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Original article (Orijinal araştırma)

Additional and new records of some Oxytelinae (Coleoptera: Staphylinidae) from Turkey with notes on habitat associations

Türkiye’den bazı Oxytelinae (Coleoptera: Staphylinidae) türlerinin habitat tercihlerine ait notlar ile ek ve yeni kayıtlar

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Abstract

In this study, the specimens collected between 2011-2015 belonging *Anotylus* Thomson, C.G., 1859, *Oxytelus* Gravenhorst, 1806 and *Platystethus* Mannerheim, 1830 (Staphylinidae: Oxytelinae) were evaluated in terms of habitats and distributions. New and additional distribution data for 16 species are reported from various provinces of Turkey. Among them, *Anotylus rugifrons* (Hochhuth, 1849), *Anotylus sexualis* (Eppelsheim, 1892) and *Oxytelus pseudopiceus* Kashcheev, 1999 are new records for Turkey. For several other species, the author provides new provincial records. Distributions of 16 species in Turkey are mapped. Photographs of habitus, male sternites VII-VIII and aedeagus of *A. sexualis*, and habitus and male sternite VII of *O. pseudopiceus* are provided. EUNIS habitat types where the species were collected were mentioned. The highest number of species (9 species) was found in E3.4 followed by G1.7 (6 species) and G3.5 (5 species). Most of species were taken from cow dung. Habitat and environment information of species listed in present study were compared and evaluated with the literature. In addition, it is thought that nutritional requirements are at the main determinant in the habitat associations of the species.

Keywords: Anatolia, *Anotylus*, EUNIS habitats, *Oxytelus*, *Platystethus*

Öz

Bu çalışmada, 2011-2015 yılları arası toplanan *Anotylus* Thomson, C.G., 1859, *Oxytelus* Gravenhorst, 1806 ve *Platystethus* Mannerheim, 1830 (Staphylinidae: Oxytelinae) cinslerine ait örnekler bulundukları habitatlar ve dağılışları açısından değerlendirilmiştir. 16 tür için yeni ve ek dağılış kayıtları Türkiye’nin çeşitli illerinden kaydedildi. Bunlar arasında, *Anotylus rugifrons* (Hochhuth, 1849), *Anotylus sexualis* (Eppelsheim, 1892) ve *Oxytelus pseudopiceus* Kashcheev, 1999 Türkiye için yeni kayıttır. Diğer birçok tür için, yazar yeni il kayıtları sağlamıştır. 16 türün Türkiye dağılışı harita ile gösterilmiştir. *Anotylus sexualis* türünün habitus, erkek VII-VIII. sternitleri ve aedeagusunun ile *O. pseudopiceus* türünün habitus ve erkek VII. sternit fotoğrafları verilmiştir. Türlerin toplandığı EUNIS habitat tiplerinden bahsedilmiştir. En fazla tür sayısı (9 tür) E3.4 habitatında bulunmuş, bunu G1.7 (6 tür) ve G3.5 (5 tür) habitatları takip etmiştir. Çoğu tür inek dışkılarından alınmıştır. Bu çalışmada listelenen türlerin habitat ve ortam bilgileri literatürdeki bilgiler ile karşılaştırılmış ve değerlendirilmiştir. Ek olarak, besin tercihinin türlerin habitat tercihlerinde temel belirleyici olduğu düşünülmektedir.

Anahtar sözcükler: Anadolu, *Anotylus*, EUNIS habitatlar, *Oxytelus*, *Platystethus*

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Introduction

Species of the subfamily Oxytelinae (Coleoptera: Staphylinidae) are distributed worldwide (not all genera) and contain more 2000 described taxa (Schülke, 2012a; Schülke & Smetana, 2015). This subfamily is characterized by transverse, more or less rectangular flattened head with the antennae fixed to the sides of the head under a raised edge or tubercle. Several genera have visible abdominal tergite II at the basal of the abdomen. Another characteristic structure is a tergite IX divided by tergite X into two parts (Lott, 2009; Schülke, 2012a).

Species of Oxytelinae are observed in two different habitat types: moss, sand and gravel on banks of water bodies; and dung (e.g., herbivorous and chickens) or decaying plant (Makranczy, 2006; Schülke, 2012a). Some species of *Bledius* Leach, 1819 and *Thinobius* Kiesenwetter, 1844 feed on algae and other organic remains and inhabit waterside mud or sand (Hammond, 1976). *Anotylus* Thomson, 1859, *Oxytelus* Gravenhorst, 1806 and some *Platystethus* Mannerheim, 1830 are found in litter, dung or decaying material in temperate regions (Hammond, 1976). In the literature, it is reported that some Oxytelinae species were found in places such as dung, organic material, and habitats such as stream edge and forest (Hammond, 1976; Makranczy, 2006; Schülke, 2012a). There is no study that gives habitats of Oxytelinae species as EUNIS habitat type.

With the studies in the last decade, several species have been added to Turkish Oxytelinae fauna and the distribution areas of some species have been expanded. These studies are not particularly concerned with determination of the subfamily species. These are generally the determination of general Turkish Staphylinidae fauna (Assing, 2009, 2010, 2011, 2013, 2014, 2016; Kesdek et al., 2009; Özgen et al., 2010; Özgen & Anlaş, 2016), examination of museums or collections specimens (Anlaş & Rose, 2009; Özgen, 2011; Schülke, 2012b), composition of dung fauna (Özgen & Anlaş, 2010; Anlaş et al., 2014; Tezcan et al., 2019) and pitfall or light trap studies (Tezcan & Anlaş, 2009; Japoshvili & Anlaş, 2011). According to the checklist of Anlaş (2009) while the number of recorded Oxytelinae taxa was 94 but this number has now increased to 112 taxa.

Nevertheless, the fauna of Oxytelinae of many Turkish provinces has been insufficiently studied. The aim of this study was to enhance knowledge on the distributions and habitats of species of three genera of Oxytelinae in Turkey.

Materials and Methods

The studied materials were deposited in Zoological Museum of Gazi University (ZMGU), Ankara, Turkey. For this study, 258 specimens of oxytelines belonging *Anotylus*, *Oxytelus* and *Platystethus* were examined. Specimens were collected in different parts of Turkey in 2011-2015.

A list of Turkish provinces with positive records for each species is provided together with sources. Reliable localities are shown as points on the distribution maps for all taxa. The points of the records without exact locality information are shown near the province, district or village. Distributions of species are mapped in Arc Map 10. Photographs were taken with a Canon EOS M camera.

If EUNIS habitat information of the localities where the specimens were collected and environment (e.g., under the stones and from cow dung) in which they were collected are known, it is written after the locality information. Habitat information of old records and records without exact locality information are unknown. EUNIS habitat type of each locality was determined using Davies et al. (2004). Specimens were collected from eleven EUNIS habitats. The codes and names of these EUNIS habitats are: E1.2E, Irano-Anatolian steppes; E3.4, moist or wet eutrophic and mesotrophic grassland; E4.4, calcareous alpine and subalpine grassland; F5.3, pseudomaquis; G1, Broadleaved deciduous woodland; G1.3, Mediterranean riparian woodland; G1.7, thermophilus deciduous woodland; G2.1, Mediterranean evergreen *Quercus*

woodland; G3.5, *Pinus nigra* woodland; G3.9, coniferous woodland dominated by Cupressaceae or Taxaceae; and G4.B, mixed Mediterranean *Pinus*-thermophilus *Quercus* woodland. For a detailed description of habitats see Davies et al. (2004).

Results

Anotylus clypeonitens (Pandellé, 1867) (Figure 1)

Material examined. Batman: Hasankeyf, Irmak Village, 37°43'32.28"N, 41°31'12.40"E, 476 m, 17.05.2015, ♂, moist or wet eutrophic and mesotrophic grassland, under stone, leg. D. Çiftçi; Eskişehir: Mihaliçcik, N of Yalınkaya, 39°59'30"N, 31°15'29"E, 1210 m, 13.07.2012, ♂, thermophilus deciduous woodland, from cow dung, leg. D. Çiftçi; Sarıcakaya, Alapınar, 4 km along Alapınar-Laçın Road, 40°02'29.94"N, 30°49'49.32"E, 1035 m, 29.06.2012, ♂, mixed Mediterranean *Pinus*-thermophilus *Quercus* woodland, from cow dung, leg. D. Çiftçi; Osmaniye: Kadirli, 37°29'40.63"N, 36°05'49.04"E, 269 m, 26.04.2015, 2♂♂, Mediterranean riparian woodland, leg. D. Çiftçi.

Distribution in Turkey. Ankara, Antalya, Balıkesir, Kocaeli, Sakarya and Sinop (Horion, 1963; Smetana, 1967; Coiffait, 1978; Herman, 2001; Anlaş & Rose, 2009; Assing, 2013).

Remarks. This species is reported here from Eskişehir, Osmaniye and Batman Provinces for the first time. The specimens were collected from various EUNIS habitats; mixed Mediterranean *Pinus*-thermophilus *Quercus* woodland, thermophilus deciduous woodland, Mediterranean riparian woodland, moist or wet eutrophic and mesotrophic grassland. According to published data, *A. clypeonitens* is found on rotting plant substances, especially in compost heaps (Lott, 2009; Schülke, 2012a). In this study, the species was found in cow dung and under stones.



Figure 1. Distribution of *Anotylus clypeonitens* in Turkey.

Anotylus complanatus (Erichson, 1839) (Figure 2)

Material examined. Batman: Hasankeyf, Irmak Village, 37°43'32.28"N, 41°31'12.40"E, 476 m, 17.05.2015, ♂, moist or wet eutrophic and mesotrophic grassland, under stone, leg. D. Çiftçi; Mersin: Silifke, S of Imamlı Village, 493 m, 36°26'50.11"N, 34°00'31.39"E, 490 m, 21.04.2015, ♂, thermophilus deciduous woodland, leg. D. Çiftçi; Muğla: Marmaris, SE of Bozburun Village, 18 m, 36°40'33.73"N, 28°04'28.58"E, 16.04.2015, 2♂♂, thermophilus deciduous woodland, leg. D. Çiftçi; Marmaris, W of Taşlıca Village, 261 m, 36°37'54.76"N, 28°05'42.07"E, 16.04.2015, ♂, thermophilus deciduous woodland, leg. D. Çiftçi; Milas, SE of Kultak Village, 1 m, 37°01'58.39"N, 28°05'52.79"E, 14.04.2015, ♂, thermophilus deciduous woodland, leg. D. Çiftçi.

Distribution in Turkey. Antalya, Istanbul and Karaman (Apfelbeck, 1901; Scheerpeltz, 1958, 1962; Horion, 1963; Anlaş, 2009; Schülke, 2009).

Remarks. This species is here reported from southeastern Anatolia for the first time. The specimens collected from thermophilus deciduous woodland habitat and moist or wet eutrophic and mesotrophic

grassland habitat. According the published data (Hammond, 1976; Lott, 2009; Schülke, 2012a), the species was found in all kinds of organic materials (dung and litter). In this study, one specimen was taken from under stone in wet meadow, habitats of other specimens are unknown.



Figure 2. Distribution of *Anotylus complanatus* in Turkey.

***Anotylus fairmairei* (Pandellé, 1867) (Figure 3)**

Material examined. Erzincan: Refahiye, SE of Yurtbaşı Village, 39°53'46.87"N, 38°56'42.28"E, 1728 m, 21.06.2011, ♀, moist or wet eutrophic and mesotrophic grassland, from cow dung, leg. D. Çiftçi; Erzurum: Aşkale, N of Yeniköy Village, 39°51'53.98"N, 40°42'11.52"E, 2065 m, 25.06.2011, ♂, calcareous alpine and subalpine grassland, from cow dung, leg. D. Çiftçi.

Distribution in Turkey. Trabzon (Assing, 2009).

Remarks. The species had been reported from Trabzon Province. The specimens from Erzincan and Erzurum represent the third record from Turkey. In this study, it was collected from calcareous alpine and subalpine grassland habitat and moist or wet eutrophic and mesotrophic grassland habitat. *Anotylus fairmairei* is widespread and rare species in Central Europe, and recorded for all kinds of organic materials (dung and litter) (Lott, 2009; Schülke, 2012a). The species has only been found in several locations in east and north east part of Turkey (Figure 3). In the present study, specimens were collected from cow dung in different habitats.



Figure 3. Distribution of *Anotylus fairmairei* in Turkey.

***Anotylus intricatus* (Erichson, 1840) (Figure 4)**

Material examined. Eskişehir: Tepebaşı, exit of Hekimdağ, 39°54'48"N, 30°34'09"E, 1241 m, 23.08.2011, ♂, moist or wet eutrophic and mesotrophic grassland, from cow dung, leg. D. Çiftçi.

Distribution in Turkey. Adana, Balıkesir and İzmir (Fauvel, 1872; Scheerpeltz, 1962; Horion, 1963; Smetana, 1967; Herman, 2001).

Remarks. The specimen from Eskişehir represents a new provincial record. *Anotylus intricatus*, widespread in Central Europe, but rare everywhere and can be found in all kind of decayed remains

(Schülke, 2012a). The species is recorded from several provinces of Turkey (Figure 4). In the present study, the species collected from moist or wet eutrophic and mesotrophic grassland habitat in cow dung.



Figure 4. Distribution of *Anotylus intricatus* in Turkey.

***Anotylus inustus* (Gravenhorst, 1806) (Figure 5)**

Material examined. Ankara: Nallıhan, between Kavakköy-Osmanköy, 40°04'16.00"N, 30°58'58.00"E, 835 m, 29.04.2012, 3♀♀, thermophilous deciduous woodland, leg. D. Çiftçi; Nallıhan, between Kuzucular-Tekirler, 40°06'38.89"N, 30°54'19.48"E, 375 m, 29.04.2012, 12♂♂, 15♀♀, Irano-Anatolian steppes, leg. D. Çiftçi; Nallıhan, Osmanköy Village, 40°04'09.29"N, 30°54'49.70"E, 570 m, 15.06.2012, ♂, *Pinus nigra* woodland, leg. D. Çiftçi; Nallıhan, turnout Yenice-Düzköy-Kuzucular road, 40°05'0.76"N, 30°51'36.78"E, 260 m, 28.04.2012, 54♂♂, 63♀♀, Irano-Anatolian steppes, from chicken feces, leg. D. Çiftçi; Antalya: Alanya, Çayarası, 36°28.56"N, 32°24'08.88"E, 1110m, 14.05.2011, ♂, leg. D. Çiftçi; Aydın: Çine, SE of Alabayır Village, 37°31'37.78"N, 28°11'01.96"E, 642 m, 13.04.2015, ♂, leg. D. Çiftçi; Bilecik: Söğüt, Akçasu, 40°05'15.97"N, 30°18'30.34"E, 185 m, 29.04.2012, 2♂♂, Irano-Anatolian steppes, from cow dung, leg. D. Çiftçi; Çanakkale: Gelibolu, SW of Evreşe, 40°38'35.08"N, 26°52'03.40"E, 7 m, 02.05.2013, ♂, moist or wet eutrophic and mesotrophic grassland, leg. D. Çiftçi; Eskişehir: Sarıcakaya, 4 km along Alapınar-Laçın Road, 40°02'29.94"N, 30°49'49.32"E, 1035m, 22.09.2011, ♂, mixed Mediterranean *Pinus*-thermophilus *Quercus* woodland, leg. D. Çiftçi; Sarıcakaya, Beyköy, 40°05'17.28"N, 30°45'55.85"E, 250 m, 29.04.2012, ♀, Irano-Anatolian steppes, leg. D. Çiftçi; Sarıcakaya, between Beyköy-Kapıkaya, 40°03'41.92"N, 30°43'40.36"E, 230 m, 29.04.2012, 4♂♂, 2♀♀, Irano-Anatolian steppes, under stones, leg. D. Çiftçi; Sarıcakaya, Düzköy, 40°05'18.41"N, 30°50'20.38"E, 250 m, 29.04.2012, 2♂♂, Irano-Anatolian steppes, leg. D. Çiftçi; Tepebaşı, Yarımca Village, 39°55'15.00"N, 30°40'17.76"E, 1311 m, 29.04.2012, 2♂♂, *Pinus nigra* woodland, leg. D. Çiftçi; Kırklareli: Center, NE of Erikler Village, 41°52'58.09"N, 27°09'22.20"E, 435 m, 01.05.2013, ♂, thermophilus deciduous woodland, leg. D. Çiftçi; Center, W of Ahmetçe Village, 41°48'00.30"N, 27°10'29.46"E, 300 m, 01.05.2013, 3♂♂, ♀, pseudomaquis, leg. D. Çiftçi; Kütahya: Tavşanlı, S of Eşen Village, 39°42'47.35"N, 29°18'58.83"E, 1087 m, 16.05.2013, ♀, coniferous woodland dominated by Cupressaceae or Taxaceae, leg. D. Çiftçi; Mersin: Gülnar, SW of Ilısu Village, 36°32'30.50"N, 33°03'24.28"E, 805 m, 21.04.2015, ♂, leg. D. Çiftçi; Silifke, S of İmamlı Village, 36°26'50.11"N, 34°00'31.39"E, 490 m, 21.04.2015, ♂, leg. D. Çiftçi; Muğla: Bodrum, E of Dağbelen Village, 37°05'00.19"N, 27°21'54.57"E, 360 m, 12.04.2015, 8♂♂, 3♀♀, leg. D. Çiftçi; Fethiye, E of Korubükü Village, 36°28'03.85"N, 29°24'08.10"E, 185 m, 25.03.2015, ♀, leg. D. Çiftçi; Fethiye, Kumlu Plain, 36°18'47.47"N, 29°16'38.19"E, 4 m, 25.03.2015, 54♂♂, 59♀♀, leg. D. Çiftçi; Marmaris, W of Taşlıca Village, 36°37'54.76"N, 28°05'42.07"E, 261 m, 16.04.2015, 2♂♂, ♀, leg. D. Çiftçi; Center, SW of Kuyucak Village, 37°03'31.95"N, 28°16'09.98"E, 478 m, 14.04.2015, ♂, leg. D. Çiftçi; Yatağan, NW of Çakırlar Village, 37°27'43.11"N, 28°08'44.82"E, 370 m, 13.04.2015, 2♂♂, leg. D. Çiftçi; Siirt: Center, Köprübaşı Village, near of Kezer Stream, 37°57'43.24"N, 41°51'26.23"E, 03.04.2014, 24♂♂, 10♀♀, leg. D. Çiftçi; Center, Kılıçlı Village, 38°00'56.83"N, 41°46'34.74"E, 546 m, 14.03.2015, 2♂♂, 2♀♀, leg. D. Çiftçi; Center, Siirt University Kezer Campus, 37°58'23.03"N, 41°51'05.32"E, 11.03.2015, 2♂♂, leg. D. Çiftçi; Tekirdağ: Malkara, SW of Çimendere

Village, 40°46'23.82"N, 27°01'01.52"E, 185 m, 02.05.2013, ♂, Mediterranean evergreen *Quercus* woodland, leg. D. Çiftçi.

Distribution in Turkey. Adana, Artvin, Batman, Bursa, Diyarbakır, Erzincan, Erzurum, Isparta, Istanbul, İzmir, Karaman, Kilis, Kocaeli, Konya, Manisa, Mardin, Mersin, Muğla and Siirt (Peyron, 1858; Fauvel, 1872; Apfelbeck, 1901; Ganglbauer, 1905; Scheerpeltz, 1958; Horion, 1963; Smetana, 1967; Herman, 2001; Anlaş, 2009; Anlaş & Rose, 2009; Kesdek et al., 2009; Tezcan & Anlaş, 2009; Özgen et al., 2010; Özgen & Anlaş, 2010; Japoshvili & Anlaş, 2011; Assing, 2013; Anlaş et al., 2014; Özgen & Anlaş, 2016; Tanyeri et al., 2017; Tezcan et al., 2019).

Remarks. This species is one of the most common and widespread species of *Anotylus* in Turkey. The species is recorded from several provinces of Turkey for the first time: Ankara, Antalya, Aydın, Bilecik, Çanakkale, Eskişehir, Kırklareli, Kütahya and Tekirdağ. *Anotylus inustus* was collected from wide variety of habitats (see material examined) in chicken feces, cow dung and under stones.

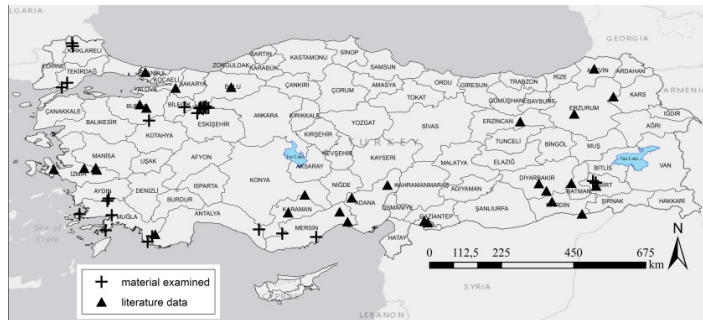


Figure 5. Distribution of *Anotylus inustus* in Turkey.

***Anotylus pumilus* (Erichson, 1839) (Figure 6)**

Material examined. Kars: Selim, E of Katranlı Village, 40°28'01.44"N, 42°43'18.10"E, 1910 m, 16.07.2011, ♂, Irano-Anatolian steppes, leg. D. Çiftçi.

Distribution in Turkey. Afyon and Ankara (Scheerpeltz, 1962; Horion, 1963; Smetana, 1967; Herman, 2001; Assing, 2013).

Remarks. The material from Kars represents the third record from Turkey fauna. This species was found in dry dung (Schülke, 2012a). Similarly, in this study, the specimen collected in Irano-Anatolian steppes in dry cow dung.



Figure 6. Distribution of *Anotylus pumilus* in Turkey.

***Anotylus rugifrons* (Hochhuth, 1849) (Figure 7)**

Material examined. Eskişehir: Tepebaşı, Uludere, 39°55'58.00"N, 30°21'17.00"E, 1240 m, 29.04.2012, 2♂♂, ♀, Irano-Anatolian steppes, under stones, leg. D. Çiftçi; Erzurum: Pasinler, N of Tepecik

Village, 39°57'33.94"N, 41°46'35.83"E, 1624 m, 14.07.2011, ♀, moist or wet eutrophic and mesotrophic grassland, leg. D. Çiftçi; Kars: Center, SE of Boğatepe Village, 40°47'34.71"N, 42°54'47.82"E, 2253 m, 17.07.2011, ♂, calcareous alpine and subalpine grassland, leg. D. Çiftçi.

Remarks. This species is widespread in Europe, but rare everywhere (Schülke, 2012a; Schülke & Smetana, 2015). It is here reported from Turkey for the first time. Similar to the published data (Schülke, 2012a), the species was found in wet meadows and river bank. Also, in this study, it was collected from under the stone in the Iranian-Anatolian steppes.



Figure 7. Distribution of *Anotylus rugifrons* in Turkey.

***Anotylus rugosus* (Fabricius, 1775) (Figure 8)**

Material examined. Eskişehir: Sarıcakaya, 5 km along Laçın-Alapınar Road, 40°01'48.00"N, 30°48'08.64"E, 580 m, 16.06.2012, ♂, *Pinus nigra* woodland, light trap, leg. D. Çiftçi.

Distribution in Turkey. Adana, Ankara, Bingöl, Erzurum, Karaman and Mersin (Peyron, 1858; Fauvel, 1871; Smetana, 1967; Özgen & Anlaş, 2010; Schülke, 2012b).

Remarks. The specimens represent new record from Eskişehir. It is one of the most common rove beetles in Central Europe and Palearctic Region (Schülke, 2012a; Schülke & Smetana, 2015). It seems to be common in Turkey, but in this study only one specimen was recorded. *Anotylus rugosus* can be found in soil litter and on all kind of decayed remains (Lott, 2009; Schülke, 2012a). In this study, the species was recorded at light trap in the *Pinus nigra* woodland, as in Lane & Mann (2006).



Figure 8. Distribution of *Anotylus rugosus* in Turkey.

***Anotylus sculpturatus* (Gravenhorst, 1806) (Figure 9)**

Material examined. Ankara: Nallıhan, between Kavakköy-Osmanköy Villages, 40°04'16.68"N, 30°58'57.00"E, 835 m, 29.04.2012, ♂, thermophilus deciduous woodland, leg. D. Çiftçi; Bilecik: Inhisar, Akkum Village, 40°05'16.59"N, 30°24'08.59"E, 325 m, 29.04.2012, ♀, orchard, under stone, leg. D. Çiftçi; Söğüt, Akçasu, 40°05'15.97"N, 30°18'30.34"E, 185 m, 29.04.2012, ♂, 2♀♀, *Pinus nigra* woodland, from cow dung, leg. D. Çiftçi; Eskişehir: Mihaliçcik, 7 km along Gürleyik-Yalımka Road, 39°59'N, 31°18'E,

1135 m, 22.09.2011, ♀, thermophilus deciduous woodland, from cow dung, leg. D. Çiftçi; Sarıcakaya, 4 km along Alapınar-Laçın Road, 39°56'03.18"N, 31°03'20.70"E, 1035 m, 22.09.2011, 6♂♂, mixed Mediterranean *Pinus*-thermophilus *Quercus* woodland, leg. D. Çiftçi; Sarıcakaya, 4 km along Alapınar-Laçın Road, 40°02'N, 30°49'E, 1035 m, 02.12.2011, ♂, mixed Mediterranean *Pinus*-thermophilus *Quercus* woodland, leg. D. Çiftçi; Tebebaşı, Tandır Village, 39°55'N, 30°40'E, 1312 m, 29.04.2012, ♂, ♀, *Pinus nigra* woodland, leg. D. Çiftçi; Muğla: Fethiye, Ölüdeniz, Baba Mountain, 36°33'30.35"N, 29°10'34.23"E, 900m, 05.05.2012, ♀, light trap, leg. D. Çiftçi; Marmaris, SE of Bozburun Village, 36°40'33.73"N, 28°04'28.58"E, 18 m, 16.04.2015, 3♂♂, leg. D. Çiftçi; Marmaris, W of Taşlıca Village, 36°37'54.76"N, 28°05'42.07"E, 261 m, 16.04.2015, ♂, leg. D. Çiftçi.

Distribution in Turkey. Antalya, Bolu, Düzce, Elazığ, İstanbul, Kastamonu, Manisa, Mardin, Mersin and Siirt (Peyron, 1858; Herman, 2001; Özgen & Anlaş, 2010; Anlaş & Rose, 2009; Assing, 2013; Assing, 2014; Anlaş et al., 2014).

Remarks. The species is new record all provinces listed above for the first time. It is one of the most common species of the genus in Central Europe and Palearctic Region (Schülke, 2012a; Schülke & Smetana, 2015). It is also common in Turkey. According to published data (Lott, 2009; Schülke, 2012a), the specimens were taken from cow dung. The specimens recorded from Turkey mostly collected from forest habitats (see material examined).

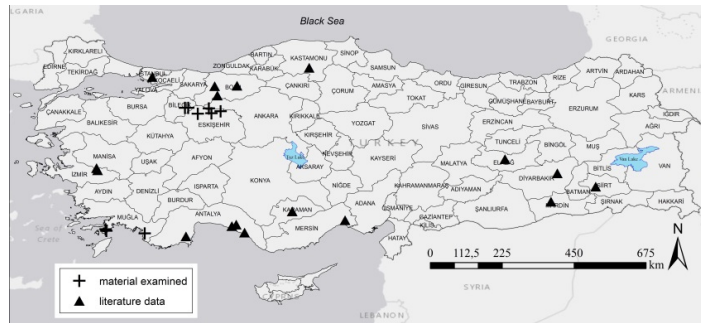


Figure 9. Distribution of *Anotylus sculpturatus* in Turkey.

***Anotylus sexualis* (Eppelsheim, 1892) (Figures 10 & 11)**

Material examined. Eskişehir: Beylikova, 3.5 km along Doğanoglu-Bozan Road, 39°49'N, 31°10'E, 862 m, 30.04.2012, ♂, Mediterranean riparian woodland, from cow dung, leg. D. Çiftçi.



Figure 10. Distribution of *Anotylus sexualis* in Turkey.

Remarks. The original description of *Oxytelus sexualis* is based on a holotype from Tashkent, Uzbekistan (Eppelsheim, 1892). Scheerpeltz (1962, 1963) provided morphological characters of *Oxytelus* (*Anotylus*) *sexualis* in his identification key and described distribution area of this species: "Transcaspien region, Turkestan, Afghanistan, Iran". Herman (1970) considered this species as *Anotylus sexualis*.

(Eppelsheim, 1892) (Herman, 1970). This species is known from Afghanistan, Iran, Uzbekistan (Schülke & Smetana, 2015). *Anotylus sexualis* is a new record for the fauna of Turkey. The published data on habitat or nutritional associations of this species are missing. Apparently, they are similar to other species of the genus. In this study, it was collected from cow dung in moist or wet eutrophic and mesotrophic grassland habitat.

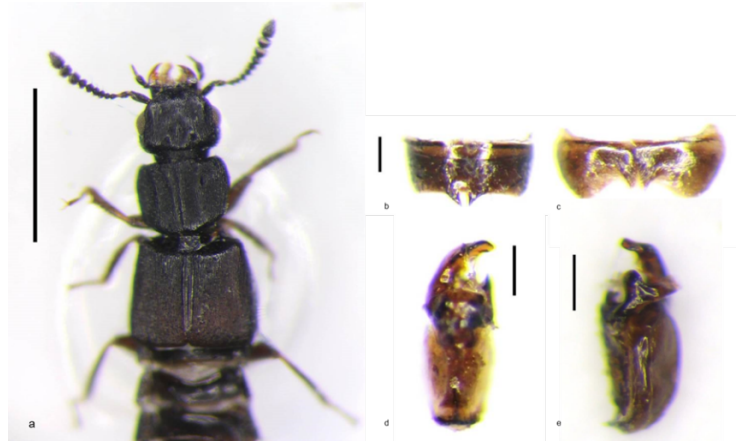


Figure 11. *Anotylus sexualis*: a) forebody (Scale: 0.5 mm), b) ♂ sternite VII, c) ♂ sternite VIII, d) aedeagus ventral view, e) aedeagus lateral view (Scales: 0.1 mm).

***Oxytelus laqueatus* (Marsham, 1802) (Figure 12)**

Material examined. Artvin: Borçka, Uğurköy, 41°28'47.29"N, 42°00'18.12"E, 22.07.2014, ♂, near broadleaved deciduous woodland, leg. D. Çiftçi.

Distribution in Turkey. Kastamonu and Rize (Assing, 2007, 2011).

Remarks. The material from Artvin represents third record from Turkey. It is a widespread species in the world (Schülke & Smetana, 2015). The species was found in all kind of decayed or rotting organic matter (Lott, 2009; Schülke, 2012a). In this study, the species is collected from broadleaved deciduous woodland.



Figure 12. Distribution of *Oxytelus laqueatus* in Turkey.

***Oxytelus piceus* (Linnaeus, 1767) (Figure 13)**

Material examined. Eskişehir: Alpu, 3 km along Alapınar-Taycılar Road, 40°00'N, 30°50'E, 1110 m, 22.08.2011, ♂, 3♀♀, thermophilus deciduous woodland, leg. D. Çiftçi; Sarıcakaya, 5 km along Laçın-Alapınar, 40°01'48.47"N, 30°48'08.64"E, 580 m, 16.06.2012, ♂, *Pinus nigra* woodland, light trap, leg. D. Çiftçi; Sarıcakaya, Alapınar, 4 km along Laçın Road, 40°02'29.94"N, 30°49'49.32"E, 1035 m, 28.06.2012, ♂, mixed Mediterranean *Pinus*-thermophilus *Quercus* woodland, from cow dung, leg. D. Çiftçi; İzmir:

Bornova, Yakaköy, 38°31'04.68"N, 27°19'53.85"E, 508 m, 11.04.2011, ♂, leg. D. Çiftçi; Kırşehir: Akçakent, W of Ömeruşağı Village, 39°43'26.61"N, 34°04'36.68"E, 877 m, 05.06.2011, 8♂♂, 5♀♀, leg. D. Çiftçi.

Distribution in Turkey. Adana, Antalya, Erzurum, Mardin and Mersin (Peyron, 1858; Smetana, 1967, Herman, 2001; Anlaş & Rose, 2009; Kesdek et al., 2009; Özgen et al., 2010).

Remarks. It is here reported from central and western Anatolia for the first time. It is a widespread species in the Palearctic Region (Schülke & Smetana, 2015). It can be detected in all kinds of digested matter, often flying (landing net in the light) (Lott, 2009). In this study, it was generally collected from forest habitats (thermophilus deciduous woodland, *Pinus nigra* woodland, mixed Mediterranean *Pinus-thermophilus Quercus* woodland) in cow dung also using light trap.



Figure 13. Distribution of *Oxytelus piceus* in Turkey.

***Oxytelus pseudopiceus* Kashcheev, 1999 (Figures 14 & 15)**

Material examined. Eskişehir: Sarıcakaya, Laçın-Alapınar Road, 40°01'48.47"N, 30°48'08.64"E, 580 m, 17.06.2012, 4♂♂, ♀, *Pinus nigra* woodland, light trap, leg. D. Çiftçi; Gümüşhane: Kelkit, E of Yeniyoğ Village, 39°54'04.61"N, 39°24'54.82"E, 1876 m, 22.06.2011, ♂, leg. D. Çiftçi.



Figure 14. Distribution of *Oxytelus pseudopiceus* in Turkey.

Remarks. According Kashcheev (1999), *O. pseudopiceus* was described based on a male holotype and paratypes (eight males and 12 females) from "south of Zaysan", three males and one female from "Zailiysky Alatau" (Kazakhstan). This author provided drawings of head, pronotum, last sternites of abdomen and aedeagus of the species (Kashcheev, 1999). *Oxytelus pseudopiceus* is a new record for Turkey. The specimens from Eskişehir were collected with a light trap at the border of *Pinus nigra* woodland. In this study, the photographs of the forebody and the male sternite VII of this species are published for the first time (Figure 15).



Figure 15. *Oxytelus pseudopiceus*: a) forebody (Scale: 0.5 mm), b) ♂ sternite VII (Scale: 0.1 mm).

***Oxytelus sculptus* Gravenhorst, 1806 (Figure 16)**

Material examined. Batman: Hasankeyf, Irmak Village, 37°43'32.28"N, 41°31'12.40"E, 476 m, 17.05.2015, ♂, moist or wet eutrophic and mesotrophic grassland, under stone, leg. D. Çiftçi; Eskişehir: Tepebaşı, Hekimdağ, 39°57'N, 30°30'E, 1240 m, 24.09.2011, ♂, ♀, Irano-Anatolian steppes, leg. D. Çiftçi.

Distribution in Turkey. Adana, Ankara, Diyarbakır, Karaman, Mardin, Mersin, Muğla and Sakarya (Peyron, 1858; Smetana, 1967; Herman, 2001; Anlaş, 2009; Özgen & Anlaş, 2010; Özgen, 2011, Tezcan et al. 2019).

Remarks. This species was recorded for Batman and Eskişehir Provinces for the first time. It is a cosmopolitan species (Schülke & Smetana, 2015). This species can be found in compost and dung heaps (Lott, 2009; Schülke, 2012a).



Figure 16. Distribution of *Oxytelus sculptus* in Turkey.

***Platystethus cornutus* (Gravenhorst, 1802) (Figure 17)**

Material examined. Eskişehir: Mihalıçcık, Üçbaşı, 39°47'N, 31°38'E, 945 m, 20.08.2011, ♂, moist or wet eutrophic and mesotrophic grassland, nearby pond, leg. D. Çiftçi.

Distribution in Turkey. Ankara, Aydın, Edirne, Eskişehir, İzmir, Manisa, Mardin, Mersin, Karaman and Kütahya (Peyron, 1858; Smetana, 1967; Peyron, 1858; Anlaş, 2009; Anlaş & Rose, 2009; Özgen et al., 2010).

Remarks. It is the most frequently encountered wetland *Platystethus* species. It breeds in mud and sand around ponds and rivers (Lott, 2009). In this study, it was also collected from around pond shores.



Figure 17. Distribution of *Platystethus cornutus* in Turkey.

***Platystethus nitens* (Sahlberg, 1832) (Figure 18)**

Material examined. Eskişehir: Mihallıçık, Ahurözü, 39°47'N, 31°42'E, 1035 m, 20.09.2011, ♂, moist or wet eutrophic and mesotrophic grassland, from cow dung, leg. D. Çiftçi; Tepebaşı, Danişment Village, 39°53'N, 30°42'E, 1200 m, 28.04.2012, ♂, thermophilus deciduous woodland and near stream, from cow dung, leg. D. Çiftçi.

Distribution in Turkey. Ankara, Antalya, Eskişehir, Isparta, Kilis, Kocaeli, Mardin and Sakarya (Scheerpeltz, 1955; Horion, 1963; Smetana, 1967; Herman, 2001; Özgen & Anlaş, 2010; Anlaş & Rose, 2009; Assing, 2013, 2014; Altunsoy et al., 2017).

Remarks. *P. nitens* usually occurs in warm places with tightly compact soil, especially on lake shores, river banks, in fields and gardens. It can be found in detritus, compost, horse and cattle dung (Burakowski et al., 1979; Koch, 1989). In this study, this species was found in cow dung on wet meadow and river banks (in thermophilus deciduous woodland).



Figure 18. Distribution of *Platystethus nitens* in Turkey.

Discussion

In this study, the specimens *Anotylus*, *Oxytelus* and *Platystethus* belonging to the Oxytelinae subfamily were evaluated in Zoological Museum of Gazi University (ZMGU), Ankara, Turkey. At the end of the evaluation, 16 species were identified. Of these species, 10 belonged to *Anotylus*, four to *Oxytelus* and two to *Platystethus*. Among them, *A. rugifrons* (Hochhuth, 1849), *A. sexualis* (Eppelsheim, 1892) and *O. pseudopiceus* Kashcheev, 1999 are new records for Turkish fauna.

In this study, habitat associations and environments of the species was compiled (Table 1) from information given in published papers.

Table 1. Oxytelinae species collected at the EUNIS habitats

Species	EUNIS Habitat Code										
	E1.2E	E3.4	E4.4	F5.3	G1	G1.3	G1.7	G2.1	G3.5	G3.9	G4.B
<i>Anotylus clypeonitens</i>		x				x	x				x
<i>Anotylus complanatus</i>		x					x				
<i>Anotylus fairmairei</i>		x	x								
<i>Anotylus intricatus</i>		x									
<i>Anotylus inustus</i>	x	x		x			x	x	x	x	x
<i>Anotylus pumilus</i>	x										
<i>Anotylus rugifrons</i>	x	x	x								
<i>Anotylus rugosus</i>									x		
<i>Anotylus sculpturatus</i>							x		x		x
<i>Anotylus sexualis</i>						x					
<i>Oxytelus laqueatus</i>					x						
<i>Oxytelus piceus</i>							x		x		x
<i>Oxytelus pseudopiceus</i>									x		
<i>Oxytelus sculptus</i>	x	x									
<i>Platystethus cornutus</i>		x									
<i>Platystethus nitens</i>		x					x				

Among the detected species, six species were collected from only one locality. Other species were collected from more than one locality (Table 1). Of the species collected from a single locality, *A. intricatus* is found in decomposed material (Schülke, 2012a) and in the present study it was taken from E3.4 habitat from the edge of stream. *Anotylus pumilus* is a common species for dry dung (Schülke, 2012a). The species was collected from dry cow dung and oak leaf litter in dry habitats (Irano-Anatolian steppes and oak forest) as that in Assing (2013). The habitat of the *A. rugosus* is given as steppes in Özgen & Anlaş (2010) and Schülke (2012b) and in present study it was collected from the black pine forest. The species that common in Europe is also likely to be highly widespread in Turkey. Therefore, it is can also be found from many different habitats. Habitat or nutritional associations of *A. sexualis* are not specified in the literature. It is thought to occur decomposed material like other species of the genus. In this study, the specimen was taken from G1.3 (Mediterranean riparian woodland) habitat in cow dung. The common species *O. laqueatus* was collected from broadleaved deciduous woodland in this study and Assing (2007). The species was found in all kind of decayed or rotting organic matter (Lott, 2009; Schülke, 2012a). *Platystethus cornutus* was most frequently encountered in wetlands (Lott, 2009). The specimens collected in this study and of Anlaş (2009) (record from Manisa: Çatalköprü) were taken from the edge of the stream. In addition, it was observed that the specimens with exact locality record were collected from various habitats; agricultural land and forest (Anlaş, 2009; Anlaş & Rose, 2009; Özgen et al., 2010). The habitat information of the species mentioned above is incomplete. The habitat information given in this study and in the literature are similar for some species. In addition, new habitat information has been added for some species.

When number of the species detected in habitats is examined numerically, nine species from E3.4 habitat, six species from G1.7 habitat and five species from G3.5 habitat were identified. Fewer than five species were found from other habitats (Table 1). The specimens collected from E3.4 habitat are usually taken from cow dung. The reason for this is that the water in this habitat is considered to be used by cattle for drinking. Ten species were identified from forest habitats (habitats starting with G code). Some of the specimens collected in forest habitats were taken from cow dung. Species collected from these habitats usually feed on various kinds of decayed or rotting organic matter. Studies in the Nearctic region (González-Vainer et al., 2012; Greenberg & Thomas, 1995) showed that forest habitats have greater coprophagous Oxytelinae species diversity than pasture habitats. This was considered to be a complex habitat that provides shelter from predators of forest habitats. In Europe, due to the fact that domestic mammals in pasture are more dominant, it is stated that coprophagous Oxytelinae species richness in pasture habitat is high (González-Vainer et al., 2012; Greenberg & Thomas, 1995). Numerous small oxytelines are many times found in cow dung. These beetles consume decomposing material in dung (Hammond, 1976; Hanski & Cambefort, 1991). Also, some oxytelines are predominantly associated with litter or decaying plant material (Hammond, 1976; Lott, 2009). In this study, it was observed that there are a moderate number of species in forest habitats, possibly because there are more nutritional resources in forests.

Overall, it is considered that the nutritional requirements of the *Anotylus*, *Oxytelus* and *Platystethus* species listed above are the main determinant of their habitat associations. However, there is insufficient information about their habitats to draw strong conclusions. Further habitat and environmental information need to be collected in future studies.

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