

ABUNDANCE NEUROPTERA SPECIES RECORDED IN PISTACHIO AND CHERRY ORCHARDS OF SOUTHEASTERN ANATOLIA OF TURKEY

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ABSTRACT: This study which is entitled the Neuroptera fauna of Pistachio and Cherry Orchards in Southeastern Anatolia Region was carried out during 2006–2009. Samples were taken from the orchards in Batman, Diyarbakır, Mardin and Siirt provinces. The samples were identified and listed. Recommendations were made on the species which can be prey of harmful insects for crops. In a total of 20 species of 15 genera and 4 families (Chrysopidae, Mantispidae, Myrmeleontidae and Nemopteridae) were collected from different localities of the southeastern region of Turkey. *Acanthaclisis mesopotamica* Hölzel, 1972 is new record Anatolian fauna.

KEY WORDS: Neuroptera, Pistachio, Cherry Orchards, fauna, Turkey.

Neuroptera is one of the oldest insect orders. The order is with 6000 species distributed among 17 families, the order is relatively small. Its member occupy a wide variety of habitats and display an array of life styles (Anonymous, 2009). Also, Turkey Neuroptera fauna has 11 families, 195 species and 6 subspecies now (Berber & Canbulat, 2009). In this region, the abundance of species of the insect order Neuroptera was studied in the traditionally cultivated landscape of southeastern Turkey. Result of study was determined 29 species, 10 genera, 5 families of the order (Satar & Özbay, 2004). But, this was only faunistic study. In this study, two important cultivated plants in general for the region in recent years, the cherry and pistachio orchards are considered the fauna of Neuroptera.

The specimens were collected in different localities of the southeastern region of Turkey (Fig. 1) between 2006 and 2009 by use light traps. Trees selected for sampling were inspected once week between March and November. Generally eudominant species were of the family Chyrosopidae and Myrmeleontidae.

MATERIALS AND METHODS

Several sampling methods were used for collecting Neuroptera species, differing on the activity patterns of the different species. The species were captured individually using net trap during the morning period. One light trap on the ground was used at each area from the mid June to the mid September. A 20 watt Philips energy saver white day light bulb was used at each trap and traps were cleared at two weeks interval. The collected material was deposited in Plant Protection, Agriculture Faculty laboratory of Dicle University.

RESULTS

In a total of 20 species of 15 genera and 4 families (Chrysopidae, Mantispidae, Myrmeleontidae and Nemopteridae) were collected from different localities of the

southeastern region of Turkey. *Acanthaclisis mesopotamica* Hölzel, 1972 is new record Anatolian fauna (Fig 2).

In this study, list of species is below.

Family Chrysopidae Schneider, 1851

Chrysoperla carnea Stephens, 1836 *sensu lato*

Host Plant Arae: Cherry

Material examined: 2♀, 5♂, 13.06.2007, Batman-Beşiri; 2♀, 1♂, 20.6.2007, Diyarbakır-Kocaköy; 3♀, 2♂, 16.08.2009, Mardin-Yeşilli; 2♀, 1♂, 09.06.2009. **Totally:** 18 exs.

Distribution in Turkey: Konya (Esben-Petersen, 1933); Turkey (locality unknown) (Hölzel, 1967a); Niğde, Nevşehir (Tuatay et al., 1972); Antalya, Van (Gepp, 1974); Adana (Popov, 1977); Adana, Adıyaman, Ağrı, Amasya, Mersin, Tokat, Trabzon, Şanlıurfa, Van, Samsun, Siirt, Şırnak, Ankara, Artvin, Aydın, Bitlis, Burdur, Çanakkale, Diyarbakır, Erzurum, Gaziantep, Hakkâri, İstanbul, İzmir, Kahramanmaraş, Malatya, Mardin (Şengonca, 1980a); Aydın, İstanbul, Konya (Monserrat & Hölzel, 1987); Ankara (Kıyak & Ozdikmen, 1993); Çanakkale (Canbulat & Kıyak, 2000); Adana (Arı & Kıyak, 2000); Kahramanmaraş (Bahadroğlu & Daymaz, 2001); Kayseri (Canbulat, 2002); Edirne (Onar & Aktaş, 2002); Adıyaman, Şanlıurfa, Batman, Diyarbakır, Mardin, Şırnak, Siirt (Satar & Özbay, 2004); Kars, Arhadan, Iğdır (Arı, 2004); Kırşehir (Canbulat & Özseraça, 2004); Elazığ (Özbay et al., 2005); Antalya, Burdur, Isparta, Denizli, Aydın, Muğla (Canbulat & Kıyak, 2005b).

Chrysopa dubitans McLachlan, 1887

Host Plant Area: Cherry

Material examined: : 1♀, 2♂, 19.09.2006, Mardin-Yeşilli; 2♀, 2♂, 02.07.2006, Mardin-Savur. **Totally:** 7 exs.

Distribution in Turkey: Mersin (Hölzel, 1965, 1967a); Adana (Popov, 1977); İzmir (Şengonca, 1979); Mersin, Antalya, Denizli, Hatay, İzmir, Mardin, Siirt (Şengonca, 1980a, 1981a); Çanakkale (Canbulat & Kıyak, 2000); Kahramanmaraş (Bahadroğlu & Daymaz, 2001); Mardin (Satar & Özbay, 2004a).

Dichochrysa flavifrons flavifrons Brauer, 1850

Host Plant Area : Cherry

Material examined: 1♀, 2♂, 16.08.2006, Mardin-Yeşilli; 2♀, 1♂, 19.09.2006, Mardin-Savur; 3♀, 2♂, 08.06.2009, Mardin-Sultan köy. **Totally:** 11 exs.

Distribution in Turkey: Middle Anatolia (locality unknown) (Aspöck & Aspöck, 1969a); Adana, Mardin, Mersin, Ankara (Şengonca, 1980a, 1981a); Çanakkale (Canbulat & Kıyak, 2000); Adana (Arı & Kıyak, 2000); Kahramanmaraş (Bahadroğlu & Daymaz, 2001); Kayseri (Canbulat, 2002); Edirne (Onar & Aktaş, 2002); Adıyaman, Diyarbakır, Mardin, Şırnak, Siirt (Satar & Özbay, 2004a); Kars, Arhadan (Arı, 2004); Elazığ (Özbay et al., 2005); Antalya, Burdur, Isparta, Denizli, Aydın, Muğla (Canbulat & Kıyak, 2005b).

Family Mantispidae Leach in Brewster, 1815

Mantispa scabricollis McLachlan, 1875

Host Plant Area: Cherry

Material examined: 1♂, 2♂ 01.07.2009, Mardin-Yeşilli.

Distribution in Turkey: İzmir, Mersin (Şengonca, 1979, 1980b); Aydın (Monserrat & Hölzel, 1987); Adana (Arı & Kıyak, 2000); Elazığ, Mardin (Satar & Özbay, 2004a); Arhadan, Kars (Arı, 2004); Antalya, Isparta, Aydın, Muğla (Canbulat & Kıyak, 2005b).

Family Myrmeleontidae Latreille, 1802

Neuroleon (Neuroleon) assimilis Navás, 1914

Host Plant Area: Cherry

Material examined: Mardin: Central, 19.VIII.2009, 2♀, 2♂, 17. IX. 2009, 1♀, **Totally:** 5 exs.

Host Plant Area: Pistachio

Material examined: Siirt: Central, 07.VIII. 2009, 1♀, Aydınlar, 02. VII. 2009, 1♀, 07.VII.2009, 1♀, 13. VIII, 2009, 4♀, 1♂, **Totally:** 8 exs.

Distribution in Turkey: İzmir (Şengonca, 1979); İstanbul (Monserrat & Hölzel, 1987); Mersin (Kacirek, 1998); Çanakkale (Canbulat & Kıyak, 2002a); Batman, Diyarbakır, Mardin (Satar & Özbay, 2004a); Arhadan, Iğdır (Arı, 2004); Antalya, Burdur, Isparta, Denizli, Muğla (Canbulat & Kıyak, 2005b).

Echthromyrmex sehittlerolmez Koçak & Kemal, 2008

Host Plant Area: Pistachio

Material examined: Siirt: Aydınlar, 01.VII.2009, 1♀, 30.IX.2009, 2♀, 07.VIII.2009, 10♀, **Totally:** 13 exs.

Distribution in Turkey: Hakkari (Koçak & Koçak 2008); Diyarbakır (Koçak & Koçak, 2008).

Mymeleon inconspicuus Rambur, 1842

Host Plant Area: Pistachio

Material examined: Siirt: Merkez, 01.VII.2009, 1♀, 30.VII.2009, 1♂, **Totally:** 2 exs.

Distribution in Turkey: Antalya (Gepp, 1974; Canbulat & Kıyak, 2005b); Kars (Arı, 2004); Adıyaman, Diyarbakır (Satar & Özbay, 2004a); Elazığ (Özbay et al., 2005).

Palpares libelluloides Linnaeus, 1764

Host Plant Area: Pistachio

Material examined: Mardin: 06.VI.2007, 1♂, Siirt, 23.VIII.2009, 2♀, **Totally:** 3 exs.

Distribution in Turkey: Konya (Esbén-Petersen, 1933); Antalya (Gepp, 1974); Ankara, Adana (Popov, 1977); Mersin, Adana, İzmir, İstanbul, Muğla, Ankara (Şengonca, 1979); Adana, Mersin, Şanlıurfa, Kahramanmaraş, Burdur (Kacirek, 1998); Kayseri (Canbulat, 2002); Çanakkale (Canbulat & Kıyak, 2002a); Adıyaman, Şanlıurfa, Batman, Diyarbakır, Siirt (Satar & Özbay, 2004a); Iğdır (Arı, 2004); Kırşehir (Canbulat & Özsaraç, 2004); Elazığ (Özbay et al., 2005); Antalya, Burdur, Isparta, Denizli, Aydın, Muğla (Canbulat & Kıyak, 2005b).

Solter ledereri Navás, 1912

Host Plant Area: Cherry, Pistachio

Material examined: Mardin: Midyat: 24.V.2006, 2♀, Ömerli, 19. VIII. 2009, 3♀, 17.IX.2009, 1♀, Siirt: Merkez, 13. IX. 2008, 2♀, 1♂, **Totally:** 9 exs.

Distribution in Turkey: Denizli (Monserrat & Hölzel, 1987); Adıyaman, Diyarbakır, Mardin (Satar & Özbay, 2004a); Iğdır (Arı, 2004); Antalya (Canbulat & Kıyak, 2005b).

Acanthaclisis mesopotamica Hölzel, 1972

Host Plant Area: Pistachio

Material examined: Siirt: Aydınlar, 25.VI.2009, 2♀. **Totally:** 2 exs.

Distribution in World: Saudi Arabia, Iraq (Hölzel, 1982). This species is new record for Turkish fauna.

Distoleon kabulensis Hölzel, 1972

Host Plant Area: Pistachio

Material examined: Siirt: Aydınlar, 25.VI.2009, 2♀. **Totally:** 2 exs.

Distribution in Turkey: Elazığ (Hölzel, 1972a); Kayseri (Canbulat, 2007). Remarks: *Distoleon kabulensis* Hölzel, 1972 were previously recorded from by Hölzel (1972a) in the part of type series from Elazığ.

Distoleon tetragrammicus Fabricius, 1798

Host Plant Area: Cherry

Material examined: 1♀, 1♂, 10.05.2008, Diyarbakır-Merkez, 700m; 1♂, 25.05.2008, Diyarbakır-Kulp, 1200m; 2♀, 1♂, 25.05.2008, Diyarbakır-Eski Lice; 1♀, 15.09.2008, Mardin-Merkez; 1♀, 2♂, 13.06.2008, Mardin-Yeşilli; 2♀, 1♂, 08.06.2009, **Totally:** 13 exs.

Distribution in Turkey: Konya (Esbén-Petersen, 1933); Mersin, Adana, İzmir, Aydın (Şengonca, 1979); Adana (Arı & Kıyak, 2000); Mersin, Hatay (Kacirek, 1998); Kayseri

(Canbulat, 2002); Çanakkale (Canbulat & Kıyak, 2002a); Diyarbakır, Şırnak (Satar & Özbay, 2004a); Arhadan (Ari, 2004); Antalya, Burdur, Isparta, Denizli, Aydın, Muğla (Canbulat & Kıyak, 2005b).

Cueta lineosa Rambur, 1842

Host Plant Area: Cheery

Material examined: Mardin: Ömerli, 19. VIII. 2009, 3♀, 2♂, 17. IX. 2009, 2♀, 2♂.

Totally: 9 exs.

Distribution in Turkey: Malatya (Hölzel, 1969); Turkey (locality unknown) (Hölzel, 1972a); Antalya (Gepp, 1974); Denizli (Monserrat & Hölzel, 1987); Mersin, Antalya (Şengonca, 1979); Mersin (Aspöck et al., 1980); Elazığ (Özbay et al., 2005); Adıyaman, Diyarbakır (Satar & Özbay, 2004a); Kırşehir (Canbulat & Özsaraç, 2004); Kayseri (Canbulat, 2002); Antalya, Denizli, Aydın (Canbulat & Kıyak, 2005b).

Neuroleon (Neuroleon) microstenus McLachlan, 1898

Host Plant Area: Cherry

Material examined: Mardin: Ömerli, 19.VIII.2009, 7♀, 2♂. **Totally:** 9 exs.

Distribution in Turkey: Nevşehir (Gepp, 1974); Ankara (Hölzel, 1972a); Adana (Şengonca, 1979); Çanakkale (Canbulat & Kıyak, 2002a); Diyarbakır, Mardin (Satar & Özbay, 2004a); Iğdır (Ari, 2004).

Myrmecaelurus trigrammus Pallas, 1771

Host Plant Area: Cherry

Material examined: Mardin: Ömerli, 19. VIII.2009, 2♀, 1♂. **Totally:** 3 exs.

Distribution in Turkey: Antalya (Schneider, 1845); Konya (Esben-Petersen, 1933); Konya, Van, Eskişehir, Ankara (Hölzel, 1972a); Edirne, Ankara, Adana (Popov, 1977); Adana, Mersin, Antalya, Aydın, İzmir (Şengonca, 1979); Ankara, Antalya, İstanbul, Aydın (Monserrat & Hölzel, 1987); Hatay, Mersin, Adana, Denizli, Aydın, Burdur (Kacirek, 1998); Adana (Ari & Kıyak, 2000); Kayseri (Canbulat, 2002); Çanakkale (Canbulat & Kıyak, 2002a); Kırşehir (Canbulat & Özsaraç, 2004); Kars, Arhadan, Iğdır (Ari, 2004); Batman, Diyarbakır, Mardin, Şırnak (Satar & Özbay, 2004a); Elazığ (Özbay et al., 2005); Antalya, Burdur, Isparta, Denizli, Aydın, Muğla (Canbulat & Kıyak, 2005b).

Neuroleon (Ganussa) tenellus Klug, 1834

Host Plant Area: Cherry

Material examined: Mardin (Ömerli), 19.VIII.2009, 2♀. **Totally:** 2 exs.

Distribution in Turkey: Adana, Siirt (Şengonca, 1979); Mersin (Aspöck et al., 1980); Antalya (Monserrat & Hölzel, 1987); Adana (Kacirek, 1998); Kayseri (Canbulat, 2002); Batman, Diyarbakır, Mardin (Satar & Özbay, 2004a) Antalya, Aydın, Muğla (Canbulat & Kıyak, 2005b).

Family: Nemopteridae Burmeister, 1839

Dielocroce ephemera Gerstaecker, [1894]

Host Plant Area: Cherry

Material examined: Mardin: Savur, 19. VIII. 2009, 7♀, 5♂, **Totally:** 12 exs.

Distribution in Turkey: Mardin (Gerstaecker, 1894; Şengonca, 1981b); Batman (Satar et al., 2004).

Lertha extensa Olivier, 1811

Host Plant Area: Cherry

Material examined: 5 ♀, 7 ♂, 9.6.2006, Diyarbakır; 3 ♀, 2 ♀, 13.6.2006, Lice, Diyarbakır prov., 1100 m; 4 ♀, 3 ♂, 14.6.2007, Nusaybin, Mardin.; 5 ♀, 11 ♂, 19.6.2007, Kozluk, Siirt prov., 5 ♀, 3 ♂, 19.6.2007, Eruh, Siirt.

Distribution in Turkey: Şanlıurfa, Hakkari (Şengonca, 1979, 1981b); Hatay (Tjeder, 1970); Kahramanmaraş, Malatya (Hölzel, 1968); Şanlıurfa (Kacirek, 1998); Van (Koçak & Kemal, 2002); Diyarbakır, Mardin, Siirt (Satar & Özbay, 2004 b); Iğdır, Kars (Ari, 2004).

Lertha sheppardi Kirby, 1904**Host Plant Area:** Cherry**Material examined:** 1 ♀, 7 ♂, 17.6.2009, Bismil, Diyarbakır. 10 ♀, 7 ♂, 9.6.2009, Yeşilli, Mardin.**Distribution in Turkey:** Amanos mountains (Navás, 1912; Hölzel, 1968); Denizli (Şengonca, 1979); Mersin (Şengonca, 1981b); Diyarbakır, Şanlıurfa (Satar & Özbay, 2004 b).**DISCUSSION**

As result of this study 20 species spread areas and abundance belonging to 4 families in neuropteran order was determined. 18 insects species which were determined in three administrative provinces and on only a culture plant are very important for insects potential in pistachio and cherry areas with this study. This study is very important to be a base to integred pest management and biological control studies which will be made in the future.

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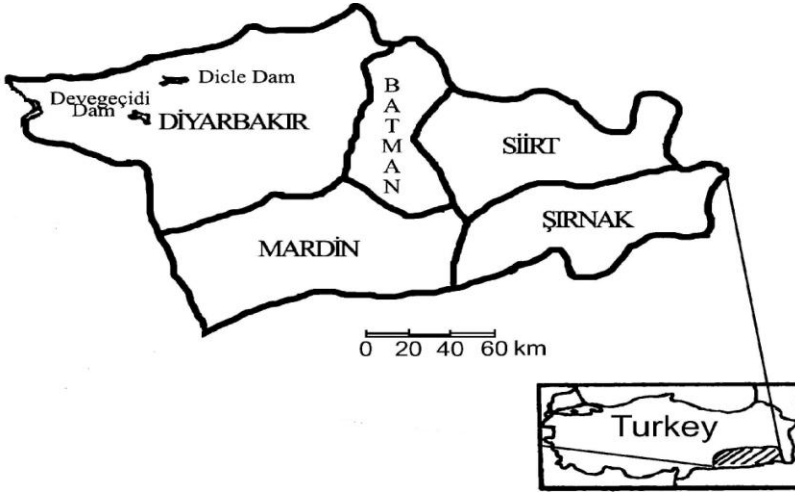


Figure 1. The collecting sites.



Figure 2. The adult of *Acanthaclisis mesopotamica* Hölzel, 1972.