



The Current Knowledge of Turkey Sphecidae and Mutillidae (Hymenoptera: Aculeata) Fauna

Türkiye Sphecidae ve Mutillidae (Hymenoptera: Aculeata) Faunası Hakkında Güncel Bilgiler

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Received: 19.01.2022

Accepted: 04.03.2022

Published: 15.04.2022

Abstract: In the study which was conducted in Bingöl, Diyarbakır and Muş provinces of Turkey between 2016-2022, 12 species in eight genera from families Sphecidae and Mutillidae were identified. These species are: *Ammophila hungarica* Mocsary, 1883, *Hoplammophila clypeata* (Mocsáry, 1883), *Podalonia fera* (Lepeletier de Saint Fargeau, 1845), *Podalonia hirsuta* (Scopoli, 1763), *Podalonia luffii* (E. Saunders, 1903), *Sceliphron arabs* (Lepeletier de Saint Fargeau, 1845), *Sceliphron destillatorium* (Illiger, 1807) and *Sceliphron madraspatanum tubifex* (Latreille, 1809) from family Sphecidae and *Dasylabris manderstiernii* (Radoszkowski, 1865), *Trogaspidia catanensis* (Rossi, 1794), *Tropidotilla litoralis* (Petagna, 1787) and *Krombeinella aramaea* (Suárez, 1963) from family Mutillidae. Except for *Podalonia hirsuta* (Scopoli, 1763) and *Tropidotilla litoralis* (Petagna, 1787) species, all species are new records for the provincial fauna of Bingöl, Diyarbakır and Muş. In addition, new localities have been found for some species, which have already been reported from Turkey. The photographs of identified species are provided.

Keywords: Hymenoptera, Sphecidae, Mutillidae, Fauna, Turkey.

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Öz: Türkiye'nin Bingöl, Diyarbakır ve Muş illerinde 2016-2022 yılları arasında yapılan çalışmada Sphecidae ve Mutillidae familyalarından sekiz cinste 12 tür tespit edilmiştir. Bu türler: Sphecidae familyasından; *Ammophila hungarica* Mocsary, 1883, *Hoplammophila clypeata* (Mocsáry, 1883), *Podalonia fera* (Lepeletier de Saint Fargeau, 1845), *Podalonia hirsuta* (Scopoli, 1763), *Podalonia luffii* (E. Saunders, 1903), *Sceliphron arabs* (Lepeletier de Saint Fargeau, 1845), *Sceliphron destillatorium* (Illiger, 1807) ve *Sceliphron madraspatanum tubifex* (Latreille, 1809) ve Mutillidae familyasından ise *Dasylabris manderstiernii* (Radoszkowski, 1865), *Trogaspidia catanensis* (Rossi, 1794), *Tropidotilla litoralis* (Petagna, 1787) ve *Krombeinella aramaea* (Suárez, 1963)'dir. Bunlardan *Podalonia hirsuta* (Scopoli, 1763) ve *Tropidotilla litoralis* (Petagna, 1787) türleri hariç diğer türler Bingöl, Diyarbakır ve Muş il faunası için yeni kayıttır. Ayrıca, Türkiye'den daha önce bildirilmiş olan bazı türler için yeni lokaliteler de bulunmuştur.

Anahtar Kelimeler: Hymenoptera, Sphecidae, Mutillidae, Fauna, Türkiye.

Cite as: Kaplan, E. & Yıldırım, E. (2022). The Current Knowledge of Turkey Sphecidae and Mutillidae (Hymenoptera: Aculeata) Fauna. Uluslararası Tarım ve Yaban Hayatı Bilimleri Dergisi, 8 (1), 53-64. DOI: 10.24180/ijaws.1060133

Plagiarism/ Ethic: This article has been reviewed by at least two referees and it has been confirmed that it is plagiarism-free and complies with research and publication ethics. <https://dergipark.org.tr/pub/ijaws>

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INTRODUCTION

With over 150,000 described living species and 2,000 extinct species which Hymenoptera is a large insect order consisting of sawflies, wasps, bees, and ants (Aguiar et al., 2013). The family Sphecidae belonging to the superfamily Apoidea (Hymenoptera) includes with 791 identified species worldwide (Pulawski, 2021). Turkey Sphecidae fauna is represented 79 species and subspecies in 12 genera (Yıldırım, 2014; Yıldırım et al., 2016; Can and Gülmez, 2021).

Mutulids called velvet ants are solitary ectoparasitoids of Hymenoptera, Diptera, Lepidoptera, Coleoptera and Blattodea (Amini et al., 2014). Mutillids has greatest diversity in the tropical and subtropical regions of the world being abundant in arid and semiarid areas (Ljubomirov and Ghahari, 2012). The family Mutillidae currently includes about 4300 described species in 212 genera worldwide (Lelej and Brothers, 2008; Aguiar et al., 2013, Yıldırım and Lelej, 2016). In previous studies, totally 73 species and subspecies belonging to 22 genera in six subfamilies of family Mutillidae of Turkey are listed (Lelej and Yıldırım, 2009; Yıldırım and Lelej, 2012).

In this study, we aims to investigate of current knowledge of Mutillidae and Sphecidae (Hymenoptera: Aculeata) in Turkey. The distribution of some species in Bingöl, Diyarbakır and Muş provinces of Turkey is enlarged.

MATERIAL AND METHOD

The samples of Pompilidae and Mutillidae was collected from Bingöl, Diyarbakır and Muş provinces of Turkey between March and October in 2016-2022 (Figure 1). The materials for this study were collected using atrap from 38 different localities. Samples which were pinned and labeled in laboratory were examined and identified under a stereo microscope and transferred to collection boxes. The material is deposited in the individual collection of Department of Plant Protection, Faculty of Agriculture, Bingöl University (Bingöl, Turkey).

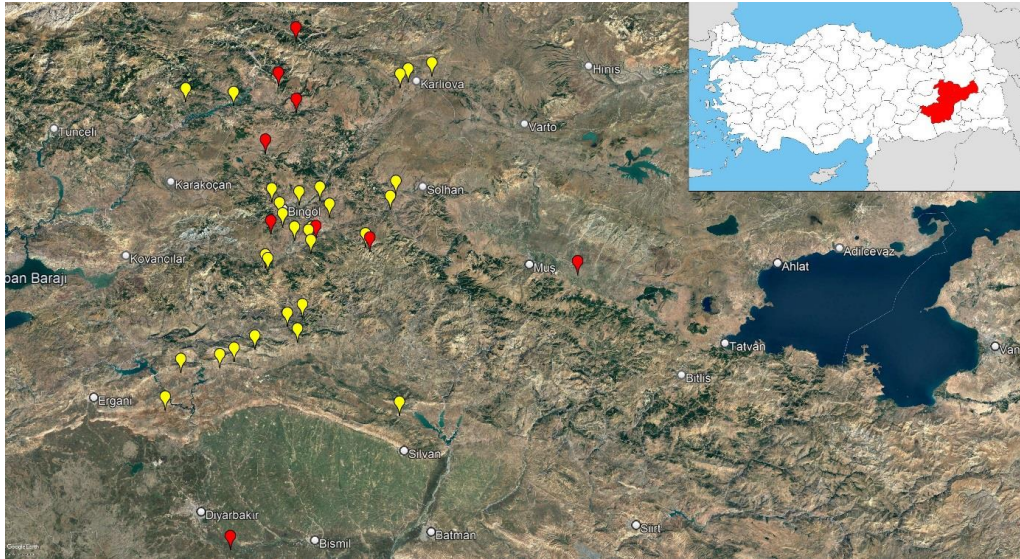


Figure 1. Map of coordinates where specimens belonging to the families Sphecidae (●), Mutillidae (●) were collected in Diyarbakır, Bingöl and Muş provinces of Turkey.

Şekil 1. Türkiye'nin Diyarbakır, Bingöl ve Muş illerinde Sphecidae (●), Mutillidae (●) familyalarına ait örneklerin toplandığı koordinatların haritası.

RESULTS AND DISCUSSION

Family Sphecidae (Latreille, 1802)

Subfamily Ammophilinae André, 1886

Genus *Ammophila* W. Kirby, 1798

Ammophila hungarica Mocsary, 1883 (Figure 2)

Material examined: **Bingöl**: Küçükterkören, N 38° 50' 41.90", E 40° 30' 17.75", 1156 m, 06.V.2018, 1♀; Ormanardı, N 38° 49' 33.98", E 40° 30' 43.33", 1203 m, 06.V.2018, 1♀; Yeniköy, N 38° 50' 11.55", E 40° 29' 52.18", 1254 m, 06.V.2018, 1♀; Genç, Doğanevler, N 38° 46' 30.65", E 40° 51' 20.32", 1419 m, 10.V.2018, 1♀; Soğukpınar, N 38° 43' 05.99", E 40° 27' 14.31", 1002 m, 05.X.2017, 1♀; Karlıova, Kargapazarı, N 39° 18' 47.67", E 41° 06' 52.87", 1860 m, 04.VI.2018, 1♀; **Diyarbakır**: Dicle, Arıköy, N 38° 23' 63.71", E 40° 15' 56.19", 852 m, 12.V.2017, 1♂; Kocaalan, N 38° 20' 50.61", E 40° 06' 59.42", 806 m, 12.V.2017, 1♀; Eğil, Dere, N 38° 14' 38.21", E 40° 05' 01.66", 912 m, 23.V.2016, 1♀; Hani, Anıl, N 38° 24' 13.01", E 40° 20' 08.23", 908 m, 25.IV.2021, 1♀; Lice, Abalı, N 38° 31' 40.75", E 40° 32' 48.20", 962 m, 28.V.2016, 1♂; Dernek, N 38° 26' 45.49", E 40° 36' 25.47", 938 m, 03.V.2017, 1♀; Silvan, Babakaya, N 38° 15' 09.18", E 41° 01' 25.08", 777 m, 12.V.2017, 1♀.

Previous records: Adana, Amasya, Ankara, Aydın, Bursa, Erzincan, Erzurum, Gaziantep, İstanbul, İzmir, Konya, Mersin, Muğla, Osmaniye, Sivas (Ljubomirov and Yıldırım, 2008; Dollfuss, 2013; Gülmez, 2019).

Remarks: New record for Bingöl and Diyarbakır provinces fauna.

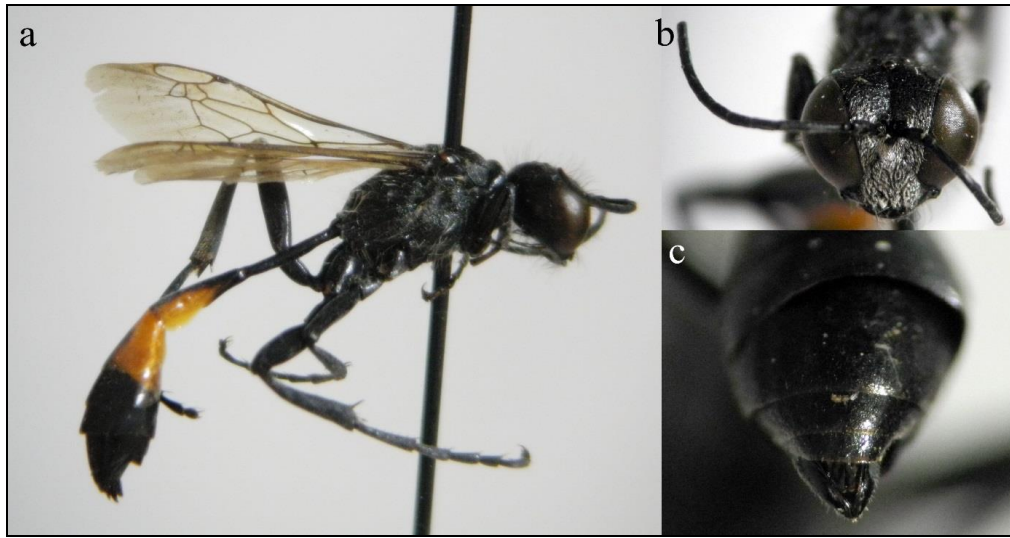


Figure 2. *Ammophila hungarica*, ♀; a) Lateral view, b) Face, c) Pydigious plate.

Şekil 2. *Ammophila hungarica*, ♀, a) Yan görünüm, b) Yüz, c) Pydigious plaka.

Genus *Hoplammophila* de Beaumont, 1960

Hoplammophila clypeata (Mocsary, 1883) (Figure 3)

Material examined: **Bingöl**: Çeltiksuyu, N 38° 52' 16.89", E 40° 33' 45.63", 1017 m, 04.V.2018, 1♂.

Previous records: Giresun, Mersin, Tekirdağ, Tokat, Tunceli (Ljubomirov and Yıldırım, 2008; Dollfuss, 2010; Gülmez and Dizer, 2016; Yıldırım et al., 2016; Can and Gülmez, 2021).

Remarks: New record for Bingöl province fauna.

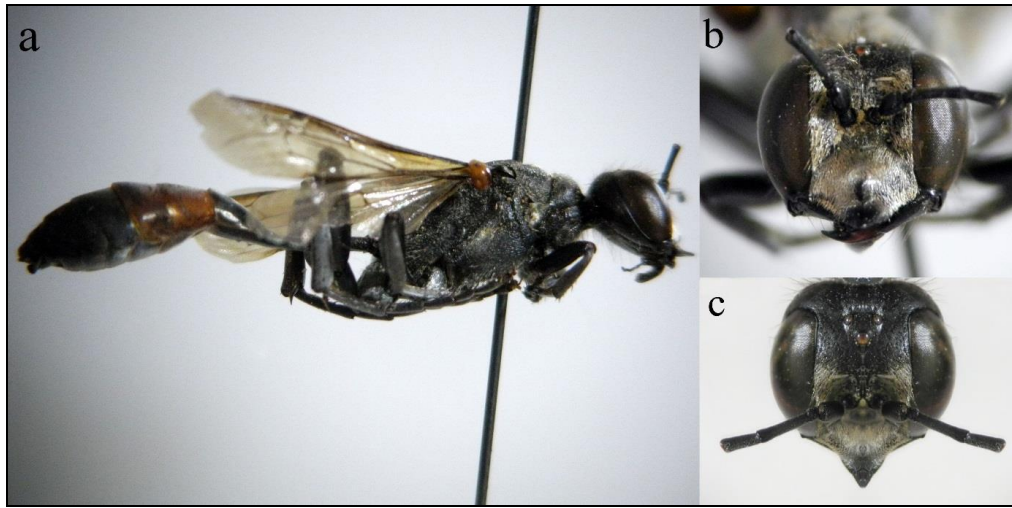


Figure 3. *Hoplammophila clypeata*, ♂; a) Lateral view, b) Face, c) Dorsal view of head.

Şekil 3. *Hoplammophila clypeata*, ♂; a) Yandan görünüm, b) Yüz, c) Başın üstten görünümü.

Genus *Podalonia* Fernald, 1927

Podalonia fera (Lepelletier de Saint Fargeau, 1845) (Figure 4)

Material examined: **Bingöl:** Kurudere, N 38° 54' 41.84", E 40° 27' 24.10", 1127 m, 13.VII.2016, 1♀;

Diyarbakır: Hani, Kalaba, N 38° 25' 52.76", E 40° 25' 02.34", 1106 m, 27.III.2016, 1♀.

Previous records: Amasya, Ankara, Artvin, Bursa, Bingöl, Denizli, Erzincan, Erzurum, Eskişehir, Giresun, Hakkâri, İzmir, Kahramanmaraş, Kars, Kayseri, Konya, Kütahya, Manisa, Mersin, Muş, Niğde, Rize, Sivas, Tokat, Tunceli (Ljubomirov and Yıldırım, 2008; Dollfuss, 2010, 2013; Tüzün and Yüksel, 2010; Japoshvili and Ljubomirov, 2012; Yıldırım, 2012; Bayındır et al., 2013; Gülmez and Dizer, 2016; Yıldırım et al., 2016; Yıldırım and Tezcan, 2018; Gülmez, 2019; Can and Gülmez, 2021).

Remarks: New record for Diyarbakır province fauna.

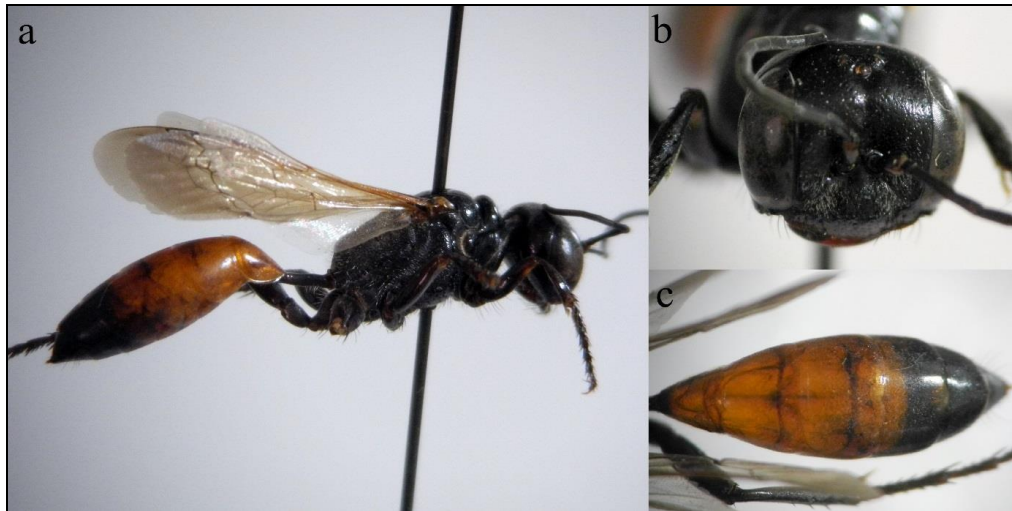


Figure 4. *Podalonia fera*, ♀; a) Lateral view, b) Face, c) Terga.

Şekil 4. *Podalonia fera*, ♀; a) Yan görünüm, b) Yüz, c) Terga.

Podalonia Hirsuta (Scopoli, 1763) (Figure 5)

Material examined: **Bingöl:** Garip, N 38° 47' 20.82", E 40° 33' 24.93", 995 m, 05.VI.2021, 1♀; Kardeşler, N 38° 54' 39.23", E 40° 38' 29.93", 1099 m, 21.V.2021, 1♀; Genç, Meşedalı, N 38° 47' 51.80", E 40° 38' 13.05", 1004 m,

08.V.2021, 1♀; Karlıova, Taşlıçay, N 39° 16' 50.71", E 40° 58' 48.88", 1840 m, 12.VII.2016, 1♀; **Diyarbakır:** Lice, Abalı, N 38° 31' 40.75", E 40° 32' 48.20", 962 m, 28.V.2016, 1♀.

Previous records: 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 and Yıldırım, 2008; Dollfuss, 2010, 2013, 2015; Tüzün and Yüksel, 2010; Japoshvili and Ljubomirov, 2012; Yıldırım, 2012; Bayındır et al., 2013; Gülmez and Dizer, 2016; Yıldırım et al., 2016; Yıldırım and Tezcan, 2018; Örgel et al., 2020; Can and Gülmez, 2021).

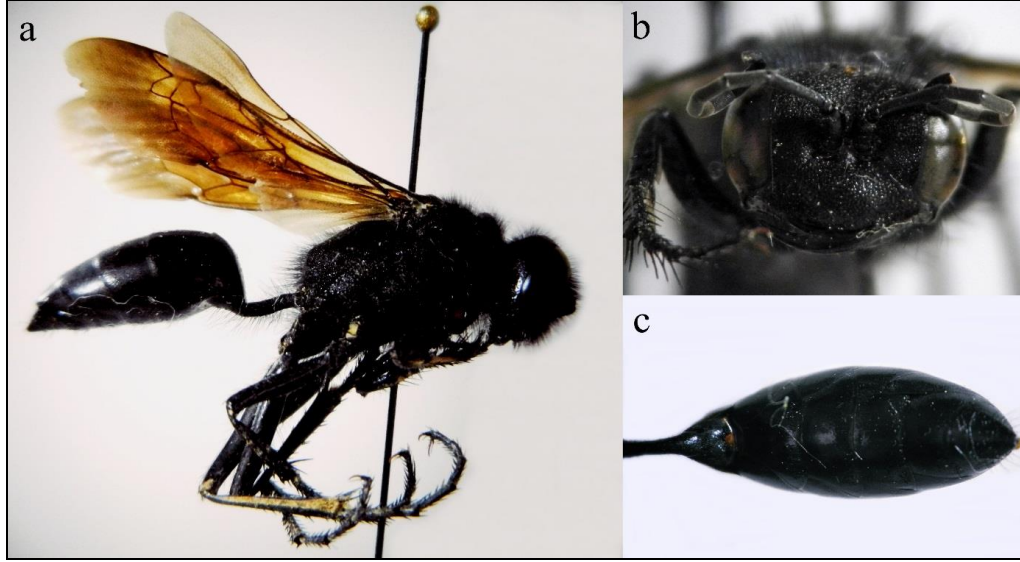


Figure 5. *Podalonia hirsuta*, ♀; a) Lateral view, b) Face, c) Sterna.
Şekil 5. *Podalonia hirsuta*, ♀, a) Yan görünüm, b) Yüz, c) Sterna.

***Podalonia luffii* (E. Saunders, 1903) (Figure 6)**

Material examined: **Bingöl:** Solhan, Düzağaç, N 38° 53' 12.22", E 40° 56' 01.31", 1332 m, 18.V.2019, 1♂.

Previous records: Erzurum, Nevşehir (Ljubomirov and Yıldırım, 2008; Dollfuss, 2010).

Remarks: New record for Bingöl province fauna.

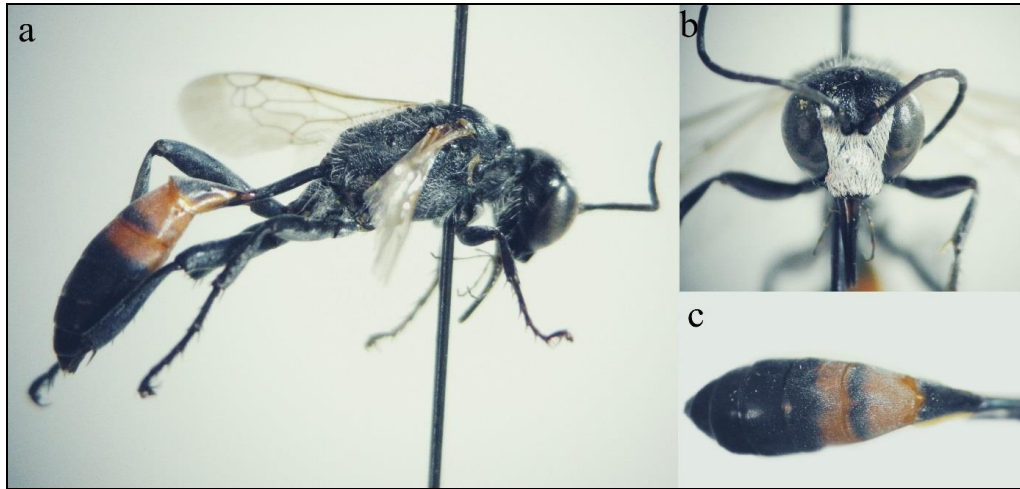


Figure 6. *Podalonia luffii*, ♂; a) Lateral view, b) Face, c) Terga.
Şekil 6. *Podalonia luffii*, ♂, a) Yan görünüm, b) Yüz, c) Terga.

Subfamily Sceliphrinae Ashmead, 1899**Genus *Sceliphron* Klug, 1801*****Sceliphron arabs* (Lepelletier de Saint Fargeau, 1845) (Figure 7)**

Material examined: **Bingöl:** Karlıova, Merkez, N 39° 17' 28.27", E 40° 59' 22.94", 1883 m, 12.VI.2016, 1♀; Solhan, Dilektepe, N 38° 56' 12.96", E 41° 00' 08.44", 1299 m, 24.V.2019, 1♀; Yayladere, Sarıtosun, N 39° 12' 24.89", E 40° 05' 10.02", 1421 m, 13.IV.2018, 1♀.

Previous records: Adana, Antalya, Batman, Iğdır, Malatya, Mersin, Muş, Sivas, Şanlıurfa, Tokat, Tunceli (Yıldırım, 2014; Dollfuss, 2016; Yıldırım et al., 2016; Yıldırım and Tezcan, 2018; Gülmez, 2019; Can and Gülmez, 2021).

Remarks: New record for Bingöl province fauna.

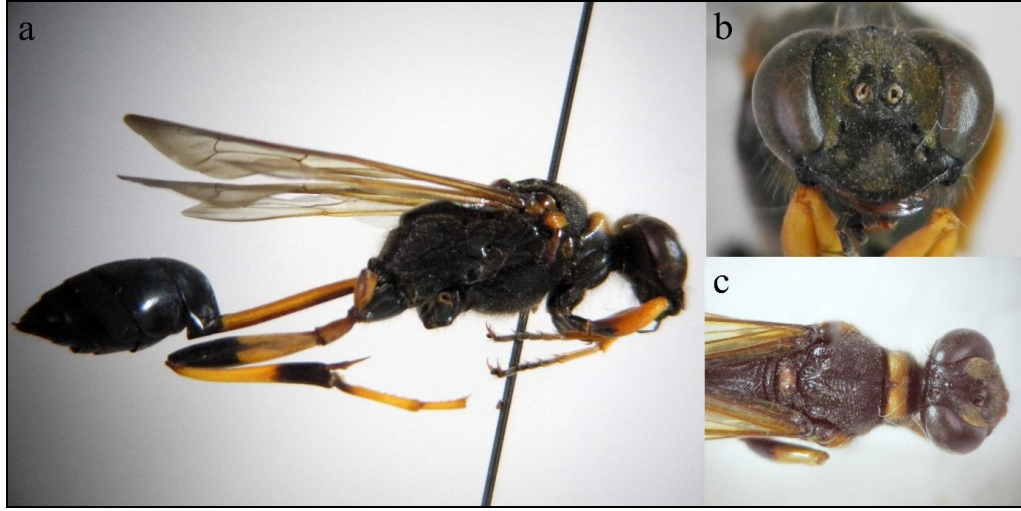


Figure 7. *Sceliphron arabs*, ♀; a) Lateral view, b) Face, c) Notum.
Şekil 7. *Sceliphron arabs*, ♀; a) Yan görünüm, b) Yüz, c) Notum.

***Sceliphron destillatorium* (Illiger, 1807) (Figure 8)**

Material examined: **Bingöl:** Genç, Meşedalı, N 38° 46' 47.59", E 40° 36' 50.63", 1002 m, 06.X.2017, 1♂.

Previous records: Adana, Adıyaman, Afyonkarahisar, Amasya, Ankara, Antalya, Artvin, Aydın, Burdur, Bursa, Çanakkale, Elazığ, Erzincan, Erzurum, Eskişehir, Giresun, Gümüşhane, Hatay, Isparta, İstanbul, İzmir, Kahramanmaraş, Karaman, Kars, Kastamonu, Konya, Malatya, Manisa, Mardin, Mersin, Muğla, Niğde, Ordu, Osmaniye, Sakarya, Sivas, Şanlıurfa, Şırnak, Tokat, Trabzon (Ljubomirov and Yıldırım, 2008; Tüzün and Yüksel, 2010; Yıldırım, 2012, 2014; Gülmez and Can, 2015; Dollfuss, 2016; Gülmez and Dizer, 2016; Yıldırım et al., 2016; Yıldırım and Tezcan, 2018; Can and Gülmez, 2021).

Remarks: New record for Bingöl province fauna.

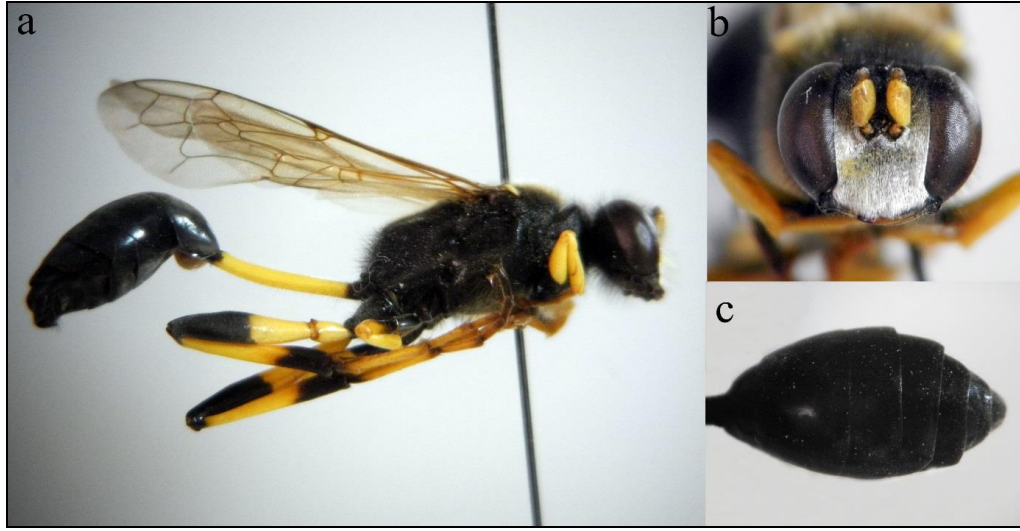


Figure 8. *Sceliphron destillatorium*, ♂; a) Lateral view, b) Face, c) Terga.
Şekil 8. *Sceliphron destillatorium*, ♂; a) Yan görünüm, b) Yüz, c) Terga.

***Sceliphron madraspatanum tubifex* (Latreille, 1809) (Figure 9)**

Material examined: **Bingöl:** Genç, Çağla, N 38° 43' 54.33", E 40° 30' 18.75", 994 m, 05.X.2017, 1♀; Soğukpınar, N 38° 43' 05.99", E 40° 27' 14.31", 1002 m, 05.X.2017, 2♂♂; Kiğı, Darköprü, N 39° 11' 58.56", E 40° 18' 02.73", 1222 m, 05.VII.2018, 1♂.

Previous records: Amasya, Ankara, Antalya, Bursa, Çorum, Denizli, Kahramanmaraş, Konya, Mersin, Muğla, Tokat, Sivas (Ljubomirov and Yıldırım, 2008; Yıldırım, 2014; Gülmez and Dizer, 2016; Yıldırım and Tezcan, 2018; Can and Gülmez, 2021).

Remarks: New record for Bingöl province fauna.

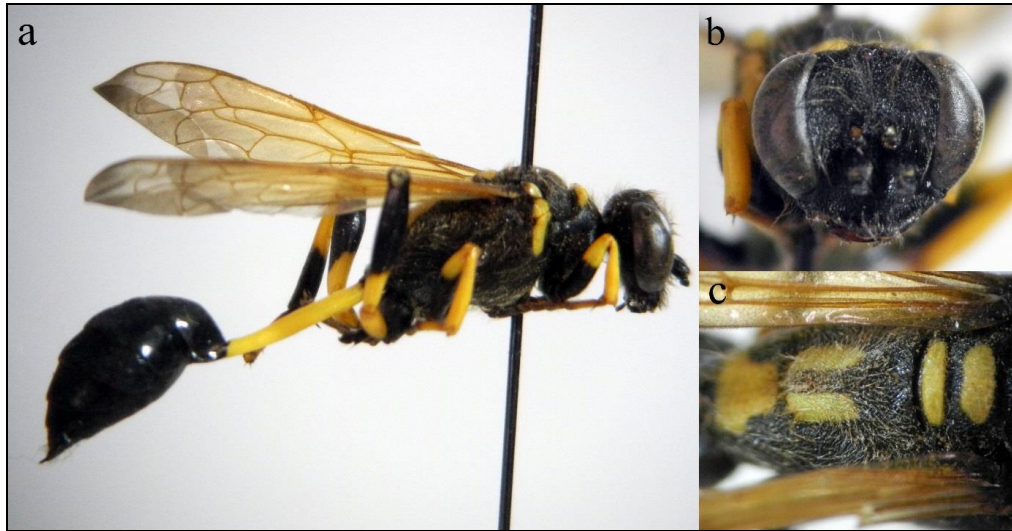


Figure 9. *Sceliphron madraspatanum tubifex*, ♂; a) Lateral view, b) Face, c) Metanotum and propodeum.
Şekil 9. *Sceliphron madraspatanum tubifex*, ♂; a) Yan görünüm, b) Yüz, c) Metanotum ve propodeum.

Family Mutillidae Latreille, 1802

Subfamily Dasylabrinae Invrea, 1964

Genus *Dasylabris* Radoszkowski, 1885

***Dasylabris mandersternii* (Radoszkowski, 1865) (Figure 10)**

Material examined: **Bingöl:** Adaklı, Erbaşlar, N 39° 10' 44.79", E 40° 31' 58.78", 1525 m, 29.V.2016, 1♀.

Previous records: Artvin, Bilecik, Denizli, Diyarbakır, Erzurum, Erzincan, Hatay, İzmir, Konya, Muğla, Van (Lelej and Yıldırım, 2009).

Remarks: New record for Bingöl province fauna.

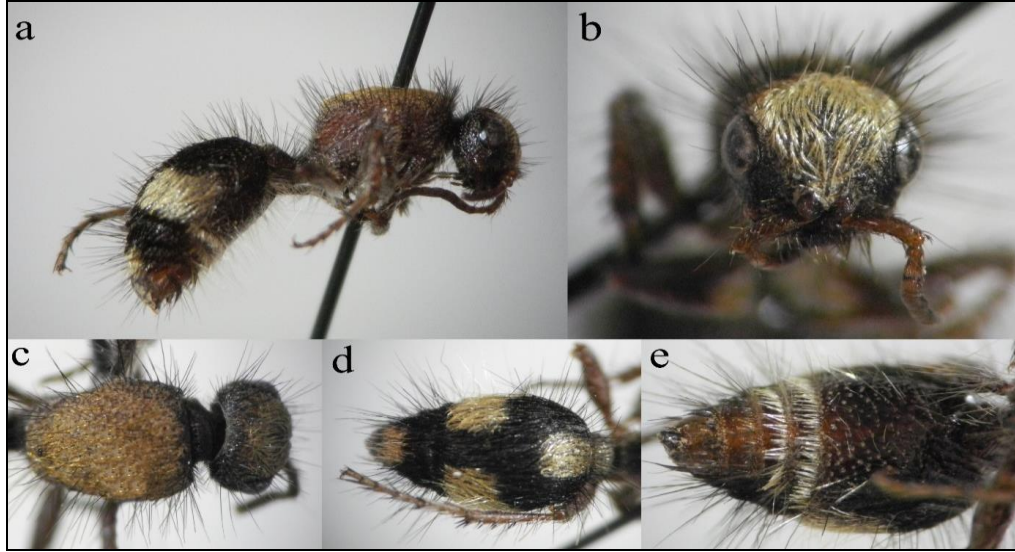


Figure 10. *Dasylabris (Craspedopyga) manderstiernii*, ♀; a) Lateral view, b) Face, c) Notum, d) Terga, e) Sterna.
Şekil 10. *Dasylabris (Craspedopyga) manderstiernii*, ♀, a) Yan görünüm, b) Yüz, c) Notum, d) Terga, e) Sterna.

Subfamily Mutillinae Latreille, 1802

Genus *Trogaspidia* Ashmead, 1899

Trogaspidia catanensis (Rossi, 1794) (Figure 11)

Material examined: **Muş:** Hasköy, Düzkişla, N 38° 42' 01.66", E 41° 42' 34.05", 1268 m, 03.VI.2017, 1♂.

Previous records: Bursa, Erzurum (Lelej and Yıldırım, 2009).

Remarks: New record for Muş province fauna.

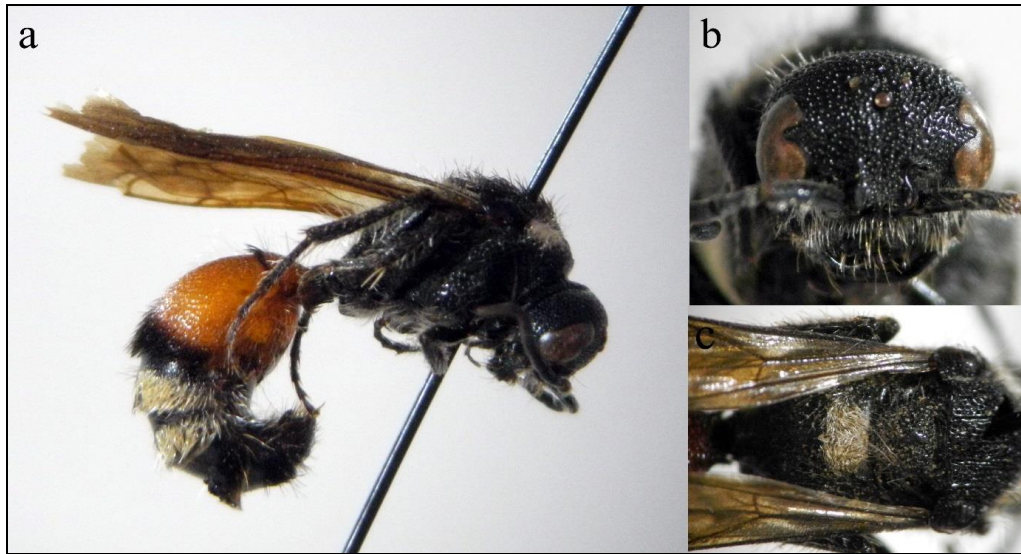


Figure 11. *Trogaspidia (Trogaspidia) catanensis*, ♂; a) Lateral view, b) Face, c) Notum and metanotum.
Şekil 11. *Trogaspidia (Trogaspidia) catanensis*, ♂, a) Yan görünüm, b) Yüz, c) Notum ve metanotum.

Genus *Tropidotilla* Bischoff, 1920

Tropidotilla litoralis (Petagna, 1787) (Figure 12)

Material examined: **Bingöl:** Sudüğünü, N 39° 03' 29.55", E 40° 24' 39.20", 1654 m, 20.VII.2017, 1♀.

Previous records: Artvin, Bilecik, Bingöl, Çanakkale, Çorum, Erzincan, Erzurum, Gümüşhane, Hakkâri, Kars, Kayseri (Lelej and Yıldırım, 2009).



Figure 12. *Tropidotilla litoralis*, ♀; a) Lateral view, b) Dorsal view, c) Face, d) Sterna, e) Pydigious plate.
Şekil 12. *Tropidotilla litoralis*, ♀, a) Yan görünüm, b) Dorsal görünüm, c) Yüz, d) Sterna, e) Pydigious plaka.

Subfamily Myrmosinae Fox, 1894

Genus *Krombeinella* Pate, 1947

Krombeinella aramaea (Suárez, 1963) (Figure 13)

Material examined: **Bingöl:** Erentepe, N 38° 48' 32.68", E 40° 28' 10.84", 1477 m, 23.V.2019, 1♂; Adaklı, Güngörsün, N 39° 15' 20.29", E 40° 28' 18.93", 1539 m, 12.VI.2019, 1♂; Genç, Binekli, N 38° 45' 47.45", E 40° 52' 23.88", 1496 m, 10.V.2018, 1♂; Meşedalı, N 38° 47' 30.40", E 40° 38' 05.29", 1007 m, 26.V.2017, 1♂; Yedisu, Şenköy, N 39° 25' 20.03", E 40° 31' 59.60", 1483 m, 02.VI.2019, 1♂; **Diyarbakır:** Çınar, Şükürlü, N 38° 42' 01.66", E 41° 42' 34.05", 1268 m, 03.VI.2017, 1♂.

Previous records: Diyarbakır (Lelej and Yıldırım, 2009).

Remarks: New record for Bingöl province fauna.

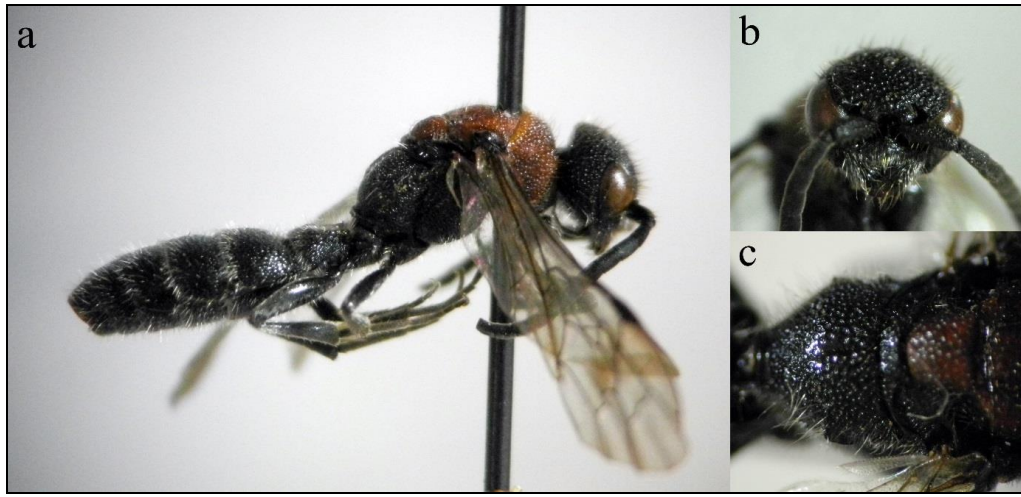


Figure 13. *Krombeinella aramaea*, ♂; a) Lateral view, b) Face, c) Metanotum and propodeum.
 Şekil 13. *Krombeinella aramaea*, ♂; a) Yan görünüm, b) Yüz, c) Metanotum ve propodeum.

CONCLUSION

This study was carried out to determine the Sphecidae and Mutillidae fauna in Bingöl, Diyarbakır and Muş provinces from eastern Turkey. In the study, eight species in four genera belong to two subfamily of Sphecidae and four species in four genera belong to three subfamily of Mutillidae from Bingöl, Diyarbakır and Muş provinces of Turkey. *Ammophila hungarica* Mocsary, 1883; *Hoplammophila clypeata* (Mocsary, 1883); *Podalonia luffii* (E. Saunders, 1903); *Sceliphron arabs* (Lepeletier de Saint Fargeau, 1845); *S. destillatorium* (Illiger, 1807); *S. madraspatanum tubifex* (Latreille, 1809); *Dasylabris mandersternii* (Radoszkowski, 1865); *Krombeinella aramaea* (Suárez, 1963) species are new records for the fauna of Bingöl province. Also, *A. hungarica* Mocsary, 1883; *P. fera* (Lepeletier de Saint Fargeau, 1845) species are first records for the fauna of Diyarbakır province. In addition, *Trogaspidia catanensis* (Rossi, 1794) species is new records for the fauna of Muş province. The scope of the study, eleven species from Bingöl, four species from Diyarbakır and one species from Muş were identified.

CONFLICT OF INTEREST

The authors must report under this title that there are no conflicts of interest.

DECLARATION OF AUTHOR CONTRIBUTION

The authors must report under this title which contributions the article has made.

DECLARATION OF ETHICS COMMITTEE

This title is mandatory for studies requiring ethics committee approval. In other studies, this title should be removed. Under this title, the name of the board, date and number should be given.

REFERENCES

- Aguiar, A. P., Deans, A. R., Engel, M. S., Forshage, M., Huber, J. T., Jennings, J. T., Johnson, N. F., Lelej, A. S., Longino, J. T., Lohrman, V., Mikó, I., Ohl, M., Ramussen, C., Taeger, A., & Yu, D. S. K. (2013). Order Hymenoptera. In: Zhang, Z.-Q. (Editor). *Animal Biodiversity: An Outline of Higher-level Classification and Survey of Taxonomic Richness* (Addenda 2013). *Zootaxa*, 3703(1), 1–82. <http://dx.doi.org/10.11646/zootaxa.3703.1.12>
- Amini, A., Lelej, A. S., Sadeghi, H., & Karimi, J. (2014). First record of the velvet ants (Hymenoptera: Mutillidae) reared from puparia of the ber fruit fly *Carpomya vesuviana* Costa (Diptera: Tephritidae) in Iran. *Zootaxa*, 3861, 585–590. <http://dx.doi.org/10.11646/zootaxa.3861.6.5>
- Bayındır, A., Gürbüz, M. F., Ljubomirov, T., & Pohl, D. (2013). Diversity of digger wasps in Kasnak Oak Forest Nature Reserve, Isparta, Turkey, with records of eight species new to Turkey (Hymenoptera: Sphecidae,

- Crabronidae and Ampulicidae). *Zoology in the Middle East*, 59(2), 144-147. <https://doi.org/10.1080/09397140.2013.810877>
- Can, İ., & Gülmez, Y. (2021). A faunistic study on the family Sphecidae (Hymenoptera) in the Upper Kelkit Valley with two new records and a checklist for Turkey. *Turkish Journal of Entomology* 45(3), 305-322. <https://doi.org/10.16970/entoted.929607>
- Dollfuss, H. (2010). The Ammophilini wasps of the genera *Eremnophila* Menke, *Eremochares* Gribodo, *Hoplammophila* de Beaumont, *Parapsammophila* Taschenberg and *Podalonia* Fernald of the "Biologiezentrum Linz"- Collection in Linz, Austria, (Hymenoptera, Apoidea, Sphecidae). *Linzer Biologische Beiträge*, 42(1), 535-560.
- Dollfuss, H. (2013). The Ammophilini wasps of the " Biologiezentrum Linz "-Collection in Linz, Austria (part 2) including the genera *Ammophila* Kirby and *Podalonia* Fernald (Hymenoptera, Apoidea, Sphecidae), and description of the hitherto unknown male of *Podalonia erythropus* (F. Smith, 1856). *Linzer Biologische Beiträge*, 45(1), 565-591.
- Dollfuss, H. (2015). The Ammophilini wasps of the "Biologiezentrum Linz"- Collection in Linz, Austria (part 3) including the genera *Ammophila* Kirby, *Eremnophila* Menke, *Eremochares* Gribodo, *Hoplammophila* de Beaumont and *Podalonia* Fernald (Hymenoptera, Apoidea, Sphecidae). *Linzer Biologische Beiträge*, 47(1), 413-439.
- Dollfuss, H. (2016). The Chloriontinae, Sceliphrinae and Sphecinae wasps of the "Biologiezentrum Linz"-Collection in Linz, Austria including the Genera *Chalybion* Dahlbom, *Chlorion* Latreille, *Dynatus* Lepeletier de Saint Fargeau, *Penepodium* Menke, *Podium* Fabricius, *Sceliphron* Klug, *Stangeella* Menke and *Trigonopsis* Perty (Hymenoptera, Apoidea, Sphecidae) and description of the new species *Chalybion ohli* from Madagascar. *Linzer Biologische Beiträge*, 48(2), 1149-1185.
- Gülmez, Y. (2019). Teratology in the solitary wasp family Sphecidae (Insecta: Hymenoptera). *Biologia*, 74(10), 1349-1357. <https://doi.org/10.2478/s11756-019-00254-7>
- Gülmez, Y., & Can, İ. (2015). First record of *Sceliphron* (*Hensenia*) *curvatum* (Hymenoptera: Sphecidae) from Turkey with notes on its morphology and biology. *North-Western Journal of Zoology*, 11(1), 174-177.
- Gülmez, Y., & Dizer, A. (2016). Tokat ili Sphecidae (Insecta: Hymenoptera) faunasının belirlenmesi. *Kafkas Üniversitesi Fen Bilimleri Enstitüsü Dergisi*, 9(1), 55-62.
- Japoshvili, G., & Ljubomirov, T. (2012). New records of Chrysididae, Mutillidae, Crabronidae, and Sphecidae (Insecta: Hymenoptera) from Gölcük Natural Park, Isparta, Turkey. *Journal of Entomological Society of Iran*, 31(1), 95-97.
- Lelej, A. S., & Brothers, D. J. (2008). The genus-group names of Mutillidae (Hymenoptera) and their type species, with a new genus, new name, new synonymies, new combinations and lectotypifications. *Zootaxa*, 1889, 1-79. 10.11646/ZOOTAXA.1889.1.1
- Lelej A. S., & Yıldırım E. (2009). A review of the Mutillidae (Hymenoptera) of Turkey. *Zootaxa* 2160, 1-28.
- Ljubomirov, T., & Yıldırım, E. (2008). *Annotated Catalogue of the Ampulicidae, Sphecidae and Crabronidae (Insecta: Hymenoptera) of Turkey*. Pensoft Publisher, Bulgaria-Russia.
- Ljubomirov, T., & Ghahari, H. (2012). An annotated checklist of Mutillidae (Insecta: Hymenoptera) from Iran. *Zootaxa*, 3449, 1-25.
- Örgel, S., Sinan, A., & Tezcan, S. (2020). New locality records on Sphecidae, Crabronidae and Scoliidae (Insecta: Hymenoptera) fauna of Turkey. *Munis Entomology and Zoology*, 15(2), 637-641.
- Pulawski, W. J. (2021). Catalog of Sphecidae sensu lato. California Academy of Sciences. <https://www.calacademy.org/scientists/projects/catalog-of-sphécidae>. [Access date: March 12, 2021].
- Tüzün, A., & Yüksel, S. (2010). Hymenoptera of Niğde province: Studies on Sphecidae fauna. *African Journal of Biotechnology*, 9(28), 4466-4477.
- Yıldırım, E. (2012). Contribution to the knowledge of the Sphecidae and Crabronidae (Hymenoptera: Aculeata) fauna of Turkey. *Entomologie Faunistique-Faunistic Entomology*, 64(3), 73-82.
- Yıldırım, E. (2014). Overview of the distribution and biogeography of Sphecidae in Turkey (Hymenoptera: Aculeata). *Entomologie Faunistique-Faunistic Entomology*, 67, 27-36.

- Yıldırım, E., & Lelej, A.S. (2012). The distribution and biogeography of Mutillidae (Hymenoptera: Aculeata) in Turkey. *Entomofauna*, 33, 289-304.
- Yıldırım, E., Ljubomirov, T., Özbek H., & Yüksel, M., (2016). New data on Spheciformes fauna (Hymenoptera: Ampulicidae, Sphecidae, Crabronidae) of Turkey. *Journal of Insect Biodiversity*, 4(3), 1-51.
- Yıldırım, E., & Tezcan, S. (2018). New locality records of Crabronidae, Evaniidae, Ichneumonidae, Leucospidae, Mutillidae, Pompilidae, Sapygidae, Sphecidae, Tiphidae and Vespidae (Hymenoptera: Apocrita) from Turkey. *Linzer Biologische Beiträge*, 50(2), 1707-1719.
- Yıldırım, E., & Lelej, A.S. (2016). The current knowledge of the Pompilidae and Mutillidae (Hymenoptera, Aculeata) fauna of Turkey. *Journal of the Entomological Research Society*, 18(1), 57-74.