

**Karacadağ (Diyarbakır, Mardin, Şanlıurfa)'daki Hayvan (İnek, Eşek, Deve, Koyun, Tavuk) Dışkılarında Bulunan Kınkanatlı (Coleoptera: Scarabaeidae, Histeridae ve Hydrophilidae) Faunasına Katkılar**

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**ÖZ**

Bu çalışma Mayıs ve Ekim aylarında 2017 ve 2018 yılları arasında Karacadağ (Diyarbakır, Mardin, Şanlıurfa) 'daki Coleoptera'ya (Scarabaeidae, Histeridae ve Hydrophilidae) ait bok böceklerinin tespiti için yapılmıştır. Çalışma sonunda Scarabaeidae'den 13 tür, Hydrophilidae'den 2 tür ve Histeridae'den 1 tür olmak üzere toplamda 16 tür kaydedilmiştir. Bu türlerden *Aphodius (Otophorus) haemorrhoidalis* (Linnaeus, 1758), *A. contaminatus* (Herbst, 1783), *A. fimetarius* (Linnaeus, 1758), *Atholus bimaculatus* (Linnaeus, 1758), *Biralus satellitius* (Herbst, 1789), *Scarabaeus sacer* (Linnaeus, 1758), *Sphaeridium marginatum* (Fabricius, 1787), *S. scarabaeoides* (Linnaeus, 1758) Diyarbakır, Mardin, Şanlıurfa illeri için ilk kayıt niteliğindedir. *Acrossus luridus* (Fabricius, 1775) ve *Onthophagus taurus* (Schreber, 1759) Mardin ve Şanlıurfa illeri için, *Cheironitis pamphilus* (Ménétriés, 1849) Diyarbakır ve Şanlıurfa, *Colobopterus erraticus* (Linnaeus, 1758), *Euonthophagus amyntas alces* (Fabricius, 1792), *E. atramentarius* (Ménétriés, 1832) ise Mardin ili için ilk kayıt niteliğindedir. Çalışmada en baskın bok böceği türü *S. scarabaeoides* (21.66 %) olmuştur. En fazla ergin tür adedine Şanlıurfa'da (72.57 %) rastlanılmıştır. En az ergin adet ise 8.82 % ile Mardin'de kaydedilmiştir.

**Anahtar kelimeler:** Bok böceği, Karacadağ, Coleoptera, Scarabaeidae, Histeridae, Hydrophilidae

**Contributions to the Coleopteran (Coleoptera: Scarabaeidae, Histeridae and Hydrophilidae) Fauna Found in Animal (Cow, Donkey, Camel, Sheep, Chicken) Feces in Karacadağ (Diyarbakır, Mardin, Şanlıurfa)**

**ABSTRACT**

This study was carried out in order to determine dung beetles of Coleoptera (Scarabaeidae, Histeridae and Hydrophilidae) in Karacadağ (Diyarbakır, Mardin, Şanlıurfa) during May and October in 2017-2018. A total of 16 species have been recorded including 13 species from Scarabaeidae, 2 species from Hydrophilidae and 1 species from Histeridae. *Aphodius (Otophorus) haemorrhoidalis* (Linnaeus, 1758), *A. contaminatus* (Herbst, 1783), *A. fimetarius* (Linnaeus, 1758), *Atholus bimaculatus* (Linnaeus, 1758), *Biralus satellitius* (Herbst, 1789), *Scarabaeus sacer* (Linnaeus, 1758), *Sphaeridium marginatum* (Fabricius, 1787), *S. scarabaeoides* (Linnaeus, 1758) are new records for three provinces that occur the study area. *Acrossus luridus* (Fabricius, 1775) and *Onthophagus taurus* (Schreber, 1759) for Mardin and Şanlıurfa provinces; *Cheironitis pamphilus* (Ménétriés, 1849) for Diyarbakır and Şanlıurfa provinces and *Colobopterus erraticus* (Linnaeus, 1758), *Euonthophagus amyntas alces* (Fabricius, 1792), *E. atramentarius* (Ménétriés, 1832) are the fist record for Mardin. In this study, *S. scarabaeoides* (21.66 %) was the most predominant dung beetle species found. The highest number of adult dung beetle species were recorded in Şanlıurfa Province accounting for 72.57 %. The lowest number of adult dung beetle species were recorded in Mardin Province accounting for 8.82 %.

**Key words:** Dung beetles, Karacadağ Mountain, Coleoptera, Scarabaeidae, Histeridae, Hydrophilidae

## INTRODUCTION

Coleoptera is one of the largest Arthropoda orders with more than 326.000 valid species have been recorded (Küçükaykay et al., 2013; Şenyüz et al., 2015; Bánki et al., 2023). Superfamily Scarabaeoidea (Coleoptera) contains more than 35.000 species in worldwide (Ratcliffe and Paulsen, 2008).

Dung beetle is the general name of insects that provide their nutrients partially or completely from feces. The vast majority of these insect species are a member of the Coleoptera order (Scholtz et al., 2009). There are approximately 7,000 species of dung beetles in worldwide. They have been seen in everywhere except the Antarctic continent (Hanski and Cambefort, 1991). Dung beetles are very useful for agriculture. They contribute to nutrient recycling, improve soil fertility by burying feces and consuming fertilizers (Loreau, 1995).

The Turkish dung beetles species have been identified and reported in Türkiye in various publications (Tuatay et al., 1972; Zümreoğlu, 1972; Carpaneto, 1976; Lodos et al., 1978, 1989, 1999; Pehlivan, 1988, 1989; Lumaret and Lobo, 1996; Carpaneto et al., 2000; Tezcan and Pehlivan, 2001; Şenyüz, 2004, 2009; Şenyüz and Şahin, 2009; Anlaş et al., 2011a, b; Şenyüz, and Gülmez, 2024). However, the studies on the Scarabaeoidea of Türkiye are still incomplete. For this reason, new faunistical data and information about the local distribution of the species in Türkiye is important.

The aim of this study was to contribute to the knowledge of the dung beetles fauna of Türkiye and to clarify which valid dung beetle species are in Türkiye. Also this study will provide a base for future researches regarding the fauna of dung beetle species.

## MATERIAL and METHODS

This study was carried out from May in 2017 to October 2018 in Karacadağ mountain in Şanlıurfa, Mardin and Diyarbakır Provinces. Karacadağ mountain was divided into four subregions for the convenience of the collection of specimens (Figure 1.) (Table 1).

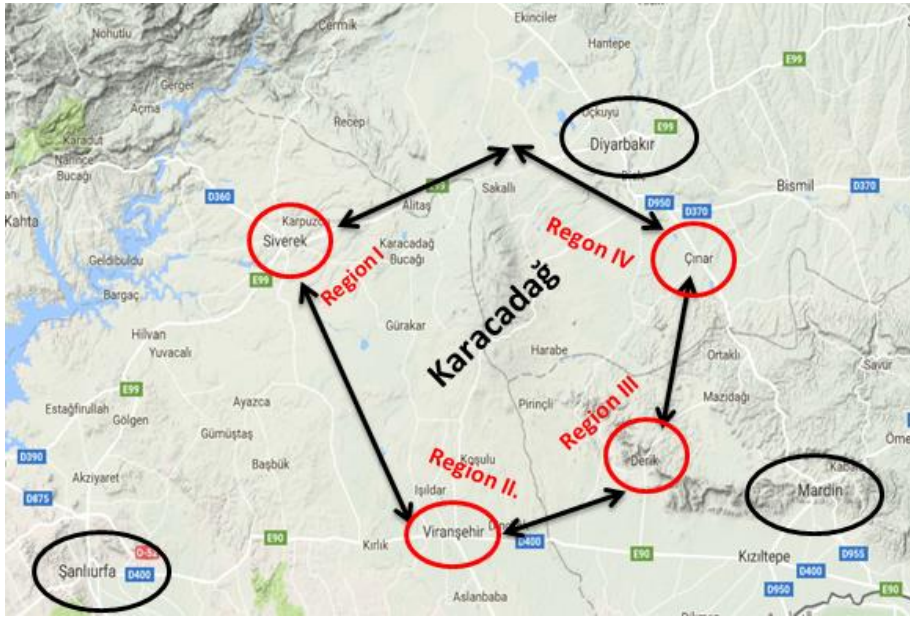


Figure 1. Division of Karacadağ into four subregions

Table 1. Subregions of study area of Karacadağ.

The subregion	The study area where it covers	Province
I	The areas in the border of Siverek and the top of the mountain	Şanlıurfa
II	The areas in the border of Viranşehir	Şanlıurfa
III	The areas in the border of Derik	Mardin
IV	The areas in the border of Çınar	Diyarbakır

These study areas were visited every fifteen days between May and October. The specimens were collected at 4 different localities (Table 2)

Table 2. Locations data of study area.

Region	Location	Latitude	Longitude	Elevation (m)
I. Siverek	Gedik village	37.749°N	39.685°E	1,142
	Karacadağ village	37.735°N	39.638° E	1,105
	Karabahçe village	37.795°N	39.764° E	1,255
	Karacadağ ski resort	37.716°N	39.835° E	1,919
II. Viranşehir	Karınca (Hisar) village	37.511° N	39.788° E	1,115
	Kargalı village	37.354° N	39.746° E	732
	Karınca, Gümüştaş and Şahverdi villages midpoint	37.482° N	39.794° E	1,025
	Dinçer village	37.434° N	39.796° E	910
III. Derik	Kuşçu village	37.294°N	40.256°E	525
	Taşıt village	37.415°N	40.303°E	1,070
	Bayraklı village	37.275°N	40.277°E	541
IV. Çınar	Leblebitaş village	37.686°N	40.463°E	725
	Ovabağ village	37.716°N	39.991°E	1,035
	Gümüştaş village	37.536°N	39.975°E	1,065
	Alabaş village	37.769°N	40.089°E	840

Adult dung beetles have been collected by hand, pit traps, water traps and light traps. The types of traps used differed according to the regions. The most common trap which used in the region has been pit traps. Traps placed so at least one pit trap was set up in each area. In addition to the traps, samples also collected from locations (without traps) where animals are densely populated and manure is released. In these localities, sheeps and cattles are grazed all day in packs. Therefore, the organic fertilizer material, such as cattle, donkey, sheep, camel and chicken droppings that found naturally in the study area used as attractants (Figure 2).



Figure 2. Pit Traps.

The main material of the study is adult species which collected in Karacadağ. Tweezers, knives, ice packs, paper bags, glass bottles, pickaxe, shovel and the material such as ethyl alcohol, ethyl acetate, distilled water, glycerin used to collect the samples. In addition different animal feces, big bottles, antifreeze and vinegar used for the traps. Some of the samples brought to the laboratory with jars and ethylalcohol the others stored in the same tubes at 4° C without alcohol. Thus, the body integrity of the samples preserved and any color change prevented.

The samples examined under a stereo microscope and they sent to Prof. Dr. Marco Dellacasa who is working in Natural History Museum of the University of Pisa (Italy) and Prof. Dr. Stefano Ziani who is working in Geolab Bologna (Italy). The definitive diagnoses carried out by their helps.

The species of dung beetle were identified by Prof. Dr. Marco Dellacasa (Natural History Museum of the University of Pisa, Italy) and Prof. Dr. Stefano Ziani (Geolab Bologna, Italy). Representative species were deposited in the laboratory of Harran University, Agricultural Faculty, Plant Protection Department, Şanlıurfa, Türkiye.

## RESULTS and DISCUSSION

In this study 16 dung beetle species were identified. Among these species, 13 species belonging to Scarabaeidae, 2 species belonging to Hydrophilidae and 1 species belonging to Histeridae families determined.

The ecological and distribution information of these sixteen species are provided below. The taxa are presented alphabetically.

**Family: Histeridae** Gyllenhal, 1808

**Subfamily: Histerinae** Gyllenhal, 1808

**Genus: Atholus** Thomson, 1859

**Atholus bimaculatus** (Linnaeus, 1758)

**Material examined:** Diyarbakır (Çınar), 06.V.2017–27. X. 2018, 725-1,065 m., (2 ♂♂, 3 ♀♀); Mardin (Derik), 06.V.2017–27.X.2018, 525-1,070 m., (1♂); Şanlıurfa (Siverek and Viranşehir), 06.05.2017–27.10.2018, 732-1,919 m., (6 ♂♂, 3 ♀♀).

**Type of animal feces:** Cattle, donkey.

**General distribution:** Europe; Albania, Austria, Balearic Islands, Belarus, Belgium, Bosnia-Herzegovina, Britain Islands, Bulgaria, Corsica, Crete, Croatia, Cyclades Islands, Czech Republic, Danish Mainland, Dodecanese Islands, Estonia, European Türkiye, French Mainland, Germany, Gibraltar, Greek Mainland, Hungary, Ireland, Italian Mainland, Kaliningrad region, Latvia, Lithuania, Luxemburg, Macedonia, Madeira, Malta, Moldova, North Aegean Islands, Norwegian Mainland, Poland, Portuguese Mainland, Romania, Russia Central, Northwest and South, Sardinia, Sicily, Slovakia, Slovenia, Spanish Mainland, Sweden, Switzerland, The Netherlands, Ukraine, Yugoslavia (Serbia and Montenegro) Russia **Africa**; Canary Islands **Asia**; Afghanistan, Cyprus, Iran, Iraq, Israel, Japan, Jordan, Türkiye (Mazur, 2004).

**Family: Hydrophilidae** Latreille, 1802

**Subfamily: Sphaeridiinae** Latreille, 1802

**Genus: Sphaeridium** Fabricius, 1775

**Sphaeridium marginatum** (Fabricius, 1787)

**Material examined:** Diyarbakır (Çınar), 06.V.2017–27. X. 2018, 725-1,065 m., (17 ♂♂, 23 ♀♀); Mardin (Derik), 06.V.2017–27.X.2018, 525-1,070 m., (14 ♂♂, 13 ♀♀); Şanlıurfa (Siverek and Viranşehir), 06.05.2017–27.10.2018, 732-1,919 m., (86 ♂♂, 85 ♀♀).

**Type of animal feces:** Cattle, donkey, sheep, camel, and chicken.

**General distribution:** Europe; Bosnia and Herzegovina, Bulgaria, Belarus, Croatia, Russia, Czech Republic, Denmark, Finland, France (including Monaco), Great Britain, Germany, Hungary, Ireland, Italy, Macedonia, Poland, Romania, Slovakia, Slovenia Spain, Russia, Switzerland, Türkiye, Ukraine. **Africa**; Algeria, Tunisia. **Asia**; Türkiye, Cyprus, Tajikistan (Fikáček et al., 2015).

**Distribution in Türkiye:** Manisa (Darılmaz & İncekara 2011)

**Sphaeridium scarabaeoides** (Linnaeus, 1758)

**Material examined:** Diyarbakır (Çınar), 06.V.2017–27. X. 2018, 725-1,065 m., (61 ♂♂, 80 ♀♀); Mardin (Derik), 06.V.2017–27.X.2018, 525-1,070 m., (33 ♂♂, 39 ♀♀); Şanlıurfa (Siverek and Viranşehir), 06.05.2017–27.10.2018, 732-1,919 m., (258 ♂♂, 308 ♀♀).

**Type of animal feces:** Cattle, donkey, sheep, camel, and chicken.

**General distribution:** Europe; Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Belarus, Croatia, Czech Republic, Denmark, Estonia, Finland, France (including Corsica, Monaco), UK, Germany, Georgia, Hungary, Ireland, Italy Latvia, Lithuania, Macedonia, the Netherlands, Norway, Russia, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland. **Africa**; Tunisia. **Asia**; Azerbaijan, Armenia, China, Israel, Japan, Kyrgyzstan, Kazakhstan, Mongolia, Türkiye, Uzbekistan. **America**; Brazil (Fikáček et al., 2015).

**Distribution in Türkiye:** Adıyaman, Bilecik, Bolu, Isparta, İçel, İzmir, Manisa, Sakarya (Darılmaz and İncekara 2011; Yılmaz and Aslan 2014).

**Family: Scarabaeidae** Latreille, 1802

**Subfamily: Aphodiinae** Leach, 1815

**Genus: Acrossus** Mulsant, 1842

**Acrossus luridus** (Fabricius, 1775)

**Material examined:** Diyarbakır (Çınar), 06.V.2017–27. X. 2018, 725-1,065 m., (14 ♂♂, 18 ♀♀); Mardin (Derik), 06.V.2017–27.X.2018, 525-1,070 m., (4 ♂♂, 5 ♀♀); Şanlıurfa (Siverek and Viranşehir), 06.05.2017–27.10.2018, 732-1,919 m., (57 ♂♂, 83 ♀♀).

**Type of animal feces:** Cattle, donkey, sheep, camel.

**General distribution:** **Europe;** Albania, Austria, Belgium, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Denmark, Estonia, Finland, France, Georgia, Germany, Great Britain, Greece, Netherlands, Ireland, Italy, Latvia, Lithuania, Hungary, Macedonia, Poland, Portugal, Romania, Russia, Spain, Sweden, Switzerland, Russia, Slovakia, Sloan, Türkiye, Ukraine (Löbl and Smetana, 2006). **Africa;** Morocco, Tunisia (Löbl and Smetana, 2006). **Asia;** Armenia, China, Iran, Israel, Kazakhstan, Cyprus, Kyrgyzstan, Western Siberia and East Siberia (Russia), Syria, Tajikistan, Turkmenistan. **America;** Argentina, Brazil, Mexico, USA (Dellacasa and Kırgız, 2002; Löbl and Smetana, 2006).

**Distribution in Türkiye:** Adana, Adıyaman, Afyon, Ağrı, Ankara, Antalya, Bartın, Bitlis, Bolu, Burdur, Çorum, Denizli, Diyarbakır, Erzurum, Eskişehir, Edirne, Gaziantep, Gümüşhane, İçel, İzmir, Kahramanmaraş, Kars, Kırklareli, Kütahya, Manisa, Osmaniye, Siirt, Sivas (Anlaş et al., 2011a; Dellacasa and Kırgız, 2002; Rozner & Rozner, 2009; Şenyüz and Şahin, 2009; Şenyüz et al., 2013).

**Genus:** *Aphodius* Illiger, 1789

*Aphodius contaminatus* (Herbst, 1783)

**Material examined:** **Diyarbakır** (Çınar), 06.V.2017–27. X. 2018, 725-1,065 m., (4 ♂♂, 13 ♀♀); **Mardin** (Derik), 06.V.2017–27.X.2018, 525-1,070 m., (4 ♂♂, 6 ♀♀); **Şanlıurfa** (Siverek and Viranşehir), 06.05.2017–27.10.2018, 732-1,919 m., (37 ♂♂, 37 ♀♀).

**Type of animal feces:** Cattle, donkey, sheep, camel.

**General distribution:** **Europe;** Austria, Belgium, Bosnia, Herzegovina, Croatia, Czech Republic, Denmark, Finland, France, England, Germany, Georgia, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Russia, Sweden, Switzerland, Türkiye, Ukraine, Serbia, **Africa;** Tunisia. **Asia;** Israel, Türkiye. **America;** USA (Löbl and Smetana, 2006).

**Distribution in Türkiye:** Edirne, Kırklareli (Dellacasa and Kırgız 2002)

*Aphodius fimetarius* (Linnaeus, 1758)

**Material examined:** **Diyarbakır** (Çınar), 06.V.2017–27. X. 2018, 725-1,065 m., (12 ♂♂, 11 ♀♀); **Mardin** (Derik), 06.V.2017–27.X.2018, 525-1,070 m., (5 ♂♂, 7 ♀♀); **Şanlıurfa** (Siverek and Viranşehir), 06.05.2017–27.10.2018, 732-1,919 m., (25 ♂♂, 35 ♀♀).

**Type of animal feces:** Cattle, donkey, sheep, camel.

**General distribution:** **Europe;** Albania, Andorra, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Belarus, Croatia, Czech Republic, Denmark, Estonia, Finland, France (including Corsica, Monaco), France (Corsica including, Monaco), Georgia, Hungary, Iceland, Ireland, Latvia, Lithuania, Luxembourg, Malta, Macedonia, Netherlands, Norway, Poland, Portugal, Romania, Russia, Slovakia, Slovenia, Spain (including Gibraltar), Sweden, Switzerland, Türkiye, Ukraine, Greece (including Crete). **Africa;** Algeria, Egypt, Libya, Morocco (including Western Share), Madeira, Archipelagia, Tunisia. **Asia;** Armenia, Cyprus, Eastern Siberia, India, Iran, Iraq, Israel, Kashmir, Kyrgyzstan, Kazakhstan, Mongolia, Nepal, Pakistan, Syria, Tajikistan, Turkmenistan, Türkiye, Uzbekistan, China. **America;** USA (Löbl and Smetana, 2006).

**Distribution in Türkiye:** Adana, Adıyaman, Afyon, Ankara, Antalya, Artvin, Bartın, Balıkesir, Bolu, Bursa, Burdur, Çankırı, Tekirdağ, Çorum, Denizli, Erzurum, Edirne, Gaziantep, Giresun, Gümüşhane, Samsun, Sivas, Rize, Hatay, Kahramanmaraş, Kastamonu, Kayseri, Kırşehir, Kırklareli, Kütahya, Manisa, İçel, Niğde, Osmaniye, İçel, İzmir, Zonguldak (Balthasar, 1952; Lodos et al., 1999; Dellacasa and Kırgız, 2002; Şenyüz, 2009; Rozner and Rozner, 2009;)

*Aphodius (Otophorus) haemorrhoidalis* (Linnaeus, 1758)

**Material examined:** **Diyarbakır** (Çınar), 06.V.2017–27. X. 2018, 725-1,065 m., (6♂♂, 7 ♀♀); **Mardin** (Derik), 06.V.2017–27.X.2018, 525-1,070 m., (1 ♂, 4 ♀♀); **Şanlıurfa** (Siverek and Viranşehir), 06.05.2017–27.10.2018, 732-1,919 m., (18 ♂♂, 40 ♀♀).

**Type of animal feces:** Cattle, donkey, sheep, camel.

**General distribution:** **Europe;** Albania, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Belarus, Croatia, Denmark, Estonia, Finland, Germany, Georgia, Greece, Hungary, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye, Ukraine, Serbia, Montenegro, **Africa;** Algeria, Morocco. **Asia;** Armenia, Japan, Kazakhstan, North Korea, Tajikistan, Uzbekistan, East Siberia. **America;** USA (Löbl and Smetana, 2006).

**Distribution in Türkiye:** Ankara, Amasya, Balıkesir Ordu, Çorum, Samsun, Artvin-Hopa, Rize, Sakarya, Tekirdağ (Balthasar, 1952; Şenyüz and Şahin 2013, Rozner and Rozner 2009).

**Genus:** *Biralus* Mulsant & Rey, 1870

*Biralus satellitius* (Herbst, 1789)

**Material examined:** Diyarbakır (Çınar), 06.V.2017–27. X. 2018, 725-1,065 m., (15 ♂♂, 12 ♀♀); **Mardin** (Derik), 06.V.2017–27.X.2018, 525-1,070 m., (8 ♂♂, 10 ♀♀); **Şanlıurfa** (Siverek and Viranşehir), 06.05.2017–27.10.2018, 732-1,919 m., (51 ♂♂, 64 ♀♀).

**Type of animal feces:** Cattle, donkey, sheep, camel.

**General distribution:** Central and Eastern Europe, Kazakhstan, Syria, The Caucasus, Türkiye, USA (Societa Entomologica Italiana, 2015).

**Distribution in Türkiye:** Adana, İçel, Kahramanmaraş (Lodos et al., 1999)

**Genus:** *Cheironitis* Lansberge, 1875

*Cheironitis pamphilus* (Ménétriés, 1849)

**Material examined:** Diyarbakır (Çınar), 06.V.2017–27. X. 2018, 725-1,065 m., (42 ♂♂, 69 ♀♀); **Mardin** (Derik), 06.V.2017–27.X.2018, 525-1,070 m., (28 ♂♂, 35 ♀♀); **Şanlıurfa** (Siverek and Viranşehir), 06.05.2017–27.10.2018, 732-1,919 m., (178 ♂♂, 315 ♀♀).

**Type of animal feces:** Cattle, donkey, sheep, camel and chicken.

**General distribution:** **Europe;** Bulgaria, Georgia, Greece, Italy, Russia, Türkiye. **Africa;** Egypt. **Asia;** Afghanistan, Azerbaijan, Armenia, Cyprus, Jordan, Iran, Israel, Lebanon, Syria, Tajikistan, Türkiye, Turkmenistan. **America;** Canada, USA (Löbl and Smetana, 2006).

**Distribution in Türkiye:** Isparta, Konya (Carpaneto, 1976)

**Genus:** *Colobopterus* Mulsant, 1842

*Colobopterus erraticus* (Linnaeus, 1758)

**Material examined:** Diyarbakır (Çınar), 06.V.2017–27. X. 2018, 725-1,065 m., (13 ♂♂, 23 ♀♀); **Mardin** (Derik), 06.V.2017–27.X.2018, 525-1,070 m., (3 ♂♂, 8 ♀♀); **Şanlıurfa** (Siverek and Viranşehir), 06.05.2017–27.10.2018, 732-1,919 m., (63 ♂♂, 86 ♀♀).

**Type of animal feces:** Cattle, donkey, sheep, camel.

**General distribution:** **Europe;** Albania, Austria, Belgium, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, England, Estonia, Finland, France, Germany, Greece, Italy, Northern Ireland, Latvia, Lithuania, Hungary, Macedonia, Netherlands, Norway, Poland, Portugal, Romania, Russia, Sardinia, Sicily, Slovenia, Slovakia, Spain, Sweden, Switzerland Türkiye, Ukraine. **Asia;** Cyprus, Türkiye. **America;** Brazil, USA (Fauna Europaea, 2015).

**Distribution in Türkiye:** Adana, Adıyaman, Afyon, Ağrı, Ankara, Antalya, Bartın, Bitlis, Bolu, Burdur, Çorum, Denizli, Diyarbakır, Erzurum, Eskişehir, Edirne, Gaziantep, Gümüşhane, İçel, İzmir, Kahramanmaraş, Kars, Kırklareli, Kütahya, Manisa, Osmaniye, Siirt, Sivas (Anlaş et al., 2011a; Dellacasa and Kırgız, 2002; Rozner and Rozner, 2009; Şenyüz and Şahin, 2009; Şenyüz et al., 2013).

**Genus:** *Onthophagus* Latreille, 1802

*Onthophagus fissicornis* (Steven, 1809)

**Material examined:** Diyarbakır (Çınar), 06.V.2017–27. X. 2018, 725-1,065 m., (12 ♂♂, 12 ♀♀); **Mardin** (Derik), 06.V.2017–27.X.2018, 525-1,070 m., (4 ♂♂, 8 ♀♀); **Şanlıurfa** (Siverek and Viranşehir), 06.05.2017–27.10.2018, 732-1,919 m., (45 ♂♂, 70 ♀♀).

**Type of animal feces:** Cattle, donkey, sheep, camel and chicken.

**General distribution:** **Europe;** Albania, Bulgaria, Greece, Macedonia, Romania, Russia, Slovakia, Türkiye, Ukraine, Yugoslavia, (Fauna Europaea, 2015).

**Distribution in Türkiye:** Adana, Ankara, Antalya, Gaziantep, Hatay, İçel, Kahramanmaraş, Kastamonu, Kayseri, Konya, Niğde, Osmaniye (Lodos et al., 1999), Adıyaman, Balıkesir, Burdur, Bursa, Çanakkale, Denizli, Edirne, Eskişehir, Gümüşhane, Isparta, İzmir, Kütahya, Sivas, Tekirdağ, Uşak (Rozner and Rozner, 2009)

*Onthophagus (Furconthophagus) furcatus* (Fabricius, 1781)

**Material examined:** Diyarbakır (Çınar), 06.V.2017–27. X. 2018, 725-1,065 m., (27 ♂♂, 32 ♀♀); **Mardin** (Derik), 06.V.2017–27.X.2018, 525-1,070 m., (4 ♂♂, 12 ♀♀); **Şanlıurfa** (Siverek and Viranşehir), 06.05.2017–27.10.2018, 732-1,919 m., (88 ♂♂, 82 ♀♀).

**Type of animal feces:** Cattle, donkey, sheep, and camel.

**General distribution:** **Europe;** Albania, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Crete, Croatia, Czech Republic, Denmark, France, Germany, Greece, Hungary, Italy, Macedonia, Netherlands, Poland, Portugal,

Republic of Moldova, Romania, Russia, Slovenia, Slovakia, Spain, Switzerland, Türkiye, Ukraine, and Yugoslavia. **Asia**; Cyprus, Türkiye. **America**; Argentina, USA. (Fauna Europaea, 2015).

**Distribution in Türkiye**: Adana, Ankara, Antalya, Bartın, Bolu, Çankırı, Gaziantep, Hatay, İçel, Kahramanmaraş, Karabük, Karaman, Kastamonu, Kayseri, Kırıkkale, Kırşehir, Osmaniye, Sinop, Yozgat Zonguldak (Lodos et al., 1999); Adıyaman, Afyon, Ağrı, Balıkesir, Burdur, Bursa, Çanakkale, Çorlu, Çorum, Denizli, Edirne, Eskişehir, Giresun, Gümüşhane, Kütahya, Nevşehir, Rize, Siirt, Sivas, Tarsus, Uşak, and Van (Rozner and Rozner, 2009).

**Onthophagus taurus** Schreber, 1759

**Material examined**: Diyarbakır (Çınar), 06.V.2017–27. X. 2018, 725-1,065 m., (17 ♂♂, 10 ♀♀); **Mardin** (Derik), 06.V.2017–27.X.2018, 525-1,070 m., (10 ♂♂, 4 ♀♀); **Şanlıurfa** (Siverek and Viranşehir), 06.05.2017–27.10.2018, 732-1,919 m., (61 ♂♂, 68 ♀♀).

**Type of animal feces**: Cattle, donkey, sheep, and camel.

**General distribution**: **Europe**; Albania, Austria, Italy, Türkiye. **Asia**; Armenia, Türkiye (Löbl and Smetana, 2006).

**Distribution in Türkiye**: Adana, Ankara, Antalya, Balıkesir, Bilecik, Çorum, Gaziantep, Hatay, Kahramanmaraş, Kastamonu, Kayseri, Kırşehir, Konya, Manisa, Mersin, Niğde, Zonguldak (Pehlivan, 1989); Bartın, Karaman, Osmaniye (Lodos et al., 1999); Afyon, Bursa, Çanakkale Denizli, Edirne, Erzincan, Eskişehir, Gümüşhane, İzmir, Kars, Kütahya, Sivas, Tekirdağ (Rozner and Rozner, 2009).

**Genus: Euonthophagus** Balthasar, 1959

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

**Material examined**: Diyarbakır (Çınar), 06.V.2017–27. X. 2018, 725-1,065 m., (21 ♂♂, 36 ♀♀); **Mardin** (Derik), 06.V.2017–27.X.2018, 525-1,070 m., (14 ♂♂, 12 ♀♀); **Şanlıurfa** (Siverek and Viranşehir), 06.05.2017–27.10.2018, 732-1,919 m., (89 ♂♂, 86 ♀♀).

**Type of animal feces**: Cattle, donkey, sheep, camel and chicken.

**General distribution**: **Europe**; Albania, Austria, Bosnia and Herzegovina, Bulgaria, Croatia, Georgia, Greece, Hungary, Macedonia, Moldova, Poland, Romania, Russia, Slovakia, Türkiye, Ukraine. **Asia**; Afghanistan, Armenia, Cyprus, Iran, Israel, Jordan, Kazakhstan, Kyrgyzstan, Syria, Tajikistan, Turkmenistan, Uzbekistan. **America**; Brazil, USA (Löbl and Smetana, 2006).

**Distribution in Türkiye**: 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; Lodos et al., 1978; Pehlivan, 1989; Lodos et al., 1999; Bellmann, 2007; Rozner and Rozner, 2009)

**Euonthophagus atramentarius** (Ménétriés, 1832)

**Material examined**: Diyarbakır (Çınar), 06.V.2017–27. X. 2018, 725-1,065 m., (21 ♂♂, 30 ♀♀); **Mardin** (Derik), 06.V.2017–27.X.2018, 525-1,070 m., (9 ♂♂, 12 ♀♀); **Şanlıurfa** (Siverek and Viranşehir), 06.05.2017–27.10.2018, 732-1,919 m., (91 ♂♂, 90 ♀♀).

**Type of animal feces**: Cattle, donkey, sheep, camel and chicken.

**General distribution**: **Europe**; Albania, Bulgaria, Georgia, Greece, Macedonia, Russia, Türkiye. **Africa**; Egypt, **Asia**; Armenia, Azerbaijan, Cyprus, Iraq, Iran, Israel, Syria, Türkiye, Uzbekistan (Löbl and Smetana, 2006).

**Distribution in Türkiye**: 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; Pehlivan, 1989; Lodos et al., 1999; Bellmann, 2007; Rozner and Rozner, 2009).

**Genus: Scarabaeus** Linnaeus, 1758

**Scarabaeus sacer** (Linnaeus, 1758)

**Material examined**: Diyarbakır (Çınar), 06.V.2017–27. X. 2018, 725-1,065 m., (5 ♂♂, 1 ♀); **Şanlıurfa** (Siverek and Viranşehir), 06.05.2017–27.10.2018, 732-1,919 m., (4 ♂♂, 3 ♀♀).

**Type of animal feces**: Cattle.

**General distribution**: **Europe**; Albania, Balearic Islands, Bosnia and Herzegovina, Bulgaria, Corsica, Crete, Croatia, Cyclades, France, Germany, Greece, Hungary, Italy, Macedonia, Portugal, Romania, Sardinia, Sicily, Slovenia, Spain, Türkiye, Ukraine. **Africa**; Algeria, Egypt, Libya, Morocco, Tunisia. **Asia**; Armenia, Azerbaijan, Afghanistan, China, Cyprus, Iran, Iraq, Israel, Jordan, India, Pakistan, Saudi Arabia, Transcaspia, Turkestan, Syria, Turkey. **America**; USA (Löbl ve Smetana, 2006).

**Distribution in Türkiye**: Adana, Adıyaman, Eskişehir, Kahramanmaraş, Samsun (Rozner and Rozner, 2009; Öztürk and Kalkar, 2011; Sullivan, 2018).

Among these species *Aphodius contaminatus*, *A. fimetarius*, *A. (Otophorus) haemorrhoidalis*, *Biralus satellitius*, *Scarabaeus sacer*, *Sphaeridium marginatum*, *S. scarabaeoides* were recorded for the first time from dung beetle for Şanlıurfa, Mardin and Diyarbakır provinces. *Acrossus luridus* and *Onthophagus taurus* were recorded for the first time from dung beetle for Mardin and Şanlıurfa provinces. Also *Cheironitis pamphilus* were recorded for the first time in Diyarbakır and Şanlıurfa, *Colobopterus erraticus*, *Euonthophagus amyntas alces*, *E. atramentarius* were recorded for the first time in Mardin province.

## DISCUSSION

Samples were collected from 3 different provinces, 4 districts and 15 villages in Karacadağ between May and October in 2017 and 2018. In the study, a total of 10 genera and 16 dung beetle species were recorded from Scarabaeidae, Hydrophilidae and Histeridae families. In addition, a total of 3,595 adult were collected. The identified dung beetle species and their percentages are given in Table 3. In this study, the percentage of *A. bimaculatus* (0.42%), *A. contaminatus* (2.81%), *A. fimetarius* (2.64%), *A. (O.) haemorrhoidalis* (2.11%), *B. satellitius* (4.45%), *O. fissicornis* (4.20%), *O. taurus* (4.73%), *S. sacer* (0.36%), were generally low. The percentage of *S. scarabaeoides* (21.67%), and *C. pamphilus* (18.47%), were high. In this study, *S. scarabaeoides* was the most predominant dung beetle species found. The highest number of adult dung beetle species were recorded in Şanlıurfa Province accounting for 72.57 %. The lowest number of adult dung beetle species were recorded in Mardin Province accounting for 8.82 %.

Table 3. Distribution of adult individuals according to provinces in 2017-2018

Specimen	Diyarbakır		Mardin		Şanlıurfa		Total		Total	Percentage of dung beetle (%)		
	♂	♀	♂	♀	♂	♀	♂	♀		♂	♀	Total %
<i>Sphaeridium scarabaeoides</i>	61	80	33	39	258	308	352	427	779	22,17	21,28	<b>21,67</b>
<i>Cheironitis pamphilus</i>	42	69	28	35	178	312	248	416	664	15,62	20,73	<b>18,47</b>
<i>Euonthophagus amyntas alces</i>	21	36	14	12	89	86	124	134	258	7,81	6,68	<b>7,18</b>
<i>Euonthophagus atramentarius</i>	21	30	9	12	91	90	121	132	253	7,62	6,58	<b>7,04</b>
<i>Onthophagus (Furconthophagus) furcatus</i>	27	32	4	12	88	82	119	126	245	7,49	6,28	<b>6,82</b>
<i>Sphaeridium marginatum</i>	17	23	14	13	86	85	117	121	238	7,37	6,03	<b>6,62</b>
<i>Colobopterus erraticus</i>	13	23	3	8	63	86	79	117	196	4,97	5,83	<b>5,45</b>
<i>Acrossus luridus</i>	14	18	4	5	57	83	75	106	181	4,72	5,28	<b>5,03</b>
<i>Onthophagus taurus</i>	17	10	10	4	61	68	88	82	170	5,54	4,09	<b>4,73</b>
<i>Biralus satellitius</i>	15	12	8	10	51	64	74	86	160	4,66	4,29	<b>4,45</b>
<i>Onthophagus fissicornis</i>	12	12	4	8	45	70	61	90	151	3,84	4,48	<b>4,20</b>
<i>Aphodius contaminatus</i>	4	13	4	6	37	37	45	56	101	2,83	2,79	<b>2,81</b>
<i>Aphodius fimetarius</i>	12	11	5	7	25	35	42	53	95	2,64	2,64	<b>2,64</b>
<i>Aphodius (Otophorus) haemorrhoidalis</i>	6	7	1	4	18	40	25	51	76	1,57	2,54	<b>2,11</b>
<i>Atholus bimaculatus</i>	2	3	1	-	6	3	9	6	15	0,57	0,30	<b>0,42</b>
<i>Scarabaeus sacer</i>	5	1	-	-	4	3	9	4	13	0,57	0,20	<b>0,36</b>
Total	289	380	142	175	1.157	1.452	1.588	2.007	3.595	-	-	-

According to the number of specimens gathered in Karacadağ in two years the highest number has been reached in Viranşehir (Şanlıurfa) (Table 4) where we called region II. A total of 1,420 specimens were obtained from this region. The share of the region is about 40%. The lowest number has been saved in Derik (Mardin) where we called region III. The number of specimen gathered in this region has been 317 and it has %8.7 from total share.

In the period of study, a total of 3 580 adult individuals were collected in Karacadağ for two years. The highest number was reached in September with 856 individuals. 24% of them were found in this month. Information for other months and years are added to Table 5.



Table 4. Distribution of adult individuals according to the subregions

Specimen	Region I Siverek		Region II Viranşehir		Region III Derik		Region IV Çınar	
	2017	2018	2017	2018	2017	2018	2017	2018
<i>Acrossus luridus</i>	21	28	48	43	3	6	14	18
<i>Aphodius (Otophorus) haemorrhoidalis</i>	13	12	15	18	2	3	7	6
<i>Aphodius contaminatus</i>	16	14	20	24	6	4	10	7
<i>Aphodius fimetarius</i>	17	15	12	16	9	3	12	11
<i>Atholus bimaculatus</i>	1	3	3	2	0	1	2	3
<i>Biralus satellitius</i>	25	25	29	36	7	9	12	17
<i>Cheironitis pamphilus</i>	94	133	112	151	26	37	47	64
<i>Colobopterus erraticus</i>	39	27	42	41	6	5	16	20
<i>Euonthophagus amyntas alces</i>	46	28	62	39	12	14	36	21
<i>Euonthophagus atramentarius</i>	52	36	53	40	12	9	29	22
<i>Onthophagus (Furconthophagus) furcatus</i>	46	39	42	43	10	6	28	31
<i>Onthophagus fissicornis</i>	26	29	25	35	8	4	14	10
<i>Onthophagus taurus</i>	32	28	28	41	6	8	12	15
<i>Scarabaeus sacer</i>	2	0	4	1	0	0	4	2
<i>Sphaeridium marginatum</i>	37	34	53	47	12	15	18	22
<i>Sphaeridium scarabaeoides</i>	119	147	128	172	31	39	68	75
Total	586	598	676	749	150	163	329	344

Table 5. Distribution of adult individuals according to the months

Specimen	May		June		July		August		September		October		Total	
	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
<i>Acrossus luridus</i>	2	4	14	16	19	22	19	21	24	28	8	4	86	95
<i>Aphodius (Otophorus) haemorrhoidalis</i>	1	3	6	4	7	9	5	7	11	8	7	8	37	39
<i>Aphodius contaminatus</i>	4	2	4	10	8	12	10	6	13	9	13	10	52	49
<i>Aphodius fimetarius</i>	3	3	8	6	10	9	5	7	10	12	14	8	50	45
<i>Atholus bimaculatus</i>	1	1	1	2	0	1	1	2	3	1	0	2	6	9
<i>Biralus satellitius</i>	3	6	11	15	18	20	16	19	19	24	6	3	73	87
<i>Cheironitis pamphilus</i>	21	37	53	81	55	79	47	71	64	85	39	32	279	385
<i>Colobopterus erraticus</i>	6	3	21	20	15	22	23	19	29	25	9	4	103	93
<i>Euonthophagus amyntas alces</i>	17	8	31	23	27	19	24	18	36	27	21	7	156	102
<i>Euonthophagus atramentarius</i>	11	5	22	25	29	23	26	20	39	26	19	8	146	107
<i>Onthophagus (Furconthophagus) furcatus</i>	7	9	24	17	26	23	21	21	32	28	16	21	126	119
<i>Onthophagus fissicornis</i>	5	6	13	11	15	19	17	19	15	17	8	6	73	78
<i>Onthophagus taurus</i>	2	8	10	14	18	18	15	22	24	19	9	11	78	92
<i>Scarabaeus sacer</i>	1	0	2	1	2	0	1	0	3	1	1	1	10	3
<i>Sphaeridium marginatum</i>	12	18	23	16	26	21	25	20	19	26	15	17	120	118
<i>Sphaeridium scarabaeoides</i>	34	46	66	86	71	89	55	78	82	101	38	33	346	433
Total	130	159	309	347	346	386	310	350	423	437	223	175	1.741	1.854

A total of 1 798 adult individuals were collected with three different trap methods used during the two year study (Table 6.). The most effective method among traps was the pit trap. With this method, 1 202 adult individuals were caught and had a share of 34%. The least efficient method was light traps with 264 adult individuals. Although light traps were used in every region, only 7% of the total number of individuals could be caught with this method. In addition to the traps, fecal samples found in the field were also checked and a total of 1,782 adult individuals were obtained and 50% of the collected individuals were captured using this method. The reason for the high number of samples caught outside traps in the relevant area is the intensively monitored cattle breeding activities in the field. There is fresh animal manure on the land every day and dung beetles tend to these areas. It has been observed that this situation reduces the interest on traps.

Table 6. Distribution of adult individuals according to the different traps

Specimen	Pit Trap		Light Trap		Water Trap		Without Trap		Total	
	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
<i>Acrossus luridus</i>	26	26	8	4	14	16	38	49	86	95
<i>Aphodius (Otophorus) haemorrhoidalis</i>	7	12	2	1	1	3	27	23	37	39
<i>Aphodius contaminatus</i>	14	12	3	5	2	2	33	30	52	49
<i>Aphodius fimetarius</i>	17	15	1	5	0	3	32	22	50	45
<i>Atholus bimaculatus</i>	-	-	-	-	-	-	6	9	6	9
<i>Birulus satellitius</i>	21	29	4	7	13	11	35	40	73	87
<i>Cheironitis pamphilus</i>	42	78	21	26	36	33	180	248	279	385
<i>Colobopterus erraticus</i>	32	36	9	11	19	15	43	31	103	93
<i>Euonthophagus amyntas alces</i>	98	68	10	8	18	12	30	14	156	102
<i>Euonthophagus atramentarius</i>	90	74	12	6	14	10	30	17	146	107
<i>Onthophagus (Furconthophagus) furcatus</i>	83	77	8	10	16	11	19	21	126	119
<i>Onthophagus fissicornis</i>	32	26	5	7	2	3	34	42	73	78
<i>Onthophagus taurus</i>	29	35	3	8	5	2	41	47	78	92
<i>Scarabaeus sacer</i>	2	2	0	0	0	0	8	1	10	3
<i>Sphaeridium marginatum</i>	37	43	7	12	3	5	73	58	120	118
<i>Sphaeridium scarabaeoides</i>	60	79	23	38	24	39	239	277	346	433
Total	590	612	116	148	167	165	868	929	1.741	1.854

The study was conducted on five different feces samples in Karacadağ: cow, sheep, donkey, camel and chicken. These feces were used both as attractants in traps and were the subject of study in field controls. Considering the two-year total, the highest number of individuals were detected in cow feces (Table 7.). A total of 2 047 adult individuals were collected in cow feces and this number constituted 62% of the total number of adults. In 2018, chicken feces were included in the study. During the controls, only 17 adult individuals were obtained from this type of feces and constituted only 0.5% of the individuals collected. The lower dry matter rate in cow feces compared to other types of feces has affected the food preference of dung beetles.

Table 7. Distribution of adult individuals according to animal feces

Specimen	Donkey		Cow		Camel		Sheep		Chicken	
	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
<i>Acrossus luridus</i>	20	24	46	61	3	3	9	3	0	0
<i>Aphodius (Otophorus) haemorrhoidalis</i>	12	9	18	21	1	5	4	3	0	0
<i>Aphodius contaminatus</i>	15	13	24	23	6	4	4	4	0	0
<i>Aphodius fimetarius</i>	11	15	29	22	4	0	5	3	0	0
<i>Atholus bimaculatus</i>	0	0	6	9	0	0	0	0	0	0
<i>Birulus satellitius</i>	18	17	32	48	8	5	11	10	0	0
<i>Cheironitis pamphilus</i>	52	69	175	244	10	12	21	30	0	4
<i>Colobopterus erraticus</i>	19	14	54	40	9	12	12	16	0	0
<i>Euonthophagus amyntas alces</i>	38	28	83	42	14	10	11	13	0	1
<i>Euonthophagus atramentarius</i>	37	23	79	59	10	6	8	10	0	3
<i>Onthophagus (Furconthophagus) furcatus</i>	28	19	71	77	11	7	8	6	0	0
<i>Onthophagus fissicornis</i>	16	12	39	44	7	7	6	7	0	1
<i>Onthophagus taurus</i>	15	18	43	51	9	5	8	10	0	0
<i>Scarabaeus sacer</i>	0	0	10	3	0	0	0	0	0	0
<i>Sphaeridium marginatum</i>	23	27	67	65	11	7	12	5	0	2
<i>Sphaeridium scarabaeoides</i>	52	79	221	256	23	21	27	33	0	6
Toplam	356	367	997	1.065	126	104	146	153	0	17

It has been observed that the biological diversity in areas where plant diversity is reduced due to grazing is less than in areas where there is no grazing. There are studies reporting that the increase in biological diversity value in insects are directly proportional to plant richness (Rambo and Faeth 1999). Another study on

the subject belongs to Weisser and Siemann (2004). In the study, they pointed up that insect specimen play a key role in the formation of plants and ecosystems and contribute to the functioning of ecosystems.

The most comprehensive survey on the fauna of dung beetles in Turkey was conducted in 2000 by Carpaneto et al. According to the results of this research, 99 genera and 625 species were registered (Carpaneto et al., 2000). However, since a long time has passed since the study, it is essential to make the necessary revisions or similar studies again.

In Türkiye where pasture farming is intensive, especially in the Southeast Anatolia Region, the economic values, biodiversity, ecology and all factors that have occurred or may occur in the biology of dung beetle species under the influence of changing climatic conditions need to be investigated more deeply and comprehensively.

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