

Fruit fly (Diptera: Tephritidae) Fauna of Amasya and Samsun Provinces, with Two New Records for Turkey

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ABSTRACT

In this study, the fruit fly (Diptera: Tephritidae) fauna of Amasya and Samsun Provinces were determined by adult fruit fly specimens collected from host plants in spring and summer between 2015 and 2018. The specimens were collected from host plants with sweeping nets, and killed in ethyl acetate jars. The collected materials were examined as morphological and the species were diagnosed under a stereo microscope. Fifty-six species and 21 genera belonging to five subfamilies were determined for the fruit fly fauna of Amasya and Samsun Provinces. The genera *Anomoia* Walker and *Philophylla* Rondani as well as the species *Anomoia purmunda* (Harris) and *Philophylla caesio* (Harris) are recorded for the first time for the fauna of Turkey. Material examined and wing photographs belonging to all the species determined in research region are given. In addition to adult body and aculeus figures, their host plants and zoogeographic distribution of the new record species are presented for the fauna of Turkey.

Zoology

Research Article

Article History

Received : 13.04.2021

Accepted : 15.9.2021

Keywords

Fruit flies
Fauna
Amasya
Samsun
Türkiye

Türkiye İçin İki Yeni Kayıt İle Birlikte Amasya ve Samsun İllerinin Meyve Sineği (Diptera: Tephritidae) Faunası

ÖZET

Bu çalışmada, Amasya ve Samsun illerinin meyve sineği (Diptera: Tephritidae) faunası, 2015 ile 2018 yılları arasında ilkbahar ve yaz aylarında konukçu bitkilerden toplanan ergin meyve sineği örnekleri ile belirlenmiştir. Örnekler konukçu bitkiler üzerinden atrap ile toplanmış ve etil asetatlı şişelerde öldürülmüştür. Toplanan materyaller morfolojik olarak incelenmiş ve türler stereo mikroskop altında teşhis edilmiştir. Amasya ve Samsun illerinin meyve sineği faunası için beş alt familyaya ait 56 tür ve 21 cins belirlenmiştir. *Anomoia* Walker ve *Philophylla* Rondani cinslerinin yanı sıra *Anomoia purmunda* (Harris) ve *Philophylla caesio* (Harris) türleri Türkiye faunası için ilk kez kaydedilmiştir. Araştırma bölgesinde tespit edilen tüm türlere ait incelenen materyal bilgileri ve kanat fotoğrafları verilmiştir. Türkiye faunası için yeni kayıt türlerinin ergin vücut ve aculeus fotoğraflarının yanında konukçu bitkileri ve zoocoğrafik dağılımları da sunulmuştur.

Zooloji

Araştırma Makalesi

Makale Tarihçesi

Geliş Tarihi : 13.04.2021

Kabul Tarihi : 15.09.2021

Anahtar Kelimeler

Meyve sinekleri,
Fauna,
Amasya,
Samsun,
Türkiye

To Cite : Görmez V, Kütük M 2022. Fruit fly (Diptera: Tephritidae) fauna of Amasya and Samsun Provinces, with two new records for Turkey. KSU J. Agric Nat 25 (4): 723-734. <https://doi.org/10.18016/ksutarimdog.vi.915417>

Atf İçin : Görmez V, Kütük M 2022. Türkiye İçin İki Yeni Kayıt İle Birlikte Amasya ve Samsun İllerinin Meyve Sineği (Diptera: Tephritidae) Faunası. KSÜ Tarım ve Doğa Derg 25 (4): 723-734. <https://doi.org/10.18016/ksutarimdog.vi.915417>

INTRODUCTION

Tephritidae (fruit flies) is one of the largest families of order Diptera which has 492 genera and 4716 species worldwide (Pape et al., 2011). Today, 1500 fruit fly species are related with fruits, and 250 of these

species found to be economically harmful (Li et al., 2013). Many species feed on plants belonging to the Asteraceae family (Freidberg and Kugler, 1989).

Researches are carried out in Turkey since 1927 about fruit flies. In particular, important findings

have been obtained in studies conducted in recent years. In the last decade alone, 9 new species (*Terellia askaleensis* Kütük et al., 2011; *Tephritis ozaslani* Kütük et al., 2012; *Terellia freidbergi* Korneyev et al., 2013; *Urophora turkeyensis* Yaran and Kütük, 2014; *Heringina arezoana* Namin and Korneyev, 2015; *Carpomya liat* (Freidberg, 2016); *Terellia akguli* Yaran et al., 2018; *Tephritis turkeri* Kütük and Yaran, 2020; *Tephritis kutuki* Yaran and Görmez, 2020) were identified, 6 genera (*Acidia* Robineau-Desvoidy, *Acinia* Loew, *Chetostoma* Rondani, *Dacus* Fabricius, *Hemilea* Loew, *Ictericoides* Hering) and 16 species (*Acidia cognata* (Wiedemann), *Acinia biflexa* (Loew), *Campiglossa sororcula* (Wiedemann), *Carpomya wiedemanni* (Meigen), *Chetostoma curvinerve* Rondani, *Dacus ciliatus* Loew, *Goniurellia tridens* (Hendel, 1910), *Hemilea dimidiata* (Costa), *Ictericoides zelleri* (Loew), *Tephritis zernyi* Hendel, *Terellia armeniaca* Korneyev, *Terellia ivannikovi* Korneyev et al., *Terellia nigronata* (Korneyev), *Terellia plagiata* (Dahlbom), *Urophora tenuis* Becker, *Urophora trinervii* Korneyev and White) were also reported as new records in Turkey (Görmez, 2011; Bayrak, 2011; Kütük et al., 2011, 2012; Kütük et al., 2013; Korneyev et al., 2013; Yaran and Kütük, 2014, 2015, 2016; Korneyev and Kolcsar, 2015; Namin and Korneyev, 2015; Freidberg, 2016; Yaran et al., 2018a, 2018b; Çalışkan Keçe et al., 2019; Görmez and Kütük, 2020; Kütük and Yaran, 2020; Yaran et al., 2021). With these contributions, the number of fruit fly species increased to 173 species and 38 genera belonging to five subfamilies in Turkey.

In this paper, fifty-six fruit flies species determined and recorded for the first time in Amasya and Samsun provinces. In addition, the genera *Anomoia* Walker and *Philophylla* Rondani as well as species *Anomoia purmunda* (Wiedemann, 1817) and *Philophylla caesio* (Meigen, 1826) are given for the fruit fly fauna of Turkey as new records.

MATERIAL and METHOD

In Amasya and Samsun Provinces, extensive field studies has been carried out and adult fruit fly specimens were collected in spring and summer between 2015 and 2018. The specimens were collected with sweeping nets and killed with ethyl acetate. All specimens are deposited in Entomology Museum of Gaziantep University. The collected materials were examined and diagnosed under a stereo microscope. Identification of the specimens was made by examining the morphological characters in the head, thorax and abdomen. Besides wing patterns, aculeus sizes and morphologies (especially for *Chaetorellia* and *Oxyna* species) were compared. Sources used to diagnose species: Hendel (1927), White (1988), Freidberg and Kugler (1989), White and Marquardt (1989), Korneyev and White (1993, 1999), Merz

(1994), Kütük (2003a, 2003b), Korneyev (2003, 2006), Kütük and Yaran (2011), Korneyev (2013), Korneyev and Evstigneev (2013), Korneyev et al. (2013, 2017) and Namin and Nozari (2015).

RESULT

As a result, fifty-six species and 21 genera belonging to five subfamilies (Aciurinae, Myopitinae, Tephritinae, Terellinae, Trypetinae) were determined for the fruit fly fauna of Amasya and Samsun Provinces. The genera *Anomoia* Walker and *Philophylla* Rondani as well as the species *A. purmunda* (Harris) and *P. caesio* (Harris) are new records from Turkey.

The faunistic information of obtained species presented alphabetically in the below.

Acanthiophilus helianthi (Rossi, 1794) (Figure 1)

Material examined: Amasya, Duruca, 40°44'N, 35°47'E, 510m, 29.06.2015, 1♂; Merzifon, Yaylacık, 40°38'N, 35°23'E, 1125m, 27.07.2015, 1♂; Suluova, Küpeli, 40°52'N, 35°27'E, 485m, 29.07.2015, 1♀; Taşova, Dudluk, 40°44'N, 36°17'E, 255m, 01.07.2017, 2♀♀, 2♂♂; Göynücek, Gözlek, 40°32'N, 35°40'E, 827m, 01.07.2017, 2♀♀, 3♂♂; Gümüşhacıköy, Sekü, 40°57'N, 36°06'E, 809m, 27.07.2017, 2♀♀, 2♂♂; Taşova, Destek, 40°51'N, 36°07'E, 800m, 30.07.2017, 1♀, 7♂♂; Samsun, Havza, Yenice, 40°59'N, 35°45'E, 680m, 29.06.2015, 1♀; Atakum, Çakıryalı, 41°23'N, 36°11'E, 30m, 30.06.2015, 2♀♀; Alaçam, Zeytin, 41°36'N, 35°41'E, 60m, 30.06.2015, 4♀♀, 2♂♂; Çarşamba, Esençay, 41°06'N, 36°35'E, 115m, 30.05.2016, 1♀, 1♂; Tekkeköy, Hamzalı, 41°20'N, 36°53'E, 18m, 29.06.2016, 1♀, 3♂♂; Terme, Evcii, 41°09'N, 37°03'E, 5m, 18.06.2017, 3♀♀, 3♂♂; Alaçam, Kapaklı, 41°30'N, 35°35'E, 801m, 28.07.2017, 4♀♀, 6♂♂; Bafra, Esençay, 41°20'N, 35°50'E, 115m, 29.07.2017, 4♀♀, 3♂♂; Havza, Boyalı, 41°13'N, 35°52'E, 770m, 29.07.2017, 15♀♀, 6♂♂; Ladik, İbi, 40°58'N, 35°54'E, 779m, 30.07.2017, 10♀♀, 7♂♂; Kavak, Akbelen, 41°09'N, 35°53'E, 910m, 18.08.2017, 1♀; Tekkeköy, Ovabaşı, 41°12'N, 36°30'E, 3m, 18.08.2017, 1♀; Ayvacık, Çamlıkale, 40°55'N, 36°29'E, 1005m, 18.08.2017, 1♂.

Aciura coryli (Rossi, 1794) (Figure 2)

Material examined: Amasya, Gümüşhacıköy, Kırca, 40°56'N, 35°08'E, 897m, 22.06.2018, 1♀, 2♂♂.

Campiglossa absinthii (Fabricius, 1805) (Figure 3)

Material examined: Amasya, Gözlek, 40°32'N, 35°40'E, 590m, 27.07.2015, 1♀, 1♂.

Campiglossa bidentis (Robineau – Desvoidy, 1830) (Figure 4)

Material examined: Samsun, Bafra, Doğanca,

41°39'N, 36°00'E, 10m, 02.05.2016, 1♂; Alaçam, İncirli, 41°35'N, 35°36'E, 202m, 31.05.2016, 1♀, 2♂♂.

***Campiglossa producta* (Loew, 1844) (Figure 5)**

Material examined: Amasya, Merzifon, Sarıbuğday, 40°44'N, 35°27'E, 650m, 28.07.2015, 2♀♀; Taşova, Destek, 40°51'N, 36°07'E, 800m, 30.07.2017, 2♂♂; Samsun, Havza, Yenice, 40°59'N, 35°45'E, 680m, 29.06.2015, 1♀; Kavak, Çakallı, 41°09'N, 36°06'E, 710m, 29.07.2015, 2♀♀, 3♂♂; Vezirköprü, Bakla, 41°08'N, 35°14'E, 576m, 15.06.2017, 2♂♂; Bafra, Esençay, 41°20'N, 35°50'E, 115m, 29.07.2017, 3♂♂; Kavak, Akbelen, 41°09'N, 35°53'E, 910m, 18.08.2017, 1♂.

***Carpomya schineri* (Loew, 1856) (Figure 6)**

Material examined: Amasya, Gümüşhacıköy, Sekü, 40°57'N, 36°06'E, 809m, 27.07.2017, 2♂♂.

***Ceratitidis capitata* (Wiedemann, 1824) (Figure 7)**

Material examined: Samsun, Atakum, Çakıryalı, 41°23'N, 36°11'E, 30m, 30.06.2015, 2♀♀, 3♂♂.

***Chaetorellia acrolophi* White and Marquardt, 1989 (Figure 8)**

Material examined: Amasya, Merzifon, Sazlıca, 40°50'N, 35°27'E, 613m, 19.05.2017, 3♀♀, 1♂.

***Chaetorellia carthami* Stackelberg, 1929 (Figure 9)**

Material examined: Amasya, Suluova, Küpeli, 40°52'N, 35°27'E, 485m, 29.07.2015, 1♂; Merzifon, Sazlıca, 40°50'N, 35°27'E, 613m, 19.05.2017, 2♀♀, 3♂♂; Gümüşhacıköy, Sekü, 40°57'N, 36°06'E, 809m, 27.07.2017, 2♀♀, 2♂♂; Samsun, Havza, Taşkaracaören, 40°54'N, 35°38'E, 682m, 02.05.2016, 1♀, 1♂.

***Chaetorellia conjuncta* (Becker, 1913) (Figure 10)**

Material examined: Amasya, Suluova, Küpeli, 40°52'N, 35°27'E, 485m, 29.07.2015, 1♀; Taşova, Mercimekköy, 40°47'N, 36°13'E, 585m, 17.06.2017, 6♀♀, 13♂♂; Göynücek, Gözlek, 40°32'N, 35°40'E, 827m, 01.07.2017, 2♂♂; Gümüşhacıköy, Sekü, 40°57'N, 36°06'E, 809m, 27.07.2017, 1♀, 6♂♂; Samsun, Vezirköprü, Bakla, 41°08'N, 35°14'E, 576m, 15.06.2017, 8♀♀, 11♂♂; Kavak, Ahırlı, 41°04'N, 35°58'E, 630m, 17.06.2017, 5♂♂; Tekkeköy, Taşdemir, 41°12'N, 36°34'E, 9m, 17.06.2017, 2♀♀, 9♂♂; Bafra, Esençay, 41°18'N, 35°50'E, 223m, 29.07.2017, 3♀♀, 26♂♂; Havza, Boyalı, 41°13'N, 35°52'E, 770m, 29.07.2017, 17♀♀, 25♂♂; Ladik, İbi, 40°58'N, 35°54'E, 779m, 30.07.2017, 6♀♀, 17♂♂.

***Chaetorellia jaceae* (Robineau – Desvoidy, 1830) (Figure 11)**

Material examined: Amasya, Gözlek, 40°32'N, 35°40'E, 590m, 27.07.2015, 2♂♂; Samsun, Vezirköprü, Yağınözü, 41°10'N, 35°23'E, 591m, 31.07.2015, 1♀; Havza, Bekdiğin, 40°59'N, 35°46'E, 675m, 02.05.2016, 2♀♀, 1♂; Bafra, Esençay, 41°20'N, 35°50'E, 115m, 29.07.2017, 1♀.

***Chaetorellia loricata* (Rondani, 1870) (Figure 12)**

Material examined: Samsun, Ladik, Sarıgazel, 40°53'N, 35°46'E, 985m, 29.07.2015, 1♀, 2♂♂.

***Chaetorellia succinea* (Costa, 1844) (Figure 13)**

Material examined: Amasya, Gümüşhacıköy, Sekü, 40°57'N, 36°06'E, 809m, 27.07.2017, 1♀; Samsun, Havza, Yenice, 40°59'N, 35°45'E, 680m, 29.06.2015, 4♀♀, 1♂; Vezirköprü, Yağınözü, 41°10'N, 35°23'E, 591m, 31.07.2015, 3♀♀; Çarşamba, Esençay, 41°06'N, 36°35'E, 115m, 30.05.2016, 5♀♀, 11♂♂; Alaçam, İncirli, 41°35'N, 35°36'E, 202m, 31.05.2016, 7♀♀, 8♂♂.

***Chaetostomella cylindrica* (Robineau – Desvoidy, 1830) (Figure 14)**

Material examined: Amasya, Merzifon, Sazlıca, 40°50'N, 35°27'E, 613m, 19.05.2017, 1♂; Gümüşhacıköy, Sekü, 40°57'N, 36°06'E, 809m, 27.07.2017, 2♀♀, 3♂♂.

***Ensina sonchi* (Linnaeus, 1767) (Figure 15)**

Material examined: Samsun, Bafra, Esençay, 41°20'N, 35°50'E, 115m, 29.07.2017, 1♀; Bafra, Esençay, 41°18'N, 35°50'E, 223m, 29.07.2017, 2♀♀, 2♂♂.

***Euaresta bullans* (Wiedemann, 1830) (Figure 16)**

Material examined: Amasya, Gümüşhacıköy, Sarıköy, 40°51'N, 35°23'E, 720m, 15.06.2017, 4♀♀, 5♂♂; Taşova, Dudluk, 40°44'N, 36°17'E, 255m, 01.07.2017, 38♀♀, 26♂♂; Göynücek, Kertme, 40°27'N, 35°27'E, 855m, 01.07.2017, 16♀♀, 24♂♂; Samsun, Çarşamba, Esençay, 41°06'N, 36°35'E, 115m, 30.05.2016, 2♀♀, 4♂♂; Tekkeköy, Hamzalı, 41°20'N, 36°53'E, 18m, 29.06.2016, 1♀; Bafra, Kabaçukur, 41°19'N, 35°50'E, 123m, 18.08.2017, 15♀♀, 16♂♂.

***Myopites apicatus* Freidberg, 1980 (Figure 17)**

Material examined: Amasya, Taşova, Sarıkız, 40°29'N, 35°59'E, 510m, 19.08.2017, 2♀♀, 3♂♂.

***Myopites cypriacus* Hering, 1938 (Figure 18)**

Material examined: Amasya, Taşova, Karabük, 40°43'N, 36°09'E, 267m, 19.08.2017, 1♀, 5♂♂.

***Orellia stictica* (Gmelin, 1790) (Figure 19)**

Material examined: Samsun, Havza, Çayırözü, 40°58'N, 35°36'E, 727m, 17.06.2017, 3♀♀, 1♂.

***Oxyna flavipennis* (Loew, 1844) (Figure 20)**

Material examined: Amasya, Merzifon, Karacaören, 40°51'N, 35°21'E, 751m, 22.06.2018, 2♀♀, 2♂♂.

***Sphenella marginata* (Fallen, 1814) (Figure 21)**

Material examined: Amasya, Gümüşhacıköy, Sarıköy, 40°51'N, 35°23'E, 720m, 15.06.2017, 1♂; Merzifon, Karatepe, 40°49'N, 35°21'E, 618m, 20.08.2017, 2♀♀, 6♂♂; Samsun, Atakum, Değirmendüzü, 41°15'N, 36°10'E, 190m, 30.06.2015, 2♂♂; Havza, Boyalı, 41°13'N, 35°52'E, 770m, 29.07.2017, 1♀, 2♂♂; Ladik, İbi, 40°58'N, 35°54'E, 779m, 30.07.2017, 2♀♀, 1♂.

***Anomoia purmunda* (Harris, 1780) (Figures 22-25)**

Material examined: Samsun, Havza, Boyalı, 41°13'N, 35°52'E, 770m, 29.07.2017, 3♂♂.

Host plant: *Cotonoaster* spp., *Crataegus* spp. and *Malus* spp. (Merz, 1994).

Distribution: Austria, Belgium, Britain Island, Bulgaria, Central European Russia, Channel Island, Corsica, Czech Republic, Danish mainland, East Palaearctic, Estonia, Finland, French mainland, Germany, Hungary, Ireland, Italian mainland, Lithuania, Near East, Northern Ireland, Netherlands, Norwegian mainland, Poland, Slovakia, Spanish mainland, Sweden, Switzerland, Ukraine (Fauna Europaea, 2020).

This genus and species are new records for the fauna of Turkey.

***Philophylla caesio* (Harris, 1780) (Figures 26-29)**

Material examined: Amasya, Gümüşhacıköy, Sekü, 40°57'N, 36°06'E, 809m, 27.07.2017, 1♀, 1♂; Gümüşhacıköy, Sekü, 40°57'N, 36°06'E, 809m, 22.06.2018, 2♂♂; Samsun, Bafra, Esençay, 41°20'N, 35°50'E, 115m, 29.07.2017, 1♀.

Host plant: *Urtica dioica* (Merz, 1994).

Distribution: Andorra, Austria, Belgium, Britain Island, Bulgaria, Central European Russia, Channel Island, Corsica, Czech Republic, Danish mainland, East European Russia, Finland, French mainland, Germany, Hungary, Ireland, Italian mainland, Lithuania, Near East, Netherlands, Northern Ireland, Norwegian mainland, Poland, Slovakia, Spanish mainland, Sweden, Switzerland, Ukraine, Yugoslavia (Fauna Europaea, 2020).

This genus and species are new records for the fauna of Turkey.

***Tephritis acanthiophilopsis* (Hering, 1938) (Figure 30)**

Material examined: Amasya, Göynücek, Gözlek, 40°32'N, 35°40'E, 827m, 01.07.2017, 2♀♀, 2♂♂.

***Tephritis bardanae* (Schrank, 1803) (Figure 31)**

Material examined: Amasya, Gümüşhacıköy, Sarıköy, 40°51'N, 35°23'E, 720m, 15.06.2017, 2♀♀, 1♂.

***Tephritis dioscurea* (Loew, 1856) (Figure 32)**

Material examined: Amasya, Taşova, Mercimekköy, 40°47'N, 36°13'E, 585m, 17.06.2017, 1♀; Göynücek, Çulpura, 40°39'N, 35°32'E, 1000m, 01.07.2017, 1♂; Samsun, Bafra, Kolay, 41°22'N, 35°48'E, 59m, 30.05.2016, 1♂; Çarşamba, Arım Köseli, 41°21'N, 36°79'E, 29m, 29.06.2016, 1♂; Terme, 41°12'N, 36°51'E, 12m, 19.05.2017, 1♂; Vezirköprü, Kocakaya, 41°18'N, 35°08'E, 275m, 14.06.2017, 1♂, 1♀; Havza, Boyalı, 41°13'N, 35°52'E, 770m, 29.07.2017, 2♀♀, 9♂♂.

***Tephritis divisa* Rondani, 1871 (Figure 33)**

Material examined: Amasya, Göynücek, Gözlek, 40°32'N, 35°40'E, 827m, 01.07.2017, 3♀♀, 4♂♂; Taşova, Destek, 40°51'N, 36°07'E, 800m, 30.07.2017, 1♀, 1♂; Samsun, Çarşamba, Esençay, 41°06'N, 36°35'E, 115m, 30.05.2016, 1♂; Havza, Boyalı, 41°13'N, 35°52'E, 770m, 29.07.2017, 6♀♀, 8♂♂; Ayvacık, Çamlıkale, 40°55'N, 36°29'E, 1005m, 18.08.2017, 1♀.

***Tephritis erdemlii* Kütük, 2008 (Figure 34)**

Material examined: Samsun, Alaçam, Kapaklı, 41°30'N, 35°35'E, 801m, 28.07.2017, 3♀♀, 1♂.

***Tephritis formosa* (Loew, 1844) (Figure 35)**

Material examined: Amasya, Merzifon, Sarıbuğday, 40°44'N, 35°27'E, 650m, 28.07.2015, 2♀♀, 2♂♂; Gümüşhacıköy, Sekü, 40°57'N, 36°06'E, 809m, 27.07.2017, 8♀♀, 12♂♂; Samsun, Havza, Boyalı, 41°13'N, 35°52'E, 770m, 29.07.2017, 1♀.

***Tephritis hyoscyami* (Linnaeus, 1758) (Figure 36)**

Material examined: Amasya, Merzifon, Sazlıca, 40°50'N, 35°27'E, 613m, 19.05.2017, 6♀♀, 14♂♂; Göynücek, Gözlek, 40°32'N, 35°40'E, 827m, 01.07.2017, 1♀, 1♂; Taşova, Destek, 40°51'N, 36°07'E, 800m, 30.07.2017, 2♀♀, 1♂; Gümüşhacıköy, Sekü, 40°57'N, 36°06'E, 809m, 30.07.2017, 2♀♀, 1♂; Samsun, Kavak, 41°03'N, 35°58'E, 640m, 30.06.2015, 2♀♀, 9♂♂; Ladik, Sarıgazel, 40°53'N, 35°46'E, 985m, 29.07.2015, 13♀♀, 10♂♂; Havza, Boyalı, 41°13'N, 35°52'E, 770m, 29.07.2017, 9♀♀, 16♂♂; Ayvacık, Çamlıkale, 40°55'N, 36°29'E, 1005m, 18.08.2017, 1♀, 1♂.

***Tephritis matricariae* (Loew, 1844) (Figure 37)**

Material examined: Amasya, Gümüşhacıköy, Sekü, 40°57'N, 36°06'E, 809m, 30.07.2017, 1♀; Samsun, Canik, Avluca, 41°10'N, 36°16'E, 415m, 29.07.2015, 1♂; Kavak, Kuzalan, 41°03'N, 35°58'E, 747m, 29.05.2016, 1♀; Bafra, Kolay, 41°22'N, 35°48'E, 59m, 30.05.2016, 1♂.

***Tephritis nigricauda* (Loew, 1856) (Figure 38)**

Material examined: Amasya, Sarımeşe, 40°34'N, 36°04'E, 664m, 29.05.2016, 1♂; Samsun, Ladik, Sarıgazel, 40°53'N, 35°46'E, 985m, 29.07.2015, 1♀.

***Tephritis postica* (Loew, 1844) (Figure 39)**

Material examined: Amasya, Merzifon, Sazlıca, 40°50'N, 35°27'E, 613m, 19.05.2017, 6♀♀, 14♂♂; Gümüşhacıköy, Sarıköy, 40°51'N, 35°23'E, 720m, 15.06.2017, 5♀♀, 7♂♂; Taşova, Destek, 40°51'N, 36°07'E, 800m, 30.07.2017, 1♀; Samsun, Kavak, 41°03'N, 35°58'E, 640m, 30.06.2015, 1♀; Ladik, 40°54'N, 35°54'E, 896m, 17.06.2017, 2♀♀, 7♂♂.

***Tephritis praecox* (Loew, 1844) (Figure 40)**

Material examined: Amasya, Taşova, Türkmendamı, 40°44'N, 36°13'E, 355m, 02.05.2016, 1♀; Samsun, Kavak, 41°03'N, 35°58'E, 640m, 30.06.2015, 1♀.

***Tephritis sauterina* Merz, 1994) (Figure 41)**

Material examined: Amasya, Gümüşhacıköy, Sekü, 40°57'N, 36°06'E, 809m, 27.07.2017, 1♂; Samsun, Bafra, Kolay, 41°22'N, 35°48'E, 59m, 30.05.2016, 1♂; Havza, Boyalı, 41°13'N, 35°52'E, 770m, 29.07.2017, 1♂.

***Tephritis separata* Rondani, 1871 (Figure 42)**

Material examined: Amasya, Göynücek, Gözlek, 40°32'N, 35°40'E, 827m, 01.07.2017, 1♀, 1♂; Samsun, Havza, Boyalı, 41°13'N, 35°52'E, 770m, 29.07.2017, 2♀♀, 3♂♂.

***Tephritomyia lauta* (Loew, 1869) (Figure 43)**

Material examined: Amasya, Merzifon, Yaylacık, 40°38'N, 35°23'E, 1125m, 27.07.2015, 1♂; Taşova, Destek, 40°51'N, 36°07'E, 800m, 30.07.2017, 1♀, 1♂; Samsun, Bafra, Kolay, 41°22'N, 35°48'E, 59m, 30.05.2016, 2♀♀, 5♂♂; Ladik, 40°54'N, 35°54'E, 894m, 30.07.2017, 2♀♀, 2♂♂.

***Terellia gynaecochroma* (Hering, 1937) (Figure 44)**

Material examined: Amasya, Gümüşhacıköy, Sekü, 40°57'N, 36°06'E, 809m, 27.07.2017, 20♀♀, 24♂♂; Samsun, Havza, Çelikalan, 41°12'N, 35°51'E, 639m, 29.07.2017, 9♀♀, 11♂♂.

***Terellia luteola* (Wiedemann, 1830) (Figure 45)**

Material examined: Amasya, Göynücek, Çulpura, 40°39'N, 35°32'E, 1000m, 01.07.2017, 4♀♀, 2♂♂; Gümüşhacıköy, Sekü, 40°57'N, 36°06'E, 809m, 30.07.2017, 1♂; Samsun, Vezirköprü, Türkmen, 41°13'N, 35°26'E, 275m, 28.07.2017, 6♀♀.

***Terellia nigripalpis* Hendel, 1927 (Figure 46)**

Material examined: Samsun, Canik, Avluca, 41°10'N, 36°16'E, 415m, 29.07.2015, 2♀♀, 1♂.

***Terellia serratulae* (Linnaeus, 1758) (Figure 47)**

Material examined: Amasya, Merzifon, Sazlıca, 40°50'N, 35°27'E, 613m, 19.05.2017, 35♀♀, 42♂♂; Gümüşhacıköy, Sekü, 40°57'N, 36°06'E, 809m, 27.07.2017, 5♀♀, 11♂♂; Taşova, Yuvaköy, 40°39'N, 36°09'E, 927m, 19.08.2017, 12♀♀, 6♂♂; Samsun, Tekkeköy, Taşdemir, 41°12'N, 36°34'E, 9m, 17.06.2017, 1♀, 4♂♂; Bafra, Esençay, 41°20'N, 35°50'E, 115m, 29.07.2017, 14♀♀, 18♂♂; Havza, Boyalı, 41°13'N, 35°52'E, 770m, 29.07.2017, 41♀♀, 45♂♂; Ayvacık, Çamlıkale, 40°55'N, 36°29'E, 1005m, 18.08.2017, 2♀♀, 5♂♂.

***Terellia virens* (Loew, 1846) (Figure 48)**

Material examined: Amasya, Merzifon, Sazlıca, 40°50'N, 35°27'E, 613m, 19.05.2017, 9♀♀, 8♂♂; Samsun, Havza, Boyalı, 41°13'N, 35°52'E, 770m, 29.07.2017, 9♀♀, 13♂♂; Kavak, Akbelen, 41°09'N, 35°53'E, 910m, 18.08.2017, 9♀♀, 11♂♂.

***Trupanea amoena* (Frauenfeld, 1857) (Figure 49)**

Material examined: Amasya, Taşova, Mercimekköy, 40°47'N, 36°13'E, 585m, 17.06.2017, 1♀; Samsun, Kavak, Akbelen, 41°09'N, 35°53'E, 910m, 18.08.2017, 1♂.

***Trupanea stellata* (Fuesslin, 1775) (Figure 50)**

Material examined: Amasya, Taşova, Dudluk, 40°44'N, 36°17'E, 255m, 01.07.2017, 2♀♀, 2♂♂.

***Urophora affinis* (Frauenfeld, 1857) (Figure 51)**

Material examined: Amasya, Suluova, 40°49'N, 35°37'E, 465m, 29.05.2016, 4♀♀, 14♂♂; Göynücek, Gözlek, 40°32'N, 35°40'E, 827m, 01.07.2017, 4♀♀, 18♂♂; Samsun, Çarşamba, Esençay, 41°06'N, 36°35'E, 115m, 30.05.2016, 6♀♀, 8♂♂; Havza, Çayırözü, 40°58'N, 35°36'E, 727m, 17.06.2017, 23♀♀, 45♂♂; Tekkeköy, Taşdemir, 41°12'N, 36°34'E, 9m, 17.06.2017, 1♀; Terme, Evcı, 41°09'N, 37°03'E, 5m, 18.06.2017, 1♀, 3♂♂.

***Urophora aprica* (Fallen, 1814) (Figure 52)**

Material examined: Amasya, Taşova, Dudluk, 40°44'N, 36°17'E, 255m, 01.07.2017, 1♂, 1♀; Samsun,

Vezirköprü, Yağınözü, 41°10'N, 35°23'E, 591m, 31.07.2015, 3♀♀, 5♂♂.

Urophora congrua Loew, 1862 (Figure 53)

Material examined: Samsun, Kavak, Çakallı, 41°09'N, 36°06'E, 710m, 29.07.2015, 1♀, 3♂♂.

Urophora cuspidata (Meigen, 1826) (Figure 54)

Material examined: Amasya, Merzifon, Yaylacık, 40°38'N, 35°23'E, 1125m, 27.07.2015, 2♀♀; Musaköy, 40°28'N, 35°44'E, 787m, 30.06.2016, 6♂♂; Gümüşhacıköy, Sekü, 40°57'N, 36°06'E, 809m, 27.07.2017, 2♂♂; Samsun, Alaçam, İncirli, 41°35'N, 35°36'E, 202m, 31.05.2016, 1♂; Vezirköprü, Bakla, 41°08'N, 35°14'E, 576m, 15.06.2017, 3♀♀, 6♂♂; Kavak, Ahırlı, 41°04'N, 35°58'E, 630m, 17.06.2017, 1♀, 3♂♂; Bafra, Esençay, 41°20'N, 35°50'E, 115m, 29.07.2017, 1♀.

Urophora jaceana (Hering, 1935) (Figure 55)

Material examined: Amasya, Suluova, Küpeli, 40°52'N, 35°27'E, 485m, 29.07.2015, 2♀♀; Merzifon, Sazlıca, 40°50'N, 35°27'E, 613m, 19.05.2017, 3♀♀, 2♂♂; Gümüşhacıköy, Sekü, 40°57'N, 36°06'E, 809m, 27.07.2017, 1♀, 1♂; Samsun, Vezirköprü, Yağınözü, 41°10'N, 35°23'E, 591m, 31.07.2015, 3♀♀, 2♂♂; Bafra, Esençay, 41°20'N, 35°50'E, 115m, 29.07.2017, 5♀♀, 12♂♂.

Urophora mauritanica Macquart 1851 (Figure 56)

Material examined: Amasya, Musaköy, 40°28'N, 35°44'E, 787m, 30.06.2016, 1♀; Samsun, Vezirköprü, Yağınözü, 41°10'N, 35°23'E, 591m, 31.07.2015, 1♀, 3♂♂.

Urophora phalolepidis Merz & White, 1991 (Figure 57)

Material examined: Amasya, Merzifon, Sazlıca, 40°50'N, 35°27'E, 613m, 19.05.2017, 1♀, 2♂♂; Samsun, Vezirköprü, Yağınözü, 41°10'N, 35°23'E, 591m, 31.07.2015, 1♀, 3♂♂; Çarşamba, Dikbiyık, 41°13'N, 36°36'E, 10m, 30.05.2016, 2♀♀, 1♂.

Urophora quadrifasciata (Meigen, 1826) (Figure 58)

Material examined: Amasya, Gümüşhacıköy, Sekü, 40°57'N, 36°06'E, 809m, 27.07.2017, 2♀♀, 5♂♂; Samsun, Havza, Boyalı, 41°13'N, 35°52'E, 770m, 29.07.2017, 2♂♂.

Urophora solstitialis (Linnaeus, 1758) (Figure 59)

Material examined: Amasya, Gümüşhacıköy, Sekü, 40°57'N, 36°06'E, 809m, 27.07.2017, 4♂♂; Samsun, Vezirköprü, Türkmen, 41°13'N, 35°26'E, 275m, 28.07.2017, 7♂♂.

Urophora stylata (Fabricius, 1775) (Figure 60)

Material examined: Amasya, Duruca, 40°44'N, 35°47'E, 510m, 29.06.2015, 8♀♀, 11♂♂; Göynücek, Gözlek, 40°32'N, 35°40'E, 827m, 01.07.2017, 1♀, 1♂; Gümüşhacıköy, Sekü, 40°57'N, 36°06'E, 809m, 27.07.2017, 2♀♀, 9♂♂; Taşova, Destek, 40°51'N, 36°07'E, 800m, 30.07.2017, 12♀♀, 18♂♂; Samsun, Bafra, Dedeli, 41°32'N, 35°51'E, 50m, 30.06.2015, 1♀, 2♂♂; Canik, Avluca, 41°10'N, 36°16'E, 415m, 29.07.2015, 6♀♀, 11♂♂; Çarşamba, Esençay, 41°06'N, 36°35'E, 115m, 30.05.2016, 1♂; Havza, Dereköy, 41°06'N, 35°42'E, 564m, 29.07.2017, 9♀♀, 23♂♂.

Urophora terebrans (Loew, 1850) (Figure 61)

Material examined: Samsun, Ondokuzmayıs, Karakavuk, 41°22'N, 36°08'E, 149m, 30.05.2016, 1♀, 2♂♂.

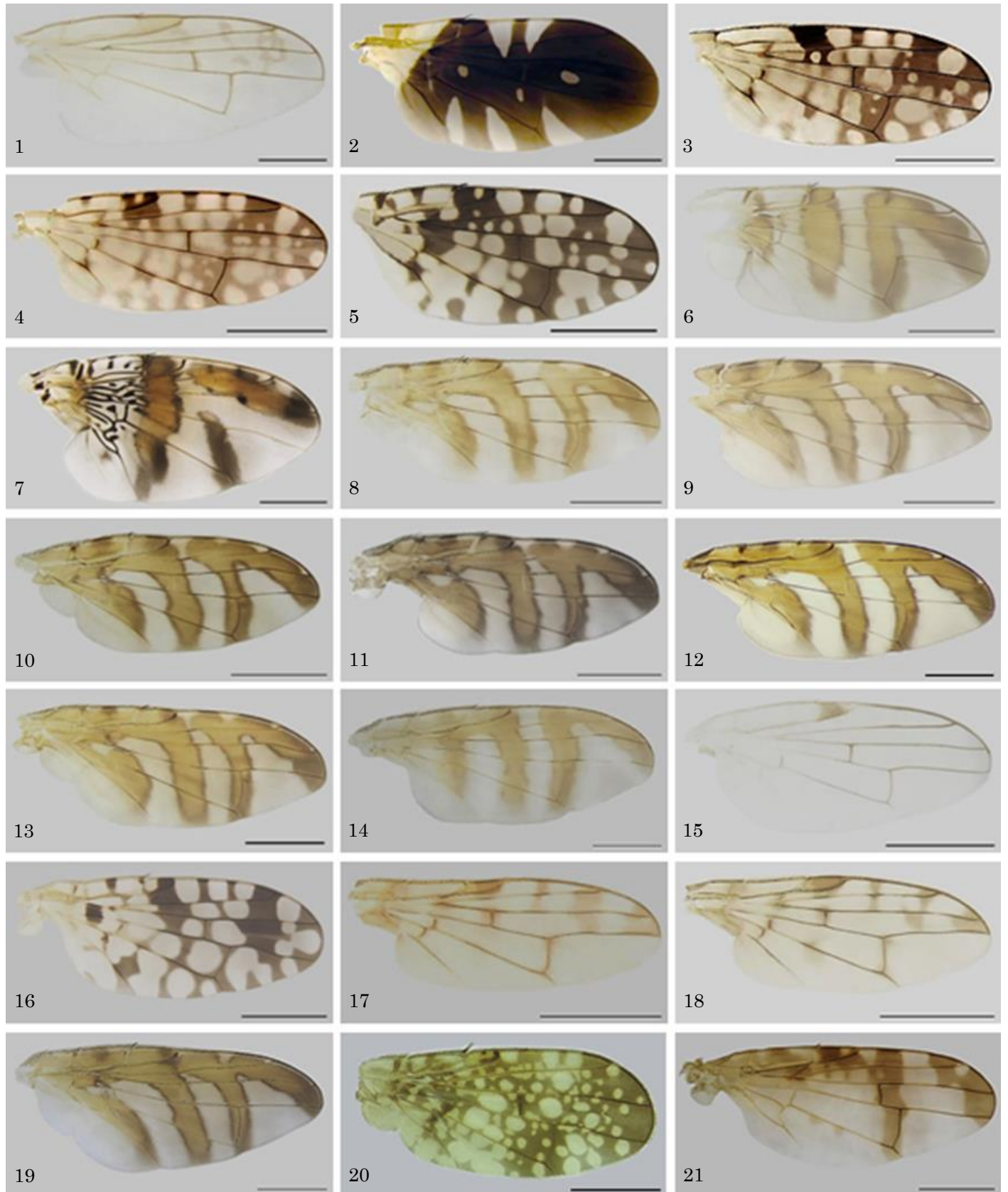
Xyphosia miliaria (Schrank, 1781) (Figure 62)

Material examined: Amasya, Musaköy, 40°28'N, 35°44'E, 787m, 30.06.2016, 5♀♀, 7♂♂; Gümüşhacıköy, Sekü, 40°57'N, 36°06'E, 809m, 30.07.2017, 2♀♀; Taşova, Yuvaköy, 40°39'N, 36°09'E, 927m, 19.08.2017, 4♂♂; Samsun, Vezirköprü, Güldere, 41°17'N, 35°55'E, 630m, 29.07.2017, 3♂♂; Havza, Boyalı, 41°13'N, 35°52'E, 770m, 29.07.2017, 11♀♀, 23♂♂.

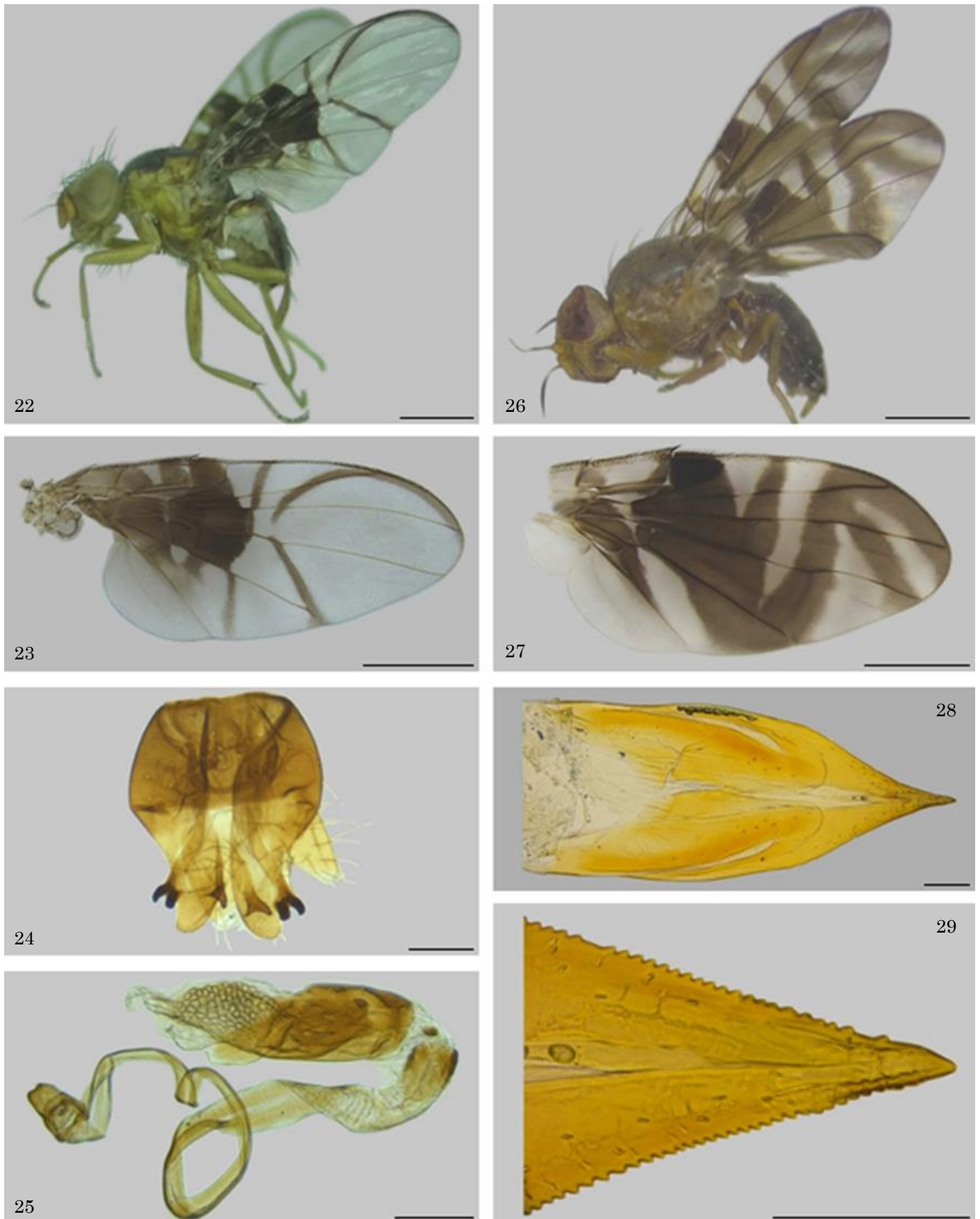
DISCUSSION

We determined the fruit fly fauna of Amasya and Samsun by identifying the species collected from the region between 2015 – 2018 years. As a result, fifty-six species and 21 genera belonging to five subfamilies of Tephritidae were determined. The genera *Anomoia* Walker and *Philophylla* Rondani as well as the species *Anomoia purmunda* (Harris) and *Philophylla caesio* (Harris) were recorded for the first time from Turkey. With these contributions, fruit fly fauna of Turkey has reached to 40 genera and 175 species.

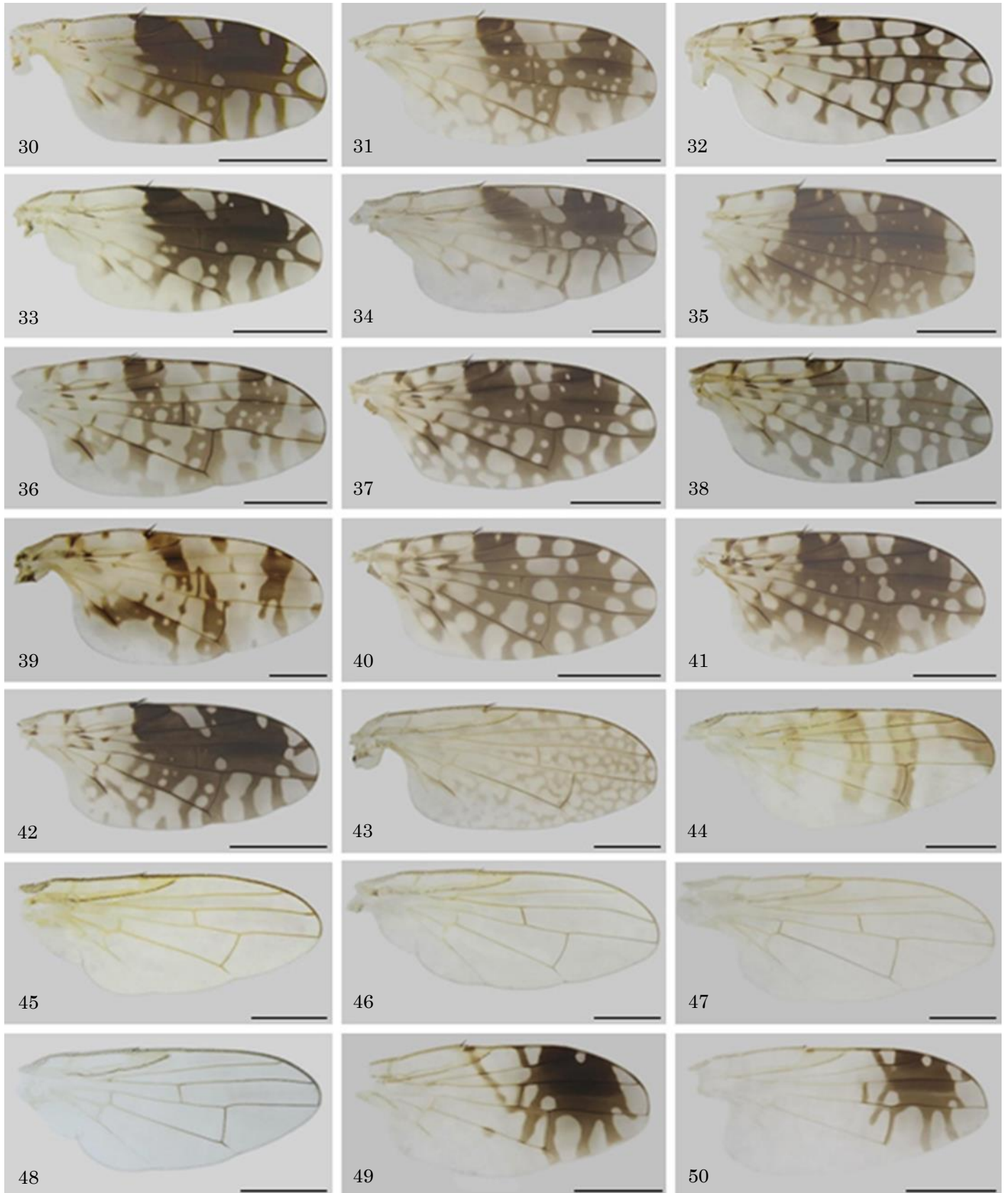
Amasya and Samsun are neighbour provinces in the north of Turkey. Central Anatolian climate observed in the south of the region, while Black Sea climate is dominant in general. Forty-six fruit fly species were identified from Amasya Province and 45 from Samsun Province. The number of species detected in both Amasya and Samsun Provinces indicates that the research region has a rich biodiversity. This could be explained by the fact that these provinces are under the influence of both Central Anatolia and Black Sea climate and have different ecosystems. On the other hand, according to previous faunistic studies, the fact that 28 species have been identified in Gaziantep Province (Yaran & Kütük, 2012), 38 species in Yozgat Province (Kütük et al., 2019) and 33 species in Ordu Province (Katrancı, 2019) can be attributed to the



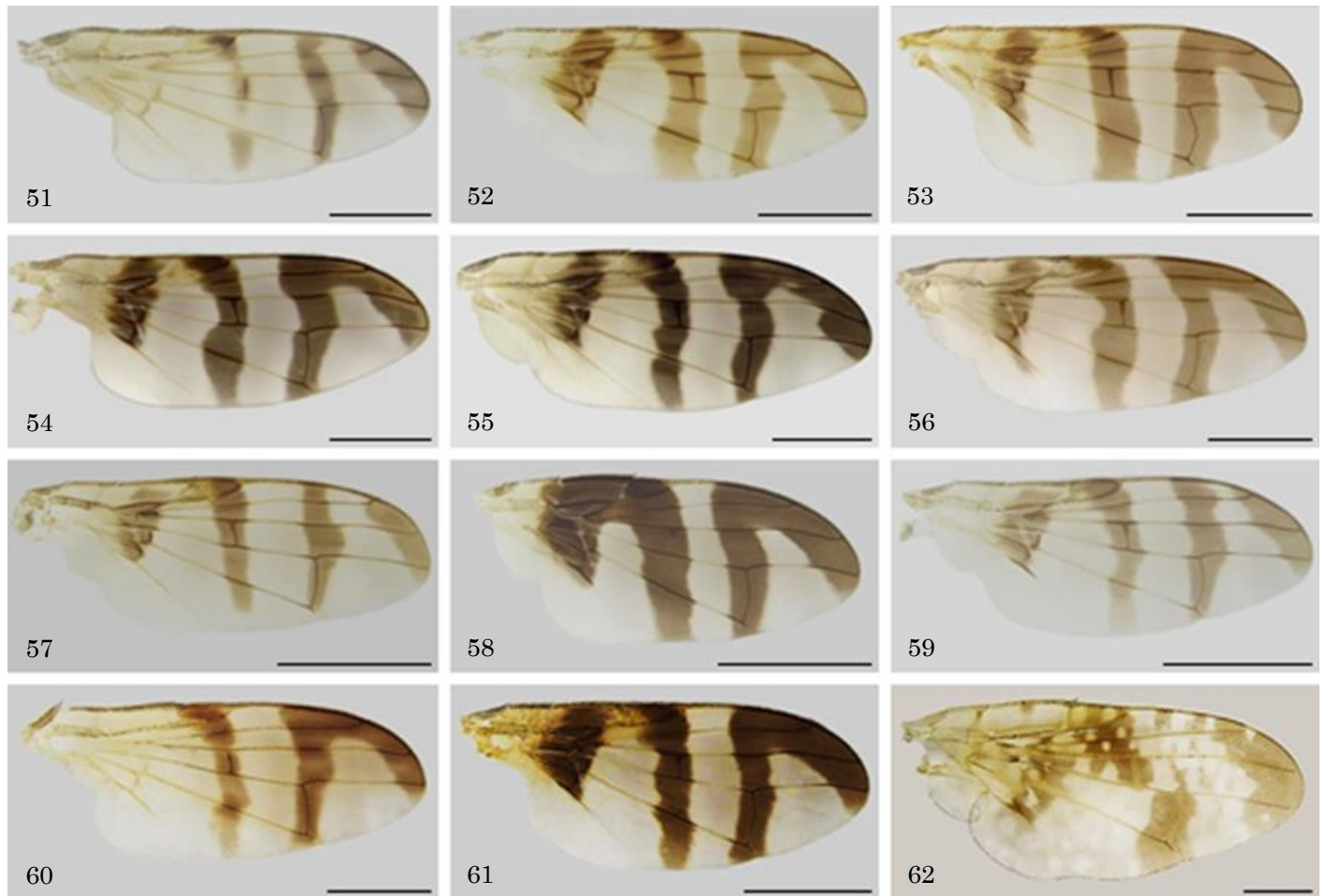
Figures 1-21. Wings of fruit fly species; 1. *Acanthiophilus helianthi*, 2. *Aciura coryli*, 3. *Campiglossa absinthii*, 4. *Cam. bidentis*, 5. *Cam. producta*, 6. *Carpomya schineri*, 7. *Ceratitis capitata*, 8. *Chaetorellia acrolophi*, 9. *Cha. carthami*, 10. *Cha. conjuncta*, 11. *Cha. jaceae*, 12. *Cha. loricata*, 13. *Cha. succinae*, 14. *Chaetostomella cylindrica*, 15. *Ensina sonchi*, 16. *Euaresta bullans*, 17. *Myopites apicatus*, 18. *Myo. cypriacus*, 19. *Orellia stictica*, 20. *Oxyna flavipennis*, 21. *Sphenella marginata*. (Scale bar: 1 mm).



Figures 22–29. *Anomoia purmunda*; 22. adult, 23. wing, 24. epandrium, 25. glans; *Philophylla caesio*; 26. adult, 27. wing, 28. aculeus 29. apex of aculeus, (Scale bars; 22, 23, 26, 27: 1 mm; 24, 25, 28, 29: 0,1 mm).



Figures 30-50. Wings of fruit fly; 30. *Tephritis acanthiophilopsis*, 31. *Tep. bardanae*, 32. *Tep. dioscurea*, 33. *Tep. divisa*, 34. *Tep. erdemlii*, 35. *Tep. formosa*, 36. *Tep. hyoscyami*, 37. *Tep. matricariae*, 38. *Tep. nigricauda*, 39. *Tep. postica*, 40. *Tep. praecox*, 41. *Tep. sauterina*, 42. *Tep. separata*, 43. *Tephritomyia lauta*, 44. *Terellia gynaeochroma*, 45. *Ter. luteola*, 46. *Ter. nigripalpis*, 47. *Ter. serratulae*, 48. *Ter. virens*, 49. *Trupanea amoena*, 50. *Tru. stellata*. (Scale bar: 1 mm).



Figures 51-62. Wings of fruit fly species; 51. *Urophora affinis*, 52. *U. aprica*, 53. *U. congrua*, 54. *U. cuspidata*, 55. *U. jaceana*, 56. *U. macrura*, 57. *U. phalolepidis*, 58. *U. quadrifasciata*, 59. *U. solstitialis*, 60. *U. stylata*, 61. *U. terebrans*, 62. *Xyphosia miliaria*, (Scale bar: 1 mm).

influence of a single climate dominance in the given regions. The high biodiversity is directly related to the climate, ecosystem and habitat diversity in the region.

TEŞEKKÜR [Century10 bold]

This study was produced from a part of the first author's PhD thesis. We thank to Gaziantep Scientific Research Projects Department (BAP) for providing financial support with PhD thesis project (project number: FEF.15.08) in our study.

Statement of Conflict of Interest

Authors have declared no conflict of interest.

Author's Contributions

The contribution of the authors is equal

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