

## Tachinids (Diptera: Tachinidae) Reared from Lepidopterous Hosts in Kayseri Province with New Host Records

Turgut ATAY<sup>1\*</sup> Mustafa ÖZDEMİR<sup>2</sup> Kenan KARA<sup>1</sup>

<sup>1</sup> Gaziosmanpaşa University, Faculty of Agriculture,  
Department of Plant Protection, Tokat, TURKEY.

<sup>2</sup> Plant Protection Central Research Institute, Ankara, TURKEY.

e-mails: turgut.atay@gop.edu.tr\*, mustafa\_ozdemir@zmmae.gov.tr, kenan.kara@gop.edu.tr

### ABSTRACT

Five tachinid species were reared from five different hosts. Two of the hosts are recorded for the first time. These two host-parasitoid couples are *Apterogenum ypsilon* (Denis and Schiffermüller, 1775) (Noctuidae) for *Pales pavida* (Meigen, 1824) and *Ephelis cruentalis* (Geyer, 1832) (Pyralidae) for *Clemelis pullata* (Meigen, 1824). Also, four new host records for Turkey were identified.

*Key words:* Tachinidae, Lepidoptera, new host records, Kayseri, Turkey.

### INTRODUCTION

Tachinidae is one of the largest families of Diptera with about 8,500 species (O'Hara 2013). The family gains importance in agricultural and forest fields ecologically and economically because all of the species of this family are parasitoids of insects and other arthropods. Many hosts are lepidopteran pests, some of which cause considerable damage unless they are controlled. Other hosts are species that belong to the orders Coleoptera, Hemiptera, Hymenoptera, Orthoptera, Diptera and Lithobiomorpha (Grenier, 1988; Stireman *et al.*, 2006; Tschorsnig, 2017). Many hosts are still unknown. Detailed information on West Palaearctic hosts can be found in Herting (1960), Tschorsnig and Herting (1994), Kara and Tschorsnig (2003), Vaňhara *et al.* (2009), Cerretti and Tschorsnig (2010), and Robertson and Shaw (2012). Kara and Tschorsnig (2003) prepared a detailed catalogue containing hosts identified from Turkey. Recently, the most comprehensive catalogue about Palaearctic hosts was prepared by Tschorsnig (2017). It comprises 827 tachinid species reared from 2672 arthropod hosts belonging to eleven insect orders and one chilopod order.

### MATERIAL AND METHODS

This study was carried out to determine the tachinid parasitoids of lepidopterous hosts from agricultural and forest areas in Kayseri province (Turkey) in 2013-2015. The Lepidopteran larvae were collected from crop, forest, weed, and ornamental plants during the vegetation period. They were brought to the laboratory with their food-plants

for rearing, transferred to separate cages and checked daily. Reared tachinids were identified by the first and third authors using the keys of Mesnil (1944-1965), Tschorsnig and Herting (1994) and Tschorsnig and Richter (1998). Nomenclature and arrangement of tachinids follows Herting and Dely-Draskovits (1993). Lepidopterous hosts were identified by the second author using the Rákósy (1996) and Slamka (1997). The specimens are deposited at the Plant Protection Museum in Gaziosmanpaşa University, Agricultural Faculty, Plant Protection Department, Tokat, Turkey.

## RESULTS

Five tachinid species were reared and are listed along with their hosts, distribution in the world and some additional information.

### Subfamily: Exoristinae

#### Tribe: Goniini

#### *Clemelis pullata* (Meigen, 1824)

Material examined: 17.06.2013, 1♂; 18.06.2013, 1♂; 20.06.2013, 3♂♂; 2♀♀.

Host: *Ephelis cruentalis* (Geyer, 1832) (Pyralidae), collected in Kayseri: Pınarbaşı-Emegil, N 38°40'23", E 036°19'17", 1571m, 23.05.2013; Kayseri: Talas-Çevlik, N 38°37'08", E 035°48'09", 1532m, 23.05.2013.

Distribution in Turkey: Tokat (Kara and Alaoğlu, 2002); Eskişehir (Aksu, 2005).

Distribution in the World: Caucasus, Central and East Asia, East Siberia (Herting and Dely-Draskovits, 1993), Europe (Tschorsnig *et al.*, 2004).

Hosts in Turkey: Any hosts of *C. pullata* have not been detected in Turkey until now.

Remarks: Crambidae, Pyralidae and Tortricidae are the usual host families of this tachinid (Tschorsnig and Herting, 1994). *Ephelis cruentalis* is a new host species for this tachinid in the world. Also, *Clemelis pullata* is the first record of a tachinid for this host.

#### *Pales pavidata* (Meigen, 1824)

Material examined: 10.06.2013, 1♂; 12.06.2013, 1♀; 13.06.2013, 1♀.

Host: *Parastichtis ypsilon* (= *Apterogenum ypsilon*) (Denis and Schiffermüller, 1775) (Noctuidae), collected in Kayseri: Bünyan, N 38°46'41", E 035°57'40", 1482 m, on *Salix* sp., 23.05.2013.

Distribution in Turkey : Erzurum, Kars (Doğanlar, 1975, 1982; Özbek and Çoruh, 2012), Kırklareli (Haeselbarth, 1983), Samsun (Tuncer and Ecevit, 1996), Tokat (Kara, 1998; Atay and Kara, 2014), Ankara (Kara and Özdemir, 2000); Amasya (Kara, 2001); Afyonkarahisa, Burdur, Isparta (Avcı, 2009); Sakarya (Balkan *et al.*, 2015).

Distribution in the World: West Asia (Kugler, 1963), Europe (Tschorsnig *et al.*, 2004).

Hosts in Turkey: *Lymantria dispar* L. (Haeselbarth, 1983; Avcı, 2009) (Lymantriidae), *Malacosoma franconica* Esp. and *M. castrensis kirghisica* Stgr. (Lasiocampidae)

*Tachinids (Diptera: Tachinidae) Reared from Lepidopterous Hosts in Kayseri*

(Doğanlar 1975; 1982), *Hyphantria cunea* (Drury) (Arctiidae) (Tuncer and Ecevit, 1996; Kara and Tschorsnig, 2003), *Aglais urticae* L. (Nymphalidae), *Leucoma salicis* (L.) (Lymantriidae) (Kara, 1998), *Yponomeuta* sp. (Yponomeutidae) (Kara and Özdemir, 2000), *Malacosoma neustria* L. (Kara and Tschorsnig, 2003; Özbek and Çoruh, 2012), *Abraxas pantaria* L. (Geometridae) (Özbek and Çalmaşur, 2010), *Antitype chi* L., *Calophasia lunula* Hufn., *Orthosia incerta* Hufn. and *Simyra dentinosa* Frr. (Noctuidae) (Robertson and Shaw, 2012).

Remarks: This tachinid is polyphagous on numerous Macrolepidoptera and some Microlepidoptera (Tschorsnig and Herting, 1994). *Parastichtis ypsillon* is a new host species for this tachinid in the world. Also, *Pales pavidus* is the first record of a tachinid for this host.

***Sturmia bella* (Meigen, 1824)**

Material examined: 23.07.2013, 1♀; 24.07.2013, 1♀; 26.07.2013, 2♀♀; 31.07.2013, 1♂; 28.07.2013, 1♂; 29.07.2013, 1♂; 01.08.2013, 2♀♀; 25.06.2015, 2♂♂; 26.06.2015, 10♀♀.

Hosts: *Aglais urticae* (Linnaeus, 1758) (*Nymphalidae*), collected in Kayseri: Hacilar-Erciyes Mountain, N 38°35'19", E 035°30'21", 2000m, on *Urtica* sp., 08.07.2013; Kayseri: Hacilar-Erciyes Mountain, N 38°33'17", E 035°30'18", 2277m, 08.07.2013; Kayseri: Melikgazi-Hisarçık, N 38°37'00", E 035°30'49", 1676m, 10.07.2013; *Vanessa atalanta* (Linnaeus, 1758) (*Nymphalidae*), collected in Kayseri: Hacilar-Erciyes Mountain, N 38°35'19", E 035°30'21", 2000m, on *Urtica* sp., 08.07.2013; Kayseri: Develi, N 38°22'39", E 035°29'05", 1198m, 09.06.2015.

Distribution in Turkey: Erzurum (Doğanlar, 1975), Marmara Region (Atak and Atak, 1984), Tokat (Kara, 1998); Sakarya (Balkan *et al.*, 2015).

Distribution in the World: West Asia (Kugler, 1963; Herting and Dely-Draskovits, 1993), Europe (Tschorsnig *et al.*, 2004),

Hosts in Turkey: *Aglais urticae* L. (Doğanlar, 1975; Kara, 1998), *Pieris brassicae* L. (Pieridae) (Atak and Atak, 1984). *V. atalanta* is a new host record for *S. bella* in Turkey.

Remarks: This tachinid is usually reared from Nymphalidae, rarely from other Macrolepidoptera (Tschorsnig and Herting, 1994). *A. urticae* and *V. atalanta* are typical hosts for this tachinid.

***Masicera sphingivora* (Robineau-Desvoidy, 1830)**

Material examined: 07.08.2013, 2♂♂; 11.08.2013, 1♀; 18.08.2013, 2♀♀; 23.08.2013, 1♀; 29.07.2014 1♂, 3♀♀; 31.07.2014 3♂♂, 2♀♀; 02.08.2014, 1♂, 7♀♀.

Host: *Hyles euphorbiae conspicua* (Rothschild and Jordan, 1903) (Sphingidae), collected in Kayseri: Pınarbaşı-Emegil, N 38°40'34", E 036°20'01", 1608m, on *Euphorbiae* sp., 09.07.2013, 26.06.2014.

Distribution in Turkey: Ankara (Tuatay *et al.*, 1972), Trakya (Gürses, 1975), Erzurum (Doğanlar, 1975, 1982; Özbek and Çoruh, 2012), Tokat (Kara, 1998), Ankara, Niğde (Kara and Özdemir, 2000), Sivas (Atay and Kara, 2014).

Distribution in the World: Caucasus, Central Asia, East and West Siberia, Far East (Herting and Dely-Draskovits, 1993), East, South and West Europe (Tschorsnig *et al.*, 2004).

Hosts in Turkey: *Hyles euphorbiae* (L.) (Sphingidae), *Dicallomera fascelina* L., *Leucoma salicis* L. (Lymantriidae) (Doğanlar, 1982; Kara, 1998; Kara and Özdemir, 2000), *Malacosoma* sp. (Lasiocampidae) (Tuatay *et al.*, 1972; Kara and Özdemir, 2000), *Euproctis chrysorrhoea* L. (Lymantriidae) (Gürses, 1975; Kara, 1998; Kara and Özdemir, 2000), *Cucullia* sp. (Noctuidae), *Hyles centralasiae* (Staudinger), *Malacosoma franconica* (Den. et. Schiff.) (Kara and Tschorsnig, 2003), *Malacosoma neustria* (L.) (Kara, 1998; Özbek and Çoruh, 2012).

Remarks: This tachinid is usually reared from Sphingidae, however also Noctuidae, Lymantriidae, Lasiocampidae and Nymphalidae are among its hosts (Tschorsnig and Herting, 1994). *H.euphorbiae* is a typical host for this tachinid.

### Subfamily: Dexiinae

#### Tribe: Voriini

#### ***Voria ruralis* (Fallén, 1810)**

Material examined: 03.06.2013, 1♀; 22.06.2015, 1♀.

Host: *Vanessa atalanta* (Linnaeus, 1758) (*Nymphalidae*), collected in Kayseri: Develi, N 38°22'40", E 035°29'07", 1224m, on *Urtica* sp., 21.05.2013, 09.06.2015.

Distribution in Turkey: İzmir (Kavut *et al.*, 1974), Erzurum (Avcı and Özbek, 1990), Tokat (Kara, 1999), Niğde (Kara and Özdemir, 2000), Amasya (Kara, 2001), Karabük (Korkmaz, 2007), Hatay (Kaya and Kornoşor, 2008).

Distribution in the World: Central, East and West Asia (Herting and Dely-Draskovits, 1993), Avrupa, (Tschorsnig *et al.*, 2004),

Hosts in Turkey: *Autographa gamma* (Lep. Noctuidae) (Kara and Özdemir, 2000). *Helicoverpa armigera* (Lep. Noctuidae) (Kara and Özdemir, 2000)., *Spodoptera exigua* (Lep. Noctuidae) (Steiner, 1937). *V. atalanta* is new host record for *V. ruralis* in Turkey.

Remarks: *Voria ruralis* is a common noctuid parasitoid (Tschorsnig and Herting, 1994). *V. atalanta* is an atypical host for this species. There are two published records of *V. ruralis* from this host (Belshaw, 1993; Tschorsnig, 1994). *V. ruralis* is usually not recorded as a parasitoid of Nymphalidae.

### ACKNOWLEDGEMENTS

We are grateful to Dr. H.-P. TSCHORSNIG (Staatliches Museum für Naturkunde, Stuttgart, Germany) for providing several literature and information on host-parasitoid couples. The study was supported by General Directorate of Agricultural Research and Policies (project number: TAGEM-BS-12 / 01-06 / 01- 29).

**REFERENCES**

- Atay, T., Kara, K., 2014, Tachinids (Diptera: Tachinidae) reared from lepidopterous and heteropterous hosts from some localities in the Kelkit Valley (Amasya, Tokat, Sivas) of Turkey. *Turkish Journal of Zoology*, 38(4): 500-507.
- Aksu, S., 2005, *Eskişehir ve çevresinde saptanan Exoristinae ve Phasiinae (Diptera: Tachinidae) türleri*. Yüksek Lisans Tezi, Osmangazi Üniversitesi, Eskişehir, 129.
- Atak, U., Atak, E. D., 1984, Lahana keleşinin (*Pieris brassicae* L.)' nın biyo-ekolojisi ve mikrobiyal ilaçlarla savaşımı üzerinde araştırmalar. *Bitki Koruma Bülteni*, 24(4): 173-199.
- Avcı, M., 2009, Parasitoids complex and new host plants of the Gypsy Moth, *Lymantria dispar* L. in the Lakes District, Turkey. *Journal of Animal and Veterinary Advances*, 8(7): 1402-1405.
- Avcı, Ü., Özbek, H., 1990, Erzurum'da lahana zararlısı lepidopter türleri ve parazitoidleri üzerinde bir araştırma. *Türk. II. Biyolojik Mücadele Kongresi*, 26-29 Eylül 1990, İzmir, Turkey, 319-330.
- Balkan, T., Kara, K., Atay, T., 2015, Tachinidae (Diptera) species of the Sakarya (Turkey) province with two new records. *Turkish Journal of Zoology*, 39(6): 1050-1055.
- Belshaw, R., 1993, *Tachinid flies (Diptera: Tachinidae)*. Handbooks for the Identification of British Insects 10(4a1): 169.
- Cerretti, P., Tschorsnig, H.-P., 2010, Annotated host catalogue for the Tachinidae (Diptera) of Italy. *Stuttgarter Beiträge zur Naturkunde A. Neue Serie*, 3: 305-340.
- Doğanlar, M., 1975, *Erzurum Bölgesinde Önemli Lepidopter Tırtıllarında Bulunan Tachinidae Sinekleri ve Bunların Kısa Biyolojileri*. Atatürk Üniversitesi Yayınları, No. 375, Atatürk Üniversitesi Basımevi, Erzurum, 136.
- Doğanlar, M., 1982, Some parasitic flies from Eastern Anatolia I. (Diptera: Tachinidae, Exoristinae). *Türkiye Bitki Koruma Dergisi*, 6: 75-79.
- Grenier, S., 1988, Applied biological control with Tachinid Flies (Diptera, Tachinidae). A Review, *Anzeiger für Schädlingskunde, Pflanzenschutz, Umweltschutz*, 61(3): 49-56.
- Gürses, A., 1975, *Trakya Bölgesinde Altın Kelebek (Euproctis chrysorrhoea L.)' in Biyo-Ökolojisi ve Savaşı Üzerinde Araştırmalar*. Ankara, Turkey, Zırai Mücadele ve Zırai Karantina Genel Müdürlüğü. Araştırma Eserleri Serisi, Teknik Bülten, 8: 79.
- Haeselbarth, E., 1983, Determination list of entomophagous insects 9. International Union for Biological Sciences, International Organization for Biological Control (IOBC) of Noxious Animals and Plants. West Palaearctic Regional Section, VI: 1-49.
- Herting, B., 1960, *Biologie der westpaläarktischen Raupenfliegen (Dipt., Tachinidae)*. Monographien zur angewandten Entomologie, Hamburg und Berlin, 188.
- Herting, B., Dely-Draskovits, Á., 1993, *Family Tachinidae*. In: Soós, A., Papp, L. (Eds.). Catalogue of Palaearctic Diptera. Anthomyiidae-Tachinidae, Budapest. 118-458.
- Kara, K., 1998, Tokat ve çevresinde saptanan Exoristinae ve Phasiinae (Diptera: Tachinidae) alt familyalarına ait sinekler üzerinde sistematik çalışmalar, Doktora tezi, Gaziosmanpaşa Üniversitesi Fen Bilimleri Enstitüsü, Tokat, 247.
- Kara, K., 1999, Dexiinae (Diptera: Tachinidae) Species of the Tokat Province. *Türkiye Entomoloji Dergisi*, 23(3): 203-210.
- Kara, K., 2001, Amasya ilinde saptanan bazı Exoristinae, Tachininae ve Dexiinae (Diptera: Tachinidae) Türleri. *Turkish Journal of Entomology*, 25(3): 217-222.
- Kara, K., Alaoğlu, Ö., 2002, New records for Turkish Tachinidae (Diptera) Fauna, *Türkiye 5. Biyolojik Mücadele Kongresi*, 4-7 Eylül 2002, Erzurum, 217-225.
- Kara, K., Özdemir, Y., 2000, Tachinid flies (Diptera, Tachinidae) reared from lepidopterous larvae in Central Anatolia (Turkey). *Zoology in the Middle East*, 20(1): 99-116.

- Kara, K., Tschorsnig, H.-P., 2003, Host catalogue for the Turkish Tachinidae (Diptera). *Journal of Applied Entomology*, 127(8): 465-476.
- Kavut, N., Dinçer, J., Karman, M., 1974, Preliminary studies on the parasites and predators of cotton pests in the Aegean Region. *Bitki Koruma Bülteni*, 14(1): 19-28.
- Kaya, K., Kornoşor, S., 2008,. The lepidopterous pest species, their parasitoids and population dynamics of the important ones in winter vegetables areas in Hatay province. *Türkiye Entomoloji Dergisi*, 32: 195-209.
- Korkmaz, Y., 2007., Batı Karadeniz Bölgesi Tachinidae (Hexapoda: Diptera) Türleri Üzerinde Faunistik Çalışmalar, Yüksek Lisans Tezi, Gaziosmanpaşa Üniversitesi, Tokat, 60.
- Kugler, J., 1963, Tachinidae of Israel. I. General Part. *Israel Journal of Zoology*, 12(1-4): 25-34.
- Mesnil, L., 1944-1965, *Larvaevorinae (Tachininae)*. In: Lindner, E. (Ed.). Die Fliegen der Paläarktischen Region. Schweizerbart'sche Verlagsbuchhandlung, Stuttgart, 1435.
- O'Hara, J. E., 2013, History of tachinid classification (Diptera, Tachinidae). *ZooKeys*, 316: 1-34.
- Özbek, H., Çalmaşur, Ö., 2010, Spotted ash looper, *Abraxas pantaria* (L.) (Lepidoptera: Geometridae), a new ash pest in Turkey. *Turkish Journal of Zoology*, 34(3): 351-358.
- Özbek, H., Çoruh, S., 2012, Larval parasitoids and larval diseases of *Malacosoma neustria* L. (Lepidoptera: Lasiocampidae) detected in Erzurum Province, Turkey. *Turkish Journal of Zoology*, 36(4): 447-459.
- Rákosy, L., 1996, *Die Noctuiden Rumäniens (Lepidoptera, Noctuidae)*. O. Ö. Landesmuseum, Linz., 648.
- Robertson, D. M., Shaw, M. R., 2012, Further rearing records of some West Palaearctic Tachinidae (Diptera). *Entomologist's Gazette* 63: 161-172.
- Slamka, F., 1997, *Die Zünslerartigen (Pyraloidea) Mitteleuropas*. František Slamka, Bratislava, 112.
- Steiner, P., 1937, Beiträge zur Kenntnis der Schädlingfauna Kleinasiens III. *Laphygma exigua* Hb., ein Groß-Schädling der Zuckerrübe in Anatolien. *Zeitschrift für angewandte Entomologie*, 23: 177-222.
- Stireman, J. O., O' Hara, J. E., Wood D. M., 2006, Tachinidae: Evolution, behavior and ecology. *Annual Review of Entomology*, 51: 525-555.
- Tschorsnig, H.-P. 1994, Die Raupenfliegen (Diptera, Tachinidae) des Museums für Naturkunde in Freiburg. *Mitteilungen des badischen Landesvereins für Naturkunde und Naturschutz (Neue Folge)*, 16: 89-96.
- Tschorsnig H.-P., Herting, B., 1994, Die Raupenfliegen (Diptera: Tachinidae) Mitteleuropas: Bestimmungstabellen und Angaben zur Verbreitung und Ökologie der einzelnen Arten. *Stuttgarter Beiträge zur Naturkunde (A)* 506: 1-170.
- Tschorsnig, H-P, Richter, V.A., 1998, Family Tachinidae. In: Papp, L., Darvas, B. (Eds.). Contributions to a Manual of Palaearctic Diptera, Science Herald Publishers, Budapest, 691-827.
- Tschorsnig, H.-P., Richter, V. A., Cerretti, P., Zeegers, T., Bergström, C., Vaňhara, J., Van de Weyer, G., Bystrowski, C., Raper, C., Ziegler, J., Hubenov, Z. 2004, Tachinidae. In: Fauna Europaea Service. <http://www.faunaeur.org>. (06.03.2017).
- Tschorsnig, H.-P., 2017, Preliminary host catalogue of Palaearctic Tachinidae (Diptera). [www.nadsdiptera.org/Tach/WorldTachs/CatPalHosts/Home.html](http://www.nadsdiptera.org/Tach/WorldTachs/CatPalHosts/Home.html). (29.04.2017).
- Tuatay, N., Kalkandelen, A., Aysev (Çağatay), N., 1972, *Nebat Koruma Müzesi Böcek Kataloğu (1961-1971)*. Ankara, Turkey, Zirai Mücadele ve Zirai Karantina Genel Müdürlüğü Yayınları Mesleki Kitaplar Serisi, 119.
- Tuncer, C., Ecevit, O., 1996, Studies on the short biology of fall webworm (*H. cunea* Drury, Lep.: Arctiidae) in hazelnut growing area of Samsun Province and its natural enemies. *Fındık ve Diğer Sert Kabuklu Meyveler Sempozyumu*. 10-11 Ocak 1996, Samsun, 134-145.
- Vaňhara, J., Tschorsnig, H.-P., Herting, B., Mückstein, P., Michalková, V., 2009, Annotated host catalogue for the Tachinidae (Diptera) of the Czech Republic. *Entomologica Fennica*, 20(1): 22-48.