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Gall midges (Diptera: Cecidomyiidae) of Turkey

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Summary

The present fauna of gall midges of Turkey includes 71 species belonging to 38 genera. Of them, 62 species are phytophagous and are associated with 59 host plant species. In this study, their zoogeographical analysis and economical importance have also been evaluated.

Key words: Cecidomyiidae, Diptera, fauna, Turkey, zoogeography
Anahtar sözcükler: Cecidomyiidae, Diptera, fauna, Türkiye, zoocoğrafya

Introduction

Until now the data on gall midges (Diptera: Cecidomyiidae) existing in Turkey were encountered in papers of about twenty Turkish researchers. In present paper a summary of gall midge species occurring in the territory of Turkey has been given for the first time. The level of gall midge species knowledge in Turkey is not satisfactory enough in comparison with the knowledge of some adjacent European countries – Bulgaria and Greece, but it is much higher in comparison with the knowledge of this family in adjacent Asian countries, such as Syria, Iran and Iraq.

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Trotter (1903) was the first to collect galls in Turkey in the course of his journey through Balkan Peninsula and Turkey. He published a summary report including his findings together with figures of some galls. He determined 16 gall midge species existing in Turkey. Several years before Trotter, somebody collected galls in Turkey but his name remains unknown. Möhn (1968) described two species, ***Lasioptera turcica*** and ***Ozirhincus anatolicus*** (now correctly: ***O. anthemidis***) based on larvae which he obtained from these galls. Schimitschek (1944) gave five gall midge species occurring in Turkey. Other 19 gall midge species were given by Alkan (1952).

In the course of preparing the manuscript of the family Cecidomyiidae for the **Catalogue of Palaearctic Diptera,** M. Skuhravá (1986) asked for help from N. Lodos. He kindly sent a list of scientific papers dealing with gall midges in Turkey. Based on these data it was possible to put together all gathered data on gall midge species occurring in Turkey at that time: 35 gall midge species were known occuring in Turkey (Skuhravá et al., 1984; Skuhravá, 1986).

Since that time several new information on occurrence of gall midges appeared in publications devoted to applied entomology. In addition, Skuhravá & Çam (1998) discovered galls on ***Astragalus lagurus*** which are caused by a new species, ***Asphondylia anatolica*** Skuhravá. Bayram et al. (1998) recorded the species ***Wachtliella rosarum*** occurring on ***Rosa canina***. Subsequently, Bayram & Skuhrava (2004) reported two interesting gall midge species from fungi, viz. ***Brachineura squamigera*** and ***Lestodiplosis polypori***, which were new members of Turkish fauna. In 1997, cecidomyiid larvae were found in flower heads of ***Chondrilla juncea*** in western Turkey which was a new species for science, ***Jaapiella chondrillae*** Skuhravá (Skuhravá & Sobhian, 2005). During 2000-2001, three gall midge species from samples of cones of ***Pinus brutia,*** viz. ***Asynapta strobi***, ***Camptomyia pinicola*** and ***Thecodiplosis*** sp. have been reared (Can, 2003). In 2003, two gall midge species, viz. ***Lasioptera eryngii*** and ***Rhopalomyia saissanica*** have been reared by H. Çam. These species marked with an asterisk (*) are new records for the gall midge fauna of Turkey.

In this article it was aimed to prepare the annotated list of gall midge species, evaluation of gall midge fauna of Turkey and its comparison with faunas of adjacent countries, analysis from the zoogeographical point of view and from the view of economical importance.

Material and Methods

Determination of galls is based on Houard (1908-1909), of larvae on Möhn (1955, 1968) and of adults on Skuhravá (1997 a, b). Data gathered during that work were analysed from the zoogeographical point of view using method described by Skuhravá (1987, 1994 a, b) and Skuhravá & Skuhravy (1998), from the point of view of economical importance according to Darvas et al. (2000) and Skuhravá & Roques (2000), nomenclature on Skuhravá (1986) and Gagné (2004).

In the following part a list of all gall midge species occuring in Turkey has been given together with new data of occurrence of several gall midge species discovered in the present time. For each species the following data were given: biology, the host plant species and plant family, references and distribution. Also synonyms which occurred in the Turkish literature in the past were also given.

Results

In this study, 71 species of 38 genera belonging to Cecidomyiidae have been reported from Turkey.

Annotated list of gall midges

Aphidoletes aphidimyza (Rondani, 1847)

Larvae are predators of many species of aphids (Homoptera: Aphidoidea) on various host plants. This species is used for biological control of aphids (Skuhravá, 1994b) .

Distribution: Cosmopolitan species (Skuhravá & Skuhravy, 1997). Recorded from Adana, Hatay and Içel in citrus gardens (Soylu & Ürel, 1977), Adana in vegetable gardens (Zeren & Düzgüneş, 1983), Izmir (Erkin, 1983).

Apiomyia bergenstammi (Wachtl, 1882)

Larvae cause plurilocular woody galls on twigs of ***Pyrus communis*** L. (Rosaceae). Pest of pears (Skuhravá, 1994b).

Distribution: Mediterranean (Skuhravá & Skuhravy, 1997). Recorded from Istanbul under the name of ***Oligotrophus berganstammi*** Wachtl (Alkan, 1952; Bodenheimer, 1958).

Arthrocnodax coryligallarum (Targioni-Tozzetti, 1887)

Larvae are predators of eriophyid mites ***Phytoptus avellanae*** Nal. (Acarina: Eriophyoidea) in big bud galls on ***Corylus avellana*** L. (Corylaceae) (Skuhravá, 1994b).

Distribution: European. Catalogued from Turkey without giving the name of the locality (Thomson & Simmonds, 1965).

Asphondylia anatolica Skuhravá & Çam, 1998

Larvae cause large galls on stems of ***Astragalus lagurus*** Willd. (Fabaceae) (Skuhravá & Çam, 1998).

Distribution: West-Asian species. Reported from Tokat (Taşçiftlik) (Skuhravá & Çam, 1998).

Asphondylia gennadii (Marchal, 1904)

Synonym: *Asphondylia capsici* Barnes, 1932

Larvae develop in pods of ***Ceratonia siliqua*** L. (Caesalpiniaceae). Pest of carobs (Skuhravá & Skuhravy, 1997).

Distribution: Mediterranean (Skuhravá & Skuhravy, 1997). Reported from Southern Anatolia (Alkan, 1958), Hatay (Iskenderun, Antakya) and Mersin (Kıray, 1965).

Asphondylia verbasci (Vallot, 1827)

Larvae live in swollen flower buds of ***Verbascum sinuatum*** (Scrophulariaceae) (Skuhravá & Skuhravy, 1997).

Distribution: Mediterranean (Skuhravá, 1987). Cited from Bursa and Sakarya (Adapazarı-Sapanca) (Trotter, 1903).

Asynapta strobi (Kieffer, 1920)

One female was reared from cones of ***Pinus brutia*** Ten. (Pinaceae) on 10.X.2001 in Izmir (Kınık) by Can (2003). Larvae of ***A. strobi*** are known to develop in cones of ***Picea abies*** (L.) Karst.[= ***Picea excelsa*** (Lam.) Link.] and probably also in cones of other species of Pinaceae. Larvae are not phytophagous, they are phytosaprophagous.

Distribution: European. Izmir (Kınık) (Can, 2003).

Brachineura squamigera (Winnertz, 1853)

Larvae of this species are phytosaprophagous and mycophagous (Bayram & Skuhravá, 2004).

Distribution: European (Skuhravá, 1986). Ankara (Çamlıdere) on ***Rhizopogon*** sp. (Fungi: Gasterales: Rhizopogonaceae) (Bayram & Skuhravá, 2004).

Camptomyia pinicola Mamaev, 1961

Larvae were originally found as developing under the bark of ***Pinus sylvestris*** L. (Pinaceae) in Russia. Roques (1983) found this species in cones of ***P. sylvestris*** and ***P. halepensis*** Mill. at several places in France. He found that two generations of gall midges develop in cones of ***P. sylvestris***. Can (2003) reared adults from cones of ***P. brutia*** Ten. from three localities in Turkey during 2000 and 2001. Adults reared in Manisa (Muradiye), on 4-17.V.2000; 2-8.XI.2000; 5.IV-27.V.2001; 2.X-15.XI.2001; in Manisa (Gelenbe), on 17.IV-15.V.2000; 17.IV-15.V.2001; in Izmir (Kınık), on 8-20.IV.2000; 3.IX-14.X.2000; 17.IV-12.V.2001; 10.IX-12.X.2001.

Distribution: European. Manisa (Muradiye, Gelenbe), Izmir (Kınık). (Can, 2003).

Clinodiplosis botularia (Winnertz, 1853)

Larvae live in galls on the main vein of the leaf of ***Fraxinus excelsior*** L. (Oleaceae).

Distribution: European (Skuhravá, 1997b). Reported from Istanbul (Acatay, 1943).

Contarinia citri Barnes, 1944

Larvae develop gregariously in swollen flower buds of ***Citrus*** spp. (Rutaceae) (Uygun & Şekeroğlu, 1983).

Distribution: Tropical and subtropical species. Reported from East Mediterranean (Uygun & Şekeroğlu, 1983).

Contarinia coryli (Kaltenbach, 1859)

Synonym: ***Diplosis corylina*** F. Löw, 1878

Larvae develop in swollen catkins of ***Corylus avellana*** L. (Corylaceae) (Skuhravá, 1994b).

Distribution: Euro-Siberian (Skuhravá, 1997b). Reported from the East Black Sea Region in Turkey (Sarıoğlu, 1976; Kurt, 1982).

Contarinia nasturtii (Kieffer, 1888)

Larvae cause several types of damage on ***Brassica*** spp. (Brassicaceae). Pest of cabbages.

Distribution: European (Skuhravá, 1997b). Cited without the name of the locality from Turkey (Göbelez, 1951).

Contarinia populi (Rübsaamen, 1917)

Larvae cause small rounded galls on leaves of ***Populus tremula*** L. (Salicaceae). In galls of ***C. populi*** the larvae of ***Lasioptera populnea*** live as inquilines.

Distribution: Euro-Siberian (Skuhravá, 1997b). Reported from Istanbul (Belgrad Forest, Alemdağ) and Balıkesir (Dursunbey) under the name of ***Diplosis populi*** (Rübsaamen) (Acatay, 1959).

Contarinia pyrivora (Riley, 1886)

Larvae develop in fruits of ***Pyrus communis*** L. (Rosaceae). Pest of pears (Skuhravá, 1994b).

Distribution: Primarily European, secondarily Holoarctic. Reported from Ankara (Bodenheimer, 1958; İren & Ahmet, 1973).

Dasineura affinis (Kieffer, 1886)

Larvae cause galls (rolled leaf margins) on leaves of ***Viola*** spp. (Violaceae) (Skuhravá & Skuhravy, 1997).

Distribution: European (Skuhravá, 1997b). Recorded from Ankara (Alkan, 1952), Izmir (İyriboz, 1941).

Dasineura crataegi (Winnertz, 1853)

Larvae cause terminal rosette galls on ***Crataegus oxyacantha*** L. and ***C. azarolus*** L. (Rosaceae) (Skuhravá, 1994b).

Distribution: European (Skuhravá, 1997b). Reported from Ankara, Bursa (Gemlik) and Sakarya (Adapazarı-Sapanca) (Trotter, 1903).

Dasineura oleae (F. Löw, 1885)

Larvae cause leaf galls on ***Olea europaea*** L. (Oleaceae) (Skuhravá & Skuhravy, 1997).

Distribution: Mediterranean (Skuhravá & Skuhravy, 1997). Reported from Bursa (Mudanya), Denizli (Trotter, 1903), Antalya and Hatay (Alkan, 1952), Aegean Region, Antalya, Hatay (İren & Ahmet, 1973).

Dasineura rosae (Bremi, 1847)

Synonyms: ***Wachtliella rosarum*** (Hardy, 1850), ***Perrisia rosarum*** Hardy, 1850.

Larvae develop in pod-like folded leaflets of ***Rosa canina*** L. (Rosaceae) (Skuhravá, 1994b).

Distribution: Euro-Siberian (Skuhravá, 1997b). Reported from Ankara (Karaca, 1956; Bayram et al., 1998), Eskişehir (Sivrihisar) (Karaca, 1956).

Dasineura rufescens (Stefani, 1896)

Larvae cause swellings on branches of ***Phillyrea variabilis*** Timb. (Oleaceae) (Skuhravá, 1986).

Distribution: Mediterranean (Skuhravá, 1986). Cited from Bursa (Gemlik) and Bilecik (Trotter, 1903).

Dasineura viciae (Kieffer, 1888)

Larvae develop in folded leaflets of ***Vicia sepium*** L. and other species (Fabaceae) (Skuhravá, 1994b).

Distribution: Euro-Siberian (Skuhravá, 1997b). Reported from Turkey without exact locality (Bodenheimer, 1939).

Dicrodiplosis pseudococci (Felt, 1914)

Larvae are predators of ***Planococcus citri*** (Homoptera: Pseudococcidae) on ***Citrus*** spp. (Rutaceae).

Distribution: Originally subtropical and tropical. It occurs also in the most southern parts of Spain and Italy. Reported from East Mediterranean Region (Soylu & Ürel, 1977).

Dryomyia circinans (Giraud, 1861)

Larvae cause hard galls on leaves of ***Quercus cerris*** L. (Fagaceae) (Skuhravá, 1994b).

Distribution: Sub-Mediterranean and Mediterranean (Skuhravá, 1986). Reported from Bilecik (Trotter, 1903), Istanbul on ***Q. pubescens*** Wil. (Acatay, 1943), Eskişehir (Sivrihisar) on ***Quercus*** sp., Manisa (Salihli, Alaşehir), Niğde (Hasandağı) (Karaca, 1956).

Feltiella acarisuga (Vallot, 1827)

Synonym: ***Therodiplosis persicae*** Kieffer, 1912

Larvae prey on red spider mites (Acarina: Tetranychidae) (Skuhravá, 1994b).

Distribution: Cosmopolitan. Reported from Turkey without exact locality (Kılıç et al., 2001).

Harmandiola cavernosa (Rübsaamen, 1899)

Larvae cause large, thick walled galls on leaves of ***Populus tremula*** L. (Salicaceae) with an opening on the upper surface (Skuhravá, 1994b).

Distribution: Euro-Siberian (Skuhravá, 1997b). Reported from Istanbul (Belgrad Forest, Alemdağ) and Balıkesir (Dursunbey) (Acatay, 1959).

Harmandiola globuli (Rübsaamen, 1889)

Larvae cause small, rounded and thin walled galls on leaves of ***Populus tremula*** L. (Salicaceae) with an opening on the lower leaf surface (Skuhravá, 1994b).

Distribution: Euro-Siberian (Skuhravá, 1997b). Reported from Istanbul (Belgrad Forest, Alemdağ) and Balıkesir (Dursunbey) (Acatay, 1959).

Hartigiola annulipes (Hartig, 1839)

Synonym: ***Phegobia tornatella*** Bremi, 1847

Larvae cause galls on leaves of ***Fagus sylvatica*** L. (Fagaceae) (Skuhravá, 1994b).

Distribution: European (Skuhravá, 1997b). Reported from Adapazarı (Sapanca) on ***F. orientalis*** as ***Oligotrophus*** sp. (Trotter, 1903), Bolu (Abant) (Alkan, 1952), Istanbul on ***Fagus*** sp. (Acatay, 1943; Schimitschek, 1953).

Iteomyia capreae (Winnertz, 1853)

Larvae cause small globular galls on leaves of ***Salix caprea*** L. (Salicaeae) (Skuhravá, 1994b).

Distribution: Euro-Siberian (Skuhravá, 1997b). Reported from Turkey without exact locality (Bodenheimer, 1958).

Jaapiella chondrillae Skuhravá, 2005

Larvae develop in flower-heads of ***Chondrilla juncea*** L. (Asteraceae) without making galls (Skuhravá & Sobhian, 2005).

Distribution: South-European. Recorded from Afyon, Izmir (Selçuk), Uşak in western Turkey (Skuhravá & Sobhian, 2005).

Janetia cerris (Kollar, 1850)

Larvae cause small hard galls on leaves of ***Quercus cerris*** L. (Fagaceae) (Skuhravá, 1994b).

Distribution: Mediterranean (Skuhravá, 1997b). Cited from Bursa (Gemlik, Iznik) as ***Arnoldia*** sp. (Trotter, 1903) and from Aksaray (Hasandağı), Izmir (Menemen) on ***Quercus*** spp. under the name of ***Arnoldia cerris*** Kollar (Karaca, 1956).

Janetia szepligetii Kieffer, 1896

Larvae cause small pustule galls on leaves of ***Quercus cerris*** L. (Fagaceae) (Skuhravá, 1994b).

Distribution: Mediterranean (Skuhravá, 1997b). Recorded from Adapazarı (Sapanca), Bursa (Trotter, 1903).

Janetiella lemeei (Kieffer, 1904)

Larvae cause small galls on leaves of ***Ulmus minor*** Mill. and other species (Ulmaceae) (Skuhravá, 1994b).

Distribution: European (Skuhravá, 1997b). Cited from Ankara (Alkan, 1952).

Janetiella oenephila (Haimhoffen, 1875)

Larvae cause galls on leaves of ***Vitis vinifera*** L. (Vitaceae). Pest of vineyard (Skuhravá & Skuhravy, 1997).

Distribution: South-European, Mediterranean (Skuhravá, 1986). Cited from Mersin (Yenice) (Tuatay et al., 1967), Adana (Kısakürek, 1976).

Lasioptera berlesiana Paoli, 1907

Larvae develop in fruits of ***Olea europaea*** L. (Oleaceae) which are attacked by the fly ***Bactrocera oleae*** (Diptera: Tephritidae) (Skuhravá & Skuhravy, 1997).

Distribution: Mediterranean (Skuhravá & Skuhravy, 1997). Reported from Aydın (Central province, Söke), Muğla (Bodrum), Balıkesir (Erdek), Kocaeli (Izmit-Central province), Izmir (Bornova) (Iyriboz, 1940, 1968), Aegean Region (Iren & Ahmet, 1973), Hatay (Antakya), Içel (Tarsus) (Coutin & Katlabi, 1986), Izmir (Aliağa,

Bayındır, Bergama, Beydağ, Bornova, Buca, Çeşme, Dikili, Foça, Karaburun, Kemalpaşa, Kınık, Kiraz, Konak, Menderes, Menemen, Ödemiş, Seferihisar, Selçuk, Tire, Torbalı, Urla) (Hepdurgun, 1998).

Lasioptera carophila F. Löw, 1874

Larvae cause galls (swellings) at the point of insertion of umbellules of many species and genera of the family Apiaceae (Skuhravá & Skuhravy, 1997). Originally the species was described based on material obtained from galls on ***Carum carvi*** L. Möhn (1968) studied larvae which was named incorrectly as ***Lasioptera argentata*** Loew, 1850. He obtained larvae of ***L. carophila*** from galls of ***Cymbocarpum wiedmanni*** Boiss. collected at Ağrı, Gümüşhane, Kars and Iğdır, 5.VII.1894, and from galls of ***Ferula pauciflora*** C. Koch, collected at Bartın-Amasra, Kastamonu, 29.VII.1982. He did not give the names of collectors (Möhn, 1968).

Distribution: European (Skuhravá, 1997b). Reported from Ağrı, Bartın (Amasra), Gümüşhane, Iğdır, Kars, Kastamonu (Möhn, 1968).

Lasioptera eryngii (Vallot, 1829) *

Larvae cause swellings on stems of ***Eryngium campestre*** L. (Apiaceae) (Skuhravá, 1994b).

Distribution: Mediterranean. ***L. eryngii*** has a large distribution area spread from western Europe up to Bulgaria and Greece. The occurrence in Turkey is at the boundary of its distribution area (Skuhravá, 1987). Material collected from Tokat (Taşlıçiftlik), on 18.-25.VI.2003 by H. Çam.

Lasioptera populnea Wachhtl, 1883

Larvae live as inquilines in galls caused by ***Contarinia populi*** on leaves of ***Populus tremula*** L. (Salicaceae) (Skuhravá, 1994b).

Distribution: Euro-Siberian. Reported from Istanbul (Belgrad Forest, Alemdağ) and Balıkesir (Dursunbey) (Acatay, 1959).

Lasioptera rubi (Schrank, 1803)

Larvae develop in swellings of the stems of ***Rubus idaeus*** L. and other species (Rosaceae) (Skuhravá, 1994b).

Distribution: Euro-Siberian (Skuhravá, 1997b). Bursa on ***R. idaeus*** (Kaya, 1999; Kaya & Kovancı, 2000).

Lasioptera turcica Möhn, 1968

Larvae cause swellings on stems of ***Echinophora anatolica*** Boiss. & Heldr. (Apiaceae). Möhn (1968) in his description based on the larva only gave as the type-locality: Turkey, Kastamonu, Bartın (Amasra), July 1892. He did not give the name of the collector.

Distribution: West-Asian. Recorded from Kastamonu, Bartın (Amasra) (Möhn, 1968).

Lestodiplosis polypori (Loew, 1850)

Larvae live as predators of larvae of various small insects inhabiting various fungi (Skuhravá, 1994b; Bayram & Skuhravá, 2004).

Distribution: European. Recorded from Ankara (Çamlıdere) on ***Russula*** sp. (Fungi: Russulaceae) (Bayram & Skuhravá, 2004).

Macrodiplosis pustularis (Bremi, 1847)

Synonym: ***Macrodiplosis dryobia*** (F. Löw, 1877)

Larvae cause leaf galls in the form of folded leaf lobe downwards of ***Quercus robur*** L. (Fagaceae) (Skuhravá, 1994b).

Distribution: European (Skuhravá, 1997b). Reported from Bursa on ***Quercus lusitanica*** Lm., Sakarya (Adapazarı, Sapanca) on ***Quercus petraea*** (Matt.) Liebl. (= ***Q. sessiflora*** Salis.) (Trotter, 1903).

Macrodiplosis roboris (Hardy, 1854)

Synonym: ***Macrodiplosis volvens*** Kieffer, 1895

Larvae cause leaf galls (rolled leaf margin upwards) of ***Quercus robur*** L. (Fagaceae) (Skuhravá, 1994b).

Distribution: European (Skuhravá, 1997b). Reported from Bursa (Gemlik) on ***Quercus lusitanica*** Lm., Sakarya (Adapazarı, Sapanca) on ***Quercus sessiflora*** Sm. (Trotter, 1903), Istanbul on ***Quercus*** sp. (Alkan, 1952).

Mayetiola destructor (Say, 1817)

Synonyms: ***Mayetiola orientalis*** Bollow, 1955; ***Mayetiola secalis*** Bollow, 1955.

Larvae cause swellings on stems of various cereals, mainly on ***Triticum aestivum*** L., less on ***Hordeum vulgare*** L. and ***Secale cereale*** L. (Poaceae). Bollow (1955) described ***Mayetiola orientalis*** based on material obtained from Nihat Shevket Iyriboz in eastern Turkey. ***M. destructor*** is a serious pest of cereals originating in Europe, at present it occurs as a serious pest mainly in North America.

Distribution: Primarily European, secondarily cosmopolitan (Skuhravá, 1986). Reported from Antalya, Ankara, Bursa (Karacabey), Konya, Yalova (Alkan, 1952), from Thrace under the name of ***Phytophaga destructor*** Say (Keyder, 1953 a, b, c), and from Aegean and Mediterranean regions on wheat (Iyriboz, 1970).

Mayetiola hordei Kieffer, 1909

Synonym: ***Mayetiola mimeuri*** Mesnil, 1934

Larvae develop in saddle-shaped swellings on stems of ***Hordeum vulgare*** L. This species differs by several morphological characters of puparia, female and male postabdomens from those of ***Mayetiola destructor*** (Say) (Gagné et al., 1991).

Distribution: European and northern African (Morocco). Recorded from Aegean region (Iyriboz, 1970).

Mikiola fagi (Hartig, 1839)

Larvae cause hard pointed galls on the upper leaf side of ***Fagus sylvatica*** L. (Fagaceae) (Skuhravá, 1994b).

Distribution: European (Skuhravá, 1997b). Reported from Adapazarı (Sapanca) (Trotter, 1903), Istanbul (Acatay, 1943), Bolu (Abant) on ***Fagus*** sp. (Alkan, 1952).

Mikiola orientalis Kieffer, 1908

Larvae cause large hard pointed galls on upper leaf side of ***Fagus orientalis*** L.

Distribution: West-Asian (Skuhravá, 1986). Recorded from Istanbul on ***Fagus*** sp. (Schimitschek, 1953).

Mikomya coryli (Kieffer, 1901)

Larvae cause small galls (depressions) on leaves of ***Corylus avellana*** L. (Corylaceae) (Skuhravá, 1994b).

Distribution: European (Skuhravá, 1997b). Reported from Eastern Black Sea Region (Ural & Kurt, 1971; Kurt, 1973).

Monarthropalpus flavus (Schrank, 1776)

Synonym: ***Monarthropalpus buxi*** Laboulbéne, 1873

Larvae cause small blister galls which are apparent on both sides of leaves of ***Buxus sempervirens*** L. (Buxaceae) (Skuhravá, 1994b).

Distribution: European, secondarily Holarctic (Skuhravá, 1986). Cited from Ankara (Toros & Kılınçer, 1975).

Odinadiplosis amygdali (Anagnostopoulos, 1929)

Larvae cause abnormal multiplication of buds of ***Prunus dulcis*** (Miller) D. A. Webb (= ***Prunus amygdalus*** L.) (Rosaceae). Flowers and fruits do not develop. Attacks result in death of trees (Nijveldt & Talhouk, 1976). It is a serious pest of almond trees.

Distribution: Mediterranean (Skuhravá & Skuhravy, 1997). Reported from Izmir (Yargıç, 1948; Alkan, 1952), Ankara on ***Amygdalus orientalis*** (Karaca, 1956).

Oligotrophus juniperinus (Linnaeus, 1758)

Larvae cause galls on terminal or lateral buds of ***Juniperus communis*** L. (Cupressaceae) (Skuhravá & Skuhravy, 1997).

Distribution: European (Skuhravá & Skuhravy, 1997). Cited from Istanbul (Schimitschek, 1953).

Oligotrophus panteli Kieffer, 1898

Larvae cause galls on terminal or lateral buds of ***Juniperus juniperinus*** L. and ***J. oxycedrus*** L. (Cupressaceae).

Distribution: European (Skuhravá & Skuhravy, 1997). Reported from Bursa (Mudanya) (Trotter, 1903).

Ozirhincus anthemidis Rübsaamen, 1915

Synonym: ***O. anatolicus*** Möhn, 1968

The species ***Ozirhincus anthemidis*** was originally described based on adults reared from swollen achenes of inflorescences of ***Anthemis arvensis*** L. and ***A. tinctoria*** L. (Asteraceae) (Skuhravá, 1994b). Möhn (1968) found larvae in swollen achenes of ***Anthemis kotschyana*** Boiss. and described them as ***O. anthemidis anatolicus***. Material originated from the type locality Amasya, Eastern Anatolia, 14.VI.1889. Möhn did not give the name of the collector.

Distribution: European (Skuhravá, 1997b). Recorded from Amasya, Eastern Anatolia (Möhn, 1968).

Ozirhincus longicollis Rondani, 1840

Originally only the female was described. Möhn (1968) studied larvae obtained from galls caused by this species in flower heads of ***Achillea spinulifolia*** Fenzl (Asteraceae) which were found at Içel (Bulgherstaaden, Cilicien), Turkey, in 1896, and of ***Chrysanthemum argenteum*** Willd. which were found in Eastern Anatolia in 1890. Möhn did not give the name of the collectors.

Distribution: European (Skuhravá, 1997b). Cited from Içel (Bulgherstaaden) and Eastern Anatolia (Möhn, 1968).

Ozirhincus millefolii (Wachtl, 1884)

Larvae cause swellings of achenes in flower heads of ***Achillea biserrata*** Bieb. (Asteraceae). Möhn (1966) studied larvae obtained from galls which were collected in Northwestern Anatolia, Samsun (Ladik) and Eastern Anatolia, 15.VII.1890, without giving the name of the collector.

Distribution: Euro-Siberian, secondarily Holarctic (Skuhravá, 1997b). Reported from Northwestern Anatolia, Samsun (Ladik) and Eastern Anatolia (Möhn, 1966).

Physemocecis hartigi (Liebel, 1892)

Larvae cause rounded blister galls on leaves of ***Tilia*** spp. (Tiliaceae) (Skuhravá, 1994b).

Distribution: European (Skuhravá, 1997b). Cited from Istanbul (Alkan, 1952).

Probruggmanniella phillyreae (Tavares, 1907)

Larvae cause blister galls on leaves of ***Phillyrea angustifolia*** L. (Oleaceae).

Distribution: Mediterranean (Skuhravá, 1986). Recorded from Bilecik (Trotter, 1903).

Rabdophaga heterobia (Loew, 1850)

Larvae of hibernation generation cause swellings on catkins and larvae of summer generation large leaf rosettes, densely haired, on ***Salix triandra*** L. (Salicaceae).

Distribution: Euro-Siberian (Skuhravá, 1997b). Cited from Ankara (Kalecik) on ***Salix*** sp. (Alkan, 1952).

Rabdophaga rosaria (Loew, 1850)

Larvae cause large rosette galls on ***S. alba*** (Skuhravá & Skuhravy, 1997).

Distribution: Euro-Siberian (Skuhravá & Skuhravy, 1997). Reported from Ankara, Eskişehir (Sivrihisar), Konya, Niğde on ***Salix alba*** and ***S. purpurea*** L. (Alkan, 1952; Karaca, 1956); Karabük (Kurşunlu) (Acatay, 1971); Kırklareli (Demirköy, Longoz), Edirne (Uzunköprü, Keşan), Sakarya (Adapazarı, Karasu), Kocaeli (Izmit, Maşukiye) on ***Salix alba*** (Özay, 1997).

Rabdophaga saliciperda (Dufour, 1841)

Larvae develop under the bark of ***Salix fragilis*** L. and ***S. alba***. Attacked branch is swollen with many emergence openings. It was also reported under the name of ***Helicomyia saliciperda*** (Dufour).

Distribution: Euro-Siberian (Skuhravá, 1997b). Reported from Ankara (Haymana) (Alkan, 1952), Western Anatolia on ***Salix*** sp. (Yargıç & Türkmenoğlu, 1948), Afyon (Dinar), Konya, Eskişehir (Acatay, 1971); Sakarya (Adapazarı, Geyve, Ferizli), Kocaeli (Izmit), Bursa (Mustafakemalpaşa, Inegöl), Bilecik, Balıkesir (Manyas, Susurluk), Çanakkale (Biga, Çan), Edirne (Uzunköprü, Keşan), Kırklareli (Vize, Demirköy) on ***S. alba***; Sakarya (Adapazarı, Geyve, Ferizli) on ***S. triandra***; Kocaeli (Izmit), Balıkesir (Manyas), Edirne, Istanbul (Bahçeköy) on ***S. babylonica*** L.; Kocaeli (Izmit) on ***S. excelsa*** J. F. Gmelin; Sakarya (Adapazarı, Ferizli) on ***S. cinerea*** L. (Özay, 1997).

Rabdophaga salicis (Schrank, 1803)

Larvae cause globular or cylindrical galls on branches of ***Salix aurita*** L. and related species of ***Salix*** (Salicaceae).

Distribution: Euro-Siberian (Skuhravá, 1997b). Reported from Ankara on ***S. alba*** (Alkan, 1952; Bodenheimer, 1958); Kocaeli (Izmit), Sakarya (Adapazarı, Geyve), Bilecik (Küplü), Bursa (Inegöl), Balıkesir (Manyas, Dursunbey, Susurluk, Sındırgı), Istanbul (Bahçeköy), Tekirdağ (Saray), Kırklareli (Vize, Demirköy), Edirne (Uzunköprü, Keşan) on ***S. alba***; Kocaeli (Izmit), Edirne on ***S. babylonica***; Kocaeli (Izmit) on ***S. excelsa*** (Özay, 1997).

Rabdophaga terminalis (Loew, 1850)

Larvae cause spindle galls on terminal shoots of ***Salix fragilis***, ***S. alba*** and related ***Salix***-species. Several generations develop in a year.

Distribution: Euro-Siberian (Skuhravá, 1997b). Reported from Edirne (Uzunköprü, Keşan), Kırklareli, Tekirdağ (Saray), Bursa (Inegöl), Sakarya (Adapazarı, Söğütlü, Karasu), Bursa (Inegöl, Bilecik, Küplü), Balıkesir (Manyas) on ***S. alba***; Sakarya (Adapazarı, Karasu) on ***Salix excelsa*** (Özay, 1997).

Resseliella oleisuga (Targioni-Tozzetti, 1886)

Larvae develop under the bark of twigs and stems of ***Olea europaea*** L. (Oleaceae) and may cause withering of the twigs (Skuhravá & Skuhravy, 1997).

Distribution: Mediterranean (Skuhravá & Skuhravy, 1997). Reported from Turkey without exact locality (Bodenheimer, 1939).

Resseliella piceae Seitner, 1906

Larvae develop inside the seed in cones of ***Abies alba*** Mill. (Pinaceae) (Skuhravá, 1994b).

Distribution: European (Skuhravá, 1997b). Cited from Western Black Sea Region on ***Abies*** sp. (Defne, 1954).

Resseliella theobaldi (Barnes, 1927)

Larvae develop under the rind of ***Rubus idaeus*** L. (Rosaceae) (Skuhravá, 1994b).

Distribution: European (Skuhravá, 1997b). Recorded from Bursa on ***R. idaeus*** (Kaya, 1999; Kaya & Kovancı, 2000)

Rhopalomyia artemisiae (Bouché, 1834)

Larvae cause large globular galls on ***Artemisia campestris*** L. and ***A. scoparia*** L. (Asteraceae) (Skuhravá, 1994b).

Distribution: Mediterranean (Skuhravá, 1997b). Cited from Bilecik (Trotter, 1903).

Rhopalomyia baccarum (Wachtl, 1883)

Larvae cause globular galls on stem of ***Artemisia scoparia*** L. (Asteraceae).

Distribution: Euro-Siberian (Skuhravá, 1997b). Cited from Bursa (Bilecik) (Trotter, 1903).

Rhopalomyia saissanica Fedotova, 1999 *

Larvae cause large globular galls on ***Artemisia austriaca*** Jacq. (Asteraceae).

Distribution: Middle and Western Asian. The galls of this species were found in eastern Kazakhstan and the causer was described several years ago by Fedotova (1999). First record from Turkey, Tokat (Taşlıçiftlik), 3-16.VII.2003, leg. H. Çam.

Taxomyia taxi (Inchbald, 1861)

Larvae cause large artichoke-shaped galls on branches of ***Taxus baccata*** L. (Taxaceae).

Distribution: European and southwest-Asian. Reported from Sinop (Ayancık) (Schimitschek, 1953).

Thecodiplosis sp.

One male and one female were reared from young cones of ***Pinus brutia*** Ten. (Pinaceae) on 4.IX.2001 by P. Can. Probably they belong to a new species for science. The status of this specimens doubtful until a more extensive material can be studied.

Distribution: West-Asian. Recorded from Manisa (Muradiye) and Izmir (Kınık).

Wachtliella ericina (F. Löw, 1885)

Larvae cause rosette galls on branches of ***Erica arborea*** L. (Ericaceae).

Distribution: Mediterranean (Skuhravá, 1986). Reported from Bursa and Sakarya (Adapazarı, Sapanca) (Trotter, 1903).

Zygiobia carpini (F. Löw, 1874)

Larvae cause swellings on the midvein of leaves on ***Carpinus betulus*** L. (Corylaceae) (Skuhravá, 1994b).

Distribution: European (Skuhravá, 1997b). Reported from Sakarya (Adapazarı, Sapanca) (Trotter, 1903) and from Turkey without exact locality (Bodenheimer, 1958).

Zoogeographical analysis

The gall midge species occurring in Turkey may be divided, according to their overall distribution, into seven groups: European, Euro-Siberian, Mediterranean, West-Asian, Holoarctic, Tropical and subtropical, and cosmopolitan.

Of the 71species forming the gall midge fauna of Turkey, 28 species (40%) are European species. They have their centres of distribution in Europe and occupy

large distribution areas, extending southwards to the Mediterranean and even to the North of Africa and some reach up to western Turkey, as for example ***Mikiola fagi*** and ***Hartigiola annulipes*** on ***Fagus sylvatica***; ***Macrodiplosis pustularis*** and ***M. roboris*** on ***Quercus petraea*** and ***Q. lusitanica; Zygiobia carpini*** on ***Carpinus betulus; Taxomyia taxi*** on ***Taxus baccata***. ***Lasioptera carophila*** occupies a large distribution area in Europe and reaches up to Turkey. It uses various host plant species and genera of Apiaceae in single parts of the distribution area.

Fifteen species (21%) occurring in Turkey may be classified as Euro-Siberian species. They occur abundantly in Europe and extend at least Western Siberia, some of them to central Siberia and few species reach up to the most eastern part of the Palaearctic Region, to the Far East. Typical representatives are ***Iteomyia capreae*** on ***Salix caprea*** and four species of the genus ***Rabdophaga*** associated with various species of ***Salix***.

Fifteen species (21%) occurring in Turkey are Mediterranean. Typical representatives of this group are ***Dasineura oleae*** on ***Olea europaea***, three species associated with ***Quercus cerris; Lasioptera eryngii*** on ***Eryngium campestre; Dasineura rufescens*** and ***Probruggmanniella phillyreae*** on ***Phillyrea variabilis*** and ***Janetiella oenephila*** on ***Vitis vinifera***.

Five species (7%) may be classified as West-Asian. ***Asphondylia anatolica*** on ***Astragalus lagurus; Lasioptera turcica*** on ***Echinophora anatolica; Rhopalomyia saissanica*** on ***Artemisia austriaca; Mikiola orientalis*** on ***Fagus*** sp. and ***Thecodiplosis*** sp. reared from cones of ***Pinus brutia***.

Three species (4%) occurring in Turkey may be designated as Holarctic. They probably are primarily European or Euro-Siberian species, according to their origin, but they occur secondarily in the Nearctic Region. Usually they were transferred or introduced to other regions with their host plants. ***Contarinia pyrivora, Monarthropalpus flavus*** and ***Ozirhincus millefolii*** are Holarctic species.

Two species, viz. ***Contarinia citri*** and ***Dicroneurus pseudococcus***, occurring in Turkey, originate from tropical and subtropical parts of the world. Three other species, viz ***Aphidoletes aphidimyza, Feltiella acarisuga*** and ***Mayetiola destructor***, have cosmopolitan distribution.

The gall midge fauna of Turkey is not distributed regularly over the whole territory of Turkey. As a result of the research carried out until our day, the richest area in terms of species is Marmara Region where 34 species (47%) were found. In the central part of the country 16 species (22%), in the Black Sea Region 14 species (19%), in the Aegean Region 14 species (19%) and in the Mediterrenean Sea Region 8 species (11%) were found. In the eastern part of the country only 5 (7%) species were found. This fact may be explained by the lack of required studies supposed to be carrying out by the institutions such as plant protection institute and related universities. Skuhrava & Skuhravy (1998) summarized their experiences from faunistic research on more than 1600 localities in Europe and that the gall midge species richness is influenced mainly by the following factors: by geographical and altitudinal position (both of which are associated with changing levels of climatic

variables including sunshine, temperature and rainfall), by the type of vegetation cover and by the human activity.

Economical importance

The following ten gall midge species occurring in Turkey may be considered to be actual or potential pests of cultivated plants, viz. ***Mayetiola destructor*** on cereals, ***Dasineura oleae*** and ***Resseliella oleisuga*** on ***Olea europaea; Odinadiplosis amygdali*** on ***Prunus dulcis; Apiomyia bergenstammi*** and ***Contarinia pyrivora*** on ***Pyrus communis; Janetiella oenephila*** on ***Vitis vinifera; Asphondylia gennadii*** on ***Ceratonia siliqua; Contarinia citri*** on ***Citrus*** spp. and ***Contarinia nasturtii*** on ***Brassica*** spp.

Özet

Türkiye Galsinekleri (Diptera: Cecidomyiidae) faunası

Bu çalışmada Türkiye Cecidomyiidae faunası gözden geçirilmiş ve 38 cinse bağlı 71 türden oluştuğu ortaya konmuştur. Bunların 62 tanesi fitofag olup, 59 konukçu bitkide beslendikleri belirlenmiştir. Çalışmada türlerin ayrıca zoocoğrafi analizi ve ekonomik önemlerine göre değerlendirilmesi yapılmıştır.

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