

ON THE BUPRESTIDAE (COLEOPTERA) SPECIES OF ALMOND ORCHARDS IN THE SOUTHEASTERN AND EASTERN ANATOLIA IN TURKEY

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ABSTRACT: The faunistic study on buprestids, conducted during 2002-2004 in the Southeastern and Eastern Anatolia Region in Turkey. In this study 17 Buprestid species, spread areas and abundance were determined in Almond orchards in Turkey. Those species were *Agrilus roscidus* Kiesenweter, *Anthaxia armeniaca* Obenberger, *Anthaxia lucens* Küster, *Anthaxia tractata* Abeille de Perin, *Aurigena lugubris longicollis* Kraatz, *Capnodis tenebricosa* (Oliver), *Capnodis carbonaria* (Klug), *Chalcophorella quadrioculata* (Redt.), *Chalcophorella stigmatica* (Schoenherr), *Chrysobothris affinis* (F.), *Chrysobothris samai* Curletti and Magnani, *Julodis armeniaca* Marseul, *Meliboeus heydeni* Abeille de Perin, *Perotis lugubris* Fabr. *Ptosima flavoguttata* (Illiger), *Sphenoptera (Tropeopeltis) anthaxoides* Reitter and *Sphenoptera (Tropeopeltis) tappesi* Marseul. In this study, *A. roscidus*, *A. armeniaca*, *A. lucens*, *A. tractata*, *A. lugubris longicollis*, *C. carbonaria*, *C. quadrioculata*, *C. affinis*, *C. samai*, *J. armeniaca*, *M. heydeni*, *P. flavoguttata*, *S. anthaxoides* and *S. tappesi* are presented here as a new record for the almond fauna in Turkey. Determined were high populations' density of *A. roscidus* in Diyarbakır, Mardin and Elazığ.

KEY WORDS: Almond, Buprestidae, new record, Turkey.

Almond culture is considered to be of great economic importance in Turkey. Approximately 13% of almond of Turkey is produced in Diyarbakır, Elazığ and Mardin Provinces (Anonymous, 1999), where are located Eastern and Southeastern Turkey.

Over recent years, improvements have been continually introduced into region, concerning both the varieties grown and the agricultural techniques, to guarantee a high quality and quantity of yield, according to the principles of integrated pest management.

Jewel beetles are likely one of the most easily recognizable families due to their striking colors. During the warmer months these beetles are often seen on the flowers of trees and shrubs. They are small to large beetles and range in size from 3 to 65 millimeters in length. They have an elongated body shape which tapers towards the abdomen and a short head, which fits closely into the broader thorax.

Larvae of the peach woodborer *Capnodis tenebrionis* L. and the almond woodborer *Capnodis carbonaria* Klug destroy the roots of both sapling and mature trees of cultivated stonefruits, *Prunus* spp. *C. tenebrionis* occurs widely in North Africa, southern and central Europe, and the Near East and around the Black and the Caspian Seas. Damage caused by *C. tenebrionis* has been reported mainly from southern European and Mediterranean areas (e.g., Garrido, 1984; Mahhou & Dannis, 1992; Tezcan, 1995; Ben-Yehuda et al., 2000). The distribution of *C. carbonaria* overlaps much of the natural distribution of almond *P. amygdalus* Batsch that ranges from Dalmatia to Asia Minor, the Near East, the Caucasus foothills, and the area between the Black and the Caspian Seas.

Economic losses due to *C. carbonaria* have been reported mainly from Israel and Egypt (Ben-Yehuda et al., 1997). Outside of the cultivated lands, both species are rare and seldom found on wild host plants. The species are responsible for the destruction of plantations of almond, apricot (*P. armeniaca* L.), cherry (*P. vulgaris* L.), nectarine and peach [*P. persica* (L.) Batsch], and plum (*P. domestica* L. and other plum species).

The aims of the study were: to determine buprestids species and abundances in Elazığ, Diyarbakır and Mardin Provinces in Turkey.

MATERIAL AND METHODS

This faunal study conducted during 2002-04, is based on the collection of more than 1329 specimen from different parts in Diyarbakır [Çermik (38°15'N, 39°45'E at altitude of about 710m.), Ergani (38°17'N, 39°45'E at altitude of about 1043m.)], Mardin [Akbağ (37°22'N, 40°39'E at altitude of about 970m.), Cevizpınarı (37°20'N, 40°46'E at altitude of about 853 m.), Ömerli (37°24'N, 40°56'E at altitude of about 1133m.) and Yeşilli (37°22'N, 40°51'E at altitude of about 1069m.)] and Eastern Anatolia Region in Elazığ [Center (38°39'N, 39°15'E at altitude of about 998m.), Gezin (38°29'N, 39°20'E at altitude of about 1256m.), Keban (38° 43'N, 53°53'E at altitude of about 1206m.) and Sivrice (38°28'N, 39°18'E at altitude of about 1280m.)] provinces (Fig. 1).

The sampling method was based on the techniques usually applied in orchards, namely knocking the adults out the trees by the frapping method. Trees were selected for sampling inspected once week between March and October. No chemical was applied during this study.

RESULTS AND DISCUSSION

In this study 17 buprestid species, spread areas and abundance were determined in Almond orchard in Turkey. In this study, *Agrilus roscidus*, *Anthaxia armeniaca*, *Anthaxia lucens*, *Anthaxia tractata*, *Aurigena lugubris longicollis*, *Capnodis carbonaria*, *Chalcophorella quadrioculata*, *Chrysobothris affinis*, *C. samai*, *Julodis armeniaca*, *Meliboeus heydeni*, *Perotis lugubris*, *Ptosima flavoguttata*, *Sphenoptera (Tropeopeltis) anthaxoides* and *S. (Tropeopeltis) tappesi* are presented here as a new record for the almond fauna in Turkey. Too many species are uncounted in Diyarbakır with 12 kinds. Elazığ and Mardin had followed this and each of them has 11 species.

A. roscidus's population density was determined almond orchard in Diyarbakır it's followed according to circumstances by *A. armeniaca*, *C. carbonaria*, *A. lucens* and *A. longicollis*. The other species' population densities were determined lower than 1 %. *A. roscidus*'s population density was determined almond orchard in Elazığ that it's followed by *C. carbonaria*. The other species' population densities were determined lower than 1 %. *A. roscidus*'s population density was determined almond orchard in Mardin that it's followed according to circumstances by *A. armeniaca*, *A. lucens*, *A. longicollis* and *C. carbonaria*. The other species' population densities were determined lower than 1 %. Following is the presentation in alphabetical order. In this study 17 Buprestid species, spread areas and abundance were determined in Almond orchards in Turkey (Table 1).

Agrilus roscidus Kiesenweter, 1857

This species was recorded from Diyarbakır, Elazığ and Mardin. It was active from early of June till end of August. The population recorded was very high. It constituted 64 % of the material. *A. roscidus* is a monophagous and oligophagous species are being described

(Królik & Niehuis, 2003). These known so far can be grouped as follows: species living on fruit trees, shrubs and herbaceous plants of the family Rosaceae (*Prunus*, *Pyrus*, *Malus*, *Crataegus*, *Rubus*, *Rosa* etc.). **General Distribution:** Albania, Austria, Belarus, Bosnia and Herzegovina, Bulgaria, Corsica, Croatia, Cyprus, Czech Republic, European Turkey, Germany, Hungary, Macedonia, Malta, Moldova, Republic of, Romania, Russia South, Sardinia, Sicily, Slovakia, Slovenia, Spanish mainland, Switzerland, Ukraine, Near East Asian: Turkey, Caucasian Russian republics, Georgia, Armenia, Azerbaidjan, Lebanon, Syria, Israel, Jordan, Sinai Peninsula (Egypt), Arabian peninsula, Iran, Iraq (Anonymous, 2004). **Distribution in Turkey:** İzmir (Tezcan, 1995), All Turkey (Lodos & Tezcan, 1995), Incl. Imroz I. - Gökçeada, but not those in the Sea of Marmara (Anonymous, 2004).

***Anthaxia armeniaca* Obenberger, 1929**

This species was recorded from Diyarbakır, Elazığ and Mardin. The population recorded was high. It constituted 16.40 % of the material. It was active from middle of April till early of August. *A. armeniaca* is a monophagous species. This species living on pistachio trees ((Lodos & Tezcan, 1995; Yanık et. al., 2001). **General Distribution:** Iran, Iraq, Turkey ((Lodos & Tezcan, 1995). **Distribution in Turkey:** Pistachio tree in Adıyaman, Mardin, Diyarbakır, Siirt and Şanlıurfa (Lodos & Tezcan, 1995), Pistachio tree in Şanlıurfa (Yanık & Yücel, 2001).

***Anthaxia lucens* Küster, 1852**

The specimens were collected in Diyarbakır, Elazığ and Mardin during April and August. It was a common species were constituted 4.4 % of the material. **General Distribution:** Albania, Croatia, Crete, European Turkey, Germany, Hungary, Macedonia, Malta, Sicily, Slovenia, East Palaearctic, Yugoslavia (Anonymous, 2008). **Distribution in Turkey:** Incl. Imroz I. - Gökçeada, but not those in the Sea of Marmara (Anonymous, 2004).

***Anthaxia tractata* Abeille de Perrin, 1901**

This was found only in May from Diyarbakır. The population recorded was very low. It constituted 0.45 % of the material. **General Distribution:** Albania, Croatia, European Turkey, Germany, Hungary, Macedonia, Malta, Sicily, East Palaearctic (Anonymous, 2004). **Distribution in Turkey:** Unknown.

***Aurigena lugubris longicollis* Kraatz, 1881**

This was found during April and September in Diyarbakır, Elazığ and Mardin. It was a common species were constituted 3 % of the material. **General Distribution:** Albania, Austria, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, European Turkey, Germany, Hungary, Macedonia, Romania, Russia, Slovakia, Slovenia, Ukraine, Yugoslavia, East Palaearctic (Anonymous, 2004). **Distribution in Turkey:** In Turkey, except for The Black Sea Region and Eastern Anatolia Region, although existed more or less, nearly everywhere it is encountered mainly in surroundings of İçel and Adana (Lodos & Tezcan, 1995).

***Capnodis carbonaria* (Klug, 1829)**

This species was recorded from Diyarbakır, Elazığ and Mardin. It was active from early of April till end of September. The population recorded was high. It constituted 5.79 % of the material. **General Distribution:** Albania, Austria, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, European Turkey, Germany, Hungary, Macedonia, Romania, Russia, Slovakia, Slovenia, Ukraine, Yugoslavia, East Palaearctic (Anonymous, 2004). **Distribution in Turkey:** Except for The Northern Black Sea Region and Eastern Anatolia Region, it is more or less encountered nearly on all sides of Turkey (Lodos & Tezcan, 1995), İzmir (Tezcan, 1995).

***Capnodis tenebricosa* (Oliver, 1790)**

This species was recorded from Diyarbakır and Mardin. This was during end of May till August. The population recorded was low in Diyarbakır and Mardin. **General Distribution:** Albania, Bosnia and Herzegovina, Bulgaria, Corsica, Croatia, European Turkey, French mainland, Greek mainland, Italian mainland, Macedonia, Moldova,

Romania, Russia, Sardinia, Slovenia, Ukraine, Yugoslavia (Anonymous, 2004). **Distribution in Turkey:** Southeastern Anatolia (Maçan, 1986), All Turkey (Lodos & Tezcan, 1995), İzmir (Tezcan, 1995).

***Chalcophorella quadrioculata* (Redtenbacher, 1843)**

Two specimens were collected in Çermik II (18.07.2003) and Sivrice (09.05.2003). The population recorded was very low. It was a common species were constituted 0.15 % of the material. **General Distribution:** Syria, Turkey (Anonymous, 2008). **Distribution in Turkey:** Turkey, Akdeniz kıyısı, Hatay, Akbes, Adıyaman, (Anonymous, 2004).

***Chalcophorella stigmatica* (Schoenherr, 1817)**

Two specimens were found only in May (Ömerli 12.05.2003) and June (Cevizpınarı 03.06.2003) from Mardin. The population recorded was very low. It constituted 0.15 % of the material. **General Distribution:** Albania, Bosnia and Herzegovina, Bulgaria, European Turkey, Greek mainland, North Aegean Is., Near East Asian: Turkey, Caucasian Russian republics, Georgia, Armenia, Azerbaidjan, Lebanon, Syria, Israel, Jordan, Sinai Peninsula (Egypt), Arabian peninsula, Iran, Iraq (Anonymous, 2004). **Distribution in Turkey:** South provinces (Nizamhoğlu, 1961), Southeastern Anatolia (Maçan, 1986), İzmir (Tezcan, 1995).

***Chrysobothris affinis* (Fabricius, 1794)**

This species was recorded from Diyarbakır and Mardin. This was during in May till August. The population recorded was very low in Diyarbakır and Mardin. **General Distribution:** Albania, Austria, Belarus, Bosnia and Herzegovina, Bulgaria, Corsica, Croatia, Czech Republic, European Turkey, French mainland, Germany, Greek mainland, Hungary, Macedonia, Malta, Moldova, Norwegian mainland, Republic of, Poland, Portuguese mainland, Romania, Russia, Sardinia, Sicily, Slovakia, Slovenia, Sweden, Switzerland, Ukraine, Yugoslavia, East Palaearctic (Anonymous, 2004). **Distribution in Turkey:** Thrace Region, İstanbul, Kocaeli, İzmir, Muğla, Ankara (Lodos & Tezcan, 1995), İzmir (Tezcan, 1995).

***Chrysobothris samai* Curletti and Magnani, 1998**

Two specimens were found only in Mardin (Akbağ 12.06.2003). **General Distribution:** Turkey (Bolu et al., 2005). **Distribution in Turkey:** Mardin (Bolu et al., 2005).

***Julodis armeniaca* Marseul, 1865**

Three specimens were found only in Diyarbakır (Çermik I 17.06.2003). **General Distribution:** Cyprus, Near East Asian: Turkey, Caucasian Russian republics, Armenia, Azerbaidjan, Lebanon, Syria, Israel, Jordan, Sinai Peninsula (Egypt), Arabian peninsula, Iran, Iraq (Anonymous, 2004). **Distribution in Turkey:** Unknown.

***Meliboeus heydeni* Abeille de Perrin, 1897**

Three specimens were found only in Diyarbakır (Çermik II 03.07.2002. 1, 17.06.2003. 2). **General Distribution:** Israel (Chikatunov, et al., 1999), Turkey (Bolu et al., 2005). **Distribution in Turkey:** Diyarbakır (Bolu et al., 2005).

***Perotis lugubris* (Fabricius, 1777)**

This species was recorded from Diyarbakır and Mardin. This was during in April till August. The population recorded was very low in Diyarbakır and Mardin. **General Distribution:** Albania, Austria, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, European Turkey, Germany, Greek mainland, Italian mainland, Macedonia, Romania, Russia, Slovakia, Slovenia, Ukraine, Yugoslavia, East Palaearctic (Anonymous, 2004). **Distribution in Turkey:** İzmit, Ankara, Adana (Nizamhoğlu, 1961), Southeastern Anatolia (Maçan, 1986), Adana, İçel (Lodos & Tezcan, 1995).

***Ptosima flavoguttata* (Illiger, 1803)**

This species was recorded from Elazığ and Mardin. This was during in May till July. **General Distribution:** Albania, Bosnia and Herzegovina, Bulgaria, Corsica, Croatia,

Cyprus, Czech Republic, European Turkey, French mainland, Greek mainland, Hungary, Italian mainland, Macedonia, Malta, Portuguese mainland, Romania, Russia, Sardinia, Sicily, Slovakia, Slovenia, Spanish mainland, Switzerland, Ukraine, Yugoslavia, Near East Asian: Turkey, Caucasian Russian republics, Armenia, Azerbaijan, Lebanon, Syria, Israel, Jordan, Sinai Peninsula (Egypt), Arabian peninsula, Iran, Iraq, North Africa (Anonymous, 2004). **Distribution in Turkey:** İzmir (Tezcan, 1995), All Turkey (Lodos & Tezcan, 1995).

***Sphenoptera (Tropheopeltis) anthaxoides* Reitter, 1895**

This species was recorded from Diyarbakır, Elazığ and Mardin. The population recorded was very low. It constituted 0.15 % of the material. It was active from middle of April till early of August. **General Distribution:** Albania, Crete, Cyprus, Greek mainland, Macedonia, Near East Asian, North Africa (Anonymous, 2004). **Distribution in Turkey:** Unknown.

***Sphenoptera (Tropheopeltis) tappesi* Marseul, 1865**

This species was recorded from Diyarbakır, Elazığ and Mardin. The population recorded was low. It constituted 1.74 % of the material. It was active from April till early of September. **General Distribution:** Greece, Cyprus, Syria, Iraq and Turkey (Obenberger, 1930; Derwesh, 1965; Georghiou, 1977; Lodos & Tezcan, 1995). Near East Asian: Turkey, Caucasian Russian republics, Armenia, Azerbaijan, Lebanon, Syria, Israel, Jordan, Sinai Peninsula (Egypt), Arabian Peninsula, Iran, Iraq, North Africa (Anonymous, 2004). **Distribution in Turkey:** Aegian region (Lodos & Tezcan, 1995), Diyarbakır (Bolu, 2008).

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Figure 1. Survey areas Elazığ (1), Diyarbakır (2) and Mardin (3).

Table 1. Buprestidae species, spread areas and abundance of almond orchard in Turkey.

Species	Diyarbakır				Elazığ				Mardin				Total	%
	Çermik I	Ergani I	Çermik II	Ergani II	Gezin	Center	Keban	Sivrice	Akbağ	Cevizpınarı	Ömerli	Yeşilli		
<i>A. roscidus</i>	25	39	96	25	20	10	5	13	510	18	81	9	851	64.0
<i>A. armeniaca</i>	7	6	31	3	-	5	-	17	90	25	33	1	216	16.4
<i>A. lucens</i>	2	5	8	-	3	-	-	4	8	7	7	15	59	4.43
<i>A. tractata</i>	-	-	4	2	-	-	-	-	-	-	-	-	6	0.45
<i>A. longicollis</i>	7	-	4	-	2	-	4	5	5	13	-	-	40	2.91
<i>C. carbonaria</i>	6	11	4	-	4	5	1	8	28	4	-	6	77	5.79
<i>C. tenebriosa</i>	5	-	6	-	-	-	-	-	4	-	-	-	15	1.12
<i>C. quadriculata</i>	-	-	1	-	-	-	-	1	-	-	-	-	2	0.15
<i>C. stigmatica</i>	-	-	-	-	-	-	-	-	-	2	-	-	2	0.15
<i>C. affinis</i>	-	1	-	-	-	-	-	-	-	2	-	1	4	0.30
<i>C. samai</i>	-	-	-	-	-	-	-	-	2	-	-	-	2	0.15
<i>J. armeniaca</i>	-	3	-	-	-	-	-	-	-	-	-	-	3	0.23
<i>M. heydeni</i>	-	-	3	-	-	-	-	-	-	-	-	-	3	0.23
<i>P. luqubris</i>	3	-	2	-	-	-	-	-	1	3	-	2	11	0.82
<i>P. flavoguttata</i>	-	-	-	-	-	-	-	2	-	2	3	5	12	0.87
<i>S. anthaxioides</i>	-	-	-	1	-	-	-	1	-	1	1	-	4	0.30
<i>S. tappesi</i>	-	-	2	-	-	-	-	12	2	2	-	5	23	1.74
Total	55	65	161	31	29	20	10	63	650	79	125	44	1332	100