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Contributions to the Dance Flies (Diptera: Empididae) of Siirt Fauna, Turkey*

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Abstract: The adults of the Empidid flies are small to medium-sized, usually shiny black or densely grey dusted species. The adults are very important in pollination because they are flower visitors. Turkey has a wide variety of habitats and species diversity. Although it seems to consist mostly of flat plains, mountainous regions are also found in the east and northeast parts. For this reason, species diversity has increased. Siirt province is rich in steppe but forests cover less space and the summers are quite hot and arid. Siirt also has variable elevation and this positively affects species diversity. This study was carried out in Siirt between 2014-2016. Specimens were collected from different habitats with using a hand net. As a result of the field studies, 15 empidid species were determined in Siirt Province. Among these 15 species, five species belong to the genus *Hilara* and ten species belong to the genus *Empis*. And also, *Hilara clavidipes* Chvála, 2008, *H. freidbergi* Chvála, 2008 and *H. fusitibia* Strobl, 1899 are new records for the Turkish fauna. When we compare the species number of the Empididae family from the world and Europe, the number of the known species from Turkey is relatively low, thus constituting the idea that Turkey should be better screened with local faunistic studies.

Keywords: *Hilara*, *Empis*, Empididae, fauna, Siirt

1. Introduction

Adults of the Empididae are small and medium-sized, black-bodied flies with bright or densely grey dusted. Head small, round, compound eyes cover most of the head. The proboscis is usually long and headed backward, and those who are more likely to be flower visitors, while the shorter proboscis is fed more by hunting (Collin, 1961; Chvála, 1983). The purpose of using the flower visitor term is to make sure that the adults are not fed only with nectar or pollen, and that they are engaged in hunting. Empidid is very important in pollination because the adults are flower visitors. Pollination is a mechanism that guarantees the seeds and development of plants. For this reason, knowing the insect fauna in a region does not only represent a faunistic value but also contributes to the continuity of plant diversity in the region (Chvála, 1983).

Siirt province is located in the Southeastern Anatolia Region, most of Siirt's land is covered with mountains. The main rivers of Siirt province are Botan (Uluçay), Kezer and Bitlis (Başur) rivers. In Siirt, the continental climate prevails and the four seasons are experiencing the most distinctive features and the summers are hot and dry. Siirt province is between the eastern Anatolian leaf forest zone and the Southeast Anatolian steppe zone. The parts of the Taurus Mountains referred to as the Southeastern Taurus Mountains, have significantly reduced oak trees in the plateau and mountains extending from here to the north. Although Siirt province is rich in terms of the steppe, it is poor in terms of forest (Anonymous, 2015).

So far, there is known only one study on biodiversity and the fauna of empidids in Siirt

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province with reported 2 species, *Empis tessellata* Fabricius, 1794 and *E. spiralis* Collin, 1937 (Çiftçi, 2015).

When we compare the species number of the Empididae family from the world and Europe, the number of the known species in Turkey is relatively low, thus constituting the idea that Turkey should be better screened with local faunistic studies. To reveal the true faunistic inventory to reflect, regional studies are needed in the narrow sense. In this study, it was aimed to reveal the Empididae fauna and biological diversity of Siirt province, to contribute to the fauna of Turkey.

2. Materials and Methods

This research was carried out at 21 stations in Siirt province between 2014 and 2016. Siirt (Figure 1) is located in the Southeastern Anatolia Region of Turkey and surrounded by Şırnak and Van from the east, Batman and Bitlis from the north, Batman from the west, Mardin and Şırnak from the south.

Specimens were collected from different habitats with using hand net. Captured specimens were killed with ethyl acetate in killing jars. The captured specimens were converted into standard museum material and placed in collection boxes and diagnosed by related literature. All specimens are deposited in the Entomological Museum of Siirt University, Department of Plant Protection.

In the identification of the specimens the studies of Engel and Frey (1938-1956), Collin (1960, 1961), Chvála (1977, 1981, 1994, 1999, 2001, 2005, 2008), Syrovatka (1980, 1991, 1995), Barták and Syrovatka (1983), Syrovatka and Chvála (1986), Chvála and Merz (2009) were used. Map of Siirt province (study area) was prepared using the ArcMap 10 program.

3. Results and Discussion

As a result of the field studies, 438 empidid specimens were collected and 15 species belonging to the subfamily Empidinae were identified. Among them, 10 species belongs to the genus *Empis*, and 5 belongs to the genus *Hilara*.

3.1. Genus *Empis* Linnaeus, 1758

3.1.1. *Empis calcarata* Bezzi, 1899

Material examined: 23 specimens, 14 male, 9 female. Example collected stations: 2 male, 1 female, Tillo, Çatlı, 1472 m, 06.05.2014; 2 male, 2 female, Şirvan, Çeltikyolu, 1017 m, 07.05.2014; 3 male, Tillo, Çatlı, 1472 m, 06.04.2015; 1 male, Pervari, Güleçler, 1553 m, 03.05.2015; 3 male, 3 female, Şirvan, 804 m, 03.05.2015; 2 male, 1 female, Kurtalan, Gözpınar, 636 m, 10.06.2015; 1 male, 2 female, Kurtalan, Kılıçlı, 542 m, 15.04.2016.

Distributions in Turkey: Antalya, Konya, Kayseri, Yozgat, Hatay, Kocaeli, Mersin (Çiftçi and Hasbenli, 2007a). Palaearctic distributions: Italy, Turkey, former Yugoslavia (Chvála and Wagner, 1989; Çiftçi and Hasbenli, 2007a).

3.1.2. *Empis curticornis* Collin, 1960

Material examined: 21 specimens, 18 male, 3 female. Example collected stations: 3 male, 1 female, Şirvan, 804 m, 03.04.2015; 3 male, Şirvan, 876 m, 03.04.2015; 4 male 1 female, Kurtalan, Kılıçlı, 542 m, 04.04.2015; 4 male, Central District, Yazlıca, 440 m, 05.04.2015; 2 male, 1 female, Central District, Eğlence, 455 m, 05.04.2015; 2 male, Şirvan, 804 m, 14.04.2016.

Distributions in Turkey: Mersin (Çiftçi and Hasbenli, 2008). Palaearctic distributions: Turkey, Palestine, Israel (Collin, 1960; Chvála and Wagner, 1989; Çiftçi and Hasbenli, 2008).

3.1.3. *Empis dasycera* (Collin, 1960)

Material examined: 20 specimens, 15 male, 8 female. Example collected stations: 2 male, 2 female, Şirvan, 876 m, 11.05.2015; 2 male, 1 female, Baykan, Gümüşkaş, 852 m, 13.05.2015; 1 male, Kurtalan, Oyacık, 599 m, 13.05.2015; 3 male, 3 female, Şirvan, 876 m, 08.06.2015; 2 male, Central District, Yazlıca, 440 m, 09.06.2015; 3 male, Kurtalan, Oyacık, 599 m, 10.06.2015; 2 male, 2 female, Kurtalan, Erdurağı, 1037 m, 10.06.2015.

Distributions in Turkey: Adana, Isparta, Konya, Kayseri (Çiftçi and Hasbenli, 2007a). Palaearctic distributions: Turkey, Jordan, Israel (Collin, 1960; Chvála and Wagner, 1989; Çiftçi and Hasbenli, 2007a).

3.1.4. *Empis dedecor* Loew, 1869

Material examined: 23 specimens, 17 male, 6 female. Example collected stations: 2 male 3 female, Baykan, Bardaklı, 600 m, 07.05.2014; 1 male, 1 female, Pervari, Güleçler, 1553 m, 11.05.2015; 4 male, Baykan, Gümüşkaş, 852 m, 13.05.2015; 3 male 1 female, Tillo, Çatlı, 1472 m, 08.06.2015; 4 male 1 female, Eruh, Ufaca, 505 m, 09.06.2015; 3 male, Kurtalan, Gözpınar, 636 m, 10.06.2015.

Distributions in Turkey: Adana, Antalya, Bilecik, Isparta, Mersin, Kayseri, Niğde, Karaman (Çiftçi and Hasbenli, 2007a, 2013). Palaearctic distributions: Turkey, Spain, Albania, Syria, Israel, former Yugoslavia, Palestine, Greece, (Chvála, 1999; Çiftçi and Hasbenli, 2007a).

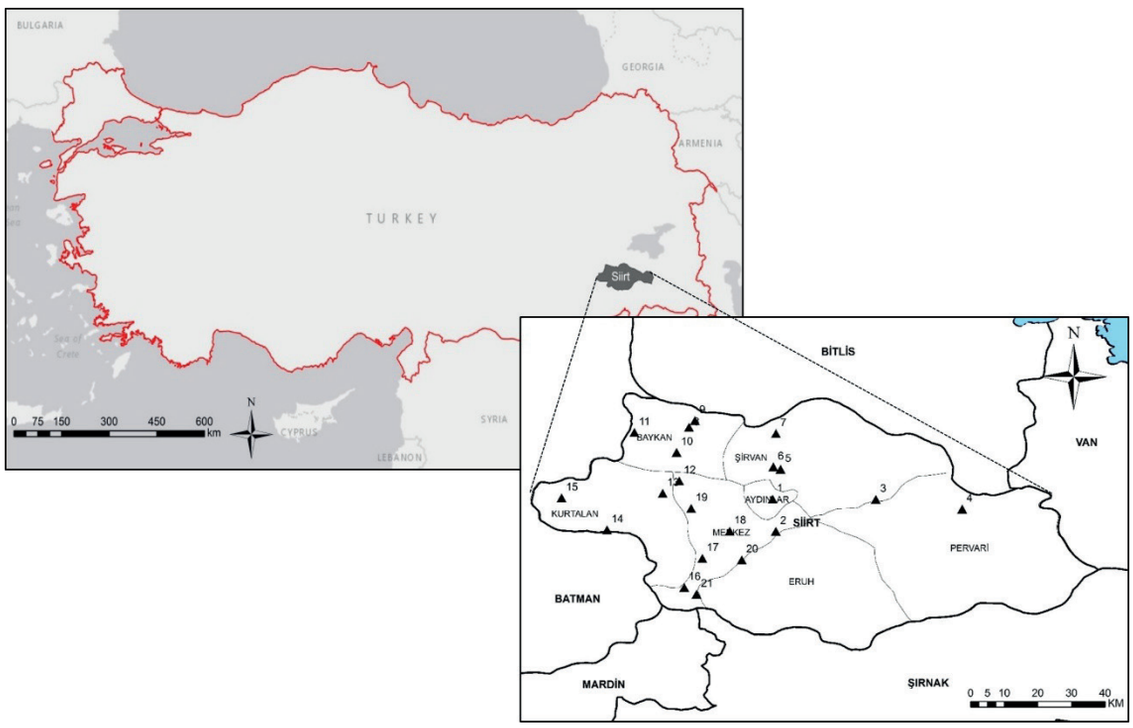

Figure 1. The study area and the sampling stations

3.1.5. *Empis inopinata* Collin, 1960

Material examined: 23 specimens, 12 male, 11 female. Example collected stations: 3 male, 3 female, Central District, Koçlu, 520 m, 06.05.2014; 2 male, 1 female, Şirvan, Çeltikyolu, 1017 m, 07.05.2014; 1 male, 2 female, Baykan, Bardaklı, 600 m, 06.05.2014; 3 male, Şirvan, Sarıdana, 700 m, 11.05.2015; 2 male 3 female, Central District, Eğlence, 455 m, 12.05.2015; 2 male 2 female, Central District, Yerlibahçe, 488 m, 07.05.2015.

Distributions in Turkey: Antalya, Konya, Denizli, Isparta, Mersin (Çiftçi ve Hasbenli, 2008). Palaearctic distributions: Israel, Turkey (Collin, 1960; Çiftçi and Hasbenli, 2008).

3.1.6. *Empis mediterranea* (Loew, 1864)

Material examined: 8 specimens, 6 male, 2 female. Example collected stations: 3 male, 2 female, Central District, Koçlu, 520 m, 03.04.2015; 17, 3 male, Central District, Eğlence, 455 m, 05.04.2015.

Distributions in Turkey: Amasya, Bursa, Konya, Adana (Çiftçi and Hasbenli, 2007a; Engel and Frey, 1938-1956). Palaearctic distributions: Spain, former Yugoslavia, Greece, former Russia, Turkey, Lebanon (Chvála and Wagner, 1989; Çiftçi and Hasbenli, 2007a).

3.1.7. *Empis nigricans* Meigen, 1804

Material examined: 9 specimens, 6 male, 3 female. Example collected stations: 2 male, 2 female, Şirvan, Sarıdana, 700 m, 11.05.2015; 1 male, 1 female, Pervari, Güleçler, 1553 m, 11.05.2015; 2 male, Baykan, Gümüşkaş, 852 m, 13.05.2015; 1 male, Eruh, Ormanardı, 437 m, 09.06.2015.

Distributions in Turkey: Isparta, Konya, Mersin, Kırklareli (Çiftçi and Hasbenli, 2007b, 2013). Palaearctic distributions: Turkey, Austria, Czech Republic, Germany, France, Netherland, Italy, Hungary, Romania, Poland, Slovenia, Slovakia (Chvála and Wagner, 1989; Chvála, 1994; Daugeron, 1999; Çiftçi and Hasbenli, 2007b).

3.1.8. *Empis pleurica* (Collin, 1960)

Material examined: 42 specimens, 24 male, 18 female. Example collected stations: 4 male, 2 female, Central District, Koçlu, 520 m, 06.05.2014; 5 male, Şirvan, Çeltikyolu, 1017 m, 07.05.2014; 3 male, 3 female, Baykan, Havel, 757 m, 07.05.2014; 3 male, Şirvan, 804 m, 11.05.2015; 1 male, Şirvan, 876 m, 11.05.2015; 2 male, 3 female, Central District, Eğlence, 455 m, 12.05.2015; 3 male, 2 female, Central District, Aktaş, 768 m, 12.05.2015; 4 male, Baykan, Gümüşkaş, 852 m, 13.05.2015; 3 male, 3 female, Kurtalan, Kılıçlı, 542 m,

13.05.2015; 4 male, 3 female, Kurtalan, Erdurağı, 1037 m, 13.05.2015; 2 male, Baykan, Obalı, 791 m, 13.05.2015; 3 male, 2 female, Central District, Yerlibahçe, 488 m, 09.06.2015; 2 male, Kurtalan, Gözpınar, 636 m, 10.06.2015.

Distributions in Turkey: Konya, Isparta, Mersin, Niğde, Çanakkale (Çiftçi and Hasbenli, 2013). Palaearctic distributions: Turkey, Jordan, Palestine (Collin, 1960; Chvála and Wagner, 1989; Çiftçi and Hasbenli, 2007a).

3.1.9. *Empis spiralis* Collin, 1937

Material examined: 113 specimens, 72 male, 41 female. Example collected stations: 2 male, 1 female, Tillo, Çatlı, 1472 m, 06.05.2014; 3 male, 1 female, Central District, Koçlu, 520 m, 06.05.2014; 2 male, 2 female, Şirvan, Çeltikyolu, 1017 m, 07.05.2015; 1 male, 1 female, Baykan, Bardaklı, 600 m, 07.05.2014; 4 male, 1 female, Central District, Koçlu, 520 m, 03.04.2015; 1 male, Şirvan, Sarıdana, 700 m, 03.04.2015; 3 male, 1 female, Pervari, Güleçler, 1553 m, 03.04.2015; 2 male, 1 female, Baykan, Gümüşkaş, 852 m, 04.04.2015; 2 male, Kurtalan, Kılıçlı, 542 m, 04.04.2015; 4 male, 3 female, Kurtalan, Oyacık, 599 m, 04.04.2015; 3 male 2 female, Central District, Yazlıca, 440 m, 05.04.2015; 2 male, 2 female, Central District, Eğlence, 455 m, 05.04.2015; 2 male, 1 female, Eruh, Ufaca, 505 m, 05.04.2015; 3 male 2 female, Şirvan, 804 m, 11.05.2015; 3 male, 1 female, Central District, Eğlence, 455 m, 12.05.2015; 3 male, 1 female, Central District, Yerlibahçe, 488 m, 12.05.2015; 3 male, 2 female, Central District, Aktaş, 768 m, 12.05.2015; 2 male, Kurtalan, Kılıçlı, 542 m, 13.05.2015; 2 male, 3 female, Kurtalan, Erdurağı, 1037 m, 13.05.2015; 2 male, Kurtalan, Gözpınar, 636 m, 13.05.2015; 3 male, 1 female, Şirvan, 804 m, 08.06.2015; 2 male, Şirvan, 876 m, 08.06.2015; 2 male, 2 female, Kurtalan, Oyacık, 599 m, 10.06.2015; 2 male, 2 female, Kurtalan, Erdurağı, 1037 m, 10.06.2015; 3 male, Central District, Koçlu, 520 m, 14.04.2016; 2 male, 2 female, Şirvan, 876 m, 14.04.2016; 2 male, Baykan, Gümüşkaş, 852 m, 15.04.2016; 2 male, 3 female, Kurtalan, Oyacık, 599 m, 15.04.2016; 3 male, 3 female. Eruh, Ufaca, 505 m, 16.04.2016; 2 male, 3 female, Eruh, Ormanardı, 437 m, 16.04.2016.

Distributions in Turkey: Siirt (Çiftçi, 2015). Palaearctic distributions: Cyprus, Algeria, Iran, Israel, Syria, Jordan (Chvála and Wagner, 1989; Shamshev and Grootaert, 2005).

3.1.10. *Empis tessellata* Fabricius, 1794

Material examined: 41 specimens, 23 male, 18 female. Example collected stations: 2 male, 2 female, Tillo, Çatlı, 1472 m, 06.05.2014; 1 male, 1 female, Baykan, Havel, 757 m, 07.05.2014; 3 male, 1 female, Pervari, Güleçler, 1553 m, 11.05.2015; 2 male, 1 female, Central District, Yazlıca, 440 m, 12.05.2015; 2 male, 2 female, Eruh, Ufaca, 505 m, 12.05.2015; 2 male 2 female, Baykan, Obalı, 791 m, 13.05.2015; 2 male, Baykan, Bardaklı, 600 m, 13.05.2015; 1 male, 1 female, Baykan, Gümüşkaş, 852 m, 13.05.2015; 2 male, 1 female, Kurtalan, Kılıçlı, 542 m, 13.05.2015; 1 male, 1 female, Tillo, Çatlı, 1472 m, 08.06.2015; 2 male, 3 female, Central District, Yazlıca, 440 m, 09.06.2015; 2 male, 2 female, Kurtalan, Oyacık, 599 m, 10.06.2015; 1 male, 1 female, Kurtalan, Gözpınar, 636 m, 10.06.2015.

Distributions in Turkey: Adana, Antalya, Amasya, Bilecik, Çanakkale, Siirt, Edirne, Mersin, Karabük, Kayseri, Konya, Kocaeli, Sakarya, Yozgat (Çiftçi and Hasbenli, 2013; Çiftçi, 2015). Palaearctic distributions: Widely distributed (Collin, 1961; Chvála and Wagner, 1989; Chvála, 1994).

3.2. Genus *Hilara* Meigen, 1822

3.2.1. *Hilara clavidipes* Chvála, 2008

Material examined: 20 specimens, 16 male, 4 female. Example collected stations: 2 male, Central District, Koçlu, 520 m, 03.04.2015; 1 male, 1 female, Şirvan, Sarıdana, 700 m, 03.04.2015; 2 male, Kurtalan, Kılıçlı, 542 m, 04.04.2015; 1 male, 1 female, Şirvan, Sarıdana, 700 m, 11.05.2015; 2 male, Eruh, Ufaca, 505 m, 12.05.2015; 2 male, Baykan, Bardaklı, 600 m, 13.05.2015; 2 male, Central District, Koçlu, 520 m, 14.04.2016; 2 male, 1 female, Kurtalan, Kılıçlı, 542 m, 15.04.2016; 2 male, 1 female, Eruh, Ufaca, 505 m, 16.04.2016.

Distributions in Turkey: New record for Turkish fauna. Palaearctic distributions: Israel (Chvála, 2008).

3.2.2. *Hilara cothurnata* Engel, 1941

Material examined: 23 specimens, 20 male, 3 female. Example collected stations: 1 male, Şirvan, Çeltikyolu, 1017 m, 07.05.2014; 2 male, Şirvan, Sarıdana, 700 m, 03.04.2015; 3 male, Kurtalan, Erdurağı, 1037 m, 04.04.2015; 8 male, Central District, Eğlence, 455 m, 05.04.2015; 3 male, Kurtalan, Erdurağı, 1037 m, 15.04.2016; 3 male, 3 female, Central District, Yerlibahçe, 488 m, 16.04.2016.

Distributions in Turkey: Hatay, Adıyaman (Chvála, 2008). Palaearctic distributions: Lebanon, Israel, Turkey (Chvála, 2008).

3.2.3. *Hilara freidbergi* Chvála, 2008

Material examined: 22 specimens, 19 male, 3 female. Example collected stations: 2 male, Tillo, Çatlı, 1472 m, 06.05.2014; 5 male, Baykan, Bardaklı, 600 m, 07.05.2014; 2 male, Şirvan, 804 m, 11.05.2015; 2 male, Şirvan, 876 m, 11.05.2015; 4 male 2 female, Central District, Yazlıca, 440 m, 12.05.2015; 4 male, 1 female, Central District, Eğlence, 455 m, 12.05.2015.

Distributions in Turkey: New record for Turkish fauna. Palaearctic distributions: Israel (Chvála, 2008).

3.2.4. *Hilara fusitibia* Strobl, 1899

Material examined: 18 specimens, 10 male, 8 female. Example collected stations: 1 male, Şirvan, Çeltikyolu, 1017 m, 07.05.2014; 1 male 2 female, Şirvan, 876 m, 03.04.2015; 2 male 1 female, Kurtalan, Kılıçlı, 542 m, 04.04.2015; 1 male, Kurtalan, Oyacık, 599 m, 04.04.2015; 2 male, 3 female, Central District, Yazlıca, 440 m, 05.04.2015; 1 male, Central District, Eğlence, 455 m, 05.04.2015; 1 male 2 female, Şirvan, 876 m, 14.04.2016; 1 male, Central District, Yazlıca, 440 m, 16.04.2016

Distributions in Turkey: New record for Turkish fauna. Palaearctic distributions: Spain, Morocco, Tunisia, Greece (Chvála, 2008).

3.2.5. *Hilara megalochira* Collin, 1937

Material examined: 21 specimens, 19 male, 2 female. Example collected stations: 2 male, Şirvan, 804 m, 11.05.2015; 2 male, Şirvan, 876 m, 11.05.2015; 4 male, Central District, Koçlu, 520 m, 12.05.2015; 2 male, 1 female, Central District, Aktaş, 768 m, 12.05.2015; 3 male, 1 female, Eruh, Ormanardı, 437 m, 12.05.2015; 5 male, Baykan, Bardaklı, 600 m, 13.05.2015; 1 male, Kurtalan, Gözpınar, 636 m, 13.05.2015.

Distributions in Turkey: Adıyaman (Chvála, 2008). Palaearctic distributions: Cyprus, Israel, Syria, Turkey (Chvála, 2008).

3.3. Zoogeographic distribution

As a result of the field studies carried out in the scope of this study, 15 species belonging to Empididae from Siirt were determined. Among these species, all species except *Empis tessellata* and *E. spiralis* are the first records for Siirt province.

Empis tessellata is common in Turkey and the Palaearctic Region. In addition, *E. nigricans* has a wide distribution in Europe.

In general, when the distribution of species is examined, most species are found in the Eastern Mediterranean Zoogeographic Subregion except for the species with wide distributions. *Empis calcarata* and *E. mediterranea* are also spread throughout the European part of the Eastern Mediterranean Subregion. *Hilara fusitibia* is also found in the northern part of the African continent.

As already mentioned earlier, most of the species found in the Siirt province originate from the area including Turkey, Palestine, Syria, Iraq and Israel from the Eastern Mediterranean Zoogeographic Subregion. *Hilara clavidipes*, *H. freidbergi* and *H. fusitibia* are new records for the Turkish fauna and it is seen that they are originated from the Middle East which also covers the southeastern part of Turkey. It is seen that the entrance doors of these species to Turkey are the Southeastern Anatolia Region.

4. Conclusions

With this study, 3 species from the genus *Hilara*, *H. freidbergi*, *H. clavidipes*, and *H. fusitibia*, are recorded for the first time from Turkey. In addition, thirteen species are new records for the research area.

In the Siirt province, summer temperature is very high, but the different elevation and the presence of various flowering plants in the steppes have positively influenced the species diversity of Siirt Empididae. It is a fact that the number of empidid species in the region will increase with the further works in and around Siirt province. This study may be an example of more detailed work to be done in the future. With this type of faunistic and species diversity studies, Turkey's species diversity is expected to increase significantly.

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