

**STAPHYLINIDAE (INSECTA: COLEOPTERA) FAUNA
ASSOCIATED WITH COW DUNG IN ASPAT (STROBILOS),
BODRUM, MUĞLA, WESTERN TURKEY**

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ABSTRACT: This paper provides information about the Staphylinidae (Insecta: Coleoptera) fauna collected from cow dung of farming terraces in Aspat (Strobilos) ancient city and its territorium, Bodrum, Muğla, Western Turkey, during the years of 2008-2009. As a result of this study, nineteen species were identified. Among them *Anotylus inustus* (Gravenhorst, 1806), *A. tetracarinatus* (Block, 1799) and *Philonthus concinnus* (Gravenhorst, 1802) were the most abundant species. Twelve species were recorded for the first time from Muğla province of Turkey.

KEY WORDS: Staphylinidae, Coleoptera, Cow dung, Fauna, Muğla, Turkey

The family Staphylinidae is a widespread and rather large family of Coleoptera, comprising 33 subfamilies, and about 60 000 species all over the world (Grebennikov & Newton, 2009; Solodovnikov et al., 2013). 1 600 staphylinid species and subspecies are known from Turkey (Anlaş, 2009).

In this study, Staphylinidae (Coleoptera) fauna on the cow dung of farming terraces in Aspat (Strobilos) ancient city and its territorium (27°26'E and 37°02'N), Bodrum, Muğla, Western Turkey have been evaluated. Studies have been conducted in 500 hectares of land during the years of 2008-2009. Material has been monitored by collecting cow dung samples at two weeks' intervals in nine different plots. One kilogram of dung samples were taken every week with three replicates at each plot. Samples were brought to laboratory where the insects were separated from dung, placed in containers with 70% alcohol, identified and recorded. Material has been deposited in the collection of Lodos Entomological Museum, Turkey (LEMT) of Ege University, Izmir and in the collection of Alaşehir Zoological Museum (AZMM) of Celal Bayar University, Manisa.

RESULTS

In this study, 19 species belong to five subfamilies of Staphylinidae have been recorded. As a result, a total of 541 specimens on the cow dung have been recorded in this area.

Family Staphylinidae Latreille, 1802**Subfamily Aleocharinae** Fleming, 1821***Aloconota gregaria*** (Erichson, 1839)

Material examined: Muğla: Bodrum, Aspat, 12.IV.2008, 3 exs., totally 3 specimens. **Distribution in Turkey:** Adana, Aksaray, Antalya, Çankırı, Gaziantep, Gümüşhane, Isparta, Kahramanmaraş, Kayseri, Kırşehir, Konya, Mersin, Muğla, Nevşehir, Niğde, Sivas, Yozgat (Anlaş, 2009; Assing, 2013, 2014; Sert et al., 2015).

Oxypoda vicina Kraatz, 1858

Material examined: Muğla: Bodrum, Aspat, 24.VIII.2009, 1 ex., totally 1 specimen. **Distribution in Turkey:** Adana, Aydın, Bitlis, Denizli, Erzurum, Eskişehir, Gaziantep, İzmir, Kahramanmaraş, Kastamonu, Konya, Manisa, Mersin, Muğla, Nevşehir, Niğde (Anlaş 2009; Assing, 2013; Sert et al., 2015).

Myllaena intermedia Erichson, 1837

Material examined: Muğla: Bodrum, Aspat, 21.III.2009, 1 ex., totally 1 specimen. **Distribution in Turkey:** Antalya, İstanbul, İzmir, Manisa, Niğde (Anlaş, 2007, 2009; Anlaş & Rose, 2011; Sert et al., 2015).

Atheta testaceipes (Heer, 1839)

Material examined: Muğla: Bodrum, Aspat, 10.V.2008, 9 exs.; 28.II.2009, 15 exs., 21.III.2009, 4 exs., totally 28 specimens. **Distribution in Turkey:** Antalya, İzmir, Kahramanmaraş, Konya, Manisa (Anlaş, 2009; Assing, 2010, 2013; Anlaş & Rose, 2011).

Atheta aeneicollis (Sharf, 1869)

Material examined: Muğla: Bodrum, Aspat, 25.II.2008, 7 exs.; 26.IV.2008, 4 exs., 13.XI.2009, 9 exs., totally 20 specimens. **Distribution in Turkey:** Adana, Adıyaman, Aksaray, Antalya, Aydın, Elazığ, Hatay, İzmir, Kahramanmaraş, Karaman, Manisa, Mersin, Muğla, Nevşehir, Niğde, Ordu, Osmaniye, Sinop, Zonguldak (Anlaş, 2009; Anlaş & Rose, 2011; Assing, 2013, 2014; Sert et al., 2015).

Aleochara intricata Mannerheim, 1830

Material examined: Muğla: Bodrum, Aspat, 23.V.2009, 3 exs.; 10.VIII.2009, 2 exs., totally 5 specimens. **Distribution in Turkey:** Adıyaman, Aksaray, Antalya, Bitlis, Hatay, İstanbul, Karaman, Kayseri, Kırşehir, Konya, Mersin, Nevşehir, Niğde, Osmaniye, Sivas, Şanlıurfa, Van, Yozgat (Anlaş, 2009; Anlaş & Rose, 2011; Sert et al., 2014, 2015).

Aleochara bipustulata (Linnaeus, 1761)

Material examined: Muğla: Bodrum, Aspat, 29.II.2008, 2 exs., 23.V.2009, 1 ex., 24.VIII.2009, 3 exs., 18.IX.2009, 2 exs., totally 8 specimens. **Distribution in Turkey:** Aksaray, Ankara, Antalya, Çankırı, Eskişehir, Gümüşhane, Hatay, İstanbul, İzmir, Kayseri, Kırşehir, Kocaeli, Konya, Malatya, Mardin, Mersin, Muğla, Nevşehir, Niğde, Ordu, Rize, Sivas, Şırnak, Van, Yozgat (Anlaş, 2009; Sert et al., 2014, 2015).

Aleochara tristis Gravenhorst, 1806

Material examined: Muğla: Bodrum, Aspat, 12.IV.2008, 9 exs., 26.IV.2008, 10 exs., 24.V.2008, 2 exs., 21.III.2009, 4 exs., 11.IV.2009, 1 ex., 23.V.2009, 3 exs., 27.VI.2009, 2 exs., 20.VII.2009, 12 exs., 24.VIII.2009, 2 exs., 16.X.2009, 5 exs., totally 50 specimens. **Distribution in Turkey:** Ankara, Antalya, Artvin, Bingöl, Bitlis, Bursa, Erzurum, Gaziantep, Hatay, Isparta, İzmir, Kahramanmaraş, Konya, Malatya, Manisa, Mardin, Mersin, Muğla, Osmaniye, Siirt (Anlaş, 2009; Tezcan & Anlaş, 2009; Özgen & Anlaş, 2010; Anlaş & Rose, 2011; Japoshvili & Anlaş, 2011; Sert et al., 2014; Anlaş et al., 2014; Tanyeri et al., 2017).

Subfamily Oxytelinae Fleming, 1821***Anotylus inustus*** (Gravenhorst, 1806)

Material examined: Muğla: Bodrum, Aspat, 25.II.2008, 19 exs., 29.III.2008, 23 exs., 12.IV.2008, 13 exs., 28.II.2009, 24 exs., 21.III.2009, 10 exs., 23.V.2009, 64 exs., 20.VII.2009, 17 exs., 13.XI.2009, 48 exs., totally 218 specimens. **Distribution in Turkey:** Adana, Artvin, Batman, Bursa, Diyarbakır, Erzurum, Isparta, İstanbul, İzmir, Kilis, Kocaeli, Konya, Manisa, Mardin, Mersin, Muğla, Siirt (Anlaş, 2009; Anlaş & Rose, 2009d; Tezcan & Anlaş, 2009; Özgen & Anlaş, 2010; Özgen et al., 2010; Japoshvili & Anlaş, 2011; Assing, 2013; Anlaş et al., 2014; Tanyeri et al., 2017).

Anotylus tetracarınatus (Block, 1799)

Material examined: Muğla: Bodrum, Aspat, 25.II.2008, 5 exs., 12.IV.2008, 18 exs., 26.IV.2008, 10 exs., 10.V.2008, 4 exs., 24.V.2008, 7 exs., 11.IV.2009, 20 exs., 20.VII.2009, 9 exs., totally 73 specimens. **Distribution in Turkey:** Ankara, Antalya, Diyarbakır, Gaziantep, Hatay, Isparta, Kastamonu, Manisa (Anlaş, 2009; Anlaş & Rose, 2009d; Japoshvili & Anlaş, 2011; Assing, 2014; Anlaş et al., 2014).

Oxytelus sculptus Gravenhorst, 1806

Material examined: Muğla: Bodrum, Aspat, 26.IV.2008, 6 exs., 10.V.2008, 2 exs., totally 8 specimens. **Distribution in Turkey:** Adana, Ankara, Diyarbakır, Mardin, Mersin, Sakarya (Anlaş, 2009; Özgen & Anlaş, 2010).

Coproporus colchicus Kraatz, 1858

Material examined: Muğla: Bodrum, Aspat, 10.V.2008, 1 ex., totally 1 specimen. **Distribution in Turkey:** Antalya, Diyarbakır, İstanbul, İzmir, Mardin, Mersin (Anlaş, 2009; Özgen & Anlaş, 2010).

Subfamily Tachyporinae Macleay, 1825***Tachinus fimetarius*** Gravenhorst, 1802

Material examined: Muğla: Bodrum, Aspat, 18.IX.2009, 1 ex., totally 1 specimen. **Distribution in Turkey:** Adıyaman, Batman, Bursa, Diyarbakır, Erzurum, Isparta, Konya, Mersin (Anlaş, 2009; Özgen & Anlaş, 2011; Assing, 2013).

Lordithon trinotatus (Erichson, 1839)

Material examined: Muğla: Bodrum, Aspat, 29.II.2008, 3 exs., totally 3 specimens. **Distribution in Turkey:** Ankara, Antalya, Aydın, Bolu, Isparta, İzmir, Kastamonu, Manisa, Uşak, Zonguldak (Anlaş, 2009; Anlaş & Rose, 2009a, Özgen & Anlaş, 2011; Assing, 2013, 2014; Sert et al., 2014).

Subfamily Paederinae Fleming, 1821***Rugilus orbiculatus*** (Paykull, 1789)

Material examined: Muğla: Bodrum, Aspat, 10.V.2008, 1 ex., totally 1 specimen. **Distribution in Turkey:** Afyonkarahisar, Antalya, Denizli, Erzincan, Erzurum, Eskişehir, İstanbul, İzmir, Karaman, Kayseri, Kütahya, Konya, Manisa, Niğde, Uşak (Anlaş, 2009; Anlaş & Rose, 2009b; Sert et al., 2013; Örgel & Anlaş, 2016; Anlaş, 2017).

Subfamily Staphylininae Latreille, 1802***Philonthus concinnus*** (Gravenhorst, 1802)

Material examined: Muğla: Bodrum, Aspat, 26.IV.2008, 5 exs., 24.V.2008, 8 exs., 20.VII.2009, 47 exs., 13.XI.2009, 7 exs., totally 67 specimens. **Distribution in Turkey:** Afyonkarahisar, Adana, Aksaray, Ankara, Antalya, Ardahan, Balıkesir, Bingöl, Bolu, Bursa, Çankırı, Denizli, Diyarbakır, Elazığ, Erzincan, Erzurum, Eskişehir, Gaziantep, Gümüşhane, Isparta, Iğdır, İzmir, Kayseri, Kırkkale, Kırşehir, Konya, Kütahya, Malatya, Manisa, Mardin,

Mersin, Mersin, Muğla, Muş, Nevşehir, Niğde, Siirt, Sivas, Tunceli, Uşak, Yozgat (Anlaş, 2009; Anlaş & Rose, 2009c; Assing, 2013; Anlaş et al., 2014; Fırat & Sert, 2016; Tanyeri et al., 2017).

Philonthus coprophilus Jarrige, 1949

Material examined: Muğla: Bodrum, Aspat, 10.V.2008, 2 exs., totally 2 specimens. **Distribution in Turkey:** Aksaray, Balıkesir, Erzurum, Kırıkkale, Konya, Nevşehir, Sinop (Anlaş, 2009; Assing, 2010).

Philonthus corruscus (Gravenhorst, 1802)

Material examined: Muğla: Bodrum, Aspat, 25.II.2008, 9 exs., 26.IV.2008, 6 exs., 24.V.2008, 3 exs., totally 18 specimens. **Distribution in Turkey:** Adana, Balıkesir, Eskişehir, Gümüşhane, İzmir, Manisa, Mardin, Mersin (Anlaş, 2009; Özgen & Anlaş, 2010; Anlaş et al., 2014; Özgen et al., 2016).

Philonthus nitidicollis (Lacordaire, 1835)

Material examined: Muğla: Bodrum, Aspat, 12.IV.2008, 11 exs., 26.IV.2008, 7 exs., 28.II.2009, 8 exs.; 11.IV.2009, 7 exs., 23.V.2009, 1 ex., totally 34 specimens. **Distribution in Turkey:** Adana, Aksaray, Ankara, Antalya, Balıkesir, Bingöl, Bursa, Denizli, Diyarbakır, Eskişehir, Gaziantep, Isparta, İzmir, Karaman, Kayseri, Kırşehir, Konya, Manisa, Mardin, Mersin, Nevşehir, Siirt, Şırnak (Anlaş, 2009; Anlaş & Rose, 2009c; Özgen & Anlaş, 2010; Japoshvili & Anlaş, 2011; Assing, 2014; Fırat & Sert, 2016).

As a result of this study, nineteen species were identified. Among them *Anotylus inustus* (Gravenhorst, 1806), *A. tetracarinatus* (Block, 1799) and *Philonthus concinnus* (Gravenhorst, 1802) were the most abundant species. Twelve species namely *Myllaena intermedia* Erichson, 1837, *Atheta testaceipes* (Heer, 1839), *Aleochara intricata* Mannerheim, 1830, *Anotylus tetracarinatus* (Block, 1799), *Oxytelus sculptus* Gravenhorst, 1806, *Coproporus colchicus* Kraatz, 1858, *Tachinus fimetarius* Gravenhorst, 1802, *Lordithon trinotatus* (Erichson, 1839), *Rugilus orbiculatus* (Paykull, 1789), *P. coprophilus* Jarrige, 1949, *P. corruscus* (Gravenhorst, 1802) and *P. nitidicollis* (Lacordaire, 1835) were recorded for the first time from Muğla province of Turkey. The number of species collected only in 2008 was fifteen (78,95%) and in 2009 was twelve (63,16%). The number found in both year was eight (42,11%).

Among those, three species namely, *Aleochara tristis* Gravenhorst, 1806, *Anotylus inustus* (Gravenhorst, 1806) and *Philonthus concinnus* (Gravenhorst, 1802) were reported from the same locality by Tanyeri et al. (2017).

The total number of cow dung fauna of Aspat rised up to twenty five in addition to six species (*Philonthus intermedius* (Lacordaire, 1835), *Philonthus laminatus* (Creutzer, 1799), *Philonthus rufimanus* Heer, 1839, *Tachyporus nitidulus* (Fabricius, 1781), *Xantholinus graecus graecus* Kraatz, 1858 and *Xantholinus rufipennis* Erichson, 1839) cited by Tanyeri et al. (2017).

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LITERATURE CITED

- Anlaş, S.** 2007. The present situation of the Staphylinidae fauna of Turkey (Coleoptera). Linzer Biologische Beiträge, 39 (1): 5-9.
- Anlaş, S.** 2009. Distributional checklist of the Staphylinidae (Coleoptera) of Turkey, with new and additional records. Linzer Biologische Beiträge, 41 (1): 215-342.
- Anlaş, S.** 2017. Notes on the genus *Rugilus* Leach, 1819 in the Palearctic Region (Coleoptera: Staphylinidae: Paederinae). Turkish Journal of Entomology, 41 (2): 197-205.
- Anlaş, S. & Rose, A.** 2009a. Some additional notes about Tachyporinae (Coleoptera: Staphylinidae) fauna of Turkey. Munis Entomology & Zoology, 4 (2): 479-482.
- Anlaş, S. & Rose, A.** 2009b. New records of Paederinae (Coleoptera: Staphylinidae) from Turkey. Acta Zoologica Bulgarica, 61 (2): 209-213.
- Anlaş, S. & Rose, A.** 2009c. Some additional notes about Staphylininae (Coleoptera: Staphylinidae) fauna of Turkey. Munis Entomology & Zoology, 4 (2): 327-333.
- Anlaş, S. & Rose, A.** 2009d. Contribution to the Oxytelinae (Coleoptera: Staphylinidae) fauna of Turkey, with new and interesting records. Acta Zoologica Bulgarica, 61 (1): 101-104.
- Anlaş, S. & Rose, A.** 2011. Some additional notes about Aleocharinae (Coleoptera: Staphylinidae) fauna of Turkey. Munis Entomology & Zoology, 6 (1): 181-185.
- Anlaş, S., Tezcan, S. & Örgel, S.** 2014. Seasonal dynamics and species composition of dung-inhabiting Staphylinids (Coleoptera, Staphylinidae) in western Turkey. Journal of Anatolian Natural Sciences, 5 (1): 14-19.
- Assing, V.** 2010. On the Staphylinidae of Turkey. VII. Five new species and additional records (Coleoptera: Staphylinidae). Koleopterologische Rundschau, 80: 71-102.
- Assing, V.** 2013. On the Staphylinidae (Coleoptera) of Turkey IX. Five new species, a new synonymy, and additional records. Stuttgarter Beiträge zur Naturkunde A, Neue Serie, 6: 103-125.
- Assing, V.** 2014. On the Staphylinidae of Turkey X. Two new species and additional records (Insecta: Coleoptera). Linzer biologische Beiträge, 46 (2): 1133- 1146.
- Firat, S. & Sert, O.** 2016. Faunistic and zoogeographical composition and preliminary evaluations of some ecological features of the subfamily Staphylininae (Coleoptera: Staphylinidae) of the Central Anatolian Region of Turkey. Turkish Journal of Zoology, 40 (1): 164-185.
- Grebennikov, V. V. & Newton, A. F.** 2009. Good-bye Scydmaenidae, or why the ant-like stone beetles should become megadiverse Staphylinidae sensu latissimo (Coleoptera). European Journal of Entomology, 106 (2): 275-301.
- Japoshvili, G. & Anlaş, S.** 2011. Notes on the family Staphylinidae (Coleoptera) collected by pitfall traps in Gölçük, Isparta province of Turkey. Journal of Entomological Research Society, 13 (1): 41-48.
- Örgel, S. & Anlaş, S.** 2016. Faunistic studies on the subfamily Paederinae (Coleoptera: Staphylinidae) in Uşak Province, Western Anatolia. Acta Biologica Turcica, 29 (2): 61-66.
- Özgen, I. & Anlaş, S.** 2010. A cow dung investigation on Staphylinidae (Coleoptera) with a new record from Turkey. Munis Entomology & Zoology, 5 (2): 642-645.
- Özgen, I. & Anlaş, S.** 2011. New and additional records of the subfamily Tachyporinae (Coleoptera, Staphylinidae) from Turkey, with observations on agricultural imortant of the genus *Tachyporus*. Turkish Journal of Entomology, 35 (2): 303-312.
- Özgen, I., Anlaş, S. & Eren, S.** 2010. Contribution to the knowledge of Staphylinidae (Coleoptera) fauna of cotton and pistachio fields in Southeastern Anatolia. Journal of Anatolian Natural Sciences, 1 (1): 20-26.
- Özgen, I., Khachikov, E. A., Örgel, S. & Altın, Ç.** 2016. Some additional notes on the genus *Philonthus* Stephens (Coleoptera: Staphylinidae: Staphylininae) in Turkey. Munis Entomology & Zoology, 11 (1): 263-267.
- Sert, O., Turan, Y., Şabanoglu, B., Anlaş, S. & Firat, S.** 2013. Faunistic, ecological and zoogeographical evaluations on the subfamily Paederinae (Coleoptera: Staphylinidae) in the Central Anatolian Region of Turkey. Turkish Journal of Entomology, 37 (4): 477-492.
- Sert, O., Turan, Y., Firat, S., Şabanoglu, B. & Kabalak, M.** 2014. Faunistic, ecological and zoogeographical assessments on some subfamilies of the family Staphylinidae (Coleoptera) in Ankara province. Hacettepe J. Biol. & Chem., 42 (4): 517-529.
- Sert, O., Turan, Y., Firat, S. & Şabanoglu, B.** 2015. Faunistic composition, ecological properties and zoogeographical composition of the subfamily Aleocharinae (Coleoptera: Staphylinidae) of the Central Anatolian Region of Turkey. Transactions of the American Entomological Society, 141 (1): 197-221.
- Solodovnikov, A., Yue Y., Tarasov, S. & Ren, D.** 2013. Extinct and extant rove beetles meet in the matrix: Early Cretaceous fossils shed light on the evolution of a hyperdiverse insect lineage (Coleoptera: Staphylinidae: Staphylininae). Cladistics, 29: 360-40.
- Tanyeri, R., Çevik, İ. E. & Tezcan, S.** 2017. An analysis on Carabidae, Tenebrionidae and Staphylinidae (Coleoptera) fauna in Aspat (Strobilos) ancient city and its territorium, Bodrum, Muğla, Turkey. Munis Entomology & Zoology, 12 (2): 570-577.
- Tezcan, S. & Anlaş, S.** 2009. Notes on the light trap collected rove beetles (Coleoptera: Staphylinidae) of the integrated cherry orchards of western Turkey. Turkish Journal of Entomology, 33: 3-11.