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Original article (Orijinal araştırma)

A new Diptera family (Pallopteridae Loew, 1862) for the fauna of Turkey with four new records

Türkiye faunası için dört yeni kayıtla yeni bir Diptera familyası (Pallopteridae Loew, 1862)

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Abstract

Family Pallopteridae Loew, 1862 is a small Diptera family which is well known in the Palearctic Region. Species of this family have been reported especially in the many countries of Europe. However, there has been no study of the distribution of the family Pallopteridae in Turkey. This study was based on fly specimens collected from Amasya, Çorum and Sinop Provinces of Turkey between 2017 and 2018. Four species [*Palloptera ustulata* Fallen, 1820, *Palloptera umbellatarum* (Fabricius, 1775), *Toxoneura basimaculata* (Czerny, 1934) and *Toxoneura trimacula* (Meigen, 1826)] of Pallopteridae (Diptera) recorded for the first time in Turkey. A key for the Turkish Pallopteridae species, zoogeographic distribution, and figures of wing and adult of each species are included.

Keywords: Fauna, new record, *Palloptera*, Pallopteridae, *Toxoneura*, Turkey

Öz

Pallopteridae Loew, 1862 familyası Palearktik bölgede iyi bilinen küçük bir sinek ailesidir. Özellikle Avrupa'nın birçok ülkesinde bu familyaya ait türlerin varlığı bildirilmiştir. Bununla birlikte Pallopteridae familyasının Türkiye'deki yayılışı ile ilgili bir çalışma bulunmamaktadır. Bu çalışma, Türkiye'den Amasya, Çorum ve Sinop illerinden, 2017 ve 2018 yılları arasında toplanan sinek örneklerine dayanmaktadır. Pallopteridae (Diptera) familyasının dört türü [*Palloptera ustulata* Fallen, 1820, *Palloptera umbellatarum* (Fabricius, 1775), *Toxoneura basimaculata* (Czerny, 1934) ve *Toxoneura trimacula* (Meigen, 1826)] Türkiye'de ilk kez kaydedilmiştir. Türkiye Pallopteridae türleri için teşhis anahtarı, her bir türün zoocoğrafik yayılışları ve ergin ve kanat fotoğrafları sunulmuştur.

Anahtar sözcükler: Fauna, yeni kayıt, *Palloptera*, Pallopteridae, *Toxoneura*, Türkiye

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Introduction

The order Diptera one of the largest insect orders, including 159 294 species worldwide (Pape et al., 2011). According to Koçak & Kemal (2013), 2 992 species of fly have been recorded from Turkey.

Tephritoidea is one of the large superfamilies consisting of 10 acalyptrate fly families (Ctenostylidae, Eurygnathomyiidae, Lonchaeidae, Pallopteridae, Piophilidae, Platystomatidae, Pyrgotidae, Richardiidae, Tephritidae and Ulidiidae) including over 7750 valid species worldwide (Korneyev, 1999; Han & Ro, 2005; Pape et al., 2011). The family Pallopteridae is a sister group of Richardiidae and Piophilidae in the superfamily Tephritoidea (Korneyev, 1999).

In the superfamily Tephritoidea, Tephritidae is one of the better-known families in Turkey with more than 160 species recorded and described (Kütük, 2009; Kütük et al., 2011, 2012; Yaran & Kütük, 2014, 2015, 2016; Korneyev & Kolcsar, 2015; Namin & Korneyev, 2015; Yaran et al., 2018a, b; Keçe et al., 2019). Also, the families Platystomatidae and Ulidiidae families have nearly 20 species in Turkey (Mesci & Hasbenli, 2015a, b). The family Pallopteridae includes 71 valid species in worldwide. This family also includes five fossil species (Gentilini et al., 2006; Pape et al., 2011). Thirty-nine species of Pallopteridae are currently recognized in the Palearctic Region (Han, 2013). Members of Pallopteridae known for their small to medium sized (about 2.5-7 mm), are slender flies varying in color from pale yellow to reddish, gray or black (Oosterbroek, 2006). According to Korneyev (1999), they usually infest shoots and stems of herbaceous plants, or live under bark, often in association with wood-boring Coleoptera.

The main purpose of this study was to contribute to the Diptera fauna of Turkey. Currently, there is no published report on the presence of the family Pallopteridae in Turkey.

This study is the first to record four members [*Palloptera ustulata* Fallen, 1820, *Palloptera umbellatarum* (Fabricius, 1775), *Toxoneura basimaculata* (Czerny, 1934) and *Toxoneura trimacula* (Meigen, 1826)] of the Pallopteridae. In the paper, a key for Turkish Pallopteridae species, zoogeographic distribution, and wing and adult photos of each species are presented.

Materials and Methods

Thirteen specimens were collected from various habitats in Amasya, Çorum and Sinop Provinces of Turkey in the summers of 2017 and 2018 (Figure 1). Fly samples were collected randomly from possible host plants using an insect net. After the collection, the flies were killed in jars containing ethyl acetate. The fruit flies collected were brought to the laboratory and prepared by standard museum methods. Thus, all the specimens were made ready for the identification to the species level. The specimens were identified according to McAlpine (1981), Merz (1998), Ozerov (2009) and Han (2013). Identification key for Turkish Pallopteridae species modified from Ozerov (2009). Specimens were deposited in Entomology Laboratory of Biology Department, Faculty of Science and Arts, Gaziantep University, Gaziantep, Turkey.

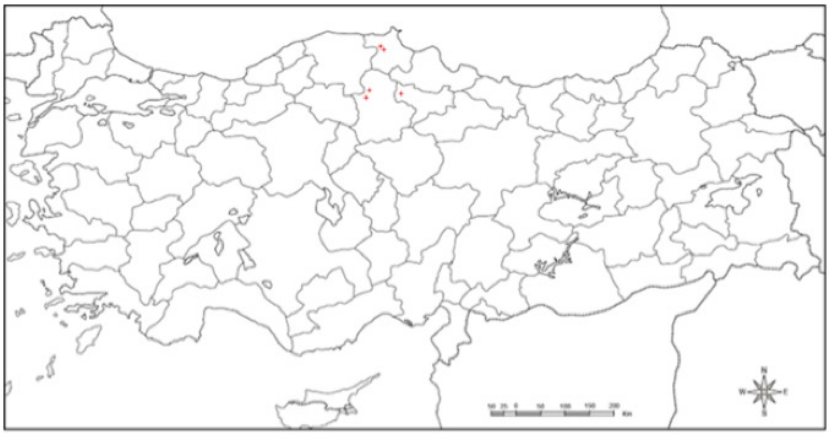

Figure 1. Distribution of the sampling sites in Turkey.

Results

Four species of the Pallopteridae were collected and identified from Amasya, Çorum and Sinop Provinces of Turkey. Species are listed below alphabetical order. Also, an identification key for the species in Turkey is included.

Key for Turkish Pallopteridae species

1. Anepisternum bare.....2 (*Palloptera,* Fallen)

- Anepisternum with bristles or setulae, or both .....3 (*Toxoneura,* Macquart)

2. Wings hyaline, at apex with dark smoky spot (Figure 2c, d)..... *Palloptera ustulata* Fallen

- The wing is darkened along the costal margin, including the Sc cell, at the apex of the veins R_{4+5} and M, and also with spots at the base of the veins R_{2+3} and R_{4+5} (Figure 2a, b).... *Palloptera umbellatarum* (Fabricius)

3. Veins M and Cu are darkened at base (Figure 3a, b)..... *Toxoneura basimaculata* (Czerny)

- Veins M and Cu are light at base (Figure 3c, d) ..... *Toxoneura trimacula* (Meigen)

Genus *Palloptera* Fallen, 1820

Palloptera umbellatarum (Fabricius, 1775) (Figure 2a, b)

Specimens examined. Çorum: Bayat, Kunduzlu, 26.VII.2017, 40°45' N, 34°14' E, 1360 m, 1 ♀, 2 ♂♂, leg. M. Yaran.

Remarks. Biology of the species is unknown. According to Rotheray (2014), larvae are found under bark of fallen *Tilia*. Adult members of *P. umbellatarum* were collected from a humid and wet habitat with abundant *Petasites hybridus* (L.) Gaertner on the floor of a *Cedrus libani* A. Richard forest (Figure 4).

Global distribution. Andorra, Austria, Belgium, Britain, Bulgaria, Corsica, Czech Republic, Danish mainland, Finland, French mainland, Germany, Hungary, Ireland, Italian mainland, Liechtenstein, Northern Ireland, Northwest European Russia, Norwegian mainland, Poland, Romania, Sicily, Slovakia, Spanish mainland, Sweden, Switzerland, The Netherlands and Ukraine (Merz, 2011).

Figure 2. Adult and wing figures of *Palloptera* species: a) *Palloptera umbellatarum* (♂), b) wing; c) *Palloptera ustulata* (♀), d) wing.

Palloptera ustulata Fallen, 1820 (Figure 2c, d)

Specimens examined. Amasya: Gümüşhacıköy, Sekü, 27.VII.2017, 40°57' N, 36°06' E, 809 m, 2 ♀♀, 1 ♂, leg. M. Yaran.

Remarks. Larvae develop beneath the bark of the tress where they probably feed on mycelium (Merz, 1998). Adult members of *P. ustulata* were collected from a humid and wet habitat with abundant *P. hybridus* and some gramineous species.

Global distribution. Andorra, Austria, Belgium, Britain, Bulgaria, Corsica, Czech Republic, Danish mainland, Finland, French mainland, Germany, Hungary, Ireland, Italian mainland, Liechtenstein, Northern Ireland, Northwest European Russia, Norwegian mainland, Poland, Romania, Sicily, Slovakia, Spanish mainland, Sweden, Switzerland, The Netherlands and Ukraine (Merz, 2011).

Genus *Toxoneura* Macquart, 1835

Toxoneura basimaculata (Czerny, 1934) (Figure 3a, b)

Specimens examined. Çorum: Bayat, Kunduzlu, 26.VII.2017, 40°45' N, 34°14' E, 1360 m, 3 ♂♂, leg. M. Yaran.

Remarks. Adult members of *T. basimaculata* were collected from a humid and wet habitat with abundant *P. hybridus* on the floor of a *C. libani* forest (Figure 4).

Global distribution. Austria, Croatia, Czech Republic, East Palearctic, Germany, Hungary, Italian mainland, Near East and Poland (Merz, 2011).

Figure 3. Adult and wing figures of *Toxoneura* species: a) *Toxoneura basimaculata* (♂), b) wing; c) *Toxoneura trimacula* (♂), d) wing.

Toxoneura trimacula (Meigen, 1826) (Figure 3c, d)

Specimens examined. Çorum: İskilip, Ahlatçık, 31.VII.2017, 40°46' N, 34°18' E, 1374 m, 1 ♂, leg. M. Yaran; Sinop: Ayancık, Gökçukur, 17.VII.2017, 41°39' N, 34°40' E, 866 m, 1 ♂, leg. M. Yaran; Ayancık, Gökdere, 21.VI.2018, 41°39' N, 34°40' E, 801 m, 2 ♂♂, leg. M. Yaran.

Remarks. Larvae of species develop in the stems of *Heracleum* sp. (Chandler 1991) and *Angelica sylvestris* (Rotheray, 2014). Adult members of *T. trimacula* were collected from a humid and wet habitat with abundant *P. hybridus* on the floor of a *C. libani* forest (Figure 4).

Global distribution. Austria, Belgium, Bosnia and Herzegovina, Britain, Czech Republic, Danish mainland, Faroe Is., Finland, French mainland, Germany, Hungary, Iceland, Ireland, Italian mainland, Lithuania, Northern Ireland, Northwest European Russia, Norwegian mainland, Poland, Romania, Slovakia, Slovenia, Spanish mainland, Sweden, Switzerland, The Netherlands and Ukraine (Merz, 2011).

Figure 4. Habitats of the Pallopteridae species collected: a, b) Çorum, Bayat, Kunduzlu, c) Çorum, İskilip, Ahlatçık, d) Sinop, Ayancık, Gökçukur.

Discussion

The family Pallopteridae includes 71 valid species worldwide and 39 species distributed in the Palearctic Region (Pape et al., 2011; Han, 2013). There is no information about distribution of this family in Turkey. This is the first record of the family Pallopteridae in Turkey. In the study, four species of Pallopteridae (*P. ustulata*, *P. umbellatarum*, *T. basimaculata* and *T. trimacula*) were identified for the first time.

Turkey is the only country covered almost entirely by three of the 34 global biodiversity hotspots: the Caucasus, Irano-Anatolian and the Mediterranean. At the nexus of Europe, the Middle East, Central Asia and Africa, Turkey's location, mountains, and its encirclement by three seas have resulted in spectacular biodiversity, making Turkey "the biodiversity superpower of Europe" (Şekercioğlu, 2011). It is clear that Turkey has many different biotopes and ecological conditions. Many species, genera and families will be waiting to be discovered in Turkey, and some species might become extinct before they can be collected and described.

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