

Orijinal araştırma (Original article)

Faunistical, ecological and zoogeographical evaluations on the dung beetles (Coleoptera: Scarabaeidae: Scarabaeinae) of Kütahya province (Turkey)

Kütahya (Türkiye) çevresi dışkı/bok böcekleri (Coleoptera: Scarabaeidae: Scarabaeinae) üzerine faunistik, zoocoğrafik ve ekolojik değerlendirme¹

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Summary

The aim of this study was to understand the faunistical, ecological and zoogeographical position of the dung beetle fauna of the Kütahya (Turkey). In this study, 21 dung beetle species (Coleoptera: Scarabaeidae: Scarabaeinae) belonging to 9 genera from Kütahya Province in the Aegean region of Turkey were collected between March 2003 and July 2004. Among them, *Scarabaeus carinatus* Gebler, 1841 is a new record for the fauna of Turkey. Two species are here recorded for the first time from the Aegean region and 21 species from the research area. In addition, chorotypes, distributions in Turkey and the Palaearctic region and habitats of each species are given. A list of sampling sites, chorotypes of species, chorological categories and percentage, main chorotypes and percentage, distribution of species according to tribe, distribution of species according to genera, and numbers of the species in different months, are given in tables and figures for the collected species.

Key words: Kütahya, Scarabaeidae, Scarabaeinae, biodiversity, distribution.

Özet

Bu çalışmanın amacı Kütahya (Türkiye) ilinin bok böceklerinin faunistik, ekolojik ve zoocoğrafik durumlarını belirlemektir. Bu çalışmada, Türkiye'nin Ege Bölgesi'nde Kütahya ve çevresinde 9 cinse ait 21 bok böceği (Coleoptera: Scarabaeidae: Scarabaeinae) türü kaydedilmiştir. Örnekler Mart 2003 ve Temmuz 2004 tarihleri arasında toplanmıştır. *Scarabaeus carinatus* Gebler, 1841, Türkiye faunası için yeni kayıttır. Ege Bölgesi'nden iki tür ve araştırma bölgesinden ise 21 tür ilk kez kaydedilmiştir. Ayrıca, araştırma bölgesinden toplanan bu türlerin korotipleri, Kütahya, Türkiye ve Palearktik Bölge'deki yayılışları ve habitatları hakkında bilgiler verilmiştir. Örnekleme noktalarının listesi, türlerin korotipleri, koroloji kategoriler ve yüzdesi, ana korotip ve yüzdesi, türlerin tribuslarla cinslere göre dağılışları ve farklı aylardaki tür sayıları tablo ve şekillerle gösterilmiştir.

Anahtar sözcükler: Kütahya, Scarabaeidae, Scarabaeinae, biyoçeşitlilik, yayılış.

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Introduction

Scarabaeidae is one of the largest families in Coleoptera. Dung beetle is a common name applied to beetles in the subfamilies Scarabaeinae and Aphodiinae (Lodos, 1995; Arnett et al., 2002). Scarabaeinae is a heterogeneous subfamily with 10 tribes, 234 genera and close to 5000 described species worldwide (Ziani, 2010). In the Palaearctic region, this subfamily comprises 9 tribes, 38 genera, and 751 species, and in Turkey there are 5 tribes, 11 genera, and 84 species (Löbl and Smetana, 2006).

The Scarabaeinae is among the most distinctive groups of all the Coleoptera. Legs, especially the protibiae, are usually shaped for digging. The antennal insertion is not visible from above and has fewer than 11 antennomeres. The antennal club has 3-7 segments, and the first segment is simple and not hollowed out to receive the second segment. The abdomen has 6 ventral sclerites. The scutellum is usually hidden and the pygidium is completely exposed (Tyndale-Biscoe, 1990; Lawrence and Newton, 1995; Lawrence et al. 1999).

Based on their nesting and resource partitioning strategies, dung beetles are divided broadly into 3 functional groups: rollers (telecoprid nesters), tunnelers (paracoprid nesters) and dwellers (endocoprid nesters). Some small dung beetle species may show kleptocoprid behaviour, which means that they utilize dung masses provisioned by digging or ball-rolling dung beetles as food sources for the latter's own larvae (Brusaard, 1987; Cambefort and Hanski, 1991; Lodos, 1995; Martin-Piera and Lopez-Colon, 2000).

Some important faunistical studies on Turkish dung beetles were done by Tuatay et al. (1972), Zümreoğlu, (1972), Carpaneto (1976), Lodos (1978), Lodos et al. (1978, 1999), Pehlivan (1988, 1989), Lumaret & Lobo (1996), Carpaneto et al. (2000), Tezcan & Pehlivan (2001), Şenyüz (2004, 2009), Şenyüz & Şahin (2009), Anlaş et al. (2011a, b). However, the studies on the Scarabaeidae of Turkey are still incomplete. For this reason, new faunistical data and information about the local distribution of the species in Turkey is important.

The main aim of this research was to study the species distributions of subfamilies and genera, abundance and rarity of species, habitat preferences of species, seasonality of species and genera, and the zoogeographical properties (chorotype classification) of the Scarabaeinae fauna of Kutahya province.

Material and Methods

This survey was conducted in the Kütahya region which is situated at the transition point between the Central Anatolia region and the Aegean region (Özel and Keser, 2007).

The samples were collected by hand, with forceps, and at light traps between March 2003 and July 2004. The samples were collected on a weekly basis, but not during the winter. A light trap with a battery was used for an average of 45 minutes at night. Table 1 lists the 12 collection localities in Kütahya and Figure 1 shows the sampling sites. The beetles were killed using ethyl acetate. Aedeagophores were dissected out under a stereo microscope and exposed in 10 % KOH solution for 1-2 h. The samples were identified according to the literature of Schaufuss (1916), Paulian et al. (1959), Balthasar (1963 a-b), Pehlivan (1988, 1989), and Martin-Piera and Lopez-Colon (2000). Distributions and some characteristics of the species are given according to Löbl and Smetana (2006) and Lodos et al. (1978, 1999). All samples were collected and species were determined by first author. Specimens are deposited in first author's private collection in the Department of Biology, Faculty of Art and Science, Dumlupınar University, Turkey.

Table 1. Sampling sites and their coordinates

Localities	North	East	Elevation (m)
Ahmetoluğu village	39° 31' 33,25"	30° 04' 46,36"	1139
Akköprü village	39° 27' 27,06"	30° 01' 31,50"	919
Arslanlı village	39° 36' 13,50"	29° 50' 02,10"	1239
Bölcek village	39° 26' 30,12"	29° 56' 25,98"	939
Büyük Saka village	39° 21' 35,64"	30° 10' 14,70"	1000
Demirciören village	39° 26' 19,86"	29° 51' 33,78"	1284
Dumlupınar village	39° 27' 33,36"	29° 55' 11,22"	946
Haciazizler village	39° 21' 62,40"	30° 00' 56,71"	1290
Karaağaç village	39° 28' 13,38"	29° 47' 10,92"	1091
Muhat Boğazı village	39° 20' 31,38"	30° 12' 07,86"	1070
Ortaca village	39° 28' 03,00"	29° 48' 24,30"	1071
Yazlıca village	39° 36' 28,98"	30° 02' 35,40"	1056

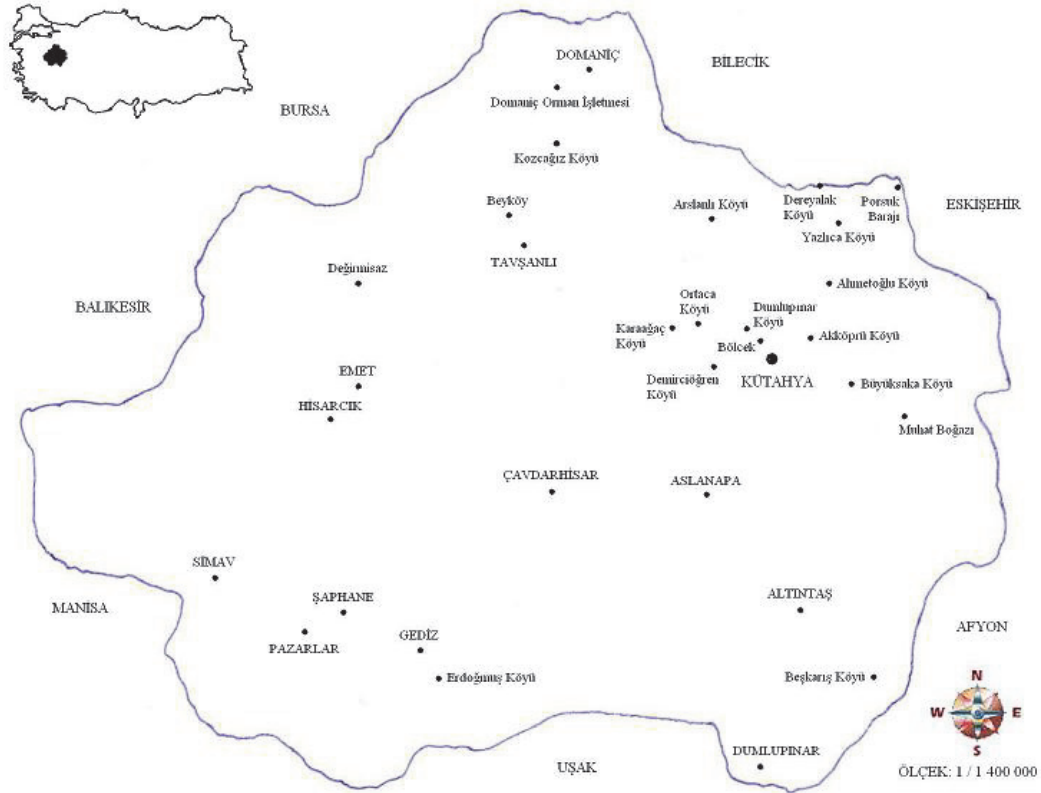


Figure 1. Sampling sites in Kütahya.

Results

This is the first detailed study of Scarabaeinae for Kütahya Province and so all identified species were new records for the fauna of the study area.

In this study, we found 21 species belonging to 9 genera: *Copris*, *Gymnopleurus*, *Euoniticellus*, *Caccobius*, *Euonthophagus*, *Onthophagus*, *Palaeonthophagus*, *Scarabaeus*, and *Sisyphus*. Chorotypes, distributions in Turkey and the Palaearctic region, and habitats of the species in the research area are given.

***Coprini* Leach, 1815**

***Copris lunaris* (Linnaeus, 1758)**

Material examined: Ahmetoluğu Village, 24.IV.2004, 12 ♂♂, 3 ♀♀; Bölcek village, 24.IX.2004, 9 ♂♂, 6 ♀♀; Dumlupınar village, 15.V.2004, 13 ♂♂, 11 ♀♀; Akköprü village, 24.IX.2003, 1 ♀, 15.V.2004, 2 ♂♂, 1 ♀; Yazlıca village, 22.V.2004, 1 ♂. Totally 59 specimens.

Distribution in Turkey: Adana, Afyon, Ankara, Antalya, Balıkesir, Bartın, Bolu, Çorum, Edirne, Erzincan, Eskişehir, Giresun, Gümüşhane, İçel, İzmir, Kahramanmaraş, Karaman, Kars, Kastamonu, Kayseri, Kırşehir, Kütahya, Manisa, Nevşehir, Osmaniye, Samsun, Sivas, Yozgat, Zonguldak (Tuatay et al., 1967, 1972; Lodos et al., 1999; Rozner and Rozner, 2009; Anlaş et al., 2011a; 2011b).

Distribution in the Palaearctic Region: Widely distributed in the Palaearctic and Australian region (Löbl & Smetana 2006; López-Colón 2013; Schoolmeesters 2013).

Habitats: In fresh cow dung, paracoprid nesting type.

Ecological notes: This species occurs in the spring and autumn, and adults emerge from the middle of April to the end of September. The samples were found in fresh cow dung and at light trap. Very common (Rozner and Rozner, 2009).

Chorotype: Turano - Europeo (Taglianti 1999; Carpaneto et al., 2000).

***Gymnopleurini* Lacordaire, 1856**

***Gymnopleurus flagellatus* (Fabricius, 1787)**

Material examined: Dumlupınar village, 26.VII.2003, 1 ♂. Total of 1 specimen.

Distribution in Turkey: Adana, Adıyaman, Afyon, Ağrı, Ankara, Balıkesir, Bilecik, Burdur, Çanakkale, Çorum, Eskişehir, Gaziantep, Giresun, Gümüşhane, Isparta, İzmir, Kahramanmaraş, Kars, Kırklareli, Niğde, Rize, Siirt, Sivas, Van (Pehlivan, 1988; Lodos et al., 1999; Rozner and Rozner, 2009).

Distribution in the Palaearctic Region: A widespread Palaearctic species, especially southern Europe (Löbl & Smetana 2006; López-Colón 2013; Schoolmeesters 2013).

Habitats: In fresh cow, telecoprid nesting type.

Ecological notes: Adults emerge in July. The specimen was found in the fresh cow dung. Common (Rozner and Rozner, 2009).

Chorotype: Centralasiatic - Mediterranean (Carpaneto et al., 2000).

***Oniticellini* H. J. Kolbe, 1905**

***Euoniticellus fulvus* (Goeze, 1777)**

Material examined: Akköprü village, 15.V.2004, 5 ♀♀, 1 ♂; Beşkarış village, 17.VIII.2003, 1 ♂; Dumlupınar village, 26.VII.2003, 4 ♂♂; 23.IX.2003, 6 ♂♂, 2 ♀♀; Karaağaç village, 25.IX.2003, 1 ♂; Muhatboğazı village, 26.IX.2003, 2 ♂♂; Ortaca Village, 11.IV.2003, 1 ♂. Total of 23 specimens.

Distribution in Turkey: Adana, Afyon, Ankara, Antalya, Aydın, Balıkesir, Bartın, Bolu, Burdur, Bursa, Çankırı, Çorum, Denizli, Edirne, Eskişehir, Gaziantep, Giresun, Gümüşhane, Isparta, İçel, Karabük, Karaman, Kastamonu, Kayseri, Kırklareli, Kırşehir, Konya, Kütahya, Manisa, Muğla, Nevşehir, Niğde, Osmaniye, Sakarya, Samsun, Tekirdağ, Uşak, Zonguldak (Tuatay et al., 1967; 1972; Lodos et al., 1999; Bellmann, 2007; Rozner and Rozner, 2009; Anlaş et al., 2011b).

Distribution in the Palaearctic Region: A widespread Palaearctic species, except in northern Europe (Löbl & Smetana 2006; López-Colón 2013; Schoolmeesters 2013).

Habitats: In fresh cow dung, endocoprid nesting type.

Ecological notes: Occur is in spring and autumn, and adults emerge from the middle of April to the middle of September. They were found in the fresh cow dung and at a light trap. Common (Rozner and Rozner, 2009).

Chorotype: Turano-Europeo-Mediterranean (Carpaneto et al., 2000).

***Onthophagini* Burmeister, 1846**

***Caccobius histeroides* (Ménétries, 1832)**

Material examined: Dumlupınar village, 26.VII.2003, 1 ♂; Yazlıca village, 22.V.2004, 1 ♂. Total of 2 specimens.

Distribution in Turkey: Adana, Adıyaman, Ağrı, Ankara, Antalya, Burdur, Bursa, Çankırı, Denizli, Edirne, Gaziantep, Hatay, İçel, Kahramanmaraş, Kırşehir, Kırklareli, Konya, Manisa, Nevşehir, Tekirdağ, Uşak, Van (Tuatay et al., 1967; 1972; Lodos et al., 1978, 1999; Rozner and Rozner, 2009; Anlaş et al., 2011a, 2011b).

Distribution in the Palaearctic Region: Widely distributed across the Balkan peninsula, the South European Territory of Russia and the Turan region (Löbl & Smetana 2006; López-Colón 2013; Schoolmeesters 2013).

Habitats: In fresh cow dung, paracoprid nesting type.

Ecological notes: Adults emerge from the middle of may to august. The specimens were found in fresh cow dung. Common (Rozner and Rozner, 2009).

Chorotype: Turano-Mediterranean (Carpaneto et al., 2000).

***Caccobius schreberi* (Linnaeus, 1767)**

Material examined: Arslanlı village, 30.V.2004, 1 ♂. Total of 1 specimen.

Distribution in Turkey: Adana, Adıyaman, Ağrı, Ankara, Antalya, Aydın, Bolu, Burdur, Bursa, Çorum, Denizli, Erzincan, Eskişehir, Gaziantep, Giresun, Gümüşhane, Hatay, Isparta, İçel, İzmir, Kahramanmaraş, Karaman, Kastamonu, Kayseri, Kırşehir, Konya, Manisa, Niğde, Osmaniye, Rize, Sakarya, Siirt, Sivas, Tekirdağ, Uşak, Yozgat, Zonguldak (Tuatay et al., 1967; 1972; Lodos et al., 1978, 1999; Bellmann, 2007; Rozner and Rozner, 2009; Anlaş et al., 2011b).

Distribution in the Palaearctic Region: Widely distributed in the Palaearctic region (Löbl & Smetana 2006; López-Colón 2013).

Habitats: In fresh cow dung and sheep dung, paracoprid nesting type.

Ecological notes: Adults emerge in may. They were collected under fresh cow dung and at a light trap. Common (Rozner and Rozner, 2009).

Chorotype: Turano-Europeo-Mediterranean (Carpaneto et al., 2000).

***Euonthophagus amyntas alces* (Fabricius, 1792)**

Material examined: Akköprü village, 15.V.2004, 1 ♂; Yazlıca village, 22.V.2004, 2 ♂♂, 2 ♀♀. Totally 5 specimens.

Distribution in Turkey: Adana, Adıyaman, Afyon, Ağrı, Ankara, Antalya, Aydın, Balıkesir, Burdur, Bursa, Çanakkale, Çorum, Denizli, Diyarbakır, Edirne, Eskişehir, Gaziantep, Giresun, Gümüşhane, Hatay, Isparta, İçel, İzmir, Kahramanmaraş, Kars, Kastamonu, Kayseri, Kütahya, Manisa, Nevşehir, Niğde, Osmaniye, Rize, Samsun, Siirt, Sivas, Tekirdağ, Uşak, Van, (Tuatay et al., 1967; 1972; Lodos et al., 1978; Pehlivan, 1989; Lodos et al., 1999; Bellmann, 2007; Rozner and Rozner, 2009; Anlaş et al., 2011b).

Distribution in the Palaearctic Region: Widely distributed in the Southern Palaearctic region (Löbl & Smetana 2006; López-Colón 2013; Schoolmeesters 2013).

Habitats: In fresh cow and sheep dung, paracoprid nesting type.

Ecological notes: Adults emerge in may. The specimens were found in fresh cow dung and sheep dung. Common (Rozner and Rozner, 2009).

Chorotype: Centralasiatic - European (Carpaneto et al., 2000).

***Euonthophagus atramentarius* (Ménétries, 1832)**

Material examined: Yazlıca village, 22.V.2004, 2 ♂♂. Total of 2 specimens.

Distribution in Turkey: Adana, Adıyaman, Afyon, Ankara, Antalya, Burdur, Çanakkale, Çorum, Denizli, Diyarbakır, Edirne, Eskişehir, Gaziantep, Hatay, Isparta, İçel, İzmir, Kahramanmaraş, Kırşehir, Manisa, Niğde, Uşak, (Tuatay et al., 1967; 1972; Pehlivan, 1989; Lodos et al., 1999; Bellmann, 2007; Rozner and Rozner, 2009; Anlaş et al., 2011b).

Distribution in the Palaearctic Region: Widely distributed in Eastern and the Southeastern Europe, North Africa and the Turan region (Löbl & Smetana 2006; López-Colón 2013; Schoolmeesters 2013).

Habitats: In fresh cow dung, paracoprid nesting type.

Ecological notes: Adults emerge in May. The specimens were found in fresh cow dung. Frequent (Rozner and Rozner, 2009).

Chorotype: East - Mediterranean (Carpaneto et al., 2000).

***Euonthophagus gibbosus* (Scriba, 1790)**

Material examined: Ahmetoluğu village, 24.IV.2004, 1 ♂. Total of 1 specimen.

Distribution in Turkey: Adana, Adıyaman, Ankara, Antalya, Burdur, Bursa, Çorum, Erzincan, Eskişehir, Gaziantep, Hatay, İçel, Kahramanmaraş, Kastamonu, Kayseri, Kırklareli, Kırşehir, Konya, Nevşehir, Niğde, Osmaniye, Rize, Siirt, Sivas (Tuatay et al., 1967; 1972; Pehlivan, 1989; Lodos et al., 1999; Rozner and Rozner, 2009).

Distribution in the Palaearctic Region: Widely distributed from Southern Europe to Central Asia (Löbl & Smetana 2006 ; López-Colón 2013; Schoolmeesters 2013).

Habitats: In fresh cow dung, paracoprid nesting type.

Ecological notes: Adults emerge in april. The specimens were found in fresh cow and sheep dung. Common (Rozner and Rozner, 2009).

Chorotype: Centralasiatic-European (Carpaneto et al., 2000).

***Onthophagus illyricus* (Scopoli, 1763)**

Material examined: Akköprü village, 24.IX.2003, 2 ♂♂, 2 ♀♀; Büyük saka village, 26.IX.2003, 1 ♂; Dumlupınar village, 26.VII.2003, 3 ♀♀; Karaağaç village, 25.IX.2003, 1 ♂. Total of 9 specimens.

Distribution in Turkey: Adana, Antalya, Aydın, Bartın, Gaziantep, Hakkari, Hatay, Isparta, İçel, Kahramanmaraş, Karaman, Kastamonu, Kayseri, Kırşehir, Konya, Kütahya, Manisa, Muğla, Niğde, Osmaniye, Uşak, Zonguldak (Pehlivan, 1989; Lodos et al., 1999; Bellmann, 2007; Rozner and Rozner, 2009; Anlaş et al., 2011b).

Distribution in the Palaearctic Region: Thoroughly dispersed in the Palaearctic Region (Löbl & Smetana 2006; López-Colón 2013; Schoolmeesters 2013).

Habitats: In fresh cow and sheep dung, paracoprid nesting type.

Ecological notes: Adults emerge from the end of July to the end of September. The specimens were found in the fresh cow and sheep dung. Common (Rozner and Rozner, 2009).

Chorotype: Turano-European (Carpaneto et al., 2000).

***Onthophagus taurus* (Schreber, 1759)**

Material examined: Beşkariş village, 17.VIII.2003, 3 ♂♂. Total of 3 specimens.

Distribution in Turkey: Adana, Afyon, Ankara, Antalya, Aydın, Balıkesir, Bartın, Bilecik, Bursa, Çorum, Diyarbakır, Edirne, Erzincan, Gaziantep, Giresun, Hatay, Isparta, İçel, İstanbul, Kahramanmaraş, Karaman, Kastamonu, Kayseri, Kırklareli, Kırşehir, Konya, Kütahya, Manisa, Muğla, Niğde, Osmaniye, Sakarya, Sivas, Tekirdağ, Uşak, Zonguldak (Tuatay et al., 1967; 1972; Lodos et al., 1978, Pehlivan, 1989; Lodos et al., 1999; Rozner and Rozner, 2009; Anlaş et al., 2011b).

Distribution in the Palaearctic Region: Thoroughly disperse in the palaearctic region (Löbl & Smetana 2006; López-Colón 2013; Schoolmeesters 2013).

Habitats: In fresh cow dung, paracoprid nesting type.

Ecological notes: Adults emerge in august. The specimens were found in fresh cow dung. Common (Rozner and Rozner, 2009).

Chorotype: Centralasiatic-European-Mediterranean (Carpaneto et al., 2000).

***Onthophagus (Palaeonthophagus) fissicornis* Steven, 1809**

Material examined: Arslanlı Village, 30.V.2004, 1 ♂; Ortaca village, 11.IV.2004, 9 ♂♂, 7 ♀♀; Yazlıca village, 22.V.2004, 1 ♂, 3 ♀♀. Totally 21 specimens.

Distribution in Turkey: Adana, Adıyaman, Afyon, Ankara, Antalya, Balıkesir, Burdur, Bursa, Çanakkale, Denizli, Diyarbakır, Edirne, Eskişehir, Gaziantep, Gümüşhane, Hatay, Isparta, İçel, İzmir, Kahramanmaraş, Kars, Kastamonu, Kayseri, Kırşehir Konya, Kütahya, Mersin, Niğde, Osmaniye, Sivas, Tekirdağ, Tokat, Uşak (Tuatay et al., 1967; 1972; Lodos et al., 1978; Pehlivan, 1989, Lodos et al., 1999; Bellmann, 2007; Rozner and Rozner, 2009).

Distribution in the Palaearctic Region: Widely distributed in the Eastern and the Southeastern of the Europe, North Africa and the Turan region (Löbl & Smetana 2006; López-Colón 2013; Schoolmeesters 2013).

Habitats: In fresh cow dung, paracoprid nesting type.

Ecological notes: Adults emerge in may and june. The specimens were found in fresh cow dung. Very common (Rozner and Rozner, 2009).

Chorotype: East - Mediterranean (Carpaneto et al., 2000).

Onthophagus (Palaeonthophagus) fracticornis (Preyssler, 1790)

Material examined: Arslanlı Village, 06.VI.2004, 5 ♂♂, 3 ♀♀; Ortaca village, 11.IV.2004, 1 ♂. Totally 9 specimens.

Distribution in Turkey: Adana, Afyon, Ankara, Antalya, Balıkesir, Burdur, Denizli, Erzincan, Eskişehir, Gaziantep, Hatay, Isparta, İçel, Kahramanmaraş, Kars, Manisa, Muğla, Osmaniye (Tuatay et al., 1967; 1972; Pehlivan, 1989; Lodos et al., 1999; Bellmann, 2007; Rozner and Rozner, 2009; Anlaş et al., 2011b).

Distribution in the Palaearctic Region: Widely distributed in the Palaearctic Region (Löbl & Smetana 2006; López-Colón 2013; Schoolmeesters 2013).

Habitats: In fresh cow dung, paracoprid nesting type.

Ecological notes: Adults emerge from april to june. The specimens were found in the fresh cow dung. Common (Rozner and Rozner, 2009).

Chorotype: Turano-European (Carpaneto et al., 2000).

Onthophagus (Palaeonthophagus) marginalis marginalis (Gebler, 1817)

Material examined: Dumlupınar village, 26.VII.2003, 1 ♂. Total of 1 specimen.

Distribution in Turkey: Adana, Adıyaman, Ankara, Burdur, Çanakkale, Çorum, Eskişehir, İzmir, Kahramanmaraş, Kırşehir, Konya, Kütahya, Niğde, Osmaniye, Rize, Sivas, Van (Tuatay et al., 1967; 1972; Pehlivan, 1989; Lodos et al., 1999; Rozner and Rozner, 1999).

Distribution in the Palaearctic Region: Europe: Widely distributed from the European region to the Sibirian region (Löbl & Smetana 2006; López-Colón 2013).

Habitats: In fresh cow dung, paracoprid nesting type.

Ecological notes: Adults emerge in july. The samples were found in fresh cow dung. Frequent (Rozner and Rozner, 2009).

Chorotype: Asiatic - European (Carpaneto et al., 2000).

Onthophagus (Palaeonthophagus) opacicollis Reitter, 1893

Material examined: Ortaca village, 11.IV.2004, 1 ♂. Total of 1 specimen.

Distribution in Turkey: Adana, Antalya, Balıkesir, Bolu, Eskişehir, Gaziantep, Hatay, İçel, Kahramanmaraş, Manisa, Niğde (Pehlivan, 1989; Lodos et al., 1999; Bellmann, 2007; Rozner and Rozner, 2009; Anlaş et al., 2011b).

Distribution in the Palaearctic Region: A widespread Palaearctic species, especially around the Mediterranean region (Löbl & Smetana 2006; López-Colón 2013; Schoolmeesters 2013).

Habitats: In fresh cow dung, paracoprid nesting type.

Ecological notes: Adults emerge in April. The specimens were found in fresh cow dung. Rare (Rozner and Rozner, 2009).

Chorotype: Mediterranean (Carpaneto et al., 2000).

Onthophagus (Palaeonthophagus) ovatus (Linnaeus, 1767)

Material examined: Yazlıca village, 22.V.2004, 4 ♂♂, 2 ♀♀. Total of 6 specimens.

Distribution in Turkey: Adana, Antalya, Bartın, Bolu, Bursa, Çanakkale, Çankırı, Gaziantep, Hatay, İçel, İzmir, Kahramanmaraş, Karabük, Karaman, Kastamonu, Kırşehir, Konya, Niğde, Osmaniye, Sakarya, Uşak, Zonguldak (Lodos et al., 1978; Pehlivan, 1989; Lodos et al., 1999; Anlaş et al., 2011a).

Distribution in the Palaearctic Region: Widely distributed in the Palaearctic region (Löbl & Smetana 2006; López-Colón 2013; Schoolmeesters 2013).

Habitats: In fresh cow dung, paracoprid nesting type.

Ecological notes: Adults emerge in May. The specimens were found in fresh cow dung. Common.

Chorotype: Turano-European (Carpaneto et al., 2000).

***Onthophagus (Palaeonthophagus) ruficapillus* Brullé, 1832**

Material examined: Akköprü village, 15.V.2004, 2 ♂♂; Ortaca Village, 11.IV.2004, 11 ♂♂, 6 ♀♀; Yazlıca Village, 22.V.2004, 2 ♂♂, 5 ♀♀. Total of 26 specimens.

Distribution in Turkey: Adana, Afyon, Amasya, Ankara, Antalya, Aydın, Balıkesir, Bartın, Bolu, Burdur, Çanakkale, Çankırı, Çorum, Denizli, Edirne, Erzurum, Eskişehir, Gaziantep, Giresun, Hatay, Isparta, İçel, İzmir, Kahramanmaraş, Kastamonu, Kırklareli, Kırşehir, Kilis, Konya, Kütahya, Manisa, Mersin, Muğla, Nevşehir, Niğde, Osmaniye, Sakarya, Samsun, Sinop, Sivas, Tekirdağ, Yozgat, Zonguldak (Pehlivan, 1989; Lodos et al., 1999, Bellmann, 2007; Rozner, 2009; Anlaş et al., 2011b).

Distribution in the Palaearctic Region: A widespread Palaearctic species especially Southern Europe and around Anatolia (Löbl & Smetana 2006; López-Colón 2013; Schoolmeesters 2013).

Habitats: In fresh cow dung, paracoprid nesting type.

Ecological notes: Adults emerge from april to june. The specimens were found in fresh cow dung. Very common (Rozner and Rozner, 2009).

Chorotype: South European (Carpaneto et al., 2000).

***Onthophagus (Palaeonthophagus) truchmenus* Kolenati, 1846**

Material examined: Arslanlı village, 30.V.2004, 2 ♀♀; Yazlıca village, 22.V.2004, 1 ♂. Total of 3 specimens.

Distribution in Turkey: Adana, Antalya, Bitlis, Kahramanmaraş, Konya, Osmaniye (Tuatay et al., 1967; 1972; Lodos et al., 1999).

Distribution in the Palaearctic Region: Europe: A widespread species in the Eastern Mediterranean region (Löbl & Smetana 2006; Schoolmeesters 2013).

Habitats: In fresh cow dung, paracoprid nesting type.

Ecological notes: Adults emerge from may to june. The specimens were found in fresh cow dung. Common (Rozner and Rozner, 2009).

Chorotype: Endemic (Carpaneto et al., 2000).

***Onthophagus (Palaeonthophagus) vacca* (Linnaeus, 1767)**

Material examined: Ahmetoluğu village, 24.IV.2004, 1 ♂; Akköprü village, 15.V.2004, 2 ♂♂; Bölcek village, 24.IX.2004, 4 ♀♀; Ortaca Village, 11.IV.2004, 1 ♂; Yazlıca Village, 22.V.2004, 2 ♂♂, 2 ♀♀. Total of 12 specimens.

Distribution in Turkey: Adana, Afyon, Ağrı, Ankara, Antalya, Aydın, Balıkesir, Bursa, Çanakkale, Çorum, Denizli, Edirne, Erzincan, Eskişehir, Gümüşhane, İçel, İzmir, Kahramanmaraş, Kars, Kırşehir, Kütahya, Manisa, Niğde, Osmaniye, Sivas, Tekirdağ (Tuatay et al., 1967; 1972; Lodos et al., 1978; Pehlivan, 1989; Lodos et al., 1999; Bellmann, 2007; Rozner and Rozner, 2009; Anlaş et al., 2011b).

Distribution in the Palaearctic Region: Thoroughly disperse in the Palaearctic Region (Löbl & Smetana 2006; López-Colón 2013; Schoolmeesters 2013).

Habitats: In fresh cow dung, paracoprid nesting type.

Ecological notes: Emergence of adults is from April to the end of September. The specimens were found in fresh cow dung. Common (Rozner and Rozner, 2009).

Chorotype: Turano-Europeo-Mediterranean (Carpaneto et al., 2000).

***Scarabaeini* Latreille, 1802**

***Scarabaeus (Scarabaeus) carinatus* (Gebler, 1841)**

Material examined: Hacıazizler village, 18.V.2004, 1 ♂, 1 ♀; 15.VIII.2004, 1 ♂. Total of 3 specimens.

Distribution in Turkey: This species is a new record for Turkey.

Distribution in the Palaearctic Region: Widely distributed in the Eastern Mediterranean region (Löbl & Smetana 2006; López-Colón 2013; Schoolmeesters 2013).

Habitats: In fresh cow dung, telecoprid nesting type.

Remark: This species is new record for the fauna of Turkey.

Ecological notes: Adults emerge from may to july. The samples were found in fresh cow dung. Very rare.

Chorotype: Turanian (Taglianti et al., 1999).

***Scarabaeus (Ateuchetus) semipunctatus* Fabricius 1792**

Material examined: Akköprü village, 06.VI.2004, 1 ♂. Total of 1 specimen.

Distribution in Turkey: Ankara, İzmir, Kayseri, Manisa, Niğde, Sakarya, Tekirdağ (Lodos et al., 1978; Pehlivan, 1988; Lodos et al., 1999).

Distribution in the Palaearctic Region: Europe: Widely distributed in the western Mediterranean region (Löbl & Smetana 2006; López-Colón 2013; Schoolmeesters 2013).

Habitats: In fresh cow dung, telecoprid nesting type.

Ecological notes: Adults emergence in june. The specimens were found in fresh cow dung. Rare.

Chorotype: Mediterranean (Taglianti et al., 1999).

***Sisyphini* Mulsant, 1842**

***Sisyphus schaefferi schaefferi* (Linnaeus, 1758)**

Material examined: Karaağaç village, 02.VI.2004, 21 ♂♂, 23 ♀♀. Total of 44 specimens.

Distribution in Turkey: Adıyaman, Ankara, Antalya, Balıkesir, Bilecik, Burdur, Çorum, Edirne, Erzurum, Eskişehir, Gümüşhane, Hatay, Isparta, İçel, İzmir, Kahramanmaraş, Kars, Kırklareli, Kütahya, Manisa, Muğla, Osmaniye, Samsun, Sivas, Tekirdağ, Uşak, Van (Tuatay et al., 1967; 1972; Lodos et al., 1978, 1999; Bellmann, 2007; Rozner and Rozner, 2009; Anlaş et al., 2011a, 2011b).

Distribution in the Palaearctic Region: Widely distributed in the Palaearctic region (Löbl & Smetana 2006; López-Colón 2013; Schoolmeesters 2013).

Habitats: In fresh cow and sheep dung, telecoprid nesting type.

Ecological notes: Adults emerge in june. They were collected under fresh cow dung. Very common (Rozner and Rozner, 2009).

Chorotype: Centralasiatic-Europeo-Mediterranean (Carpaneto et al., 2000).

Discussion

In different habitats of the Kütahya province, 21 species belonging to 9 genera in 6 tribes of dung beetles were recorded. *Scarabaeus carinatus* was a new record of Scarabaeinae for Turkey. *Euonthophagus gibbosus* and *Palaeonthophagus truchmenus* were new records for the Scarabaeinae fauna of the Aegean Region and the research area. *Caccobius histeroides*, *C. schreberi*, *Copris lunaris*, *Euoniticellus fulvus*, *Euonthophagus amyntas*, *E. atramentarius*, *Gymnopleurus flagellatus*, *Onthophagus illyricus*, *O. taurus*, *Palaeonthophagus fissicornis*, *P. fracticornis*, *P. marginalis*, *P. opacicollis*, *P. ovatus*, *P. ruficapillus*, *P. vacca*, *Scarabaeus semipunctatus* and *Sisyphus schaefferi* were also new records for the research area.

Information about the chorotype of the species found in research area are given in Table 2 and Figures 2 – 3 . According to these results, the numeric predominance of the main chorotypes is of widely distributed Holarctic species at 66,667 %. Mediterranean taxa represent 19,048 %. European taxa, Western Palaearctic taxa, and endemic taxa represent 4,762 % of the total number.

Table 2 Chorotypes of species

The main Chorotypes	Chorotypes	Species	
Holarctic Region	Asiatic – European	<i>Palaeonthophagus marginalis</i>	
	Centralasiatic – European	<i>Euonthophagus amyntas</i> <i>Euonthophagus gibbosus</i>	
	Centralasiatic – Europeo – Mediterranean	<i>Onthophagus taurus</i> <i>Sisyphus schaefferi</i>	
	Centralasiatic – Mediterranean	<i>Gymnopleurus flagellatus</i>	
	Turano – European	<i>Copris lunaris</i> <i>Palaeonthophagus fracticornis</i> <i>Onthophagus illyricus</i> <i>Palaeonthophagus ovatus</i>	
	Turano – Europeo – Mediterranean	<i>Caccobius schreberi</i> <i>Euoniticellus fulvus</i> <i>Palaeonthophagus vacca</i>	
	Turano – Mediterranean	<i>Caccobius histeroides</i>	
	Europe	South European	<i>Palaeonthophagus ruficapillus</i>
	Mediterranean	East – Mediterranean	<i>Euonthophagus atramentarius</i> <i>Palaeonthophagus fissicornis</i>
		Mediterranean	<i>Palaeonthophagus opacicollis</i> <i>Scarabaeus semipunctatu</i>
Western Palaearctic Region		Turania	<i>Scarabaeus carinatus</i>
	Endemic	<i>Palaeonthophagus truchmenus</i>	

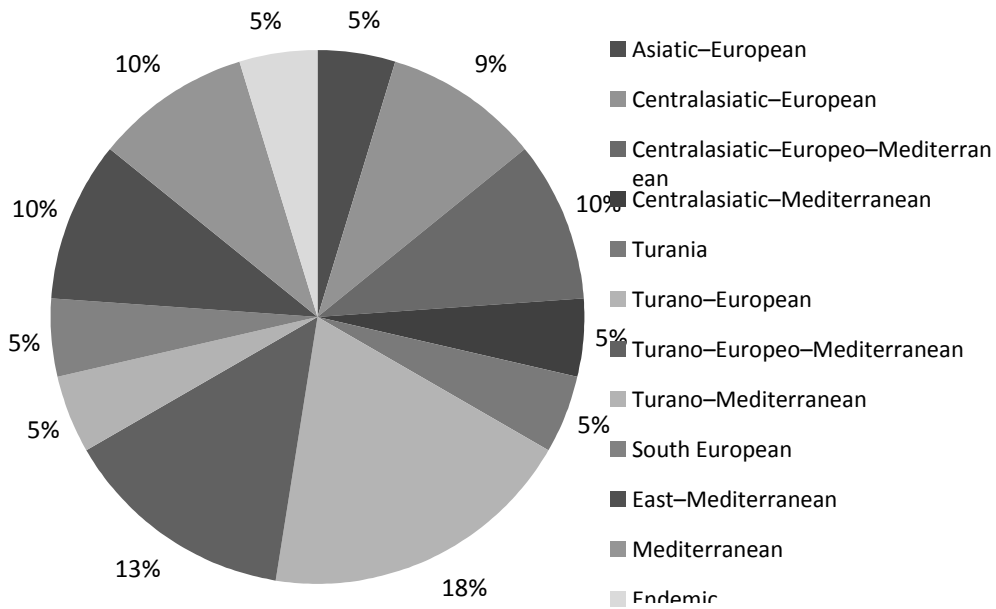


Figure 2: Chorological categories and percentage.

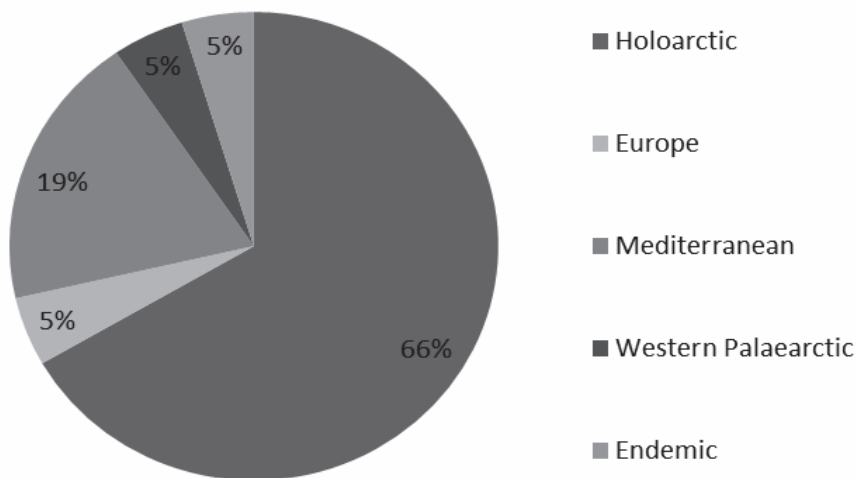


Figure 3: Main chorotypes and percentage.

Results of the study indicate that species of Onthophagini (15 species, 71.43%), Scarabaeini (2 species, 9.52%), Coprini, Gymnopleurini, Oniticellini 1905, and Sisyphini (1 species, 4.76% each) comprise the major part of the research area's Scarabaeinae fauna. Distributions of the species are given in Figure 4.

Figure 5 shows that the genus *Palaeonthophagus* has the highest number of species (8), followed by *Euonthophagus* (3 species), *Caccobius*, *Onthophagus*, *Scarabaeus*, (all with 2 species each), *Copris*, *Euoniticellus*, *Gymnopleurus*, *Sisyphus* (all with 1 species each).

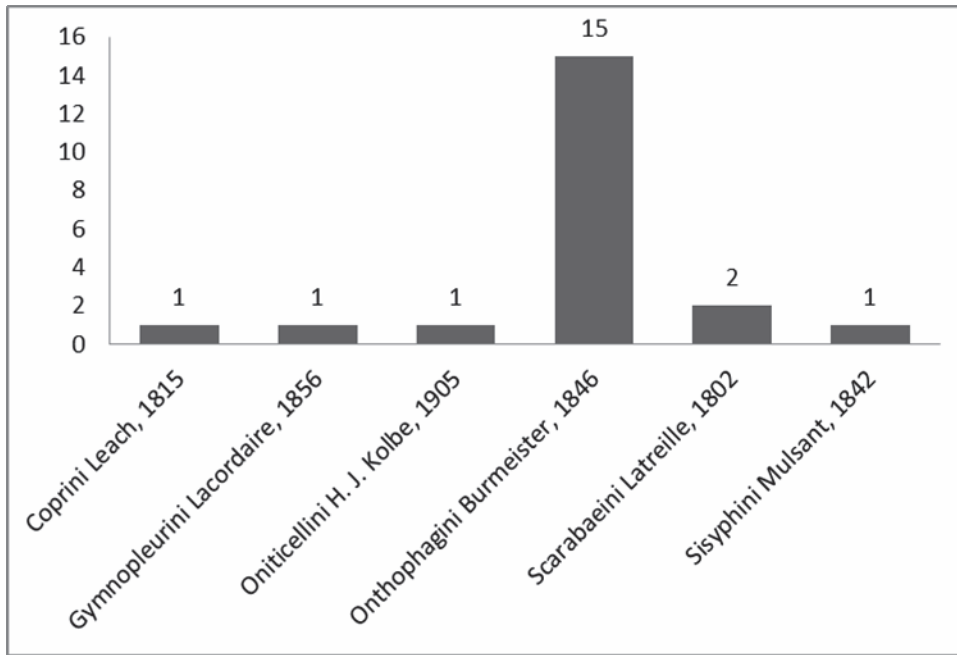


Figure 4: Distributions of species according to tribe.

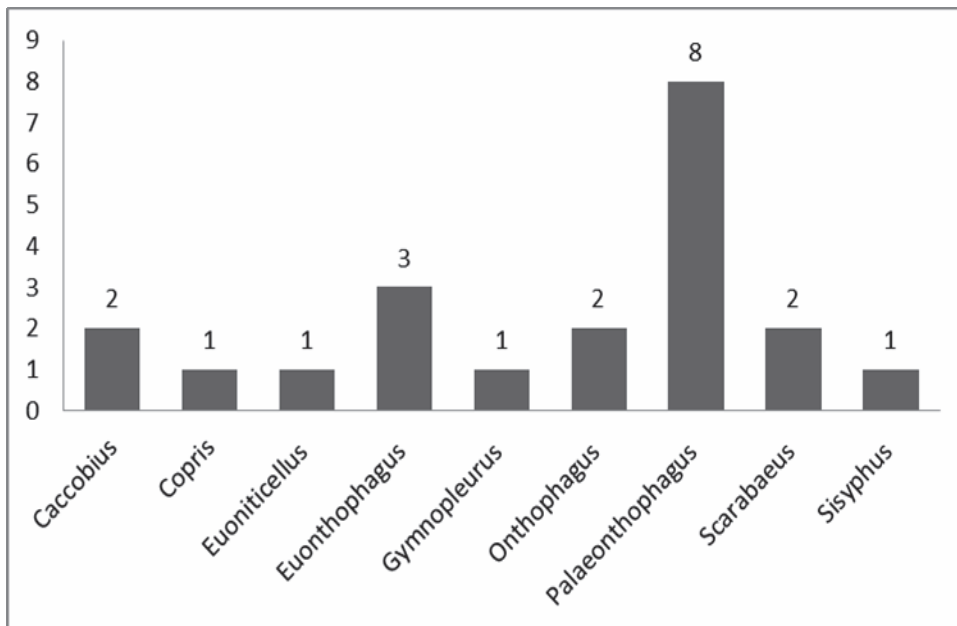


Figure 5 Distributions of species according to genera.

Numbers of the species collected in different months are given in Figure 6. May has the highest number of species (12 species), followed by April (7 species), July (5 species), September (4 species), and June and August (3 species each).

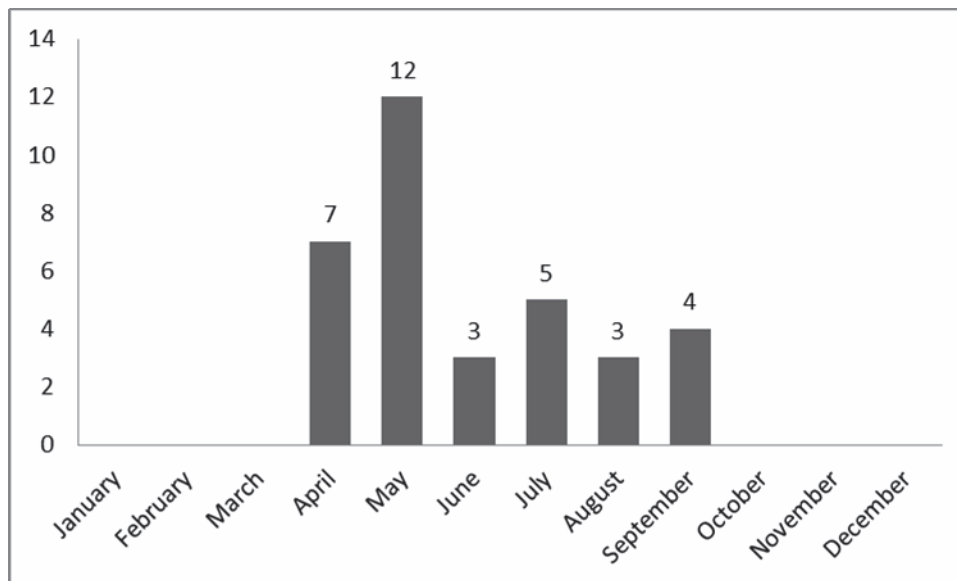


Figure 6 Numbers of the species in different months.

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