



Contributions to the Turkish Fauna of Spider Flies (Diptera: Brachycera: Acroceridae)

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Abstract

The Acroceridae family, an endoparasite in true spiders, is also referred to as spider flies. In this study, the list of Turkish Acrocerid species was updated with the newly recorded acrocerid species. The specimens in Zoological Museum of Gazi University collected from different regions of Turkey at different times (1997-2013) were evaluated. *Acrocera laeta* Gerstäcker, 1856 from Konya in central Anatolia and *Ogcodes pallipes* Latreille in Olivier, 1812 from Ardahan in northern east of Anatolia are recorded for the first time. Now Turkish Acrocerid fauna are ten species. The distribution map of the species are given.

Keywords: Acroceridae, Anatolia, fauna, new records

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Türkiye örümcek sinekleri faunasına katkılar (Diptera: Brachycera: Acroceridae)

Özet

Gerçek örümceklerde endoparazit olan Acroceridae familyası, örümcek sinekleri olarak da anılır. Bu çalışmada, Türk Acrocerid tür listesi yeni kayıtlarla birlikte güncellenmiştir. Gazi Üniversitesi Zooloji Müzesi'nde bulunan Türkiye'nin farklı bölgelerinden farklı zamanlarda (1997-2013) toplanan örnekler değerlendirilmiştir. *Acrocera laeta* Gerstäcker, 1856 Orta Anadolu'da Konya'dan ve *Ogcodes pallipes* Latreille in Olivier, 1812 Kuzeydoğu Anadolu'da Ardahan'dan ilk defa kaydedilmiştir. Günümüz Türk Acrocerid faunası on türdür. Türlerin dağılım haritaları verilmiştir.

Anahtar kelimeler: Acroceridae, Anadolu, fauna, yeni kayıtlar

1. Introduction

Acroceridae (Diptera: Brachycera) family known as spider flies, small-headed flies or swollen-bodied flies have a small head and a humbled thorax. There is a great variety in size and colour among the taxa. Their mouth parts are well developed, partially developed or absent. Those with well-developed mouth parts have an elongated proboscis. In this way, they feed on the nectar of flowers. Some acrocerid species are known as good pollinators in the ecosystem [1, 2].

Adult flies are short-lived, from one to six weeks. The flies are active only on warm sunny days [1]. The phenological information of some acrocerid species has been presented in previous studies. Accordingly, some species start to appear from May (such as *Acrocera orbiculus* and *Ogcodes pallipes*), while some species start to appear from June (such as *Acrocera sanguinea* and *Ogcodes zonatus*). They continue to appear until the end of August [10, 17]. Acrocerid larvae are endoparasitoids of true spiders (Araneae). Acrocerid females lay their eggs independently of the

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host but in the habitat where the spider lives. After the larva hatches from the egg, it awaits its host. After the larva finds its host, it adheres to the spider's body and usually settles between the spider's book lung lamellae [1, 2, 3].

Acroceridae is represented about 500 species in the world [4]. Although some acrocerid species are widely distributed, they are less known because they are rare in the field [1]. There are 34 species belonging to this family in Europe [5]. Studies on the Turkish Acroceridae family are few and insufficient. Until this study, seven species were known from the Turkish fauna [6, 7, 8, 9]. In recent years, four species from Van province have been recorded. Three of them were new records [7, 8, 9].

The aim of this study is to determine an update Acroceridae fauna of Turkey.

2. Materials and methods

The material discussed here is from the collection in Zoological Museum of Gazi University (ZMGU, Ankara, Turkey). The specimens were collected individually with a sweep net.

The species with detailed locality information in published papers and examined materials in this paper are shown on the distribution map. The species that recorded from Turkey but with no clear locality information (for example, as recorded in Asia Minor) are not shown on distribution map. The map was created in ArcGIS 10.1 program.

Identification work was carried out with the keys provided by Nartshuk [1] and Sack [10].

The species are given in alphabetical order. The Palaearctic distribution of species was obtained from Nartshuk [6] and Schlinger [11].

3. Results

23 acrocerid specimens (14 males, 9 females) in the Zoological Museum of Gazi University were evaluated. As a result of the examination, 6 species belonging to 3 genera were determined. The species are as follows; *Acrocera* (s.str.) *laeta*, *A.* (s.str.) *orbiculus*, *Astomella hispaniae*, *Ogcodes pallipes*, *O. zonatus* and *Oligoneura murina*. Among these species *A. laeta* and *O. pallipes* are new records for Turkish fauna. A total of 9 species are now known from Turkey (Table 1). The distribution map of the species is shown in Figure 1.

Acrocera (s.str.) *laeta* Gerstäcker, 1856

Material examined: Konya: Sarıveliler, Gevne Valley, 36°35'N, 32°32' E, 1170 m, 01.07.2001, ♀, leg. A. Hasbenli

Remark: *A. laeta* was described from the male holotype collected on Sardinia (Italy) and also was recorded from USSR (SET, TC (Ge)) and Kazakhstan [6]. This species is new record for Turkish fauna. The species were collected from Gevne Valley located in the Middle Toros Mountains in the south of Turkey. In the Gevne valley, juniper, maquis, riparian and rocky plant communities, black pine (*Pinus nigra*), red pine (*Pinus brutia*) and Taurus fir (*Abies cilicica* ssp. *isaurica*) forests, high mountain meadows, steppe and agricultural areas have seen [12].

Acrocera (s.str.) *orbiculus* (Fabricius, 1787)

Material examined: Niğde: Çamardı, Demirkazık village, 37°52' N, 35°06' E, 1635 m, 11.07.2002, ♂, leg. A. Hasbenli

Remarks: *Acrocera orbiculus* is a Holarctic (North America) species and one of the most frequently collected acrocerid in Palaearctic (Europe, USSR, Tajikistan, Kazakhstan, China, Algeria) [6, 13]. This species was recorded Van province for the first time from Turkey by Kemal and Koçak [7]. The second record is given in this paper.

Acrocera (*Acrocerina*) *sanguinea* Meigen, 1804

Remarks: The species is distributed in central and southern Europe [6]. It was recorded from Artos Mountain (Van) by Kemal and Koçak [8].

Astomella hispaniae Lamarck, 1816

Material examined: Antalya: Gündoğmuş, 36°48' N, 32°00' E, 980 m, 23.06.1999, ♂, leg. A. Hasbenli; Konya: Hadim, Beyreli village, Gevne Valley, 36°51' N, 32°21' E, 1570 m, 01.07.2001, ♂, ♀, leg. A. Hasbenli and Ü. Çağlar.

Remarks: *Astomella hispaniae* is distributed in South Europe, Turkey, Syria and Algeria [6].

Ogcodes formosus Loew, 1873

Remarks: Loew [14] based the original description of *Oncodes formosus* a holotype from Shahrud, Iran. After that, this species was recorded from Artos Mountain (Van, Turkey) by Koçak and Kemal [7].

Ogcodes hirtus (Sack, 1936)

Remarks: The species was described from the female holotype collected on "Kurdistan ross." [10]. Schlinger stated the type locality of *O. hirtus* as "Kurdistan, Iran" and also gave the definition of the male [11]. Distribution information of the species was written as "south-eastern of Turkey" (? Turkey)" in the Catalogue of Palaearctic Diptera [6]. South-eastern region of Turkey has borders with the Kurdistan region in Iran. For this reason, we think that there may be confusion in the country names. Therefore, Turkey's record of this species is not clear. But we will consider the *Ogcodes hirtus* might be in Turkish fauna.

Ogcodes guttatus Costa, 1854

Remarks: *O. guttatus*, the one nonendemic species, distributed the Palaearctic, Oriental and southern Ethiopian regions. One male specimen record, collected from İstanbul in 1925 leg. G. Edwards (deposited in BMNH), was published by Schlinger [11]. However, detailed locality information for the specimen was not given [11].

***Ogcodes pallipes* Latreille, 1811**

Material examined: Ardahan: Hanak, SW of Yünbüken village, 41°15' N, 42°51' E, 1990 m, 17.07.2011, ♀, leg. A. Hasbenli and D. Çiftçi

Remarks: This species is new record for Turkish fauna. It is distributed in Europe and western Asia [6, 11]. EUNIS habitat type of the examined specimen's locality is "E4.4- Calcareous alpine and subalpine grassland" based on Davies et al. [15]. See Davies et al. [15] for detailed characteristics of this habitat.

***Ogcodes zonatus* Ercihson, 1840**

Material examined: Adana: Pozantı, Hamidiye village, 37°31' N, 35°02' E, 1045 m, 21.07.2002, ♂, leg. A. Hasbenli; Eskişehir: Tepebaşı, NE of Takmak village, 39°43' N, 30°20' E, 931m, 05.07.2013, ♀, leg. A. Hasbenli and D. Çiftçi; Kayseri: Yahyalı, around Derebağı waterfall, 1280 m, 25.06.1997, ♀, leg. A. Hasbenli.

Remarks: This species is widely distributed, reaching from Mongolia to Europe and south into North Africa, though it is as yet unknown from Scandinavia [11]. The first record from the Turkey was given by Kemal and Koçak [7] from Van province. Tragacanthic *Astragalus* species were dominant in the locality where was collected [7]. The specimens in this study were collected from steppe between sparse trees and shrubs.

***Oligoneura murina* (Loew, 1844)**

Material examined: Adana: Tufanbeyli, Güzelim Village, 38°06' N, 36°10' E, 1490 m, 24.06. 2002, ♂, leg. A. Hasbenli; Aksaray: Güzelyurt, between İhlara-Yenipınar, 38°13' N, 34°17' E, 1364 m, 14.06.2005, ♂, leg. A. Hasbenli; Alanya: Aksu, 110 m, 06.05.1992, ♂, leg. A. Hasbenli; Artvin: Yusufeli, Barhal Brook, 764 m, 18.07.2004, ♀, leg. A. Hasbenli; Erzincan: Tercan, N of Karacakışlak village, 39°53' N, 40°25' E, 2082m, 19.07.2013, ♀, leg. A. Hasbenli and D. Çiftçi; Hatay: Dörtyol, Topaktaş Plateau, 36°49' N, 36°19' E, 1114 m, 26.06.2004, ♂, ♀, leg. Ü.Çağlar; Kayseri: Develi, Dereşimli Village, 38°12' N, 35°53' E, 1426 m, 26.06.2002, 3 ♂♂, leg. A. Hasbenli; Yeşilhisar, Güzelöz Village, 1260 m, 25.06.1997, ♀, leg. A. Hasbenli; Mersin: Mezitli, 7 km N of Fındıkpınarı, 36°57' N, 34°18' E, 1927 m, 08.07.2006, ♂, leg. A. Hasbenli; Niğde: Centrum, Bağlama Village, 38°15' N, 34°36' E, 1439 m, 29.06.2005, ♂, leg. A. Hasbenli; Ulukışla, between Darboğaz-Gümüüş villages, 37°28' N, 34°35' E, 1716 m, 30.06.2006, 1 ♂, leg. A. Hasbenli.

Remarks: The type locality was given by Loew in [16] as Kleinasien (Turkey) and Kos Island (Greece). In addition, the species was recorded from Greece, Armenia, Georgia and Iran [6].

3.1. Checklist of Acroceridae

A distributional checklist of Acroceridae (Diptera: Brachycera) of Turkey is presented as in Table 1.

Table 1. A distributional checklist of Acroceridae of Turkey

Species	Provinces and/or localities	References
<i>Acrocera laeta</i> Gerstäcker, 1856	Konya	This paper (new record)
<i>Acrocera orbiculus</i> (Fabricius, 1787)	Niğde, Van	This paper, [7]
<i>Acrocera sanguinea</i> Meigen, 1804	Van (Artos Mountain)	[8]
<i>Astomella hispaniae</i> Lamarck, 1816	Konya, Antalya	This paper, [6]
<i>Ogcodes formosus</i> Loew, 1873	Van (Artos Mountain)	[7]
<i>Ogcodes guttatus</i> Costa, 1854	Istanbul (not shown on the map)	[6, 11]
<i>Ogcodes hirtus</i> (Sack, 1936)	Not cited	Narsthuk, 1998; Sack, 1936; Schlinger, 1960
<i>Ogcodes pallipes</i> Latreille, 1811	Ardahan	This paper (new record)
<i>Ogcodes zonatus</i> Ercihson, 1840	Adana, Eskişehir, Kayseri, Van	This paper, [6, 7]
<i>Oligoneura murina</i> (Loew, 1844)	Adana, Aksaray, Alanya, Artvin, Erzincan, Hatay, Kayseri, Mersin, Niğde	This paper [6, 16]

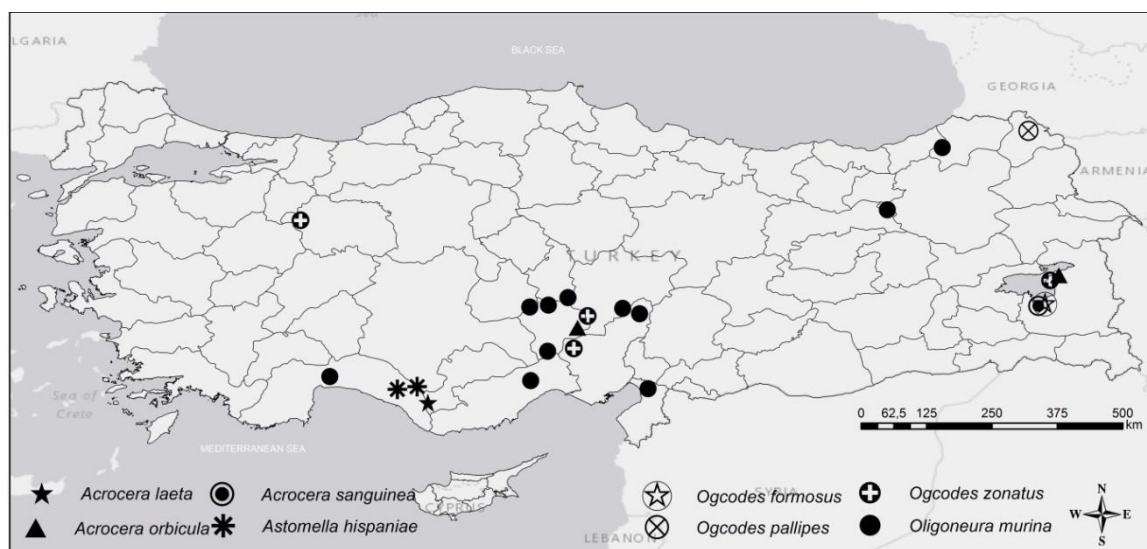


Figure 1. Distribution map of Turkish acrocerid species (*Ogcodes guttatus* not shown on the map).

4. Conclusions and discussion

As mentioned in the section above, the species of the acrocerid are active on hot sunny days [1]. In parallel to it, it is observed that the species recorded from Turkey are gathered in May, June, and July. Turkey is located between the subtropical zone and temperate zone. Different types of climate (Mediterranean, Continental, Marmara and Black Sea climate) are observed due to factors such as Turkey being surrounded by seas on three sides, the extension of mountains, and landforms. Due to these climates, summer months are generally hot and sunny in Turkey [18]. Therefore, it is considered that there will be more acrocerid species in the period between May and August compared to most parts of the country.

During their larval stages, acrocerids are internal parasites of true spiders. Naturally, females lay their eggs in habitats where spiders can live. While the subfamily Panopinae is Mygalomorphae spiders parasites, Acrocerinae is observed as a parasite in different Araneomorphae families. Palaearctic acrocerids were reared (from the following spider's families: Ctenizidae and Theraphosidae (Mygalomorphae) - *Astomella* species; Araneidae, Theridiidae, Lycosidae, Agelenidae, Oxyopidae, Anyphaeidae, Clubionidae, Gnaphosidae, Thomisidae and Salticidae (Araneomorphae) - *Acrocera* and *Ogcodes* species [1]. These spider families and species, in which acrocerids are parasites, are also recorded and distributed in Turkey [19, 20].

When the general situation of the Turkish Acroceridae fauna is compared with the European Acroceridae fauna, it is observed that it is not at a sufficient and satisfactory level. When Turkey's favorable climatic conditions and rich vegetation, and the diversity and richness of the spider fauna are considered, the Turkish acrocerid fauna is predicted to be richer.

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