

Orijinal araştırma (Original article)

The Tipulidae (Diptera) fauna of the Marmara region, with nine new records and one new genus record (*Tanyptera* Latreille, 1804) for Turkey

Türkiye için dokuz kayıt ve bir cins (*Tanyptera* Latreille, 1804) kaydı ile birlikte Marmara Bölgesi'nin Tipulidae (Diptera) faunası¹

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Summary

The study was conducted in the Marmara region, which forms a passage between the Balkan peninsula and Anatolia from June 2008 to April 2011. In this study, a total of 64 taxa belong to Tipulidae were detected. Among these, *Tanyptera* (s.str.) *atrata atrata* (Linnaeus, 1758), *Tipula* (*Acutipula*) *balcanica* Vermoolen, 1983, *Tipula* (*A.*) *vittata* Meigen, 1804, *Tipula* (*Lunatipula*) *caudatula* Loew, 1872, *Tipula* (*L.*) *hera* Theischinger, 1979, *Tipula* (*L.*) *pannonia jordansi* Mannheims, 1954, *Tipula* (*L.*) *selene* Meigen, 1830, *Tipula* (*Pterelachisus*) *pseudovariipennis* Czizek, 1912 and *Tipula* (*Savtshenkia*) *benesignata* Mannheims, 1954 were recorded for the first time from the Turkish fauna. The genus *Tanyptera* Latreille, 1804 was also recorded for the first time in Turkey.

Key words: Diptera, Tipulidae, Marmara Region, fauna, new records.

Özet

Balkan Yarımadası ve Anadolu arasında geçit özelliğine sahip olan Marmara Bölgesi'nde Haziran 2008 ve Nisan 2011 arasında yapılan bu çalışmada Tipulidae'ye ait toplam 64 takson tespit edilmiştir. Bunlardan, *Tanyptera* (s.str.) *atrata atrata* (Linnaeus, 1758), *Tipula* (*Acutipula*) *balcanica* Vermoolen, 1983, *Tipula* (*A.*) *vittata* Meigen, 1804, *Tipula* (*Lunatipula*) *caudatula* Loew, 1872, *Tipula* (*L.*) *hera* Theischinger, 1979, *Tipula* (*L.*) *pannonia jordansi* Mannheims, 1954, *Tipula* (*L.*) *selene* Meigen, 1830, *Tipula* (*Pterelachisus*) *pseudovariipennis* Czizek, 1912 ve *Tipula* (*Savtshenkia*) *benesignata* Mannheims, 1954 Türkiye faunası için ilk kez kaydedilmektedir. Bunlara ek olarak, *Tanyptera* Latreille, 1804 cinsi de Türkiye için ilk kayıttır.

Anahtar sözcükler: Diptera, Tipulidae, Marmara Bölgesi, fauna, yeni kayıtlar.

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Introduction

Tipulid larvae have a life-span of one year or longer and generally live in semi-aquatic or terrestrial environments. Their adults have a short life span and are located in the moist and shady parts of forests, where they fed on plant sap and nectar. Adults are easily distinguished from the other families of Tipuloidea with their long and fragile legs, wing vascularity, elongated final palp segment and missing ocel eyes. Its medium-sized body varies from 10 mm to 30 mm (Mannheims & Theowald, 1980; Oosterbroek & Theowald, 1992).

Tipulidae is one of the largest families of Diptera with 4283 recognized taxa. In the Palearctic region, 1332 taxa belonging to 17 genera and 33 subgenera are recognized (Oosterbroek, 2015). 10 genera and approximately 470 taxa are known in Europe (Oosterbroek, 2006).

In recent years, important changes have occurred in the number of known Tipulidae taxa in Turkey and its neighbors. The most significant increase has occurred in Turkey, with 22 taxa having been added to the fauna list since 2001. The number of known taxa in Turkey has increased from 130 (Koç & Oosterbroek, 2001) to 152 (Oosterbroek, 2015) (Table 1).

Table 1. Number of Tipulid taxa in Turkey and neighbouring countries in 2001 and 2015

Tipulidae	COUNTRIES									
		TURKEY	Greek	Bulgaria	Azerbaijan	Armenia	Georgia	Iran	Iraq	Syria
Taxa numbers	2001	130	163	56	52	59	67	28	-	8
	2015	152	169	74	62	57	76	30	-	10

Material and Methods

The Marmara region consists of 11 provinces including Balıkesir (Ba), Bilecik (Bi), Bursa (Bu), Çanakkale (Ça), Edirne (Ed), İstanbul (İs), Kırklareli (Kı), Kocaeli (Ko), Sakarya (Sa), Tekirdağ (Te) and Yalova (Ya) (Fig. 1). The Marmara region is between the continents of Europe and Asia and serves as a passage between the Balkan Peninsula and Anatolia.

Adult Tipulidae samples were collected from aquatic and semi-aquatic areas, forests, sandy areas, meadows, shrubby steppes and unnatural habitats located in the research area as classified by Pollet (2000).

Adult samples were generally collected using a 40 cm diameter hand net with sweeping method and rarely by light trap. Genital preparations of some samples were performed in the laboratory. Genitals were placed in small capsules filled with glycerin and attached to pinned the specimens. All specimens were preserved by drying and deposited in the Collection of the Zoological Laboratory of the Department of Biology, Muğla Sıtkı Koçman University, Muğla, Turkey (ZMMU).



Figure. 1. Study areas in Turkey.

Results

A total of 183 days field study was performed in the Marmara region with the purpose of collecting adult Tipulidae samples. A total of 5721 samples, including 3870 males, were collected. According to the identification results, a total of 64 taxa were determined (Table 2).

Table 2. The distribution and number of Tipulidae samples collection of the Marmara region during June 2008 to April 2011

Species and Subspecies	Notes	Provinces
1. <i>Tanyptera</i> (s.str.) <i>atrata atrata</i> (Linnaeus, 1758)	NT, e, W, E	Kı
2. <i>Dolichozepe</i> (s.str.) <i>graeca</i> Mannheims, 1954	NM, a, W	Bu, Ça, Ko
3. <i>Nephrotoma analis</i> Schummel, 1833	NM, a, W, E	Bi, Bu, Ça, İs, Kı, Ko, Sa
4. <i>N. appendiculata appendiculata</i> (Pierre, 1919)	NM, a, e, W	Ba, Bi, Bu, Ça, Ed, İs, Kı, Ko, Sa, Te
5. <i>N.cornicina cornicina</i> Linnaeus, 1758	NM, a, W, E	Ba, Bi, Bu, Ça, Kı, Ko, Sa, Ya
6. <i>N. croceiventris lindneri</i> (Mannheims, 1951)	NM, a, W	Ba, Bi, Bu, Ça, Ed, Kı, Te
7. <i>N. guestfalica guestfalica</i> (Westhoff, 1879)	a, e, W	Ba, Bi, Bu, Ça, Sa, Ya
8. <i>N. nasuta</i> Oosterbroek, 1975	en, t, a, W	Ba, Bi, Bu, Ça, Kı
9. <i>N.quadrifaria quadrifaria</i> (Meigen, 1804)	a, e, W	Bi, Bu, Ça, Kı, Ko, Sa, Ya
10. <i>N. scalaris scalaris</i> Meigen, 1818	a, e, W	Ba, Bi, Bu, Ça, Ed, İs, Kı, Ko, Sa, Te, Ya
11. <i>N. theowaldi</i> Oosterbroek, 1978	NM, t, a, e, W	Ba, Bu, Ça, Ed, Kı, Ko, Sa, Te
12. <i>Tipula (Acutipula) aktashi</i> Koc, Hasbenli & de Jong, 1998	t, e, W	Bu, Kı
13. <i>T. (A.) balcanica</i> Vermoolen, 1983	NT, a, e, W	Kı, Sa
14. <i>T. (A.) fulvipennis</i> De Geer, 1776	a, W, E	Ba, Bu, Ça, Kı, Ko
15. <i>T. (A.) latifurca</i> Vermoolen, 1983	a, e, W	Ba, Bi, Bu, Ça, Kı, Ko, Sa
16. <i>T. (A.) vittata</i> Meigen, 1804	NT, e, W	Kı
17. <i>T. (Dentrotipula) flavolineata</i> Meigen, 1804	NM, a, W, E	Bu
18. <i>T. (Lunatipula) adapazariensis</i> Theischinger, 1987	en, t, a, W	Sa

Table 2. (Continued)

Species and Subspecies	Notes	Provinces
19. <i>T. (L.) borysthenica</i> Savchenko, 1954	NM, a, W	Ba, Bi, Bu, Ça, Ed, Kİ, Sa
20. <i>T. (L.) canakkalensis</i> Theischinger, 1987	en, t, a, W	Ba, Ça
21. <i>T. (L.) caudatula</i> Loew, 1872	NT, e, W	Ed, Kİ
22. <i>T. (L.) decolor</i> Mannheims, 1963	a, W	Ba, Bi, Bu, Ça, Ed, İS, Kİ, Ko, Sa, Te
23. <i>T. (L.) dedecor</i> Loew, 1873	NM, a, W	Ba
24. <i>T. (L.) dracula</i> Theischinger, 1977	NM, a, W	Ça
25. <i>T. (L.) furcula</i> Mannheims, 1954	a, e, W	Ba, Bi, Bu, Ça, Ed, İS, Kİ, Ko, Sa
26. <i>T. (L.) gebze</i> Koc, Hasbenli & Vogtenhuber, 2007	en, t, a, W	İS, Sa
27. <i>T. (L.) helvola</i> Loew, 1873	a, e, W	Ba, Bi, Bu, Ça, Ed, İS, Kİ, Ko, Sa, Te, Ya
28. <i>T. (L.) hera</i> Theischinger, 1979	NT, e, W	Kİ
29. <i>T. (L.) istriana</i> Erhan and Theowald, 1961	a, e, W	Ba, Bi, Bu, Ça, İS, Kİ, Ko, Sa, Ya
30. <i>T. (L.) kerkis</i> Theischinger, 1977	NM, t, a, W	Ba, Ça
31. <i>T. (L.) mendli</i> Martinovsky, 1976	t, a, e, W	Ba, Bi, Bu, Ça, Ko, Sa, Ya
32. <i>T. (L.) pannonia jordansi</i> Mannheims, 1954	NT, e, W	Kİ
33. <i>T. (L.) peliostigma peliostigma</i> Schummel, 1833	a, e, W, E	Ba, Bi, Bu, Ça, Kİ, Ko, Sa, Ya
34. <i>T. (L.) peteri</i> Theischinger, 1979	en, t, a, W	Ba, Bi, Bu, Ça, Kİ, Ko, Sa, Ya
35. <i>T. (L.) pseudowolffi</i> Theischinger, 1979	NM, t, a, W	Ba, Bi, Sa
36. <i>T. (L.) quinquespinis</i> Theischinger, 1980	NM, t, a, W	Ça
37. <i>T. (L.) selene</i> Meigen, 1830	NT, a, e, W	Bu, Kİ, Sa
38. <i>T. (L.) soosi izmirensis</i> Theischinger, 1987	NM, t, a, W	Ba, Bi, Bu, Ça, Ed, İS, Kİ, Ko, Sa, Ya
39. <i>T. (L.) soosi soosi</i> Mannheims, 1954	a, e, W	Ba, Bi, Bu, Ça, Ed, Kİ, Ko, Sa
40. <i>T. (L.) tibonella</i> Theischinger, 1977	a, W	Ba, Bi, Bu, Ça, Kİ, Ko, Sa
41. <i>T. (L.) transmarmarensis</i> Koc, Aktas & Oosterbroek, 1995	en, t, a, W	Bi, Bu, İS, Kİ, Sa
42. <i>T. (L.) truncata truncata</i> Loew, 1873	e, W	Kİ
43. <i>T. (L.) turca</i> Mannheims, 1963	en, t, a, W	Bu, Ko
44. <i>T. (L.) turcolivida</i> Mannheims, 1968	en, t, a, W	Ça, Kİ, Ko, Sa
45. <i>T. (L.) vermooleni</i> Theischinger, 1987	NM, a, W	Ba, Bu
46. <i>T. (L.) verrucosa sinedente</i> Theischinger, 1980	NM, t, a, W	Bu, Ça, Ed, Kİ
47. <i>T. (L.) vogtenhuberi</i> Theischinger, 1979	NM, a, W	Ça
48. <i>T. (L.) vulpecula</i> Theischinger, 1979	NM, en, t, a, W	Bu, Ko, Sa
49. <i>T. (Mediotipula) anatoliensis</i> Theowald, 1978	NM, en, t, a,	Ba
50. <i>T. (M.) stigmatella</i> Schummel, 1833	a, W	Bi, Bu, İS, Ko, Sa
51. <i>T. (Pterelachisus) aspoECKi</i> Vogtenhuber, 2004	NM, en, t, a, W	Bu
52. <i>T. (P.) luteobasalis luteobasalis</i> Savchenko, 1964	NM, a, W	Bu
53. <i>T. (P.) pseudovariipennis</i> Cizek, 1912	NT, e, W	Kİ
54. <i>T. (Savtshenkia) benesignata</i> Mannheims, 1954	NT, a, W, E	Bu, Ça
55. <i>T. (S.) odontostyla</i> Savchenko, 1961	NM, a, W	Ba, Ça, Kİ
56. <i>T. (S.) serrulifera</i> Alexander, 1942	NM, a, W	Bu
57. <i>T. (Schummelia) variicornis variicornis</i> Schummel, 1833	NM, a, W, E	Bu, Ça, Kİ, Ko
58. <i>T. (s.str) italica errans</i> Theowald, 1984	a, e, W	Ba, Ça, Ed, Kİ, Sa
59. <i>T. (s.str) orientalis</i> Lackschewitz, 1930	a, e, W, E	Ba, Bi, Bu, Ça, Ed, İS, Kİ, Ko, Sa, Te
60. <i>T. (Vestiplex) kosswigi</i> Mannheims, 1953	en, t, a, W	Bu, Ça, Ko
61. <i>T. (V.) semivittata semivittata</i> Savchenko, 1960	NM, a, W	Ko
62. <i>T. (Yamatotipula) caesia</i> Schummel, 1833	NM, a, e, W	Bi, Bu, Ko, Sa
63. <i>T. (Y.) lateralis</i> Meigen, 1804	a, e, W, E	Ba, Bi, Bu, Ça, Ed, İS, Kİ, Ko, Sa, Te, Ya
64. <i>T. (Y.) submontium</i> Theowald & Oosterbroek, 1981	a, W	Ba, Bu, Ça, Ed, Kİ, Ko

NM: New for the Marmara Region,

NT: New for Turkey,

en: endemic to Turkey,

t: type-locality in Turkey,

a: known from the Asiatic part of Turkey,

e: known from the European part of Turkey,

W: known from the West Palearctic,

E: known from the East Palearctic.

1. *Tanyptera (s.str.) atrata atrata* (Linnaeus, 1758)

Material examined: Kırklareli: *Pınarhisar*, Yenice, The Magnetic Field (41° 44' N / 27° 39' E), 565 m, 11.V.2009, 1 male.

Ecological remarks: The material was collected from moist mixed forests.

2. *Tipula (Acutipula) balcanica* Vermoolen, 1983

Material examined: Kırklareli: *Demirköy*, Pınarhisar (41° 46' N / 27° 41' E), 618 m, 11.V.2009, 1 male; *Bıçkı* stream (41° 48' N / 27° 48' E), 198 m, 12.V.2009, 6 males, 2 females. Sakarya: *Adapazarı*, Geyve, Fındıksuyu (40° 35' N / 30° 20' E) 230 m, 09.VII.2010, 2 males, 1 female.

Ecological remarks: The species is recorded for the first time from Turkey and materials were collected from moist mixed forests.

3. *Tipula (Acutipula) vittata* Meigen, 1804

Material examined: Kırklareli: *Demirköy*, Velika bridge (41° 47' N / 27° 42' E), 520 m, 11.V.2009, 1 male. *Pınarhisar*, Yenice (41° 44' N / 27° 38' E), 490 m, 20.IV.2009, 1 male; The Magnetic Field (41° 44' N / 27° 39' E), 565 m, 20.IV.2009, 6 male; 11.V.2009, 1 male, 1 female; 12.V.2009, 1 male, 1 female.

Ecological remarks: Materials were collected from moist mixed forests.

4. *Tipula (Lunatipula) caudatula* Loew, 1862

Material examined: Edirne: *Lalapaşa*, Sinanköy (41° 49' N / 26° 43' E), 143 m, 10.V.2009, 1 male. *Merkez*, Küçükdöllük (41° 45' N / 26° 40' E), 85 m, 10.V.2009, 1 female. Kırklareli: *Pınarhisar*, Kaynarca, Manastır stream (41° 39' N / 27° 26' E), 185 m, 11.V.2009, 1 male.

Ecological remarks: Materials were collected from river sides and mixed forests.

5. *Tipula (Lunatipula) hera* Theischinger, 1979

Material examined: Kırklareli: *Demirköy*, İğneada, Sislioba (41° 58' N / 27° 56' E), 115 m, 20.VI.2009, 1 male; (41° 54' N / 27° 57' E), 55 m, 20.VI.2009, 1 male.

Ecological remarks: Materials were collected from moist mixed forests.

6. *Tipula (Lunatipula) pannonia jordansi* Mannheims, 1954

Material examined: Kırklareli: *Demirköy*, Dupnisa cave (41° 50' N / 27° 33' E), 350 m, 11.V.2009, 3 males, 2 females; *Sarpdere* (41° 51' N / 27° 34' E), 370 m, 11.V.2009, 1 female; Velika bridge (41° 47' N / 27° 42' E), 520 m, 11.V.2009, 4 males. *Pınarhisar*, Yenice, The Magnetic Field (41° 44' N / 27° 39' E), 565 m, 11.V.2009, 1 male.

Ecological remarks: Materials were collected from moist mixed forests.

7. *Tipula (Lunatipula) selene* Meigen, 1830

Material examined: Bursa: *Osmangazi*, Uludağ (40° 09' N / 29° 01' E), 780 m, 09.VII.2008, 1 male; (40° 08' N / 29° 02' E), 1060 m, 03.VI.2009, 1 male; *Yiğitalı* (40° 13' N / 29° 01' E), 270 m, 03.VI.2009, 2 males. Kırklareli: *Dereköy* stream (41° 55' N / 27° 22' E), 452 m, 21.VI.2009, 1 male. *Demirköy*, Pınarhisar (41° 47' N / 27° 43' E), 643 m, 20.VI.2009, 1 male. Sakarya: *Adapazarı*, Geyve, Geyve valley, *Osmaniye* (40° 36' N / 30° 19' E), 55 m, 16.V.2010, 1 male.

Ecological remarks: Materials were collected from river side, partially moist mixed forests and moist heaths.

8. *Tipula (Pterelachisus) pseudovariipennis* Czizek, 1912

Material examined: Kırklareli: *Demirköy*, Bıçkı stream (41° 48' N / 27° 48' E), 198 m, 12.V.2009, 1 male; Velika bridge (41° 47' N / 27° 42' E), 520 m, 11.V.2009, 2 males. *Pınarhisar*, Yenice, The Magnetic Field (41° 44' N / 27° 39' E), 565 m, 11.V.2009, 2 males, 4 females; 12.V.2009, 2 males; Jandarma Tepe (41° 45' N / 27° 41' E), 780 m, 12.V.2009, 1 male.

Ecological remarks: Materials were collected from river side within deciduous forests and moist forests.

9. *Tipula (Savtshenkia) benesignata* Mannheims, 1954

Material examined: Bursa: *Osmangazi*, Çaybaşı (40° 02' N / 29° 04' E), 970 m, 10.X.2009, 1 male. Çanakkale: *Biga*, Çelikkörü (40° 21' N / 26° 59' E), 52 m, 30.X.2009, 1 male. *Yenice*, Çakır, Atatürk fountain (39° 56' N / 27° 21' E), 350 m, 25.X.2009, 1 male.

Ecological remarks: Materials were collected from river side within moist forests.

Discussion

29 taxa are known in the Marmara region (Koç et al., 1998, 2007; Koç & Oosterbroek, 2001; Mannheims & Theowald, 1980; Oosterbroek, 1978, 2009; Theischinger, 1979, 1987; Vogtenhuber, 2004). However, two of these *Ctenophora (Cnemoncois) ornata* Meigen, 1818 and *Tipula (Lunatipula) cedrophila* Mannheims, 1963 that were previously recorded in Kırklareli and Bilecik were not detected in this study.

This study provides an important contribution to the tipulid fauna of Turkey, particularly in the Marmara region. Nine taxa were recorded from Turkey and 26 taxa were recorded from the Marmara region for the first time. Consequently, the number of tipulid species known in the Marmara region increases to 66 and in Turkey to 161. These results suggest that many more species and subspecies can yet be found in our country, which has a wide variety of geographical and climatic properties.

Ten of these taxa found in the research area were from both the West Palearctic and East Palearctic regions; 54 of them were only found in the West Palearctic. There was been no encounter with a species distributed only in the East Palearctic. 12 of the detected taxa are endemic and also type localities of 20 taxa of them are in Turkey (Table 2).

When the distribution and numbers of taxa known in the provinces of the Marmara region was examined, Bursa (42), Kırklareli (39) and Çanakkale (38) have the highest taxa numbers while Tekirdağ (8), Yalova (11) and İstanbul (13) have the lowest taxa numbers. Less field study was done than that was expected due to excessive urbanization and destruction of natural areas.

These provinces with the most taxa, Bursa, Kırklareli and Çanakkale, are close to Uludağ, Yıldız Mountain and Kaz Mountain regions, all of which have significant biological diversity. The rich biological diversity in terms of other animal groups of these areas has already been acknowledged. This study also characterizes the rich biological Tipulidae diversity of these areas.

In the research area, adult Tipulidae samples were mostly found in May-June. The majority of the samples collected in September and October were bivoltine species. Considering a study performed in Southwest Anatolia by Koç et al. (2013), the taxa of the Marmara region fly a few weeks later than Southwest Anatolian taxa due to the fact that Southwest Anatolia is warmer than the Marmara region. The phonologies of most of Marmarian tipulids are similar to their relatives in Central Europe when this study was compared with Mannheims (1950), Hollander (1975) and Brinkmann (1991).

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