

# The Fruit Fly (Diptera: Tephritidae) Fauna of Kayseri and Sivas Provinces with a New Record for Turkey

Murat KÜTÜK

Gaziantep University, Faculty of Science and Arts, Department of Biology, 27310, Gaziantep - TURKEY

Received: 26.01.2007

**Abstract:** This study is based on the fruit fly material collected in the Kayseri and Sivas provinces of Turkey during 2005 and 2006. Thirty-nine species of fruit flies were identified in the study region. *Urophora tenuior* Hendel is recorded for the first time from Turkey. The distribution, host plants, and figures of wing patterns of each species are given. The zoogeographic distribution of the species is included.

**Key Words:** Fruit flies, Tephritidae, Turkey, fauna, Kayseri, Sivas

## Kayseri ve Sivas İllerinde Meyve Sinekleri (Diptera: Tephritidae) Faunasının Belirlenmesi ve Türkiye Faunasına Yeni Bir Kayıt

**Özet:** Bu çalışma 2005-2006 yıllarında Kayseri ve Sivas illerinden toplanan meyve sinekleri materyaline dayanmaktadır. Araştırma bölgesi içerisinde otuz dokuz meyve sineği türü belirlenmiştir. *Urophora tenuior* Hendel Türkiye faunasına yeni kayıt olarak rapor edilmiştir. Her bir türün lokalitesi, konukçu bitkileri ve kanat desenleri verilmiştir. Türlerin Zoocoğrafik yayılışları belirtilmiştir.

**Anahtar Sözcükler:** Meyve sinekleri, Tephritidae, Türkiye, fauna, Kayseri, Sivas

### Introduction

Fruit flies (Tephritidae) are one of the largest families of the acalyprate Diptera, numbering over 4300 valid species worldwide (Norrbom, 2004). Many species of fruit flies, especially the subfamily Tephritinae, develop in plants of the family Asteraceae (Freidberg and Kugler, 1989). Some species of Tephritidae infest the flowerheads of Asteraceae hosts, collectively belonging to several tribes, with or without the induction of galls. Some species induce the formation of galls in flowerheads, stems, or roots of Asteraceae (Freidberg, 1984).

Ninety-four species of fruit flies were reported in Turkey by Kütük (2003a). In addition, *Tephritis merzi* Freidberg and Kütük were described from Turkey in 2002, and *Urophora doganlari* Kütük and *Myoleja korneyevi* Han and Kütük in 2006. *Tephritis dioscurea* (Loew), *T. divisa* Rondani, *T. mariannae* Merz, *Terellia*

*gynaecochroma* (Hering), *T. luteola* (Wiedemann), *Urophora neuenschwanderi* Freidberg, and *U. variabilis* Loew have also been recorded in Turkey (Kütük, 2003a, 2005). Therefore, the fauna of fruit flies in Turkey totals 104 species. Comprehensive keys to species for several countries are available (e.g., Freidberg and Kugler, 1989, for Israel and nearby areas; Merz, 1994, for North and Central Europe; White, 1988, for Great Britain).

### Materials and Methods

Adult specimens were collected using an insect net from the host plant in various locations in Kayseri and Sivas provinces, Turkey, during 2005 and 2006. [This study was supported by the Project of Research Foundation of İnönü University (project number: 2004–3)]. These specimens are deposited at the insect museum of Gaziantep University, Department of Biology,

Gaziantep. Species were identified using the keys by Hering (1944), Freidberg and Kugler (1989), and Merz (1994). The terminology follows primarily White et al. (2000). Synonymy is found in Norrbom et al. (1999). Host plants were identified by Şemsettin Civelek (Firat University, Department of Biology, Elazığ, Turkey) and Necattin Türkmen (Çukurova University, Department of Biology, Adana, Turkey).

## Results

In this study, 39 species of 16 genera of fruit flies (*Acanthiophilus*, *Actinoptera*, *Chaetorellia*, *Chaetostomella*, *Ensina*, *Euaresta*, *Orellia*, *Oxyna*, *Rhagoletis*, *Sphenella*, *Tephritis*, *Tephritomyia*, *Terellia*, *Trupanea*, *Urophora*, and *Xyphosia*) were collected in Kayseri and Sivas provinces during 2005-2006. In this paper, *Urophora tenuior* Hendel is recorded for the first time from Turkey. Genera and species are listed in alphabetical order.

### *Acanthiophilus helianthi* (Rossi, 1794)

(Figure 1)

*Specimens examined:* Kayseri: 3 ♂♂, 7 ♀♀, Pınarbaşı, Kaynar, 38°59'N, 36°23'E, 1615 m, 05.07.2005; 2 ♀♀, Sarız, 38°27'N, 36°28'E, 1610 m, 08.07.2005; 3 ♂♂, 6 ♀♀, Pınarbaşı, Karaboğaz, 38°47'N, 36°27'E, 1550 m, 08.07.2005; 6 ♂♂, 7 ♀♀, Yazılı, 38°38'N, 35°42'E, 1545 m, 17.08.2005; 3 ♂♂, 5 ♀♀, Sarız, Yeşilkent, 38°18'N, 36°26'E, 1575 m, 16.07.2006; Sivas: 3 ♂♂, 7 ♀♀, Ulaş, 39°33'N, 36°56'E, 1430 m, 19.06.2005; 3 ♂♂, 3 ♀♀, Ulaş, Altınyayla, 39°21'N, 37°01'E, 1580 m, 04.07.2005; 1 ♂, 3 ♀♀, 39°40'N, 37°00'E, 1295 m, 05.07.2005; 3 ♂♂, 3 ♀♀, Yıldızeli, Pamukpınar, 39°56'N, 36°31'E, 1500 m, 05.07.2005; 2 ♂♂, 3 ♀♀, Şarkışla, Tavladere, 39°14'N, 36°28'E, 1500 m, 05.07.2005; 3 ♂♂, Gürün, Yazıyurdu, 38°45'N, 37°05'E, 1550 m, 15.07.2006.

*Distribution:* Most of Europe (except north) (Merz and Korneyev, 2004), Transcaucasica, Near East (from Turkey and Israel to Iran), Central Asia, East Palaearctic, North Africa and Oriental Region (Norrbom et al., 1999).

*Host plants:* *Carthamus tinctorius* L., *Cart. glaucus* M. Bieb., *Cart. tenuis* L., *Centaurea iberica* Trev. ex Spreng, *Cent. pallescens* Delile, *Cent. procurrens* Sieb., *Cent. nigra* L., *Cent. calpitropa* L., *Cent. solstitialis* L., *Cent. scabiosa* L., *Cent. stoebe* L., *Cent. jacea* L., *Cent. cyanus*

L., *Serratula* spp., *Acroptilon* spp., *Scolymus hispanicus* L. and numerous allied species of the subtribe Centaureinae, and possibly other genera of the tribe Cardueae (Giray 1979; White, 1988; Freidberg and Kugler, 1989; Merz, 1994).

### *Actinoptera discoidea* (Fallén, 1814)

(Figure 2)

*Specimens examined:* Sivas: 3 ♂♂, 4 ♀♀, Kangal, Sipahikonağı, 38°13'N, 36°12'E, 1450 m, 04.07.2005; 2 ♂♂, 2 ♀♀, Kangal, Kuşkayası, 39°06'N, 37°14'E, 1515 m, 15.08.2006.

*Distribution:* Europe (Merz and Korneyev, 2004); Transcaucasica (Richter, 1970); Turkey (Kütük and Özgür, 2004).

*Host plant:* *Helichrysum arenarium* (L.) Moench. (Frauenfeld, 1857)

### *Chaetorellia carthami* Stackelberg, 1929

(Figure 3)

*Specimens examined:* Kayseri: 9 ♂♂, 7 ♀♀, Pınarbaşı, Kaynar, 38°59'N, 36°23'E, 1615 m, 05.06.2005; 3 ♂♂, 4 ♀♀, Sarız, 38°27'N, 36°28'E, 1610 m, 08.07.2005; 4 ♂♂, 3 ♀♀, Sarız, Kemer, 38°18'N, 36°26'E, 1575 m, 16.06.2006; Sivas: 3 ♂♂, 6 ♀♀, Şarkışla, 39°14'N, 36°28'E, 1500 m, 05.07.2005; 2 ♂♂, 3 ♀♀, Şarkışla, Tavladere, 39°08'N, 36°26'E, 1680 m, 05.07.2005; 3 ♂♂, 5 ♀♀, Kangal, Akgedikli, 39°02'N, 37°44'E, 1500 m, 15.06.2006; 2 ♂♂, 2 ♀♀, Gürün, Yazıyurdu, 38°45'N, 37°05'E, 1625 m, 15.07.2006.

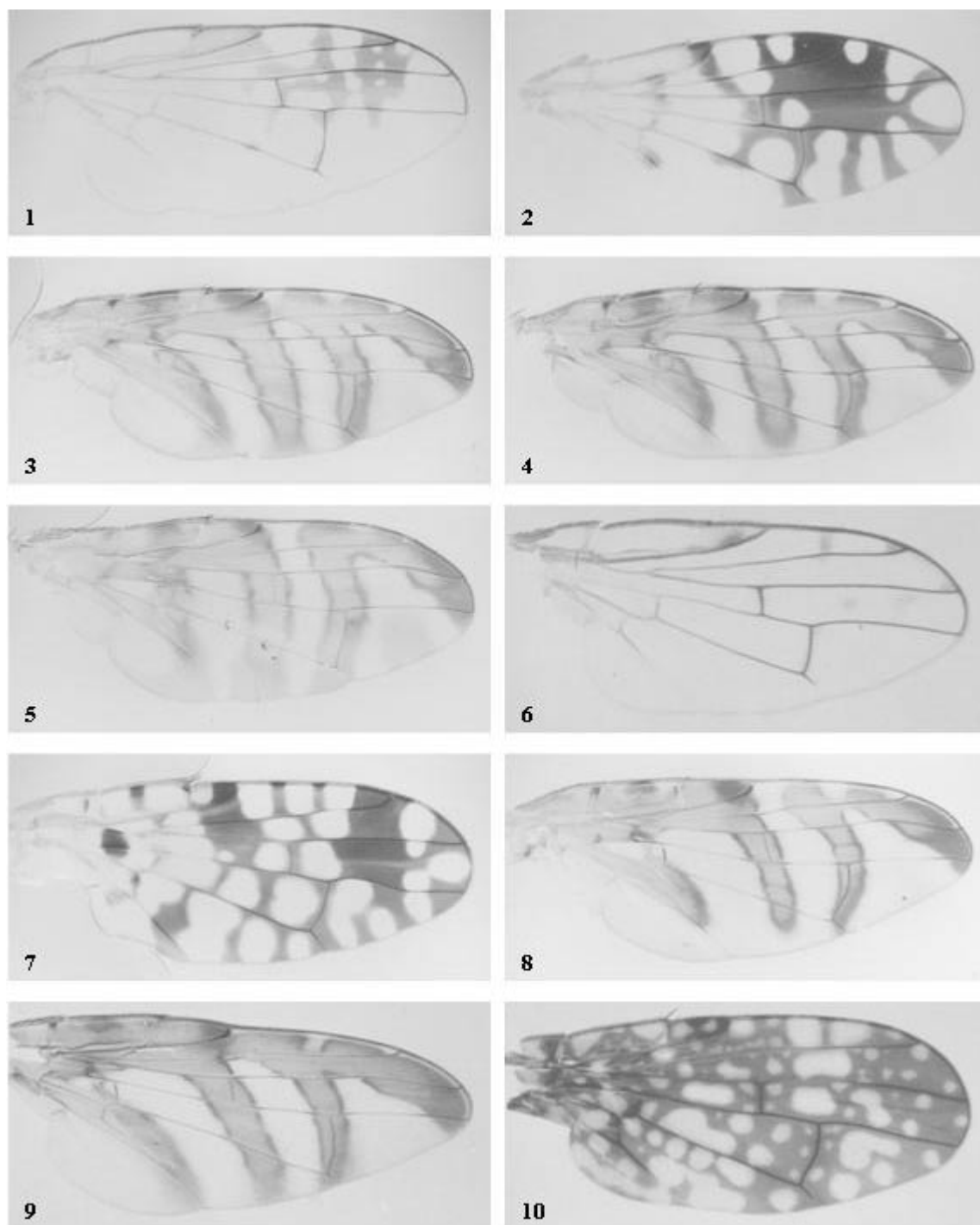
*Distribution:* Cyprus, Israel, Iraq, Uzbekistan (White and Marquardt, 1989), Turkey (Kütük and Özgür, 2003).

*Host plants:* *Carthamus tenuis* L., *C. tinctorius* L. (White and Marquardt, 1989).

### *Chaetorellia loricata* (Rondani, 1870)

(Figure 4)

*Specimens examined:* Kayseri: 4 ♂♂, 4 ♀♀, Pınarbaşı, Kaynar, 38°59'N, 36°23'E, 1615 m, 05.07.2005; 3 ♂♂, 5 ♀♀, Pınarbaşı, Aşağıbeyçayır, 38°41'N, 36°28'E, 1665 m, 16.07.2006; Sivas: 10 ♂♂, 8 ♀♀, Yıldızeli, Çermik, 39°48'N, 36°43'E, 1345 m, 05.07.2005; 4 ♂♂, 8 ♀♀, Kangal, Kuşkayası, 39°06'N, 37°14'E, 1515 m, 15.07.2006; 6 ♂♂, 10 ♀♀, Kangal, Akgedikli, 39°02'N, 37°44'E, 1500 m, 15.07.2006; 3 ♂♂, 6 ♀♀, Gürün, Konakpınar, 38°55'N, 37°17'E, 1775 m, 13.08.2006.



Figures 1-10. Wings of fruit flies: 1- *Acanthiophilus helianthi*, 2- *Actinoptera discoidea*, 3- *Chaetorellia carthami*, 4- *Chaetorellia loricata*, 5- *Chaetostomella cylindrica*, 6- *Ensina sonchi*, 7- *Euresta bullans*, 8- *Orellia falcata*, 9- *Orellia stictica*, 10- *Oxya plavipennis*.

*Distribution:* Most of Europe, except north (Merz and Korneyev, 2004); Turkey (White and Marquardt, 1989; Kütük and Özgür, 2003).

*Host plants:* *Centaurea scabiosa* L. (White & Marquardt, 1989), *C. alpestris* Hegetschw., *C. tenuifolia* Dufour (Merz, 1994) in Europe.

*Chaetostomella cylindrica* (Robineau-Desvoidy, 1830)

(Figure 5)

*Specimens examined:* Kayseri: 2 ♂♂, 2 ♀♀, Pınarbaşı, Kaynar, 38°59'N, 36°23'E, 1615 m, 15.06.2005; 4 ♂♂, 6 ♀♀, Hisarcık, 38°36'N, 35°30'E, 1790 m, 07.07.2005; 6 ♂♂, 6 ♀♀, Pınarbaşı, Aşağıbeyçayır, 38°41'N, 36°28'E, 1665 m, 16.07.2006; 3 ♂♂, 5 ♀♀, Pınarbaşı, 38°43'N, 36°25'E, 1530 m, 16.08.2006; Sivas: 6 ♂♂, 7 ♀♀, Taşlıdere, 39°36'N, 37°01'E, 1335 m, 04.07.2005; 2 ♂♂, 3 ♀♀, Yıldızeli, Çermik, 39°48'N, 36°43'E, 1345 m, 05.07.2005; 3 ♂♂, 3 ♀♀, Gürün, Yazıyurdu, 38°45'N, 37°05'E, 1625 m, 15.07.2006.

*Distribution:* Most of Europe, except north (Merz and Korneyev, 2004); Turkey (Kütük and Özgür, 2003).

*Host plants:* *Onopordum cynarocephalum* Boiss. et Bl., *O. acanthium* L., *O. floccosum* L., *Cousinia hermonis* L., *Echinops viscosus* DC, *Arctium tomentosum* L., *Carduus crispus* L., *Card. nutans* L., *Centaurea bracteata* L., *Cent. cyanus* L., *Cent. iberica* Trev. ex Spreng, *Cent. solstitialis* L., *Cent. nigrescens* L., *Cent. maculosa* L., *Cent. nervosa* L., *Cent. nigra* L., *Cent. scabiosa* L., *Cent. jacea* L., *Cent. montana* L., *Cent. triumfetti* L., *Cirsium arvense* (L.) Scop., *Cirs. oleraceum* (L.) Scop., *Cirs. gaillardotii* L., *Cirs. palustre* (L.) Scop., *Cirs. rivulare* (L.) Scop., *C. aculae* L., *C. eriophorum* (L.) Scop., *C. eristhales* (L.) Scop., *C. tuberosum* (L.) All., *Cirs. vulgare* (Savi) Ten., *Carthamus tenuis* (Boiss.) Bornm., *Crupina vulgaris* L., *Jurinea mollis* Boiss. and Hausskn., *Serratula tinctoria* L., *Picnoman acarna* L. (White, 1988; Freidberg and Kugler, 1989; Merz, 1994; Kütük and Özgür, 2003).

*Ensina sonchi* (Linnaeus, 1767)

(Figure 6)

*Specimens examined:* Kayseri: 3 ♂♂, 5 ♀♀, Pınarbaşı, Kaynar, 38°59'N, 36°23'E, 1615 m, 08.06.2005; 2 ♀♀, Tomarza, Dadaloğlu, 38°29'N, 36°06'E, 1570 m, 06.07.2005; 2 ♂♂, Yahyalı, Delialıuşağı, 37°59'N, 35°32'E, 1510 m, 11.08.2006; 2 ♂♂, 4 ♀♀, Sarız, 38°16'N, 36°23'E, 1545 m, 13.08.2006.

*Distribution:* Most of Europe (Merz and Korneyev, 2004); North Africa; Asia from Transcaucasia (Richter, 1970), Turkey, Israel, Iran, to Far East Russia, Japan, and China, introduced into tropical Asia, Ethiopia, and Hawaii (Giray, 1979; Freidberg and Kugler, 1989; Merz, 1994; Norrbom et al., 1999; Merz and Korneyev, 2004).

*Host plants:* Various Cichorieae (*Chondrilla*, *Cichorium*, *Crepis*, *Helminthia*, *Hypochoeris*, *Lactuca*, *Picris*, *Prenanthes*, *Scorzonera*, *Sonchus*, *Taraxacum*, *Tragopogon* spp.) and *Leucanthemum vulgare* Lam. (Freidberg and Kugler, 1989; Merz, 1994).

*Euaresta bullans* (Wiedemann, 1830)

(Figure 7)

*Specimens examined:* Kayseri: 3 ♂♂, 6 ♀♀, Tomarza, 38°24'N, 35°53'E, 1390 m, 16.06.2005; 8 ♂♂, 10 ♀♀, Yahyalı, Yeşilköy, 37°55'N, 35°31'E, 1020 m, 06.07.2005; 3 ♂♂, Hisarcık, 38°36'N, 35°30'E, 1790 m, 07.08.2005.

*Distribution:* Peru, China, Argentina, Uruguay; introduced into the USA, southern part of Europe (Bulgaria, France, Greece (Crete), Hungary, Italy, FYR Macedonia, Moldova, Russia, Slovakia, Spain, Ukraine), Middle East (Israel, Turkey), South Africa, and Australia (Freidberg and Kugler, 1989; Norrbom et al., 1999).

*Host plant:* *Xanthium spinosum* L. (Freidberg and Kugler, 1989).

*Orellia falcata* (Scopoli, 1763)

(Figure 8)

*Specimens examined:* Kayseri: 1 ♂, 1 ♀, Sarız, 38°27'N, 36°28'E, 1610 m, 08.06.2005; Sivas: 2 ♀♀, Kangal, 39°14'N, 37°10'E, 1540 m, 04.07.2005; 2 ♂♂, 3 ♀♀, Kangal, Akgedikli, 39°02'N, 37°44'E, 1500 m, 15.07.2006.

*Distribution:* Most of Europe (Merz and Korneyev, 2004), Turkey, Israel, West Siberia, Central Asia (Giray, 1979; Freidberg and Kugler, 1989; Norrbom et al., 1999; Merz and Korneyev, 2004).

*Host plants:* *Tragopogon longirostris* Bischoff ex Sch.Bip., *T. orientalis* L. and *T. pratensis* L. in Europe (White, 1988; Freidberg and Kugler, 1989; Merz, 1994). Larvae in stems, pupation at root collar.

*Orellia stictica* (Gmelin, 1790)

(Figure 9)

*Specimens examined:* Kayseri: 1 ♂, 1 ♀, Tomarza, 38°24'N, 35°53'E, 1390 m, 06.07.2005; Sivas: 3 ♂♂, 5 ♀♀, Kangal, Akgedikli, 39°02'N, 37°44'E, 1500 m, 15.07.2006; 2 ♂♂, 2 ♀♀, Gürün, Konakpınar, 38°55'N, 37°17'E, 1775 m, 15.07.2006.

*Distribution:* Austria, Bulgaria, Czech Republic, France, Germany, Hungary, Romania, Sweden,

Switzerland, Ukraine (Merz and Korneyev, 2004); Armenia, Azerbaijan, Syria (Korneyev, 1987), Turkey (Kütük and Özgür, 2003), Kazakhstan, Kyrgyzstan, Far East Russia (Korneyev and Ovchinnikova, 2004).

*Host plants:* Various species of *Tragopogon*, occasionally *Taraxacum serotinum* (Waldst. and Kit.) Poir. and *Scorzonera* spp. (Korneyev, 1987); *Tragopogon orientalis* L. (Merz, 1994; Kütük and Özgür, 2003). Larvae in flowerheads.

*Oxya flavipennis* (Loew, 1844)

(Figure 10)

*Specimens examined:* Kayseri: 1 ♂, Hisarcık, 38°36'N, 35°30'E, 1790 m, 07.07.2005; 3 ♂♂, 2 ♀♀ Sarız, Yeşilkent, 38°18'N, 36°26'E, 1575 m, 16.07.2006; Sivas: 1 ♂, 2 ♀♀, Koyulhisar, 40°21'N, 37°47'E, 1615 m, 15.06.2005.

*Distribution:* Most of Europe (Merz and Korneyev, 2004), Turkey, East Palaearctic and Near East (White, 1988; Freidberg and Kugler, 1989; Kütük, 2003a).

*Host plants:* *Achillea millefolium* L., *A. nobilis* L. (White, 1988).

*Rhagoletis berberidis* Jermy, 1961

(Figure 11)

*Specimens examined:* Kayseri: 8 ♂♂, 12 ♀♀, Yahyalı, 38°01'N, 35°25'E, 1570 m, 06.07.2005; Sivas: 3 ♂♂, 5 ♀♀, Kangal, Sipahikonağı 38°13'N, 36°12'E, 1450 m, 04.08.2005.

*Distribution:* Austria, Hungary, Russia (North Caucasus), Slovakia, Switzerland, Turkey, Ukraine (Merz and Korneyev, 2004; Kütük and Özasan, 2006).

*Host plant:* *Berberis vulgaris* L. (Merz, 1994).

*Sphenella marginata* (Fallén, 1814)

(Figure 12)

*Specimens examined:* Kayseri: 3 ♂♂, 5 ♀♀, Erciyes plateau, 38°35'N, 35°30'E, 1945 m, 07.06.2005; 3 ♂♂, 6 ♀♀, Pınarbaşı, Karaboğaz, 38°47'N, 36°27'E, 1550 m, 08.07.2005; 3 ♂♂, 5 ♀♀, Sarız, 38°18'N, 36°26'E, 1575 m, 16.07.2006.

*Distribution:* Widespread in Europe (Merz and Korneyev, 2004), and Asia, from Near East (Freidberg and Kugler; 1989) and Turkey, eastwards to western Siberia (Richter, 1970) and Afghanistan (Diribek and Diribek, 1971), southwards to Spain and North Africa (Norrbom et al., 1999).

*Host plants:* Various species of *Senecio* (White, 1988; Freidberg and Kugler, 1989; Merz, 1994).

*Tephritis cometa* (Loew, 1856)

(Figure 13)

*Specimens examined:* Kayseri: 3 ♂♂, 5 ♀♀, Erciyes plateau, 38°31'N, 35°31'E, 2210 m, 07.07.2005; 3 ♂♂, 5 ♀♀, Sarız, Yeşilkent, 38°18'N, 36°26'E, 1575 m, 16.08.2006; Sivas: 2 ♂♂, 3 ♀♀, Kangal, Akgedikli, 39°02'N, 37°44'E, 1500 m, 15.06.2006; 2 ♂♂, 2 ♀♀, Kangal, Kuşkayası, 39°06'N, 37°14'E, 1515 m, 15.07.2006.

*Distribution:* Widespread in Europe (Merz and Korneyev, 2004), eastwards to Western Siberia, China (Xingjian), Afghanistan (Norrbom et al., 1999), including Armenia, Georgia, Iran (Zaitzev, 1947), and Turkey (Kütük, 2006a).

*Host plants:* Various species of *Cirsium*, including *C. vulgare* (Savi) Ten., *C. arvense* (L.) Scop., *C. palustre* (L.) Scop., and *C. gaillardotii* L. (Giray, 1979; White, 1988; Merz, 1994).

*Tephritis dioscurea* (Loew, 1856)

(Figure 14)

*Specimens examined:* Kayseri: 3 ♂♂, 6 ♀♀, Yıldızeli, Pamukpınar, 39°56'N, 36°31'E, 1500 m, 05.07.2005; 3 ♂♂, 4 ♀♀, Erciyes plateau, 38°35'N, 35°30'E, 1945 m, 07.08.2005; Sivas: 3 ♂♂, 5 ♀♀, Kangal, 39°06'N, 37°14'E, 1515 m, 15.08.2006.

*Distribution:* Widespread in Europe (Austria, Estonia, France, Germany, Hungary, Latvia, Lithuania, Moldova, Sweden, Switzerland, and Ukraine) (Merz, 1994; Norrbom et al., 1999; Merz and Korneyev, 2004; Georgia, Armenia (Zaitzev, 1947), and Turkey (Kütük, 2005); other records need revision.

*Host plants:* *Achillea millefolium* L., *Artemisia absinthium* L., *A. crithmifolia* L. and *Chrysanthemum corymbosum* (L.) Scop. (Hendel, 1927; Merz, 1994); *A. setacea* Waldst. and Kit. (Zaitzev, 1947).

*Tephritis formosa* (Loew, 1844)

(Figure 15)

*Specimens examined:* Kayseri: 3 ♂♂, 6 ♀♀, Tomarza, Dadaloğlu, 38°29'N, 36°06'E, 1570 m, 16.06.2005; 3 ♂♂, 2 ♀♀, Hisarcık, 38°36'N, 35°30'E, 1790 m, 07.07.2005; 3 ♂♂, 7 ♀♀, Sarız, 38°27'N, 36°28'E, 1610 m, 08.07.2005.

*Distribution:* Europe, except Scandinavia (Merz and Korneyev, 2004) to "Caucasus" (Richter, 1970), Turkey (Kütük, 2006a), Israel (Freidberg and Kugler, 1989); Iran (Dirlbek and Dirlbek, 1971) and China (Xingjian) (Wang, 1998).

*Host plants:* *Sonchus asper* (L.) Hill, *S. oleraceus* L. in mainland Europe (Merz, 1994), *S. arvensis* L. in Britain (White, 1988); records of *Hypochaeris radicata* L., and *Crepis virens* L. (Leclercq, 1967).

***Tephritis hurvitzii* Freidberg, 1981**

(Figure 16)

*Specimens examined:* Kayseri: 3 ♂♂, 5 ♀♀, Tomarza, Dadaloğlu, 38°29'N, 36°06'E, 1570 m, 06.07.2005; 3 ♂♂, 2 ♀♀, Sarız, 38°16'N, 36°23'E, 1545 m, 08.07.2005; Sivas: 3 ♂♂, 7 ♀♀, Ulaş, Altınyayla, 39°21'N, 37°01'E, 1580 m, 04.08.2005.

*Distribution:* Greece, Ukraine (Crimea), Armenia, Azerbaijan, southern Kazakhstan, Kyrgyzstan, Uzbekistan, Turkey, Cyprus, Syria, Iraq, Lebanon, Israel, Jordan, and Iran (Freidberg and Kugler, 1989; Freidberg and Kütük, 2002; Korneyev, 2003).

*Host plants:* *Scorzonera syriaca* Boiss. & Bl. and *Tragopogon longirostris* Bischoff ex Sch.Bip. (Freidberg and Kugler, 1989).

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

(Figure 17)

*Specimens examined:* Kayseri: 3 ♂♂, 3 ♀♀, Tomarza, 38°24'N, 35°53'E, 1390 m, 06.06.2005; 4 ♂♂, Tomarza, Dadaloğlu, 38°29'N, 36°06'E, 1570 m, 06.07.2005; 4 ♂♂, 7 ♀♀, Yazılı, 38°38'N, 35°42'E, 1545 m, 07.07.2005; 3 ♂♂, 7 ♀♀, Pınarbaşı, Karaboğaz, 38°47'N, 36°27'E, 1550 m, 08.08.2005; Sivas: 1 ♂, 4 ♀♀, Taşlıdere, 39°36'N, 37°01'E, 1580 m, 11.06.2005; 3 ♂♂, 5 ♀♀, Kangal, Tahtalı, 39°14'N, 37°10'E, 1540 m, 04.07.2005; 2 ♂♂, 3 ♀♀, Şarkışla, Tavladere, 39°08'N, 36°26'E, 1680 m, 05.07.2005; 6 ♂♂, 8 ♀♀, Şarkışla, 39°14'N, 36°28'E, 1500 m, 05.07.2005; 2 ♂♂, 3 ♀♀, Kangal, 39°12'N, 37°24'E, 1570 m, 15.07.2006; 4 ♂♂, 2 ♀♀, Gürün, Yazyurdu, 38°45'N, 37°05'E, 1625 m, 15.08.2006.

*Distribution:* Southern and Central Europe (Merz and Korneyev 2004), Georgia (Zaitzev, 1947), Turkey (Kütük, 2006a), Israel, Iran, North Africa (Norrbom et al., 1999), Kazakhstan (Richter, 1965), Kyrgyzstan

(Freidberg and Kugler, 1989), China (Xingjian) (Wang, 1998).

*Host plants:* *Onopordum cynarocephalum* Boiss. et al. (Freidberg and Kugler, 1989) and *O. acanthium* L. (Merz, 1994).

***Tephritis pulchra* (Loew, 1844)**

(Figure 18)

*Specimens examined:* Kayseri: 1 ♂, 1 ♀, Hisarcık, 38°36'N, 35°30'E, 1790 m, 08.08.2005; 3 ♂♂, 1 ♀, Sarız, 38°18'N, 36°26'E, 1575 m, 16.07.2006.

*Distribution:* Western, Central, and Southern Europe, Near East and North Africa (Merz and Korneyev 2004); Turkey (Freidberg and Kütük, 2002).

*Host plants:* *Scorzonera cana* (C.A.Meyer) Hoffm. and *S. laciniata* L. (Merz, 1993).

***Tephritis separata* Rondani, 1871**

(Figure 19)

*Specimens examined:* Kayseri: 3 ♂♂, Tomarza, Dadaloğlu, 38°29'N, 36°06'E, 1570 m, 16.06.2005; 3 ♂♂, 3 ♀♀, Erciyes plateau, 38°35'N, 35°30'E, 1945 m, 07.07.2005; 1 ♂, 3 ♀♀, Sarız, 38°27'N, 36°28'E, 1610 m, 08.07.2005; Sivas: 2 ♂♂, 3 ♀♀, Taşlıdere, 39°36'N, 37°01'E, 1335 m, 04.08.2005.

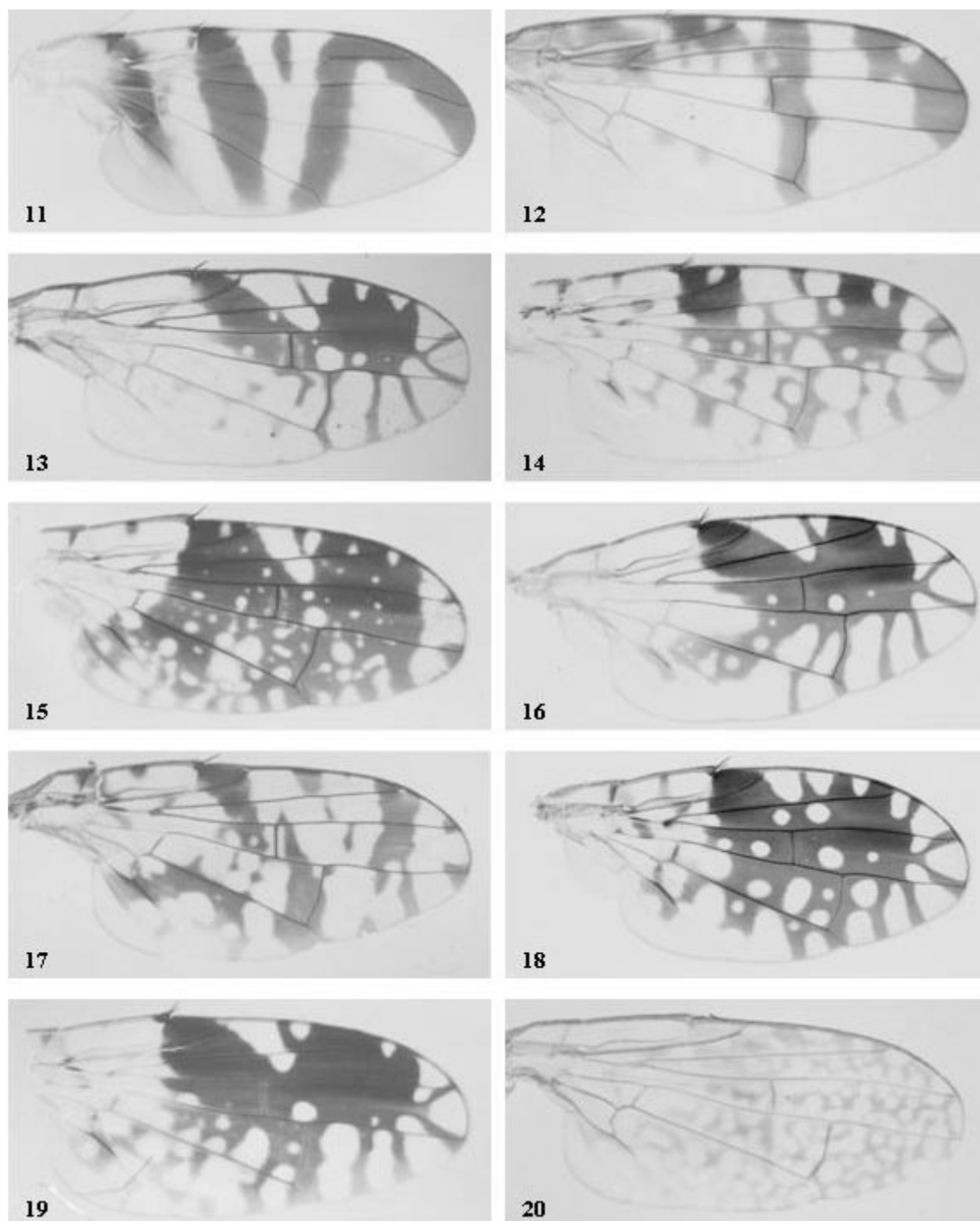
*Distribution:* Widespread in Western, Central, and Eastern Europe (Merz and Korneyev, 2004), Turkey (Kütük, 2006a), Israel (Freidberg and Kugler, 1989), Tajikistan, and possibly in West Siberia of Russia, Syria, Iraq, Kazakhstan, and Kyrgyzstan (Korneyev and Ovchinnikova, 2004).

*Host plants:* *Picris echioides* L. (White, 1988; Freidberg and Kugler, 1989; as *Helminthia echioides*), *P. hieracioides* L. (Merz, 1994).

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

(Figure 20)

*Specimens examined:* Kayseri: 4 ♂♂, 8 ♀♀, Yahyalı, Delialıuşağı, 37°59'N, 35°32'E, 1510 m, 06.07.2005; 4 ♂♂, 2 ♀♀, Kayseri, Yazılı, 38°38'N, 35°42'E, 1545 m, 07.07.2005; 3 ♂♂, 1 ♀, Sarız, Kemer, 38°22'N, 36°26'E, 1510 m, 16.07.2006; 3 ♂♂, 6 ♀♀, Sarız, Yeşilkent, 38°18'N, 36°26'E, 1575 m, 16.07.2006; Sivas: 2 ♂♂, 3 ♀♀, Kangal, Akgedikli, 39°02'N, 37°44'E, 1500 m, 15.08.2006.



Figures 11-20. Wings of fruit flies: 11- *Rhagoletis berberidis*, 12- *Sphenella marginata*, 13- *Tephritis cometa*, 14- *T. dioscurea*, 15- *T. formosa*, 16- *T. hurvitzii*, 17- *T. postica*, 18- *T. pulchra*, 19- *T. separata*, 20- *Tephritomyia lauta*.

*Distribution:* Greece (incl. mainland, Crete, Cyclades, and Dodecanese), Turkey, Israel, Iran, and Egypt (Hendel, 1927; Freidberg and Kugler, 1989).

*Host plant:* *Echinops viscosus* DC. (Freidberg and Kugler, 1989).

*Terellia ceratocera* Hendel, 1913

(Figure 21)

*Specimens examined:* Kayseri: 7 ♂♂, 4 ♀♀, Sarız, 38°27'N, 36°28'E, 1610 m, 08.07.2005; Sivas: 5 ♂♂, 4 ♀♀, Kangal, Akgedikli, 39°02'N, 37°44'E, 1500 m, 15.07.2006.

*Distribution:* Most of Europe, except south (Merz and Korneyev, 2004), Turkey (Kütük and Özgür 2003); Kazakhstan and Siberia (Richter, 1965).

*Host plants:* *Centaurea scabiosa* L. and *C. alpestris* Hegetschw. and Heer (White, 1988; Merz, 1994).

*Terellia fuscicornis* (Loew, 1844)

(Figure 22)

*Specimens examined:* Kayseri: 4 ♂♂, 3 ♀♀, Tomarza, Dadaloğlu, 38°24'N, 35°53'E, 1390 m, 06.07.2005; 3 ♂♂, 7 ♀♀, Pınarbaşı, 38°43'N, 36°25'E, 1530 m, 15.07.2006; Sivas: 3 ♂♂, 3 ♀♀, Gürün, Konakpınar, 38°55'N, 37°17'E, 1775 m, 15.07.2006.

*Distribution:* Mediterranean region (from Spain and France to Greece, Turkey, Cyprus, and Israel) (Kugler and Freidberg, 1975; Giray, 1979; Kütük and Özgür, 2003; Özgür and Kütük, 2003; Merz and Korneyev, 2004).

*Host plants:* *Cynara cardunculus* L., *C. scolymus* L., *C. syriaca* Boiss. (Kugler and Freidberg, 1975; Neuenschwander and Freidberg, 1983).

*Terellia gynaecochroma* (Hering, 1936)

(Figure 23)

*Specimens examined:* Kayseri: 2 ♂♂, 5 ♀♀, Tomarza, 38°24'N, 35°53'E, 1390 m, 06.07.2005; 4 ♂♂, 6 ♀♀, Yazılı, 38°38'N, 35°42'E, 1545 m, 07.07.2006; 3 ♂♂, 3 ♀♀, Pınarbaşı, Karaboğaz., 38°47'N, 36°27'E, 1550 m, 08.07.2005; Sivas: 6 ♂♂, 3 ♀♀, Kangal, Tahtalı, 39°14'N, 37°10'E, 1540 m, 04.06.2005; 4 ♂♂, 1 ♀, Şarkışla, 39°14'N, 36°28'E, 1500 m, 15.06.2005; 3 ♂♂, 4 ♀♀, Central, 39°40'N, 37°00'E, 1295 m, 05.07.2005; 2 ♂♂, 4 ♀♀, Taşlıderdere, 39°36'N, 37°01'E, 1335 m, 10.07.2005; 6 ♂♂, 2 ♀♀, Şarkışla, Tavludere, 39°08'N, 36°26'E, 1680 m, 11.07.2005; 3 ♂♂, 7 ♀♀, Yıldızeli, Çermik, 39°48'N, 36°43'E, 1345 m, 11.07.2006; 6 ♂♂, 9 ♀♀, Kangal, 39°12'N, 37°24'E, 1570 m, 15.07.2006; 3 ♂♂, 5 ♀♀, Gürün, Yazıyurdu, 38°45'N, 37°05'E, 1550 m, 15.07.2006; 8 ♂♂, 3 ♀♀, Kangal, Kuşqayası, 39°06'N, 36°14'E, 1515 m, 16.07.2006.

*Distribution:* Central and South Europe, Caucasus, Cyprus, Israel, Turkey, Iran, and Lebanon (Norrbom et al., 1999; Knio et al., 2002; Kütük and Varol, 2006).

*Host plants:* *Onopordum anisacanthum* L. and *O. illyricum* L. (Knio et al., 2002; Kütük and Varol, 2006).

*Terellia luteola* (Wiedemann, 1830)

(Figure 24)

*Specimens examined:* Kayseri: 3 ♂♂, 5 ♀♀, Erciyes plateau, 38°35'N, 35°30'E, 1955 m, 07.07.2005; 3 ♂♂, Pınarbaşı, Aşağıbeyçayır, 38°41'N, 36°28'E, 1665 m, 17.07.2006; Sivas: 3 ♂♂, 5 ♀♀, Şarkışla, 39°14'N, 36°28'E, 1500 m, 05.07.2005; 3 ♂♂, 3 ♀♀, Kangal, Akgedikli, 39°02'N, 37°44'E, 1500 m, 15.07.2006.

*Distribution:* Mediterranean region (Spain, Italy, Greece, Turkey, Lebanon, Israel, Tunisia, and Egypt (including Sinai Peninsula)) (Norrbom et al., 1999; Khouzama et al., 2002; Kütük and Varol, 2006; Merz and Korneyev, 2004); Kazakhstan (Korneyev and Kameneva, 1993).

*Host plants:* *Carthamus glaucus* M.Bieb., *C. lanatus* L. and *C. tenuis* (Boiss.) Bornm. (Kugler and Freidberg, 1975), *C. syriacum* (Boiss.) Dinsm. (Knio et al., 2002).

*Terellia nigripalpis* Hendel, 1927

(Figure 25)

*Specimens examined:* Kayseri: 14 ♂♂, 16 ♀♀, Yazılı, 38°38'N, 35°42'E, 1545 m, 17.06.2005; 8 ♂♂, 5 ♀♀, Erciyes plateau, 38°35'N, 35°30'E, 1945 m, 17.07.2005; 10 ♂♂, 5 ♀♀, Sarız, Yeşilkent, 38°18'N, 36°26'E, 1575 m, 16.07.2006; Sivas: 12 ♂♂, 21 ♀♀, Yıldızeli, Çermik, 39°48'N, 36°43'E, 1345 m, 05.07.2005; 7 ♂♂, 11 ♀♀, Şarkışla, Tavludere, 39°08'N, 36°26'E, 1680 m, 05.07.2005; 6 ♂♂, 7 ♀♀, Yıldızeli, 39°54'N, 36°33'E, 1420 m, 05.08.2005; 3 ♂♂, 5 ♀♀, Gürün, Yazıyurdu, 38°45'N, 37°05'E, 1550 m, 15.07.2006; 7 ♂♂, 3 ♀♀, Gürün, Konakpınar, 38°55'N, 37°17'E, 1775 m, 15.07.2006; 3 ♂♂, 3 ♀♀, Kangal, Akgedikli, 39°02'N, 37°44'E, 1500 m, 15.07.2006.

*Distribution:* Turkey (Hendel, 1927).

*Host plants:* *Cirsium vulgare* (Savi) Ten., and *Centaurea* spp. (new data).

*Terellia quadratula* (Loew, 1869)

(Figure 26)

*Specimens examined:* Kayseri: 4 ♂♂, 4 ♀♀, Sarız, 38°27'N, 36°28'E, 1610 m, 08.07.2005; Sivas: 4 ♂♂, 7



♀♀, Yıldızeli, Çermik, 39°48'N, 36°43'E, 1345 m, 14.08.2005; 6 ♂♂, 4 ♀♀, Kangal, Akgedikli, 39°02'N, 37°44'E, 1500 m, 15.07.2006.

*Distribution:* Armenia, Azerbaijan, Turkey, Iran, Lebanon, Jordan, Israel (Korneyev, 2006).

*Host plant:* *Echinops viscosus* DC (Freidberg and Kugler, 1989).

***Terellia ruficauda* (Fabricius, 1794)**

(Figure 27)

*Specimens examined:* Kayseri: 18 ♂♂, 21 ♀♀, Sarız, 38°27'N, 36°28'E, 1610 m, 08.07.2005; Sivas: 5 ♂♂, 7 ♀♀, Şarkışla, 39°08'N, 36°26'E, 1680 m, 05.08.2005.

*Distribution:* Europe (Merz and Korneyev 2004); Transcaucasia, Turkey, Kazakhstan, Kyrgyzstan, East of Palaearctic (Mongolia, China, Far East Russia), and Nearctic region (Kütük and Özgür, 2003; Merz and Korneyev, 2004; Korneyev and Ovchinnikova, 2004).

*Host plants:* *Cirsium palustre* (L.) Scop., *C. arvense* (L.) Scop., *C. eriophorum* (L.) Scop., and *C. dissectum* (L.) Scop. (White, 1988; Merz, 1994; Kütük and Özgür, 2003).

***Terellia serratulae* (Linneaus, 1758)**

(Figure 28)

*Specimens examined:* Kayseri: 8 ♂♂, 4 ♀♀, Tomarza, 38°24'N, 35°53'E, 1390 m, 16.06.2005; 4 ♂♂, 5 ♀♀, Yahyalı, 38°01'N, 35°25'E, 1570 m, 06.07.2005; 7 ♂♂, 2 ♀♀, Erciyes plateau, 38°35'N, 35°30'E, 1945 m, 07.07.2005; 7 ♂♂, 5 ♀♀, Erciyes plateau, 38°31'N, 35°31'E, 2210 m, 07.07.2005; 3 ♂♂, 3 ♀♀, Sarız, 38°16'N, 36°23'E, 1545 m, 08.07.2005; 3 ♂♂, 3 ♀♀, Pınarbaşı, Karaboğaz, 38°47'N, 36°27'E, 1550 m, 18.06.2006; 6 ♂♂, 3 ♀♀, Sarız, Yeşilkent, 38°18'N, 36°26'E, 1575 m, 16.07.2006; Sivas: 2 ♂♂, 6 ♀♀, Kangal, Sipahikonağı, 38°13'N, 36°12'E, 1450 m, 04.07.2005; 5 ♂♂, 7 ♀♀, Yıldızeli, Çermik, 39°48'N, 36°43'E, 1345 m, 05.07.2005; 3 ♂♂, 6 ♀♀, Kangal, Akgedikli, 39°02'N, 37°44'E, 1500 m, 16.06.2006; 5 ♂♂, 3 ♀♀, Gürün, Konakpınar, 38°55'N, 37°17'E, 1775 m, 15.07.2006; 3 ♂♂, 3 ♀♀, Kangal, Kuşkayası, 39°06'N, 37°14'E, 1515 m, 15.07.2006; 9 ♂♂, 11 ♀♀, Yıldızeli, Çermik, 39°48'N, 36°43'E, 1345 m, 11.08.2006.

*Distribution:* Most of Europe, Kazakhstan, Azerbaijan, Georgia, Armenia, Iran, China, Iraq, Syria, Israel, Turkey,

East Palaearctic, and North Africa, (Giray, 1979; Kütük and Özgür, 2003; Özgür and Kütük, 2003; Merz and Korneyev, 2004).

*Host plants:* In Europe, *Carduus acanthoides* L., *Card. defloratus* L., *Card. nutans* L., *Cirsium alatum* (Gmel.) Bobr., *Cirs. erisithales* (Jacq.) Scop., *Cirs. oleraceum* (L.) Scop., *Cirs. tuberosum* (L.) All., and *Cirs. vulgare* (Ten.) Savi are recorded (Zwölfer, 1965; White, 1988; Merz, 1994). References of *Cirs. arvense* (L.) Scop. as host plant from Italy cited by Merz (1994) need further confirmation. *T. serratulae* was reared from *Cirs. phyllocephalum* Boiss. and Blanche in Israel (Kugler and Freidberg, 1975), *Galactites tomentosa* Moench., *Lamyropsis cynaroides* (Lam.) Dittrich, and *Card. pycnocephalus* L. in Crete (Neuenschwander and Freidberg, 1983).

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

(Figure 29)

*Specimens examined:* Kayseri: 6 ♂♂, 9 ♀♀, Pınarbaşı, Kaynar, 38°59'N, 36°23'E, 1615 m, 05.07.2005; 3 ♂♂, 1 ♀, Hisarcık, 38°47'N, 35°30'E, 1790 m, 06.07.2005; 6 ♂♂, 2 ♀♀, Pınarbaşı, Sıradan, 38°39'N, 36°10'E, 1440 m, 07.07.2005; 2 ♂♂, Pınarbaşı, Karaboğaz, 38°47'N, 36°27'E, 1550 m, 18.08.2005; 3 ♂♂, Pınarbaşı, 38°43'N, 36°25'E, 1530 m, 16.07.2006; Sivas: 3 ♂♂, 5 ♀♀, Taşlıdere, 39°36'N, 37°01'E, 1335 m, 04.07.2005; 3 ♂♂, Şarkışla, , 39°14'N, 36°28'E, 1500 m, 05.07.2005; 4 ♂♂, 1 ♀, Kangal, Akgedikli, 39°02'N, 37°44'E, 1500 m, 15.07.2006.

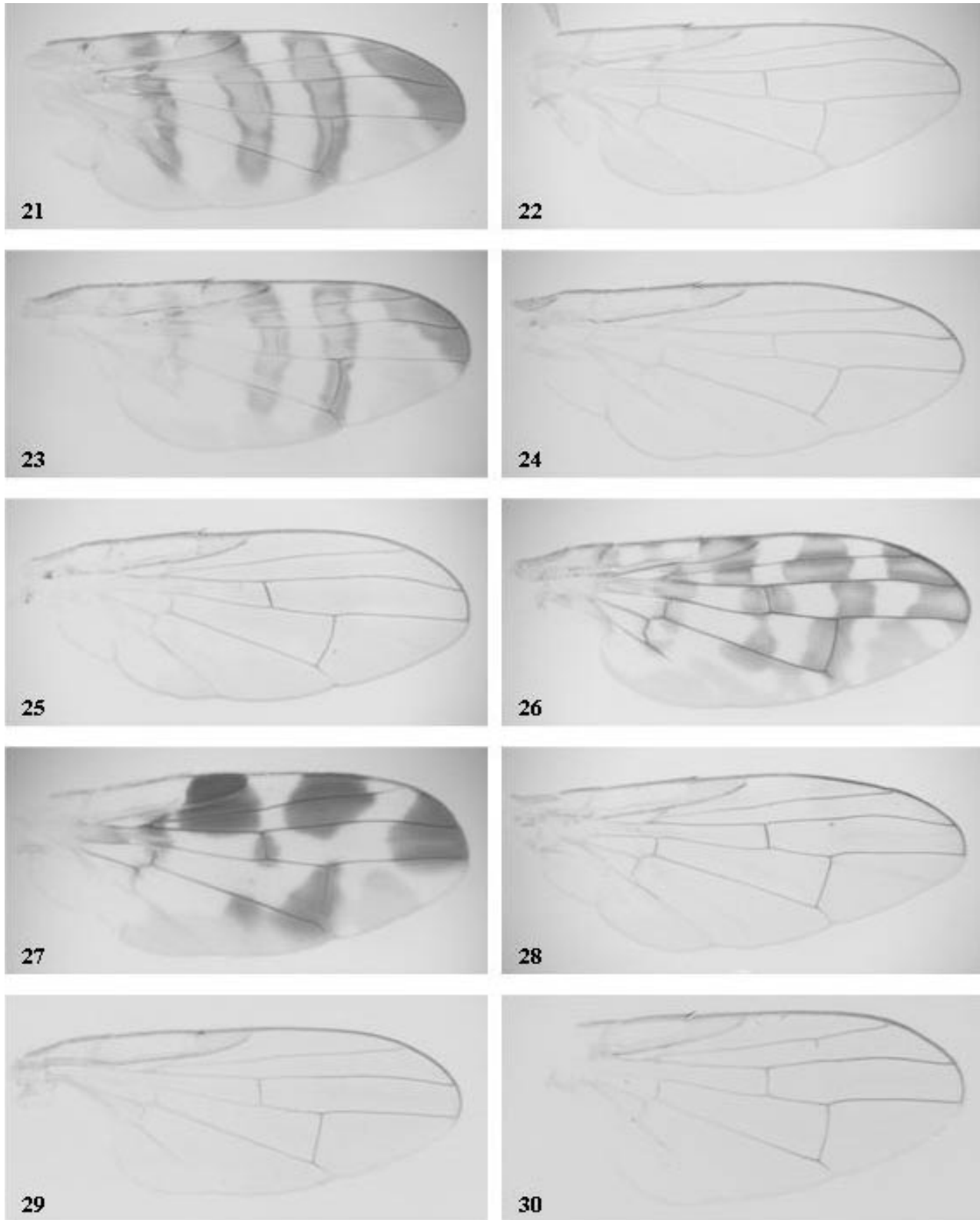
*Distribution:* Most of Europe, Turkey, Afghanistan, Kazakhstan, Israel, Iran, East Palaearctic and Nearctic region, and North Africa (Kütük and Özgür, 2003; Özgür and Kütük, 2003; Merz and Korneyev, 2004).

*Host plants:* *Centaurea iberica* Trev. ex Spreng, *C. hyalolepis* L., *C. vallesiaca* L., *C. calcitropa* L., *C. solstitialis* L., *C. maculosa* Lam., *C. alba* L., and *C. pichleri* L. (Giray, 1979; Freidberg and Kugler, 1989; Merz, 1994; Kütük and Özgür, 2003).

***Terellia zerovae* Korneyev, 1985**

(Figure 30)

*Specimens examined:* Kayseri: 5 ♂♂, 2 ♀♀, Pınarbaşı, Karaboğaz, 38°47'N, 36°27'E, 1550 m, 08.07.2005; Sivas: 4 ♂♂, 7 ♀♀, Taşlıdere, 39°36'N, 37°01'E, 1335 m, 14.06.2006.



Figures 21-30. Wings of fruit flies: 21- *Terellia ceratocera*, 22- *T. fuscicornis*, 23- *T. gynaeochroma*, 24- *T. luteola*, 25- *T. nigripalpis*, 26- *T. quadratula*, 27- *T. ruficauda*, 28- *T. serratulae*, 29- *T. virens*, 30- *T. zerovae*.

*Distribution:* Tajikistan (Korneyev, 1985, Greece (mainland and Crete), Romania and Turkey (White, 1989).

*Host plants:* *Centaurea iberica* Trev. ex Spreng (Korneyev, 1985), *C. argenta* L. (White, 1989).

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

(Figure 31)

*Specimens examined:* Kayseri: 3 ♂♂, 2 ♀♀, Pınarbaşı, Kaynar, 38°59'N, 36°23'E, 1615 m, 05.07.2005; 4 ♂♂, 1 ♀, Tomarza, Dadaloğlu, 38°29'N, 36°06'E, 1570 m, 06.07.2005; Sivas: 4 ♂♂, 3 ♀♀, Kangal, Akgedikli, 39°02'N, 37°44'E, 1500 m, 15.07.2006.

*Distribution:* Widespread in southern Palaearctic region, Ethiopia, India, Sri Lanka, Australia (Norrbom et al., 1999; Merz and Korneyev, 2004), including Turkey (Kütük, 2003a).

*Host plants:* *Lactuca scariola* L., *Lac. serriola* L., *Lac. sativa* L. (Freidberg and Kugler, 1989; Merz, 1994); in Europe, other recorded host plants are *Achillea millefolium* L., *Centaurea* sp., *Leontodon autumnalis* L., *Picris hieracioides* L., *Sonchus arvensis* L., *S. asper* (L.) Hill, and *S. oleraceus* L. (Merz, 1994). *Launaea nudicaulis* (L.) Hook.fil. and *Carthamus tinctorius* L. have been recorded as host plants in Israel (Freidberg and Kugler, 1989), and also *Centaurea iberica* Trev. ex Spreng in Turkey (Giray, 1979).

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

(Figure 32)

*Specimens examined:* Kayseri: 2 ♂♂, 3 ♀♀, Tomarza, Dadaloğlu, 38°29'N, 36°06'E, 1570 m, 16.06.2005; 3 ♂♂, Pınarbaşı, Karaboğaz, 38°47'N, 36°27'E, 1550 m, 18.06.2005; Sivas: 1 ♂, 1 ♀, Yıldızeli, 39°54'N, 36°33'E, 1420 m, 05.07.2005; 2 ♂♂, 3 ♀♀, Kangal, Akgedikli, 39°02'N, 37°44'E, 1500 m, 15.07.2006.

*Distribution:* Widespread in the Palaearctic region from British Islands and Scandinavia to Kazakhstan, China, Middle Asia, Iran, and North Africa; also in India (Norrbom et al., 1999; Merz and Korneyev, 2004); Turkey (Kütük, 2003a).

*Host plants:* Mainly various ragworts, including *Senecio coronopifolius* Desf., *S. desfontainei* Druce, *S. doriiformis* DC., *S. vernalis* Waldst. & Kit. in Israel (Freidberg and Kugler, 1989), *S. erucifolius* L., *S. jacobaea* L., *S. paludosus* L., *S. squalidus* L., *S. vulgaris* L.

in Europe (Hendel, 1927; White, 1988; Merz, 1994), also reared from *Aaronsohnia faktorovskyi* Warb. et Eig., *Artemisia judaica* L., *A. absinthium* L., *Aster amellus* L., *Bellis perennis* L., *Bellis* sp., *Carthamus tinctorius* L., *Centaurea cyanus* L., *C. montana* L., *C. scabiosa* L., *Hieracium* spp., *Inula conyza* DC., *I. crithmoides* L., *I. graveolens* (L.) Desf., *I. viscosa* (L.) Ait., *Picris hieracioides* L., *Serratula tinctoria* L., *Leontodon autumnalis* L., *Matricaria recutita* L., *M. discoidea* DC., and *M. perforata* Mérat, and occasionally recorded from *Eupatorium cannabinum* L., *Calendula officinalis* L., *Centaurea calcitrapa* L., *Crepis paludosa* (L.) Moench, *C. tectorum* L., and some other asteraceous plants (White, 1988; Freidberg and Kugler, 1989; Merz, 1994).

***Urophora doganlari*** Kütük, 2006

(Figure 33)

*Specimens examined:* Kayseri: 11 ♂♂, 12 ♀♀, Pınarbaşı, Karaboğaz, 38°47'N, 36°27'E, 1550 m, 08.06.2005; 21 ♂♂, 24 ♀♀ Sivas, Şarkışla, Tavladere, 39°07'N, 36°25'E, 1745 m, 10.06.2006.

*Distribution:* Turkey (Kütük, 2006b).

*Host plant:* *Centaurea bornmuelleria* Hausskn. ex Bornm (Kütük, 2006b).

***Urophora jaceana*** (Hering, 1935)

(Figure 34)

*Specimens examined:* Kayseri: 3 ♂♂, 7 ♀♀, Pınarbaşı, Kaynar, 38°59'N, 36°23'E, 1615 m, 15.06.2005; 2 ♂♂, 3 ♀♀, Tomarza, Dadaloğlu, 38°29'N, 36°06'E, 1570 m, 06.07.2005; 3 ♂♂, 2 ♀♀, Sarız, Yeşilkent, 38°18'N, 36°26'E, 1575 m, 16.07.2006; Sivas: 3 ♂♂, 3 ♀♀, Kangal, 39°14'N, 37°10'E, 1540 m, 04.07.2005; 2 ♂♂, 3 ♀♀, Yıldızeli, Pamukpınar, 39°56'N, 36°31'E, 1500 m, 05.07.2005; 3 ♂♂, 6 ♀♀, Gürün, Yazıyurdu, 38°45'N, 37°05'E, 1550 m, 15.07.2006.

*Distribution:* Most of Europe; from Ireland and France in the West and Norway and Northern Russia (Kola Peninsula) in the North to the Pyrenees, Alps, Caucasus, and Turkey in the South and Ural Mountains in the East; introduced into Eastern America (Korneyev and White, 1999; Kütük, 2003b).

*Host plants:* *Centaurea jacea* L., *C. nigra* L. (White and Korneyev, 1989).

***Urophora mauritanica*** Macquart, 1851

(Figure 35)

*Specimens examined:* Kayseri: 5 ♂♂, 7 ♀♀, Tomarza, Dadaloğlu, 38°29'N, 36°06'E, 1568 m, 06.07.2005; 6 ♂♂, 6 ♀♀, Yahyalı, Yeşilköy, 37°55'N, 35°31'E, 1020 m, 06.07.2005; Sivas: 4 ♂♂, 2 ♀♀, Yıldızeli, 39°54'N, 36°33'E, 1420 m, 05.07.2005.

*Distribution:* Albania, Algeria, Bulgaria, Crete, Cyprus, Czech Republic, French mainland, Greek mainland, Italian mainland, Sardinia, FYR Macedonia, Malta, Moldova, Morocco, south of European Russia, Spain, Ukraine, Turkey, Azerbaijan, Kazakhstan, Uzbekistan, Israel, Algeria, Libya (as *U. macrura*; White and Korneyev, 1989; Merz and Korneyev, 2004).

*Host plants:* *Carthamus*, *arborescens* M.Bieb., *C. glaucus* M.Bieb., *C. tinctorius* L., *C. lanatus* L., and *C. tenuis* (Boiss.) Bornm. (Fraunfeld, 1857; White and Korneyev, 1989; Freidberg and Kugler, 1989).

*Urophora quadrifasciata* (Meigen, 1826)

(Figure 36)

*Specimens examined:* Kayseri: 4 ♂♂, 7 ♀♀, Tomarza, Dadaloğlu, 38°29'N, 36°06'E, 1570 m, 17.06.2005; 6 ♂♂, 2 ♀♀, Sarız, Yeşilkent, 38°18'N, 36°26'E, 1575 m, 16.07.2006; Sivas: 4 ♂♂, 3 ♀♀, Kangal, 39°14'N, 37°10'E, 1540 m, 04.07.2005; 5 ♂♂, 3 ♀♀, Yıldızeli, Pamukpınar, 39°56'N, 36°31'E, 1500 m, 05.07.2005; 3 ♂♂, 7 ♀♀, Gürün, Yazıyurdu, 38°45'N, 37°05'E, 1550 m, 15.07.2006.

*Distribution:* Most of Europe, Turkey, Kazakhstan, Israel, Iran, East Palaearctic and Nearctic region, and North Africa (Kütük and Özgür, 2003; Merz and Korneyev, 2004).

*Host plants:* The larvae develop in flowerhead galls on *Centaurea iberica* Trev. ex Spreng, *C. solstitialis* L., *C. aspera* L., *C. sterilis* L., *C. breviceps* Trev. ex Spreng., *C. nicaeensis* Trev. ex Spreng., *C. procurrans* Sieb., *C. jacea* L., *C. maculosa* Lam., *C. splendens* Sieb., *C. nigrescens* L., *C. cyanus* L., *C. calpitropa* L., *C. nigra* L., and *Serratula tinctoria* L. (Giray, 1979; White, 1988; White and Korneyev, 1989; Freidberg and Kugler, 1989; Merz, 1994; Korneyev and White, 2000; Kütük, 2003b).

*Urophora solstitialis* (Linnaeus, 1758)

(Figure 37)

*Specimens examined:* Kayseri: 5 ♂♂, 3 ♀♀, Erciyes plateau, 38°35'N, 35°30'E, 1945 m, 17.06.2005; 6 ♂♂, 6 ♀♀, Pınarbaşı, Karaboğaz, 38°47'N, 36°27'E, 1550 m, 08.08.2005; 3 ♂♂, 5 ♀♀, Sarız, Yeşilkent, 38°18'N, 36°26'E, 1575 m, 16.07.2006; Sivas: 13 ♂♂, 8 ♀♀,

Taşlıdere, 38°36'N, 37°01'E, 1335 m, 04.07.2005; 6 ♂♂, 11 ♀♀, Yıldızeli, 39°48'N, 36°43'E, 1345 m, 08.07.2006.

*Distribution:* Most of Europe, except Spain and Mediterranean region (Merz and Korneyev, 2004), North Caucasus, Armenia, Turkey, Kazakhstan, Western China (Xingjian), Far East Russia (Magadan) (Korneyev and White, 1999), North America, Australia, and New Zealand (Norrbom et al., 1999).

*Host plants:* *Carduus defloratus* L., *C. nutans* L., *C. personata* (L.) Jacq., *C. acanthoides* L., *C. crispus* L., *Cirsium vulgare* (Savi) Ten., and *C. heterophyllum* (L.) Hill. (White, 1988; Merz, 1994; Kütük, 2003b).

*Urophora tenuior* Hendel, 1910

(Figure 38)

*Specimens examined:* Sivas: 7 ♂♂, 4 ♀♀, Kangal, Sipahikonağı, 38°13'N, 36°12'E, 1450 m, 04.07.2005; 4 ♂♂, 6 ♀♀, Kangal, Tahtalı, 39°14'N, 37°10'E, 1540 m, 04.07.2005.

*Distribution:* Southeastern Kazakhstan, eastern Uzbekistan, Turkmenistan, Tajikistan, Iran, Afghanistan (Korneyev and White, 1999).

This species is a new record for the fauna of Turkey.

*Host plants:* *Cousinia mollis* Boiss. & Hausskn. (Korneyev and White, 2000). In this study, *Cousinia cataonica* Boiss. & Hausskn. is recorded as a host plant (new data).

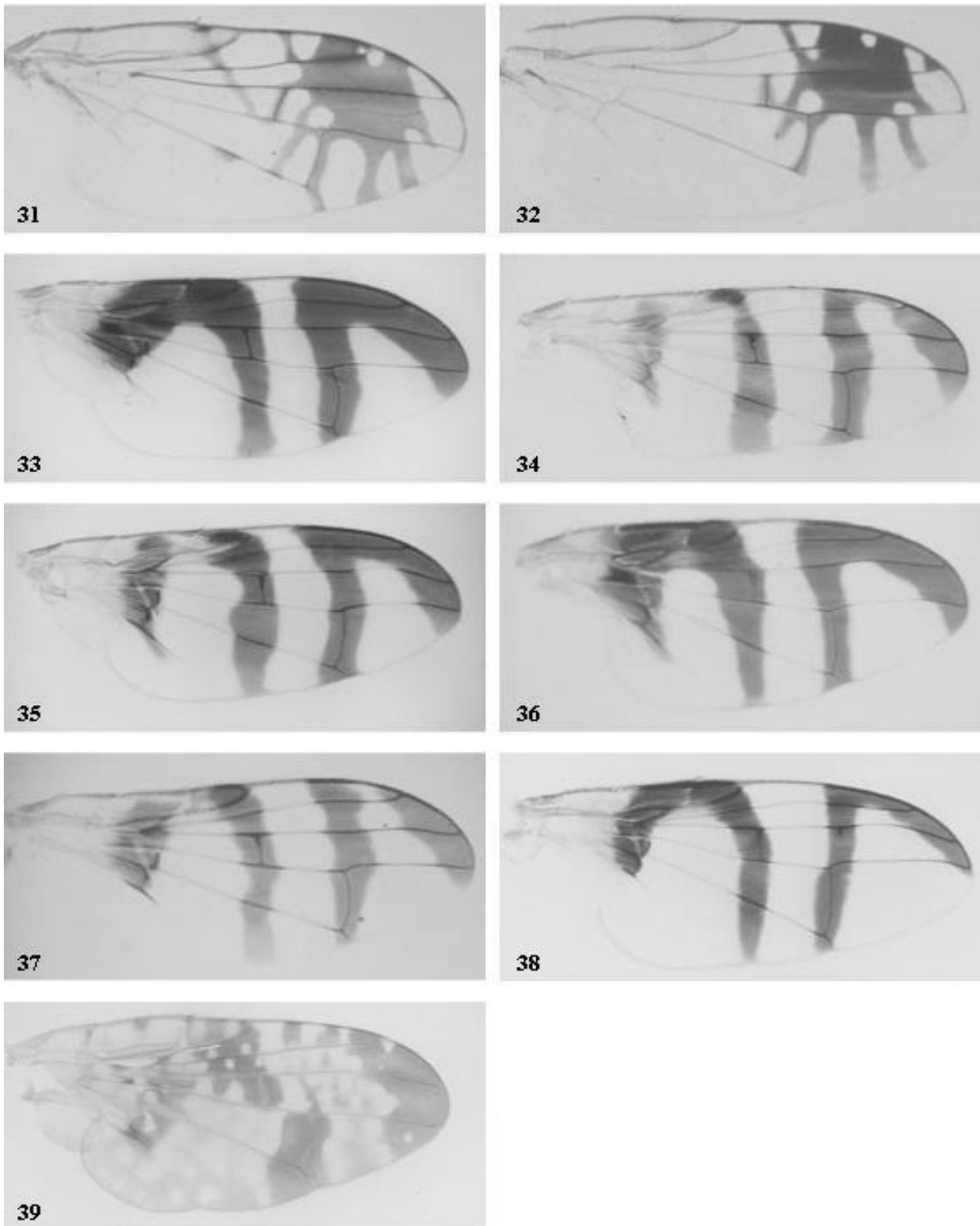
*Xyphosia miliaria* (Schrank, 1781)

(Figure 39)

*Specimens examined:* Kayseri: 3 ♂♂, 2 ♀♀, Yahyalı, 38°01'N, 35°25'E, 1570 m, 06.07.2005; 2 ♂♂, 1 ♀♀, Pınarbaşı, Karaboğaz, 38°47'N, 36°27'E, 1550 m, 08.07.2005; Sivas: 2 ♂♂, 3 ♀♀, Eğriçimen plateau, 40°21'N, 37°47'E, 1615 m, 15.08.2005; 3 ♀♀, Kangal, Akgedikli, 39°02'N, 37°44'E, 1500 m, 15.07.2006.

*Distribution:* Most of Europe (Merz and Korneyev, 2004), Russia from European Territory to the Far East; Kazakhstan; Kyrgyzstan; China (Korneyev and Ovchinnikova, 2004); Turkey (Kütük, 2003).

*Host plants:* In Europe, *Carduus crispus* L., *Card. defloratus* L., *Card. nutans* L., *Card. acanthoides* L., *Cirsium arvense* (L.) Scop., *Cirs. erisithales* (Jacq.) Scop., *Cirs. palustre* (L.) Scop., *Cirs. vulgare* (Savi) Ten., *Cirs. oleraceum* (L.) Scop., and *Cirs. eriophorum* (L.) Scop. (Merz, 1994).



Figures 31-39. Wings of fruit flies: 31- *Trupanea amoena*, 32- *T. stellata*, 33- *Urophora doganlari*, 34- *U. jaceana*, 35- *U. mauritanica*, 36- *U. quadrifasciata*, 37- *U. solstitialis*, 38- *U. tenuior*, 39- *Xyphosia miliaria*.

## Acknowledgments

I thank Prof. Dr. Şemsettin Civelek (Firat University, Department of Biology, Elazığ, Turkey) and Assistant Prof. Necattin Türkmen (Çukurova University, Department of Biology, Adana, Turkey) for identifying

the host plants of fruit flies. I am grateful to the İnönü University Project of Research Foundation (project number: 2004-3) for the support provided for this project.

## References

- Dirlbek, J. and Dirlbek, K. 1971. Beitrag zur Kenntnis der Bohrfliegen (Diptera, Trypetidae) Afghanistans. Acta Faun. Entomol. Mus. Natl. Pragae 14: 5-7.
- Fraunfeld, G.R. 1857. Beitrage zur Naturgeschichte der Trypeten nebst Beschreibung einiger neuer Arten. Sitzungsber. Akad. Wiss. 22: 523-557.
- Fridberg, A. 1984. Gall Tephritidae (Diptera). In T.N. Ananthakrishnan, (ed., Biology of Gall Insects), Oxford and IBH Publishing Co., New Delhi, pp. 129-67.
- Freidberg, A. and Kugler, J. 1989. Fauna Palaestina. Insecta IV. Diptera: Tephritidae. Israel Academy of Sciences and Humanities, Jerusalem.
- Freidberg, A. and Kütük, M. 2002. A new species of *Tephritis* from Turkey, with a key to the species of the *Tephritis pulchra* Group. Israel Journal of Zoology, 48: 295-311.
- Giray, H. 1979. Türkiye Trypetidae (Diptera) Faunasına ait ilk liste. Türkiye Bitki Koruma Dergisi, 3: 35-46.
- Hendel, F.G. 1927. 49. Trypetidae. In: E. Lindner, ed., Die Fliegen der Palaarktischen Region, Stuttgart, pp. 1-221.
- Hering, M. 1944. Bestimmungstabelle der Gattung *Tephritis* Latreille, 1804. Siruna Seva, 5: 17-31.
- Knio, K.M., Kalash, S.H. and White, I.M.. 2002. Flower head-infesting fruit flies (Diptera: Tephritidae) on thistles (Asteraceae) in Lebanon. Journal of Natural History, 36: 617-629.
- Khouzama, M.K., Kalash, S.M. and White, I.M. 2002. Flowerhead-infesting fruit flies (Diptera: Tephritidae) on thistles (Asteraceae). Lebanon Journal of Natural History, 36, 617-629.
- Korneyev, V.A. 1985. Fruit flies of the tribe Terellini Hendel, 1927 (Diptera, Tephritidae) of the fauna of the USSR. Entomol. Obozr., 64: 624-644.
- Korneyev, V.A. 1987. A revision of the subgenus *Cerajocera* stat. n. of the genus *Terellia* (Diptera: Tephritidae) with description of a new species of fruit flies. Zool. Zh. 66: 237-243.
- Korneyev, V.A. 2003. New and little known Tephritidae (Diptera, Cyclorrhapha) from Europe. Vestnik Zoologii, 37: 3-12.
- Korneyev, V.A. 2006. A revision of the *quadratura* group of the genus *Terellia* Robineau-Desvoidy (Diptera: Tephritidae). Freidberg A., ed. Biotaxonomy of Tephritoidea [Proceedings of the Tephritidological Meeting, Israel, 2000]. Isr. J. Entomol. 35-36: 341-366.
- Korneyev, V.A. and Kameneva, E.P. 1993. On the consortial associations of Asteraceae in Western Tien-Shang. Ukrainian Botanical Journal, 50: 37-50.
- Korneyev, V.A. and White, I.M. 1999. Tephritids of Genus *Urophora* R.-D. (Diptera: Tephritidae) of East Palaearctic. III. Key to Palaearctic species. Ent. Obozr., 78: 464-482. [In Russian; English summary; English translation Entomol. Rev., Wash. 80: 497-510].
- Korneyev, V.A. and White, I.M. 2000. Fruit-flies of the genus *Urophora* R.-D (Diptera, Tephritidae) of East Palaearctic. IV. Conclusion. Ent. obozr. 79: 239-253. [In Russian; English summary; English translation Entomol. Rev., Wash. 79: 296-309].
- Korneyev, V.A. and Ovchinnikova, O.G. 2004. 79. Fam. Tephritidae - Fruit Flies. Keys to Insects of Far East Russia. Vol. VI. Diptera and Fleas. Part 3, Vladivostok: Dal'nauka. 3: 456-564 (in Russian).
- Kugler, J. and Freidberg, A. 1975. A list of the fruitflies (Diptera: Tephritidae) of Israel and nearby areas, their host plants and distribution. Israel Journal of Entomology, 10: 51-72.
- Kütük, M. 2003a. Güney Batı Anadolu Bölgesi meyve sinekleri (Diptera: Tephritidae) faunası ve sistematigi üzerine araştırmalar, Doktora Tezi, ÇÜFBE, Adana, 217 pp.
- Kütük, M. 2003b. Doğu Akdeniz Bölgesi *Urophora* Robineau-Desvoidy (Diptera: Tephritidae) faunası ve sistematigi üzerine araştırmalar. Türkiye Entomoloji Dergisi, 27: 149-160.
- Kütük, M. 2005. Two new records of *Tephritis* Latreille, 1804 (Diptera: Tephritidae) from Turkey. Turk. J. Zool., 29: 167-170.
- Kütük, M. 2006a. The fauna and systematic of the genus *Tephritis* Latreille, 1804 (Diptera: Tephritidae) with a key to the species of *Tephritis* in Turkey. Turk. J. Zool., 30: 345-356.
- Kütük, M. 2006b. A new species of *Urophora* Robineau-Desvoidy, 1830 (Diptera: Tephritidae) from Turkey, with a key to the species of the *Urophora quadrifasciata* group. Turk. J. Zool., 30: 147-153.
- Kütük, M. and Özgür, A.F. 2003. Faunistical and systematical studies on the genus *Tephritis* Latreille, 1804 (Diptera: Tephritidae) in the South West of Turkey along with new records. Türk. Entomol. Derg. 27: 243-252.
- Kütük, M. and Özgür, A.F. 2004. Two new records of the fruit flies (Diptera: Tephritidae) for Fauna of Turkey. J. Agric. Fac. Ç.U., 19: 53-56.
- Kütük, M. and Varol, M.I. 2006. Records of two new species of *Terellia* Robineau-Desvoidy, 1830 (Diptera: Tephritidae) new to the Turkish fauna. Turk. J. Zool., 30: 99-102.

- Kütük, M. and Özaslan, M. 2006. Faunistical and systematical studies on the Trypetinae (Diptera: Tephritidae) in the Turkey along with a new record to Turkish Fauna. *Munis Entomology & Zoology*, 1: 173-178.
- Leclercq, M. 1967. Contribution à l'étude des Trypetidae (Diptera) paléarctiques et de leurs relations avec les végétaux. *Bull. Rech. Agron. Gembloux (N.S.)* 2: 64-105.
- Merz, B. 1993. Fruchthfliegen aus der Region des Mte. Gargano (Italien, Puglia) mit Beschreibung einer neuen *Tephritis*-Art (Diptera: Tephritidae). *Mitt. Entomol. Ges. Basel*, 43: 110-127.
- Merz, B. 1994. Diptera, Tephritidae. *Insecta Helvetica Fauna*, HGE Press, Geneva.
- Merz, B. and Korneyev, V.A. 2004. Fauna Europea: Tephritidae In Pape, T. (ed.) (2004) *Fauna Europea: Diptera, Brachycera*. Fauna Europea version 1.1, <http://www.faunaeur.org>.
- Neuenschwander, P. and Freidberg, A. 1983. The fruit flies of Crete (Diptera: Tephritidae). *Israel J. Entomol.* 17: 81-94.
- Norrbon, A.L., Carroll, L.E., Thompson, F.C., White, I.M. and Freidberg, A. 1999. Systematic database of names (pp. 65-251). In: Thompson, F.C. (ed.). *Fruit fly expert identification system and systematic information database*. *Myia* 9 (1998): VII + 524 pp. & Diptera Data Dissemination Disk (CD-ROM) (1998) 1.
- Norrbon, A.L. 2004. Updates to a biosystematic database of world Diptera for Tephritidae throughout 1999. *Diptera Data Dissemination Disk (CD-ROM)* 2.
- Özgür, A.F. and Kütük, M. 2003. Adana ili meyve sinekleri (Tephritidae: Diptera) faunasının tespiti. *Journal of Agriculture Fac. Ç.U.*, 18: 35-44.
- Richter, V.A. 1965. A review of the fauna of the fruit flies (Diptera, Trypetidae) of Kazakhstan. *Entomol Rev.* 44: 79-84.
- Richter, V.A. 1970. [Family Tephritidae (Trypetidae)], In: *Key to the insects of the European part of the USSR*. Zool. Ins. Acad. Nauk. SSSR, Leningrad, p. 132-172.
- Wang, X. 1996. The fruit flies (Diptera: Tephritidae) of the East Asian region. *Acta Zootaxonomica Sinica*, 21. Supplement.
- White, I.M. 1988. Tephritid flies (Diptera: Tephritidae). *Handbook for the identification of British insects*. Dorset Press, London.
- White, I.M. 1989. A New Species of *Terellia* Robineau-Desvoidy Associated with *Centaurea solstitialis* L. and a revision of the *Terellia virens* (Loew) species group (Diptera: Tephritidae). *Entomologists' Monthly Magazine*, 125: 53-61.
- White, I.M. and Korneyev, V.A. 1989. A revision of the western Palaearctic species of *Urophora* Robineau-Desvoidy (Diptera: Tephritidae). *Syst. Entomol.* 14: 327-374.
- White, I.M. and Marquardt, K. 1989. A revision of the genus *Chaetorellia* Hendel (Diptera: Tephritidae) including a new species associated with spotted knapweed *Centaurea maculosa* Lam. (Asteraceae). *Bull. Entomol. Res.* 79: 453-487.
- White, I.M., Headrick, D.H., Norrbom, A.L. and Carroll, L.E. 2000. 33 Glossary. In: Aluja, M., Norrbom A.L., *Fruit flies (Tephritidae): phylogeny and evolution of behavior*. CRC Press, London, New York, Washington, pp. 881-924.
- Zaitzev, F.A. 1947. The fruit fly fauna of the Caucasus and adjacent lands (Diptera, Trypetidae), *Tr. Zool. Inst. Acad. Nauk Gruz.* 7: 1-16.
- Zwölfer, H. 1965. Preliminary list of phytophagous insects attacking wild Cynareae (Compositae) species in Europe. *Tech. Bull. Commonw. Inst. Biol. Control*, 6: 81-154.