m, 06.VIII.2015, 2 ♀♀; Suşehri, Geminbeli, 2010 m, 18.VII.2017, ♀, ♂; 24.VII.2017, ♀; 01.VIII.2017, 3 ♂♂; 29.VI.2018, 2 ♂♂; 17.VII.2018, 6 ♂♂.

Global distribution. Asia, Europe, North Africa, Russia and Turkey (Pulawski, 2021).

***Ammophila striata* Mocsáry, 1879 (Figure 2k)**

Material examined. Gümüşhane: Kelkit, Ağıl, 1700 m, 13.VII.2016, ♂.

Global distribution. Central Asia, Southern Europe, Russia, and Turkey (Pulawski, 2021).

***Ammophila terminata* F. Smith, 1856 (Figure 2l)**

Material examined. Gümüşhane: Kelkit, Ağıl, 1700 m, 13.VII.2016, ♀.

Global distribution. Asia, Europe, North Africa, Russia and Turkey (Pulawski, 2021).

***Hoplammophila armata* (Illiger, 1807) (Figure 2m)**

Material examined. Sivas: Suşehri, Çamlıgöze, 830 m, 06.VIII.2015, ♂; 03.VIII.2016, ♂.

Global distribution. Europe, Iran, Russia, Turkey (Pulawski, 2021).

***Hoplammophila clypeata* (Mocsáry, 1883) (Figure 2n)**

Material examined. Giresun: Alucra, Gürbulak, 1560 m, 11.VI.2018, ♂.

Global distribution. Europe, North Africa and Turkey (Pulawski, 2021).

***Podalonia alpina* (Kohl, 1888) (Figure 2o)**

Material examined. Sivas: Gölova, Çobanlı, 1290 m, 12.VIII.2017, ♂.

Global distribution. Central and East Asia, Europe, North Africa, Russia and Turkey (Pulawski, 2021).

***Podalonia fera* (Lepelletier de Saint Fargeau, 1845) (Figure 2p, q)**

Material examined. Erzincan: Refahiye, Çat, 1250 m, 01.VIII.2017, 5 ♂♂; Giresun: Alucra, Mesudiye, 1440 m, 03.IX.2015, ♂; Şebinkarahisar, 1300 m, 03.IX.2015, 2 ♀♀; Sivas: Akıncılar, Şenbağlar, 1140 m, 12.VIII.2017, 2 ♂♂; Suşehri, Çokrak, 1040 m, 24.VII.2017, ♀.

Global distribution. Central Asia, Europe, Russia and Turkey (Pulawski, 2021).

***Podalonia hirsuta* (Scopoli, 1763) (Figure 2r,s)**

Material examined. Erzincan: Refahiye, Sakaltutan, 2010 m, 14.VI.2016, 2 ♂♂; 27.VII.2018, ♀; Gümüşhane: Şiran, Fındıkbeli, 1875 m, 28.VI.2017, ♀; 11.VII.2017, ♂; Sivas: Akıncılar, Şenbağlar, 1110 m, 16.IV.2017, 4 ♀♀; Gölova, Çobanlı, 1290 m, 12.VIII.2017, ♂; Suşehri, Aşağısarıca, 930 m, 16.IV.2017, ♀; Suşehri, Çamlıgöze, 830 m, 25.IV.2018, ♀; 29.IV.2018, ♀; 02.VI.2018, 4 ♂♂; Suşehri, Geminbeli, 2010 m, 17.VII.2018, 5 ♂♂.

Global distribution. Central and East Asia, Europe, Russia and Turkey (Pulawski, 2021).

***Podalonia nigrohirta* (Kohl, 1888) (Figure 2t)**

Material examined. Erzincan: Refahiye, Sakaltutan, 1900 m, 29.VI.2017, ♂.

Global distribution. Central Asia (Pulawski, 2021).

Remark: New record for Turkish fauna.

***Podalonia tydei* (Le Guillou, 1841) (Figure 2u, v)**

Material examined. Sivas: Gölova, Çobanlı, 1290 m, 17.IX.2015, ♀, ♂; Zara, Kumoğlu, 1660 m, 09.VIII.2016, ♀.

Global distribution. Africa, Arabian Peninsula, Asia, Cyprus, Madagascar, Russia and Turkey (Pulawski, 2021).

Subfamily Sceliphrinae Ashmead, 1899

***Chalybion femoratum* (Fabricius, 1781) (Figure 2w)**

Material examined. Sivas: Suşehri, Akşar, 1110 m, 24.VII.2017, 2 ♀♀.

Global distribution. Central and East Asia, Europe, North Africa and Turkey (Pulawski, 2021).

***Chalybion flebile* (Lepelletier de Saint Fargeau, 1845) (Figure 2x)**

Material examined. Sivas: Suşehri, Çokrak, 1040 m, 17.VII.2018, ♂.

Global distribution. Arabian Peninsula, Central Asia, Cyprus, North Africa, South Europe and Turkey (Pulawski, 2021).

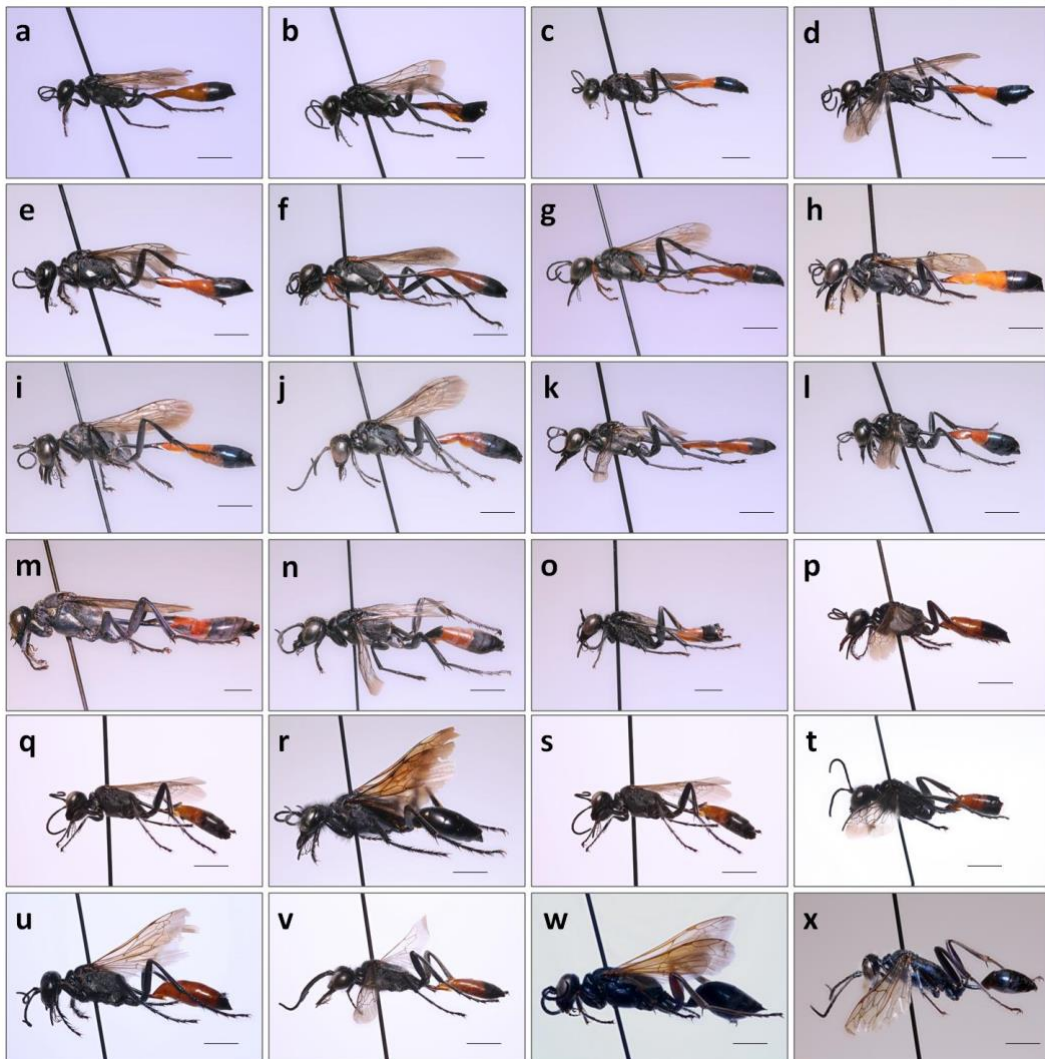


Figure 2. a) *Ammophila campestris* ♀; b) *Ammophila campestris* ♂; c) *Ammophila gussakovskii* ♀; d) *Ammophila gussakovskii* ♂; e) *Ammophila haladai* ♀; f) *Ammophila heydeni* ♀; g) *Ammophila heydeni* ♂; h) *Ammophila mongolensis* ♀; i) *Ammophila sabulosa* ♀; j) *Ammophila sabulosa* ♂; k) *Ammophila striata* ♂; l) *Ammophila terminata* ♀; m) *Hoplammophila armata* ♂; n) *Hoplammophila clypeata* ♂; o) *Podalonia alpina* ♂; p) *Podalonia fera* ♀; q) *Podalonia fera* ♂; r) *Podalonia hirsuta* ♀; s) *Podalonia hirsuta* ♂; t) *Podalonia nigrohirta* ♂; u) *Podalonia tydei* ♀; v) *Podalonia tydei* ♂; w) *Chalybion femoratum* ♀; and x) *Chalybion flebile* ♂ (scale bars: 2 mm).

***Sceliphron arabs* (Lepelletier de Saint Fargeau, 1845) (Figure 3a)**

Material examined. Sivas: Suşehri, Çamlığöze, 830 m, 06.VIII.2015, ♀.

Global distribution. Georgia, Iraq, Iran, Turkey (Pulawski, 2021).

***Sceliphron curvatum* (F. Smith, 1870) (Figure 3b)**

Material examined. Giresun: Şebinkarahisar, 1250 m, 20.VII.2017, ♀.

Global distribution. Central and East Asia, Europe, South America, Russia and Turkey (Pulawski, 2021).

***Sceliphron destillatorium* (Illiger, 1807) (Figure 3c, d)**

Material examined. Erzincan: Refahiye, Akçiğdem, 1700 m, 13.VII.2017, ♀; Refahiye, Sakaltutan, 1975 m, 12.VII.2018, 2 ♀♀, ♂; 27.VII.2018, 2 ♂♂; Giresun: Çamoluk, Arslanca, 1180 m, 28.VI.2017, ♀; Çamoluk, Hacıören, 1410 m, 20.VII.2017, ♀; 28.VI.2017, ♀; Gümüşhane: Şiran, Seydibaba, 1450 m, 03.VII.2018, ♂; Sivas: Akıncılar, Şenbağlar, 1140 m, 11.VII.2018, ♀; İmranlı, Aşağıçulha, 1830 m, 18.VII.2017, ♀; Suşehri, Akşar, 1110 m, 24.VII.2017, 2 ♀♀; Suşehri, Aşağısarıca, 930 m, 02.VI.2018, ♀; 05.VII.2018, ♂; Suşehri, Çokrak, 1140 m, 05.VII.2018, 2 ♂♂.

Global distribution. Arabian Peninsula, Central and East Asia, Europe, North Africa and Turkey (Pulawski, 2021).

***Sceliphron funestum* Kohl, 1918 (Figure 3e)**

Material examined. Sivas: Suşehri, Çokrak, 1040 m, 05.VII.2018, ♀.

Global distribution. Greece, Iran, Turkey (Pulawski, 2021).

***Sceliphron madraspatanum tubifex* (Latreille, 1809) (Figure 3f)**

Material examined. Sivas: Akıncılar, Şenbağlar, 1140 m, 01.VIII.2017, ♀.

Global distribution. Arabian Peninsula, Central and East Asia, Europe, Russia and Turkey (Pulawski, 2021).

Subfamily Sphecinae

***Palmodes occitanicus* (Lepelletier de Saint Fargeau & Serville, 1828) (Figure 3g)**

Material examined. Giresun: Alucra, Mesudiye, 1440 m, 02.VII.2018, ♂; Sivas: Suşehri, Boyalıca, 980 m, 18.VII.2017, ♂.

Global distribution. Arabian Peninsula, Central and East Asia, Europe, North Africa, Russia and Turkey (Pulawski, 2021).

***Palmodes strigulosus* (A. Costa, 1861) (Figure 3h)**

Material examined. Erzincan: Refahiye, Çat, 1250 m, 26.VII.2017, ♀; Giresun: Şebinkarahisar, 1210 m, 13.VII.2016, ♀.

Global distribution. Arabian Peninsula, Central Asia, Europe, Russia and Turkey (Pulawski, 2021).

***Prionyx kirbii* (Vander Linden, 1827) (Figure 3i, j)**

Material examined. Giresun: Alucra, Gürbulak, 1560 m, 07.VIII.2017, ♀, ♂; Çamoluk, Hacıören, 1410 m, 24.VII.2016, 2 ♀♀; 11.VIII.2016, 3 ♂♂; Şebinkarahisar, 1200 m, 07.VIII.2017, ♀, 5 ♂♂; Gümüşhane: Kelkit, Çilhoroz, 1550 m, 02.VII.2018, ♂; Kelkit, Kılıçtaşı, 1380 m, 29.VI.2017, ♂; Sivas: Gölova, Çobanlı, 1290 m, 12.VIII.2017, ♂; Suşehri, Aşağısarıca, 830 m, 13.VI.2017, ♂; Suşehri, Çamlığöze, 830 m, 11.VII.2017, ♀; 07.VIII.2017, 6 ♀♀, 3 ♂♂; Suşehri, Çokrak, 1040 m, 17.VII.2018, ♂.

Global distribution. Arabian Peninsula, Central and East Asia, Europe, North and South Africa, Russia and Turkey (Pulawski, 2021).

***Prionyx lividocinctus* (A. Costa, 1861) (Figure 3k)**

Material examined. Gümüşhane: Şiran, Güreşköy, 1190 m, 11.VIII.2016, ♀.

Global distribution. Arabian Peninsula, Central Asia, Europe, North Africa, Russia and Turkey (Pulawski, 2021).

***Prionyx nudatus* (Kohl, 1885) (Figure 3l, m)**

Material examined. Erzincan: Refahiye, Çat, 1250 m, 01.VIII.2017, ♀; 26.VII.2017, 2 ♀♀; Refahiye, Sakaltutan, 1970 m, 11.VII.2018, 2 ♂♂; Giresun: Alucra, Gökçebel, 1600 m, 03.IX.2015, ♀; Şebinkarahisar, 1300 m, 03.IX.2015, ♀, ♂; Sivas: Akıncılar, Şenbağlar, 1140 m, 02.VI.2018, ♂; Gölova, Çobanlı, 1290 m, 12.VIII.2017, ♀; Suşehri, Boyalıca, 930 m, 22.VIII.2015, ♂.

Global distribution. Central and East Asia, Europe, North Africa, Russia and Turkey (Pulawski, 2021).

***Sphex flavipennis* Fabricius, 1793 (Figure 3n, o)**

Material examined. Erzincan: Refahiye, Çat, 1250 m, 01.VIII.2017, ♂; Giresun: Şebinkarahisar, 1200 m, 24.VII.2016, ♀; 20.VII.2017, 2 ♂; 24.VII.2018, ♀; Gümüşhane: Kelkit, Çilhoroz, 1550 m, 02.VII.2018, ♂; Şiran, Güreşköy, 1190 m, 11.VIII.2016, ♂; Sivas: Akıncılar, Şenbağlar, 1140 m, 30.VIII.2016, ♂; 01.VIII.2017, ♀, 2 ♂♂; 12.VIII.2017, 3 ♀♀; 11.VII.2018, 2 ♂♂; Suşehri, Boyalıca, 980 m, 18.VII.2017, ♀, 2 ♂♂; Suşehri, Çamlığöze, 830 m, 11.VII.2017, ♂; Suşehri, Çokrak, 1040 m, 05.VII.2018, ♂.

Global distribution. Arabian Peninsula, Central and East Asia, Europe, North Africa, Russia and Turkey (Pulawski, 2021).

***Sphex fumicatus* Christ, 1791 (Figure 3p)**

Material examined. Sivas: Suşehri, Çokrak, 1040 m, 19.VI.2016, 2 ♀♀.

Global distribution. Africa, Arabian Peninsula, Central and East Asia, Europe, South America, Russia and Turkey (Pulawski, 2021).

***Sphex funerarius* Gussakovskij, 1934 (Figure 3q, r)**

Material examined. Giresun: Alucra, Mesudiye, 1530 m, 03.IX.2015, ♂; Şebinkarahisar, 1200 m, 07.VIII.2017, ♀; Gümüşhane: Şiran, Güreşköy, 1190 m, 11.VIII.2016, 2 ♀♀; Sivas: Akıncılar, Şenbağlar, 1140 m, 01.VIII.2017, ♀; 12.VIII.2017, 3 ♀♀.

Global distribution. Arabian Peninsula, Central and East Asia, Europe, North Africa, Russia and Turkey (Pulawski, 2021).

***Sphex melanocnemis* Kohl, 1885 (Figure 3s)**

Material examined. Sivas: Akıncılar, Şenbağlar, 1140 m, 01.VIII.2017, 2 ♀♀; Gölova, Çobanlı, 1290 m, 11.VIII.2018, ♀; Suşehri, Çokrak, 1040 m, 05.VII.2018, ♀.

Global distribution. China, Israel, Jordan, Syria, Turkey (Pulawski, 2021).

***Sphex pruinosus* Germar, 1817 (Figure 3t)**

Material examined. Sivas: Akıncılar, Şenbağlar, 1140 m, 30.VIII.2016, ♂; 12.VIII.2017, ♂; Suşehri, Boyalıca, 980 m, 18.VII.2017, ♂.

Global distribution. Africa, Arabian Peninsula, Central and East Asia, Cyprus, Europe and Turkey (Pulawski, 2021).

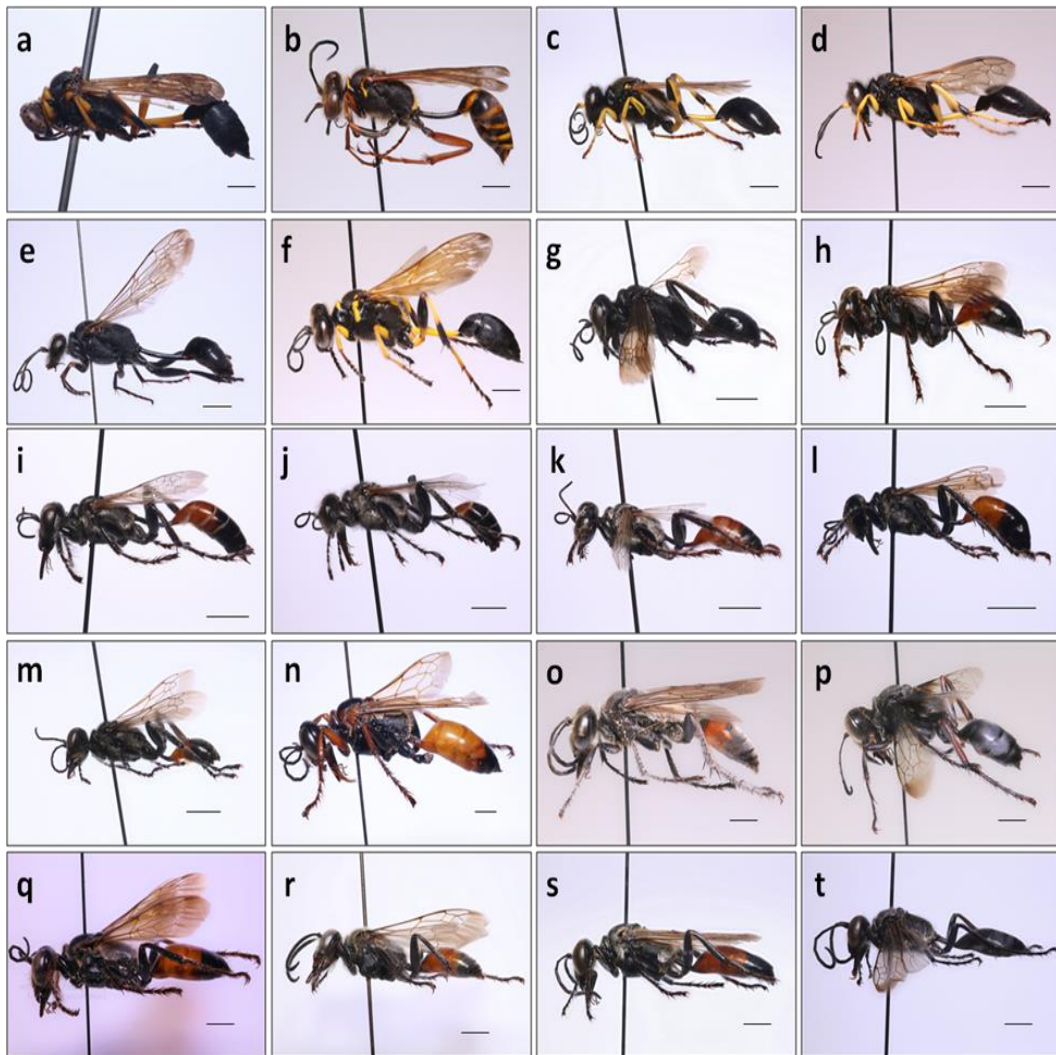


Figure 3. a) *Sceliphron arabs* ♀; b) *Sceliphron curvatum* ♀; c) *Sceliphron destillatorium* ♀; d) *Sceliphron destillatorium* ♂; e) *Sceliphron funestum* ♀; f) *Sceliphron madraspatanum tubifex* ♀; g) *Palmodes occitanicus* ♂; h) *Palmodes strigulosus* ♀; i) *Prionyx kirbii* ♀; j) *Prionyx kirbii* ♂; k) *Prionyx lividocinctus* ♀; l) *Prionyx nudatus* ♀; m) *Prionyx nudatus* ♂; n) *Sphex flavipennis* ♀; o) *Sphex flavipennis* ♂; p) *Sphex fumicatus* ♀; q) *Sphex funerarius* ♀; r) *Sphex funerarius* ♂; s) *Sphex melanocnemis* ♀; and t) *Sphex pruinosis* ♂ (scale bars: 2 mm).

Discussion

Thirty-two species and subspecies in eight genera of Sphecidae were determined from Upper Kelkit Valley. Of these, 12 are new records for the provinces in the region. *A. gussakovskii* and *P. nigrohirta* were also recorded for the first time for Turkish fauna, so the number of taxa belonging to the family was raised to 79. Prior to this study, Sphecidae family had been represented by 33 species in the provinces sampled. New species records were added to the fauna of these provinces; therefore, distribution areas of some previously known species in Turkey have been expanded (Figure 4). The most widespread species in the studied area were *A. heydeni*, *A. sabulosa*, *P. hirsuta* and *P. kirbii*.

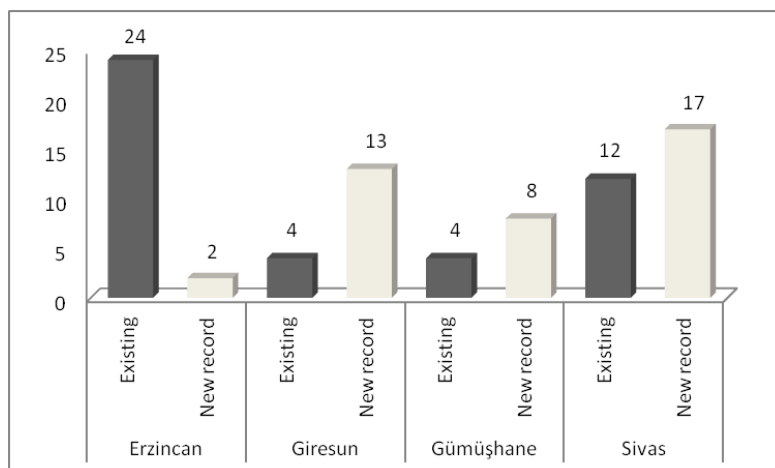


Figure 4. Number of existing and newly recorded species from the Sphecidae family in the study area.

Kelkit Valley forms a narrow corridor through which Central Asian and Caucasian fauna elements cross to Central Anatolia (Demirsoy, 2002). The two species, *A. gussakovskii* and *P. nigrohirta*, which are new records for Turkey, originally spread in Central Asia and the Caucasus (Pulawski, 2021). Since they are firstly determined in the Kelkit Valley in Turkey, they most likely reached the country recently during their westward spread. For now, Erzincan province is the westernmost distribution point of the species in the Palearctic region.

Vertical distribution of the species in the research area ranged from 800 to 2100 m. The largest number of samples were collected between 1000 and 1200 m. Most likely, elevations in these ranges have favorable habitats and suitable climatic conditions for most of the species. The cosmopolitan species, including *A. heydeni*, *A. sabulosa*, *P. hirsuta*, *S. destillatorium* and *P. nudatus*, were found at almost all altitudes in the region, while *A. gussakovskii* and *P. nigrohirta* were only found in locations above 1900 m (Figure 5).

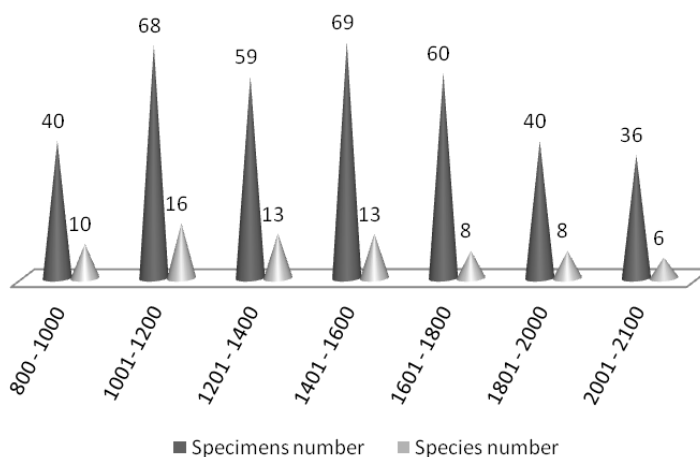


Figure 5. Vertical distribution of the detected species in the research area.

In the present study, Turkey Sphecidae species list has been updated. The taxa added to the Turkish Sphecidae fauna following the recent list prepared by Yıldırım (2014) and the modifications in the names of species/subspecies are included in our study. With the two newly recorded species in this study, the number of species and subspecies belonging to the Sphecidae is reached to 79 in 12 genera (Table 2) in Turkey.

Table 2. Current species list of Sphecidae in Turkey

Taxon	Distribution in Turkey	References
Subfamily Ammophilinae		
Genus <i>Ammophila</i> W. Kirby, 1798		
<i>Ammophila assimilis</i> Kohl, 1901	Adana, Antalya, Mersin	Ljubomirov & Yıldırım, 2008; Yıldırım, 2014; Dollfuss, 2015
<i>Ammophila barbara</i> (Lepelletier de Saint Fargeau, 1845)	Ağrı, Ankara, Bayburt, Bitlis, Erzincan, Isparta, Konya, Muş, Nevşehir, Osmaniye	Ljubomirov & Yıldırım, 2008; Yıldırım, 2014; Dollfuss, 2013b, 2015; Yıldırım et al., 2016
<i>Ammophila campestris</i> Latreille, 1809	Ankara, Bolu, Bursa, Erzurum, Gümüşhane, Kahramanmaraş, Kars, Kayseri, Mersin, Sivas, Trabzon	Ljubomirov & Yıldırım, 2008; Dollfuss, 2013b; Yıldırım, 2014; Yıldırım et al., 2016
<i>Ammophila elongata</i> Fischer de Waldheim, 1843	Van	Dollfuss, 2013a, 2013b
<i>Ammophila gracillima</i> Taschenberg, 1869	Iğdır	Yıldırım et al., 2016
<i>Ammophila gussakovskii</i> Dollfuss, 2013	Erzincan	Present data
<i>Ammophila haladai</i> Dollfuss, 2013	Bolu, Erzincan, Isparta, Kars, Konya, Mersin, Nevşehir, Van	Dollfuss, 2013a, 2013b
<i>Ammophila heydeni</i> Dahlbom, 1845	Adana, Afyonkarahisar, Amasya, Ankara, Antalya, Artvin, Aydın, Bayburt, Bilecik, Bingöl, Bitlis, Bursa, Çankırı, Çorum, Edirne, Erzincan, Erzurum, Gümüşhane, Hatay, Iğdır, İstanbul, İzmir, Kahramanmaraş, Karaman, Kars, Kastamonu, Kayseri, Kırşehir, Konya, Kütahya, Malatya, Mersin, Muş, Nevşehir, Niğde, Sakarya, Sivas, Sinop, Şanlıurfa, Tekirdağ	Ljubomirov & Yıldırım, 2008; Tüzün & Yüksel, 2010; Yıldırım, 2012; Bayındır et al., 2013; Dollfuss, 2013b, 2015; Gülmez & Dizer, 2016; Yıldırım et al., 2016; Yıldırım & Tezcan, 2018; Gülmez, 2019
<i>Ammophila hungarica</i> Mocsáry, 1883	Adana, Amasya, Ankara, Aydın, Bursa, Erzincan, Erzurum, Gaziantep, İstanbul, İzmir, Konya, Mersin, Muğla, Osmaniye, Sivas	Ljubomirov & Yıldırım, 2008; Dollfuss, 2013b; Gülmez, 2019
<i>Ammophila mongolensis</i> Tsuneki, 1979	Sivas	Dollfuss, 2013b
<i>Ammophila pubescens</i> Curtis, 1836	Ağrı, Erzurum, Kars, Nevşehir, Niğde	Ljubomirov & Yıldırım, 2008; Tüzün & Yüksel, 2010; Dollfuss, 2013b
<i>Ammophila sabulosa</i> (L., 1758)	Adana, Aksaray, Amasya, Ankara, Antalya, Artvin, Aydın, Balıkesir, Bayburt, Bilecik, Bolu, Bursa, Çankırı, Erzincan, Erzurum, Eskişehir, Iğdır, Isparta, İstanbul, İzmir, Kahramanmaraş, Kars, Kocaeli, Konya, Kütahya, Mersin, Manisa, Muş, Rize, Tokat, Trabzon, Tunceli, Van, Zonguldak	Ljubomirov & Yıldırım, 2008; Tüzün & Yüksel, 2010; Japoshvili & Ljubomirov, 2012; Yıldırım, 2012; Bayındır et al., 2013; Dollfuss, 2013b; Gülmez & Dizer, 2016; Yıldırım et al., 2016; Gülmez, 2019; Örgel et al., 2020
<i>Ammophila sareptana</i> Kohl, 1884	Ankara, Çankırı, Erzurum, Kırşehir, Kütahya, Mersin, Sivas, Tekirdağ	Ljubomirov & Yıldırım, 2008; Dollfuss, 2013b; Yıldırım et al., 2016
<i>Ammophila sinensis</i> Sickmann, 1894	Erzincan, Erzurum	Ljubomirov & Yıldırım, 2008; Yıldırım, 2012
<i>Ammophila striata</i> Mocsáry, 1878	Kahramanmaraş, Konya, Kütahya, Sivas, Van	Ljubomirov & Yıldırım, 2008; Gülmez, 2019
<i>Ammophila terminata</i> F. Smith, 1856	Ankara, Antalya, Bayburt, Bursa, Erzurum, İstanbul, Kars, Mersin, Niğde, Nevşehir, Van	Ljubomirov & Yıldırım, 2008; Tüzün & Yüksel, 2010; Yıldırım, 2012; Dollfuss, 2013b; Yıldırım et al., 2016; Gülmez, 2019
<i>Ammophila theryi</i> (Gribodo, 1894)	Konya	Ljubomirov & Yıldırım, 2008
<i>Ammophila vagabunda</i> F. Smith, 1856	Niğde	Dollfuss, 2013b
Genus <i>Eremochares</i> Gribodo, 1883		
<i>Eremochares dives</i> (Brullé, 1833)	Ankara, Denizli, Konya, Mersin, Niğde	Ljubomirov & Yıldırım, 2008; Dollfuss, 2010b
Genus <i>Hoplammophila</i> de Beaumont 1960		
<i>Hoplammophila aemulans</i> (Kohl, 1901)	Muğla	Dollfuss, 2015
<i>Hoplammophila anatolica</i> de Beaumont, 1960	Antalya, Mersin	Ljubomirov & Yıldırım, 2008
<i>Hoplammophila armata</i> (Illiger, 1807)	Artvin, Hakkari, Konya, Mersin, Samsun, Sivas, Tokat	Ljubomirov & Yıldırım, 2008; Dollfuss, 2010b; Gülmez & Dizer, 2016; Gülmez, 2019
<i>Hoplammophila clypeata</i> (Mocsáry, 1883)	Mersin, Tekirdağ, Tokat, Tunceli	Ljubomirov & Yıldırım, 2008; Dollfuss, 2010b; Gülmez & Dizer, 2016; Yıldırım et al., 2016

Table 2. (Continued)

Taxon	Distribution in Turkey	References
Genus <i>Parapsammophila</i> Taschenberg, 1869		Dollfuss, 2013a, 2013b
<i>Parapsammophila caspica</i> (Gussakovskij, 1930)	Mersin	Dollfuss, 2010b
Genus <i>Podalonia</i> Fernald, 1927		
<i>Podalonia affinis</i> (Kirby, 1798)	Amasya, Ankara, Antalya, Ardahan, Artvin, Bayburt, Bursa, Erzurum, Iğdır, Kars, Kayseri, Mersin, Nevşehir, Sivas, Tokat, Trabzon	Ljubomirov & Yıldırım, 2008; Dollfuss, 2010b, 2013b; Tüzün & Yüksel, 2010; Gülmez & Dizer, 2016; Yıldırım et al., 2016
<i>Podalonia alpina</i> (Kohl, 1888)	Erzurum, Gümüşhane, Kars, Kayseri, Mersin	Ljubomirov & Yıldırım, 2008; Dollfuss, 2013b
<i>Podalonia ebenina</i> (Spinola, 1839)	Ankara, Bingöl, Bolu, Erzurum, Kayseri, Kırşehir, Konya, Niğde, Sivas	Ljubomirov & Yıldırım, 2008; Dollfuss, 2010b; Tüzün & Yüksel, 2010
<i>Podalonia fera</i> (Lepelletier de Saint-Fargeau, 1845)	Amasya, Ankara, Artvin, Bursa, Bingöl, Denizli, Erzincan, Erzurum, Eskişehir, Hakkari, İzmir, Kahramanmaraş, Kars, Kayseri, Konya, Kütahya, Manisa, Mersin, Muş, Niğde, Rize, Tokat, Tunceli	Ljubomirov & Yıldırım, 2008; Dollfuss, 2010b, 2013b; Tüzün & Yüksel, 2010; Japoshvili & Ljubomirov, 2012; Yıldırım, 2012; Bayındır et al., 2013; Gülmez & Dizer, 2016; Yıldırım et al., 2016; Yıldırım & Tezcan, 2018; Gülmez, 2019
<i>Podalonia flavida</i> (Kohl, 1901)	Isparta, Kayseri, Konya, Manisa	Ljubomirov & Yıldırım, 2008; Dollfuss, 2010b
<i>Podalonia harveyi</i> (de Beaumont, 1967)	Ankara	Ljubomirov & Yıldırım, 2008
<i>Podalonia hirsuta</i> (Scopoli, 1763)	Adana, Amasya, Ankara, Ardahan, Artvin, Aydın, Bayburt, Bingöl, Bilecik, Bitlis, Bolu, Bursa, Çorum, Denizli, Diyarbakır, Elazığ, Erzincan, Erzurum, Giresun, Gümüşhane, Hakkari, Hatay, İstanbul, İzmir, Kahramanmaraş, Kars, Kastamonu, Kayseri, Konya, Kütahya, Manisa, Mersin, Muğla, Niğde, Rize, Samsun, Sivas, Tokat, Trabzon, Uşak	Ljubomirov & Yıldırım, 2008; Dollfuss, 2010b, 2013b, 2015; Tüzün & Yüksel, 2010; Japoshvili & Ljubomirov, 2012; Yıldırım, 2012; Bayındır et al., 2013; Gülmez & Dizer, 2016; Yıldırım et al., 2016; Yıldırım & Tezcan, 2018; Örgel et al., 2020
<i>Podalonia luffii</i> (Saunders, 1903)	Erzurum, Nevşehir	Ljubomirov & Yıldırım, 2008; Dollfuss, 2010b
<i>Podalonia nigrohirta</i> (Kohl, 1888)	Erzincan	Present data
<i>Podalonia tydei tydei</i> (Le Guillou, 1841)	Adana, Ankara, Antalya, Artvin, Aydın, Balıkesir, Bursa, Elazığ, Erzincan, Erzurum, Iğdır, İstanbul, Kars, Kayseri, Konya, Malatya, Manisa, Mersin, Samsun, Şırnak, Tokat, Tunceli	Ljubomirov & Yıldırım, 2008; Dollfuss, 2010b, 2013b; Tüzün & Yüksel, 2010; Gülmez & Dizer, 2016; Yıldırım et al., 2016; Yıldırım & Tezcan, 2018; Örgel et al., 2020
Subfamily Sceliphrinae		
Genus <i>Chalybion</i> Dahlbom, 1843		
<i>Chalybion femoratum</i> (Fabricius, 1781)	Ankara, Burdur, Bursa, Denizli, Erzincan, Erzurum, Hakkari, Iğdır, Karabük, Kars, Konya, Malatya, Manisa, Mersin, Nevşehir, Şırnak	Ljubomirov & Yıldırım, 2008; Yıldırım, 2012, 2014; Dollfuss, 2016; Gülmez, 2019
<i>Chalybion flebile</i> (Lepelletier de Saint-Fargeau, 1845)	Antalya, Aydın, Burdur, Diyarbakır, Elazığ, Erzurum, Gaziantep, Hakkari, Hatay, Kars, Malatya, Manisa, Mersin, Niğde, Tokat, Tunceli, Şanlıurfa	Ljubomirov & Yıldırım, 2008; Tüzün & Yüksel, 2010; Bayındır et al., 2013; Yıldırım, 2014; Dollfuss, 2016; Gülmez & Dizer, 2016; Yıldırım et al., 2016; Yıldırım & Tezcan, 2018; Gülmez, 2019
<i>Chalybion klapperichi</i> (Balthasar, 1957)	Denizli	Dollfuss, 2016
<i>Chalybion minos</i> (de Beaumont, 1965)	Antalya, Balıkesir, Denizli, Elazığ, Malatya, Mersin	Ljubomirov & Yıldırım, 2008; Yıldırım, 2014; Dollfuss, 2016
<i>Chalybion omissum</i> (Kohl, 1889)	Adana, Ankara, Antalya, Burdur, Çanakkale, Denizli, Hakkari, Isparta, İzmir, Konya, Manisa, Mersin, Muğla, Şırnak, Van	Ljubomirov & Yıldırım, 2008; Bayındır et al., 2013; Yıldırım, 2014; Dollfuss, 2016; Yıldırım et al., 2016;
<i>Chalybion turanicum</i> (Gussakovskij, 1935)	Adıyaman, Antalya, İzmir, Kayseri, Mardin, Mersin	Dollfuss, 2016
<i>Chalybion walteri</i> (Kohl, 1889)	Adıyaman, Burdur, Denizli, Eskişehir, Gaziantep, Hatay, Iğdır, Kahramanmaraş, Kayseri, Malatya	Ljubomirov & Yıldırım, 2008; Yıldırım, 2012, 2014; Dollfuss, 2016; Yıldırım et al., 2016

Table 2. (Continued)

Taxon	Distribution in Turkey	References
Genus <i>Sceliphron</i> Klug, 1801		
<i>Sceliphron arabs</i> (Lepeletier de Saint Fargeau, 1845)	Adana, Antalya, Batman, Iğdır, Malatya, Mersin, Muş, Şanlıurfa, Tokat, Tunceli	Yıldırım, 2014; Dollfuss, 2016; Yıldırım et al., 2016; Yıldırım & Tezcan, 2018; Gülmez, 2019
<i>Sceliphron curvatum</i> (Smith, 1870)	Amasya, Erzurum, Kocaeli, Ordu, Samsun, Tokat	Gülmez & Can, 2015a; Gülmez & Dizer, 2016; Yıldırım et al., 2016; Yıldırım & Tezcan, 2018; Ertürk et al., 2019; Ertürk & Taş, 2021
<i>Sceliphron destillatorium</i> (Illiger, 1807)	Adana, Adıyaman, Afyonkarahisar, Amasya, Ankara, Antalya, Artvin, Aydın, Burdur, Bursa, Çanakkale, Elazığ, Erzincan, Erzurum, Eskişehir, Giresun, Hatay, Isparta, İstanbul, İzmir, Kahramanmaraş, Karaman, Kars, Kastamonu, Konya, Malatya, Manisa, Mardin, Mersin, Muğla, Niğde, Ordu, Osmaniye, Sakarya, Şanlıurfa, Şırnak, Tokat, Trabzon	Ljubomirov & Yıldırım, 2008; Tüzün & Yüksel, 2010; Yıldırım, 2012, 2014; Gülmez & Can, 2015b; Dollfuss, 2016; Gülmez & Dizer, 2016; Yıldırım et al., 2016; Yıldırım & Tezcan, 2018
<i>Sceliphron funestum</i> Kohl, 1918	Adana, Adıyaman, Antalya, Aydın, İzmir, Mersin, Muğla, Siirt	Ljubomirov & Yıldırım, 2008; Yıldırım, 2014; Dollfuss, 2016; Yıldırım et al., 2016
<i>Sceliphron madraspatanum madraspatanum</i> (Fabricius, 1781)	Ankara, İstanbul, Mersin, Muğla	de Beaumont, 1967; Gülmez & Tüzün, 2005; Dollfuss, 2016; Gülmez, 2019
<i>Sceliphron madraspatanum tubifex</i> (Latreille, 1809)	Amasya, Ankara, Antalya, Bursa, Çorum, Denizli, Kahramanmaraş, Konya, Mersin, Muğla, Tokat	Ljubomirov & Yıldırım, 2008; Yıldırım, 2014; Gülmez & Dizer, 2016; Yıldırım & Tezcan, 2018
<i>Sceliphron spirifex</i> (L., 1758)	Adana, Adıyaman, Antalya, Aydın, Balıkesir, Bursa, Denizli, Hatay, Isparta, İstanbul, İzmir, Kahramanmaraş, Manisa, Mersin, Muğla, Niğde, Tokat, Trabzon	Ljubomirov & Yıldırım, 2008; Tüzün & Yüksel, 2010; Japoshvili & Ljubomirov, 2012; Yıldırım, 2012, 2014; Dollfuss, 2016; Gülmez & Dizer, 2016; Yıldırım et al., 2016; Yıldırım & Tezcan, 2018
Subfamily Sphecinae Latreille, 1802		
Genus <i>Chilosphex</i> Menke, 1976		
<i>Chilosphex argyrius</i> (Brullé, 1833)	Bursa, Denizli, Erzurum, Hatay, Isparta, Kars, Tunceli	Ljubomirov & Yıldırım, 2008; Bayındır et al., 2013; Yıldırım, 2014; Yıldırım et al., 2016
<i>Chilosphex pseudargyrius</i> (Roth, 1967)	Konya, Mardin, Mersin	Dollfuss, 2008; Ljubomirov & Yıldırım, 2008; Yıldırım, 2014
Genus <i>Isodontia</i> Patton, 1880		
<i>Isodontia paludosa</i> (Rossi, 1790)	Adıyaman, Ankara, Antalya, Artvin, Bursa, Erzincan, Erzurum, Isparta, Kars, Konya, Niğde, Tokat, Van	Dollfuss, 2008; Ljubomirov & Yıldırım, 2008; Tüzün & Yüksel, 2010; Japoshvili & Ljubomirov, 2012; Yıldırım, 2012, 2014; Bayındır et al., 2013; Gülmez & Dizer, 2016
<i>Isodontia splendidula</i> (Costa, 1858)	Ankara, Hatay, Manisa, Mersin, Sakarya, Tokat, Tunceli	Dollfuss, 2008; Ljubomirov & Yıldırım, 2008; Yıldırım, 2014; Gülmez & Dizer, 2016; Yıldırım et al., 2016
Genus <i>Palmodes</i> Kohl, 1890		
<i>Palmodes melanarius</i> (Mocsáry, 1883)	Aksaray, Ankara, Denizli, İzmir	Ljubomirov & Yıldırım, 2008; Yıldırım, 2014; Yıldırım et al., 2016; Danilov & Byvaltsev, 2020
<i>Palmodes minor</i> (Morawitz, 1890)	Amasya, Ankara, Konya	Ljubomirov & Yıldırım, 2008; Yıldırım, 2014; Danilov & Byvaltsev, 2020
<i>Palmodes occitanicus</i> (Le Peletier & Serville, 1828)	Antalya, Balıkesir, Bursa, Denizli, Erzincan, Erzurum, Iğdır, İstanbul, Kars, Manisa, Mersin, Muğla, Nevşehir, Şanlıurfa, Tokat, Tunceli	Dollfuss, 2008; Ljubomirov & Yıldırım, 2008; Yıldırım, 2014; Gülmez & Dizer, 2016; Yıldırım et al., 2016; Danilov & Byvaltsev, 2020
<i>Palmodes orientalis</i> (Mocsáry, 1883)	Burdur, Isparta, Kars	Bayındır et al., 2013; Yıldırım et al., 2016
<i>Palmodes strigulosus</i> (Costa, 1861)	Adıyaman, Amasya, Ankara, Antalya, Bilecik, Bingöl, Burdur, Bursa, Denizli, Elazığ, Erzincan, Erzurum, Isparta, Kars, Kayseri, Kırklareli, Konya, Manisa, Mardin, Mersin, Tokat	Dollfuss, 2008; Ljubomirov & Yıldırım, 2008; Tüzün & Yüksel, 2010; Yıldırım, 2012, 2014; Gülmez & Dizer, 2016; Yıldırım et al. 2016; Danilov & Byvaltsev, 2020; Örgel et al., 2020

Table 2. (Continued)

Taxon	Distribution in Turkey	References
Genus <i>Prionyx</i> Vander Linden, 1827		
<i>Prionyx crudelis</i> (Smith, 1856)	Kahramanmaraş, Manisa, Mersin	Ljubomirov & Yıldırım, 2008; Yıldırım, 2014; Örgel et al., 2020
<i>Prionyx guichardi</i> (de Beaumont, 1967)	Kayseri, Kırşehir	Ljubomirov & Yıldırım, 2008; Yıldırım, 2014
<i>Prionyx haberhaueri</i> (Radoszkowski, 1871)	Çankırı	Ljubomirov & Yıldırım, 2008; Yıldırım, 2014
<i>Prionyx kirbii</i> (Vander Linden, 1829)	Adana, Afyonkarahisar, Amasya, Ankara, Antalya, Bursa, Çankırı, Erzurum, Isparta, İzmir, Kars, Kayseri, Kütahya, Manisa, Mersin, Samsun, Tokat	Ljubomirov & Yıldırım, 2008; Japoshvili & Ljubomirov, 2012; Bayındır et al., 2013; Yıldırım, 2012, 2014; Gülmez & Dizer, 2016; Gülmez, 2019; Örgel et al., 2020
<i>Prionyx lividocinctus</i> (Costa, 1861)	Ankara, Antalya, Bursa, Çanakkale, Denizli, Elazığ, Erzincan, Kayseri, Kırklareli, Manisa, Mardin, Mersin, Şanlıurfa	Dollfuss, 2008; Ljubomirov & Yıldırım, 2008; Yıldırım, 2014
<i>Prionyx niveatus</i> (Dufour, 1854)	Ankara, Kars	Ljubomirov & Yıldırım, 2008; Yıldırım, 2014
<i>Prionyx nudatus</i> (Kohl, 1885)	Amasya, Ankara, Antalya, Artvin, Bitlis, Burdur, Bursa, Çankırı, Erzincan, Erzurum, Iğdır, İstanbul, Kars, Konya, Sivas, Tokat	Dollfuss, 2008; Ljubomirov & Yıldırım, 2008; Yıldırım, 2012, 2014; Gülmez & Dizer, 2016; Yıldırım et al., 2016
<i>Prionyx radoszkowskyi</i> Kohl, 1888	Erzincan	Can & Gülmez, 2019
<i>Prionyx songaricus</i> (Eversmann, 1849)	Adıyaman, Antalya, Batman, Denizli, Konya, Malatya, Manisa, Mardin, Mersin, Şanlıurfa	Ljubomirov & Yıldırım, 2008; Yıldırım, 2014; Yıldırım et al., 2016
<i>Prionyx subfuscatus</i> (Dahlbom, 1845)	Ankara, Antalya, Bursa, Erzurum, İstanbul, Kars, Kayseri, Mersin, Sivas	Ljubomirov & Yıldırım, 2008; Yıldırım, 2014
<i>Prionyx viduatus mocsaryi</i> (Kohl, 1883)	Erzincan, Erzurum, Isparta	Ljubomirov & Yıldırım, 2008; Japoshvili & Ljubomirov, 2012; Yıldırım, 2012, 2014
<i>Prionyx viduatus pollens</i> (Kohl, 1885)	Eskişehir	Ljubomirov & Yıldırım, 2008; Yıldırım, 2014
<i>Prionyx viduatus viduatus</i> (Christ, 1791)	Amasya, Ankara, Antalya, Çankırı, Denizli, Kars, Mersin, Niğde, Sivas, Tokat	Ljubomirov & Yıldırım, 2008; Tüzün & Yüksel, 2010; Yıldırım, 2014; Gülmez & Dizer, 2016; Yıldırım et al., 2016; Gülmez, 2019
Genus <i>Sphex</i> L., 1758		
<i>Sphex afer</i> Lepeletier de Saint Fargeau, 1845	Konya	de Beaumont, 1967
<i>Sphex atropilosus</i> Kohl, 1885	Erzurum, Kars	Dollfuss, 2008; Ljubomirov & Yıldırım, 2008; Yıldırım, 2012, 2014
<i>Sphex funerarius</i> Gussakovskij, 1934	Adana, Ankara, Antalya, Artvin, Aydın, Balıkesir, Bursa, Çankırı, Denizli, Erzincan, Erzurum, Eskişehir, Giresun, Gümüşhane, Hatay, İstanbul, İzmir, Kars, Kayseri, Konya, Kütahya, Manisa, Mersin, Muğla, Rize, Tokat, Tunceli	Dollfuss, 2008; Ljubomirov & Yıldırım, 2008; Japoshvili & Ljubomirov, 2012; Yıldırım, 2012, 2014; Bayındır et al., 2013; Gülmez & Dizer, 2016; Yıldırım et al., 2016;
<i>Sphex leuconotus</i> Bullé, 1833	Ankara, Artvin, Erzurum, Eskişehir, Hatay, Iğdır, Kars, Konya, Muş, Şanlıurfa, Van	Dollfuss, 2008; Ljubomirov & Yıldırım, 2008; Yıldırım, 2012, 2014; Yıldırım et al., 2016;
<i>Sphex melanocnemis</i> Kohl, 1885	Ankara, Bursa, Çankırı, Çanakkale, Denizli, Elazığ, Mersin, Konya, Şanlıurfa	Dollfuss, 2008; Ljubomirov & Yıldırım, 2008; Yıldırım, 2014
<i>Sphex oxianus</i> Gussakovsky, 1928	Ankara, Artvin, Şanlıurfa	Ljubomirov & Yıldırım, 2008; Yıldırım, 2014
<i>Sphex pruinosus</i> Germar, 1817	Adana, Ankara, Antalya, Artvin, Balıkesir, Denizli, Erzincan, Erzurum, Iğdır, Isparta, İzmir, Kahramanmaraş, Kırkkale, Konya, Malatya, Mersin, Muğla, Muş, Tokat, Trabzon, Tunceli	Dollfuss, 2008; Ljubomirov & Yıldırım, 2008; Tüzün & Yüksel, 2010; Yıldırım, 2012, 2014; Bayındır et al. 2013; Gülmez & Dizer, 2016; Yıldırım et al., 2016; Yıldırım & Tezcan, 2018; Gülmez, 2019

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