

Notes on the Chrysopidae (Neuroptera) Fauna of Ardahan, Iğdır and Kars Provinces of Turkey

İsmail ARI^{1*}, Metin AKTAŞ², Suat KIYAK²

¹Kafkas University, Faculty of Science and Letters, Biology Department, 36100 Kars - TURKEY

²Gazi University, Faculty of Science and Letters, Biology Department, 06500 Teknikokullar, Ankara – TURKEY

Received: 05.08.2005

Abstract: This study was based on 558 specimens belonging to 23 species of 10 genera of Chrysopidae of the order Neuroptera. These specimens were collected from Ardahan, Iğdır and Kars provinces between 2001 and 2003. Among the species, *Dichochrysa ventralis* Curtis, 1834 is a new record for the Turkish Neuroptera fauna. The distribution of each species, worldwide and in Turkey, is also presented.

Key Words: Neuroptera, Chrysopidae, fauna, Turkey

Türkiye'nin Ardahan, Iğdır ve Kars İlleri Chrysopidae (Neuroptera) Faunası Üzerine Notlar

Özet: Bu çalışma, Neuroptera takımı Chrysopidae familyasının 10 cins ve 23 türüne ait 558 örneğe dayanmaktadır ve bu örnekler 2001 - 2003 yılları arasında Ardahan, Iğdır ve Kars illerinden toplanmıştır. Türler arasından *Dichochrysa ventralis* Curtis 1834 Türkiye Neuroptera faunası için yeni kayıttır. Herbir türün Türkiye ve dünyadaki dağılımı da verilmiştir.

Anahtar Sözcükler: Neuroptera, Chrysopidae, fauna, Türkiye

Introduction

The Chrysopidae is one of the largest and economically most important families of the Neuroptera. The family includes over 1200 currently recognised species and subspecies that are divided between 86 genera and subgenera. The larvae of all species and adults of a few genera are predaceous and most feed on aphids, coccids and other soft-bodied insects they encounter on foliage. For this reason, some species have been reared and successfully used for the biological control of agricultural pests (Brooks and Barnard, 1990).

The Chrysopidae fauna of Turkey has not yet been completed and requires further detailed study. To reach this goal, regional field studies should be carried out in every part of Turkey, yet have hitherto been conducted only in the western parts of the country; the eastern parts of Turkey have rarely been studied (Hölzel, 1967a, 1967b; Gepp, 1974; Şengonca, 1979, 1980, 1981; Aspöck et al., 1980, 2001).

The north-east region of Turkey was chosen for the present study of the Neuroptera fauna and to the best of our knowledge there are no previous studies of the Chrysopidae fauna in this region. The study area consists of various ecosystems, such as forest, steppe vegetation, culture plants and marshes. Mediterranean and terrestrial climate prevails in the area of study. The topographic structure of the region is quite heterogeneous. The present study aimed to identify the Chrysopidae fauna of Ardahan, Iğdır and Kars provinces.

Materials and Methods

In total, 558 specimens were collected using a net trap and a light trap (a projector with white light) in Ardahan, Iğdır and Kars provinces between April and September of 2001-2003. After specimens were captured, they were killed in jars with ethyl acetate, kept in paper envelopes and brought to the laboratory. They were relaxed in boxes with water vapour and then spread

* E-mail: ismaila66@mynet.com.tr

out. Each specimen was examined and were then labelled and put in boxes as entomological museum materials, according to Borrer et al. (1992) and Kıyak (2000). Hölzel (1965, 1967b, 1978), Aspöck et al. (1980), Duelli (1996), and Şengonca (1980) were followed to identify the specimens. All the specimens are stored in the Zoological Museum of the Faculty of Science and Letters at Gazi University, Ankara, Turkey.

Results

Chrysopidae Schneider, 1851

Chrysopinae Schneider, 1851

Italochrysa italica (Rossi, 1970)

Materials examined: Iğdır (Karakoyunlu), 860 m, 29.8.2003, 1♀; (Aralık), 810 m, 1.9.2003, 1♂; (Küllük), 895 m, 2.9.2003, 1♂; (side of Iğdır-Ağrı road), 1070 m, 3.9.2003, 3♀♀, total: 6 specimens.

Distribution in Turkey: Adıyaman, Ankara, Çanakkale, İzmir, Kahramanmaraş, Konya and Mersin (Hölzel, 1967a; Kıyak and Özdikmen, 1993; Canbulat, 1998; Arı and Kıyak, 2000; Satar and Özbay, 2004; Canbulat and Kıyak, 2005).

General Distribution: Bulgaria, France, Iraq, Israel, Spain, Italy, Switzerland, Lebanon, Egypt, Portugal, Romania, Turkey and Greece (Brauer, 1876; Aspöck et al., 1980, 1996; Santas, 1984; Popov, 2002a).

Brinckochrysa amseli (Hölzel, 1967)

Material examined: Iğdır (Küllük), 895 m, 2.9.2003, 1♂, total: 1 specimen.

Distribution in Turkey: Adana (Şengonca, 1981).

General Distribution: Anatolia and Afghanistan (Hölzel, 1967a; Aspöck et al., 1980, 1996, 2001).

Chrysoperla carnea (Stephens, 1836)

Materials examined: Kars (Sarıkamış), 2025-2100 m, 10.7.2001, 7♀♀, 3♂♂; Selim (Cumhuriyet), 1775 m, 11.7.2001, 16♀♀, 7♂♂; (Kağızman), 1250-1300 m, 14.7.2001, 7♀♀, 4♂♂; (Arpaçay), 1775 m, 16.7.2001, 5♀♀; (Şahnalar), 1750-1800 m, 17.7.2001, 24♀♀, 11♂♂; (Susuz), 1750-1800 m, 23.7.2001, 18♀♀, 7♂♂; (Digor), 1640-1700 m, 24.7.2001, 1♀, 2♂♂; (Digor), 1515-1540 m, 30.6.2002, 2♂♂; (Digor), 1675-1725 m, 30.5.2002, 3♀♀, 2♂♂; (Dağpınarı), 2000-2020 m; 25.7.2001, 4♀♀, 1♂; Kağızman (Paslı), 1655-1685 m,

3.7.2002, 5♀♀, 1♂; Sarıkamış (Karakurt), 1560-1660 m, 24.7.2002, 4♀♀; Sarıkamış (Topyazı), 1940 m, 25.7.2002, 3♀♀, 1♂; Kağızman (Akçay), 1315 m, 10.8.2002, 1♀; Selim (Cumhuriyet), 1795 m, 17.8.2002, 3♀♀, 1♂; Sarıkamış (Mescitli), 1555-1730 m, 20.8.2002, 3♀♀, 4♂♂; Selim (Karahamza), 1855 m, 22.8.2002, 1♀; Ardahan (Çamlıçatak), 1860-1990 m, 28.7.2001, 2♂♂; (vicinity of Ardahan), 1810-1860 m, 29.7.2001, 6♀♀, 1♂; (Göle), 2040 m, 30.7.2001, 4♀♀, 1♂; (vicinity of Ardahan), 2005-2040 m, 1.8.2001, 3♀♀, 1♂; (Hanak), 1950-2100 m, 2.8.2001, 2♂♂; (Çıldır), 1950-2100 m, 4.8.2001, 9♀♀, 2♂♂; (Posof), 1520 m, 5.8.2001, 1♀, 1♂; (the bank of Posof Stream), 1380-1400 m, 6.8.2001, 2♀♀; Posof (Asmakonak), 1450 m, 7.8.2001, 1♀; (Ilgar Mountain), 1510-1860 m, 28.7.2002, 10♀♀, 2♂♂; Posof (Eminbey), 1450-1500 m, 30.7.2002, 7♀♀; Damal (Söğütören), 2155 m, 1.8.2002, 1♀; Çıldır (Beyrehatun), 1920 m, 6.8.2002, 1♂; Çıldır (Doğruyol), 2045 m, 7.8.2002, 1♀; Iğdır (Tuzluca), 1120-1140 m, 20.8.2001, 19♀♀, 1♂; (Aralık), 815 m, 17.8.2001, 7♀♀; Aralık (Yenidoğan), 1100 m, 25.5.2002, 2♀♀; (Tuzluca), 910 m, 27.5.2002, 2♂♂; (Tuzluca), 1100-1170 m, 28.5.2002, 2♀♀, 3♂♂; Tuzluca (Pernot), 1055-1100 m, 29.5.2002, 6♀♀, 7♂♂; (Aralık), 820 m, 23.6.2002, 6♀♀, 1♂; (Aralık), 815 m, 24.6.2002, 3♀♀, 3♂♂; (Tuzluca), 990-1005 m, 26.6.2002, 2♀♀, 2♂♂; Tuzluca (Gaziler), 1030-1075 m, 1.7.2002, 4♀♀, 3♂♂, total: 282 specimens.

Distribution in Turkey: Adana, Adıyaman, Ağrı, Amasya, Ankara, Antalya, Artvin, Aydın, Batman, Bitlis, Burdur, Çanakkale, Denizli, Diyarbakır, Edirne, Erzurum, Gaziantep, Hakkari, Isparta, İstanbul, İzmir, Kahramanmaraş, Kayseri, Kırşehir, Malatya, Mardin, Mersin, Muğla, Samsun, Siirt, Şanlıurfa, Şırnak, Tokat, Trabzon and Van (Şengonca, 1979, 1981; Monserrat and Hölzel, 1987; Kıyak and Özdikmen, 1993; Canbulat, 1998, 2002; Arı and Kıyak, 2000; Onar and Aktaş, 2002; Canbulat and Özaraç, 2004; Satar and Özbay, 2004; Canbulat and Kıyak, 2005).

General Distribution: Germany, America, Albania, Austria, Belgium, Bulgaria, Algeria, Czechoslovakia, Denmark, Morocco, Finland, France, Holland, England, Iran, Ireland, Israel, Sweden, Switzerland, Spain, Italy, Cyprus, Lebanon, Libya, Luxembourg, Hungary, Malta, Egypt, Norway, Poland, Portugal, Romania, Russia, Syria, Tunisia, Turkey, Yugoslavia and Greece (Brauer, 1876; Hölzel, 1966; Aspöck et al., 1980, 1996;

Alrouechdi, 1984; Santas, 1984; Dinkins et al., 1994; Paulin, 2002; Popov, 2002b).

Chrysopa dorsalis Burmeister, 1839

Materials examined: Ardahan (Çamlıçatak), 1900 m, 28.7.2001, 2♀♀; Göle (Karıncadüzü), 2005 m, 30.7.2001, 3♀♀, 1♂; (the side of Ardahan-Göle road), 1850-1900 m, 1.8.2001, 1♀, 2♂♂; (Hanak), 1950-2000 m, 2.8.2001, 3♀♀; Posof (Asmakonak), 1550-1600 m, 6.8.2001, 2♀♀, 2♂♂; Posof (Çamyazı), 1600-1650 m, 10.8.2001, 1♀, 2♂♂; (Göle, near Değirmenlidere), 1590 m, 21.7.2003, 1♀; (Çamlıçatak), 1865 m, 19.8.2003, 1♀; Göle (Budaklı), 2005 m, 4.8.2002, 1♀; Çıldır (Beyrehatun), 1900 m, 6.8.2002, 1♀; Kars (Sarıkamış), 2050-2100 m, 23.7.2002, 4♀♀, 3♂♂; Sarıkamış (Mescitli), 1615 m, 28.7.2002, 1♂; Sarıkamış (Mescitli), 1575-1700 m, 20.8.2002, 5♂♂, 3♀♀, total: 39 specimens.

Distribution in Turkey: Ankara and Mersin (Şengonca, 1981).

General Distribution: Austria, Germany, Belgium, Bulgaria, Czechoslovakia, Denmark, Finland, France, Georgia, Croatia, Holland, England, Spain, Israel, Switzerland, Italy, Liechtenstein, Luxembourg, Hungary, Norway, Poland, Romania, Russia, Slovenia, Turkey, Ukraine, Yugoslavia and Greece (Brauer, 1876; Aspöck et al., 1980, 1996, 2001; Popov, 2002b).

Chrysopa perla (Linnaeus, 1758)

Materials examined: Ardahan (Posof gendarmerie station), 1532 m, 5.8.2001, 1♀; Posof (Yeniköy), 1465 m, 6.8.2001, 1♀; Posof (Asmakonak), 1650 m, 8.8.2001, 1♂; Posof (Çamyazı), 1510-1890 m, 28.7.2002, 9♀♀, 4♂♂; Posof (Eminbey), 1440 m, 30.7.2002, 1♀; Göle (Budaklı), 2010 m, 4.8.2002, 1♀; (vicinity of Göle), 21.7.2003, 1♀, 1575 m, total: 19 specimens.

Distribution in Turkey: Ankara, İstanbul, Muğla and central and northern Anatolia (Schneider, 1845; Aspöck et al., 1980, 2001; Şengonca, 1981).

General Distribution: Germany, Austria, Belgium, White Russia, Bulgaria, Bosnia and Herzegovina, Czechoslovakia, Denmark, Armenia, Estonia, Finland, France, Georgia, Holland, Spain, England, Switzerland, Sweden, Italy, Japan, Caucasia, Kazakhstan, Kyrgyzstan, North Anatolia, Latvia, Luxembourg, Hungary, Malta, Mongolia, Norway, Poland, Romania, Russia, Siberia,

Slovenia, Ukraine, Yugoslavia and Greece (Brauer, 1876; Aspöck et al., 1980, 1996).

Chrysopa formosa Brauer, 1850

Materials examined: Kars (Kağızman-Değirmendere), 1370 m, 13.8.2002, 1♂; Ardahan (Göle, near Değirmenlidere), 1590 m, 21.7.2003, 1♀, 1♂, total: 3 specimens.

Distribution in Turkey: Adana, Ankara, Antalya, Burdur, Denizli, Isparta, İstanbul, İzmir, Kırşehir and Muğla (Şengonca, 1981; Arı and Kıyak, 2000; Canbulat and Öz Saraç, 2004; Canbulat and Kıyak, 2005).

General Distribution: Afghanistan, Albania, Germany, Austria, Azerbaijan, Bulgaria, Algeria, Czechoslovakia, Armenia, France, Morocco, Georgia, Croatia, Iran, Switzerland, Italy, Japan, Kazakhstan, North China, Korea, Latvia, Lebanon, Hungary, Malta, Mongolia, Moldova, Pakistan, Portugal, Poland, Romania, Russia, Siberia, Slovenia, Tunisia, Turkmenistan, Ukraine, Yugoslavia and Greece (Brauer, 1876; Aspöck et al., 1980, 1996, 2001; Santas, 1984).

Chrysopa astarte Hölzel, 1967

Materials examined: Kars (Sarıkamış), 2080 m, 23.7.2002, 1♂; (the bank of Kars Stream), 1760 m, 22.6.2002, 1♀, total: 2 specimens.

Distribution in Turkey: Anatolia (Hölzel, 1967a; Şengonca, 1979, 1981).

General Distribution: Afghanistan, Iran and Pakistan (Hölzel, 1967a; Aspöck et al., 2001).

Chrysopa curdica Hölzel, 1967

Materials examined: Kars (Kağızman-Akçay), 1185 m, 10.8.2002, 1♀, 1♂, total: 2 specimens.

Distribution in Turkey: Van (Hölzel, 1967b; Şengonca, 1979, 1981).

General Distribution: East Anatolia (Aspöck et al., 2001).

Chrysopa walkeri (McLachlan, 1893)

Materials examined: Ardahan (Posof), 1520 m, 6.8.2001, 1♀; (Göle, near Değirmenlidere), 1580 m, 3.8.2002, 1♂; (Göle, near Değirmenlidere), 1575-1605 m, 21.7.2003, 2♀♀, 1♀, total: 5 specimens.

Distribution in Turkey: East Anatolia and Antalya (Şengonca, 1979, 1981; Popov, 1990; Canbulat and Kıyak, 2005).

General Distribution: Germany, Austria, Bulgaria, Czechoslovakia, Armenia, France, Finland, Croatia, Spain, Switzerland, Cyprus, Caucasia, Kyrgyzstan, Lebanon, Hungary, Mongolia, Moldova, Uzbekistan, Romania, Slovenia, Turkey, Ukraine and Yugoslavia (Hölzel, 1967a; Aspöck et al., 1980, 2001).

Chrysopa abbreviata Curtis, 1834

Materials examined: Kars (Sarıkamış-Topyazi), 1950 m, 25.7.2002, 1♀, 1♂, total: 2 specimens.

Distribution in Turkey: Muğla-Patara (Schneider, 1845).

General Distribution: Germany, Albania, Austria, Belgium, White Russia, Bulgaria, Bosnia and Herzegovina, Czechoslovakia, Denmark, France, Finland, Croatia, Holland, England, Sweden, Switzerland, Ireland, Italy, Caucasia, Kazakhstan, Kyrgyzstan, Liechtenstein, Lithuania, Hungary, Latvia, Mongolia, Moldova, Norway, Poland, Romania, Russia, Slovenia, Tajikistan, Ukraine and Yugoslavia (Brauer, 1876; Aspöck et al., 1980, 1996, 2001; Makarkin, 1990).

Chrysopa pallens (Rambur, 1838)

Materials examined: Kars, 1760 m, 20.7.2001, 1♀; Ardahan (Posof), 1480 m, 7.8.2001, 1♂, total: 2 specimens.

Distribution in Turkey: Adana, Ankara, Antalya, Burdur, Denizli, Edirne, Isparta, İzmir, İstanbul, Kahramanmaraş, Mersin and Muğla (Onar and Aktaş, 2002; Canbulat and Kıyak, 2005)

General Distribution: Afghanistan, Germany, Anatolia, Albania, Austria, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Czechoslovakia, China, Denmark, Armenia, Morocco, Finland, France, Georgia, Croatia, Holland, Iraq, England, Iran, Spain, Israel, Sweden, Switzerland, Italy, Japan, Kazakhstan, Kyrgyzstan, Korea, Latvia, Libya, Lebanon, Luxembourg, Hungary, Malta, Mongolia, Moldova, Norway, Pakistan, Poland, Portugal, Romania, Russia, Slovakia, Slovenia, Syria, Taiwan, Tunisia, Turkmenistan, Tajikistan, Ukraine, Yugoslavia and Greece (Brauer, 1876; Hölzel, 1966; Aspöck et al., 1980, 2001; Santas, 1984).

Chrysotropia ciliata (Wesmael, 1841)

Materials examined: Iğdır (Karakoyunlu), 860 m, 29.8.2003, 1♂; (Küllük), 895 m, 2.9.2003, 3♀♀, 1♂; (side of Iğdır-Ağrı road), 1070 m, 3.9.2003, 2♀♀;

(Karakoyunlu), 860 m, 4.9.2003, 1♀, 1♂, total: 9 specimens.

Distribution in Turkey: Kahramanmaraş (Şengonca, 1981).

General Distribution: Germany, Austria, Belgium, Bulgaria, Czechoslovakia, Denmark, South France, Finland, Holland, England, Spain, Sweden, Switzerland, Italy, Japan, Korea, North Iran, Hungary, Norway, Poland, Romania and Yugoslavia (Aspöck et al., 1980, 1996, 2001).

Cunctochrysa albolineata (Killington, 1935)

Materials examined: Ardahan (Hanak), 1950 m, 2.8.2001, 1♂; Posof (Çamyazı), 1615 m, 28.7.2002, 1♀; Iğdır (Aralık-Yenidoğan), 970 m, 19.8.2001, 1♂; Kars (Sarıkamış - Mescitli), 1555 m, 20.8.2002, 2♀♀, 1♂, total: 6 specimens.

Distribution in Turkey: Central and south Anatolia (Şengonca, 1981).

General Distribution: Afghanistan, Germany, Austria, Azerbaijan, White Russia, Bulgaria, Czechoslovakia, Denmark, Armenia, France, Georgia, Croatia, Holland, England, Ireland, Sweden, Spain, Japan, Korea, Kyrgyzstan, North China, North Iran, Liechtenstein, Macedonia, Hungary, Mongolia, Poland, Portugal, Slovenia, Turkey, Turkmenistan, Ukraine and Greece (Şengonca, 1979; Aspöck et al., 1980, 2001; Popov, 2002b).

Dichochrysa ventralis Curtis, 1834

Materials examined: Ardahan (Posof-Asmakonak), 1460 m, 7. 8. 2001, 2♀♀; Posof (Asmakonak), 1453 m, 8.8.2001, 1♂; Posof (Çamyazı), 1642-1842 m, 28.7.2002, 2♀♀, 1♂, total 6: specimens.

Distribution in Turkey: This species is new to the Turkish Chrysopidae fauna.

General Distribution: Austria, Germany, Belgium, Czechoslovakia, Denmark, France, Finland, South Siberia, Holland, Spain, England, Italy, Sweden, Latvia, Luxembourg, Hungary, Norway, Poland, Romania, Turkistan, Greece and Yugoslavia (Brauer, 1876; Aspöck et al., 1980, 1996, 2001).

Dichochrysa subflavifrons (Tjeder, 1949)

Materials examined: Kars (Sarıkamış), 2050 m, 10.7.2001, 1♀; (Sarıkamış), 2075 m, 13.8.2001, 2♀♀; Ardahan (Göle), 2035 m, 30.7.2001, 2♀♀; (Center),

1760 m, 1.8.2001, 1♀; (Hanak), 1950-2000 m, 2.8.2001, 2♀♀; (Posof), 1600 m, 5.8.2001, 1♂; (the bank of Posof Stream), 1540 m, 10.8.2001, 1♀; Posof (Eminbey), 1460 m, 30.7.2002, 1♂; (Göle), 1590 m, 3.8.2002, 1♂, total: 12 specimens.

Distribution in Turkey: Adana, Antakya, Hakkari, Kahramanmaraş, Mardin, Mersin, Samsun and Edirne (Şengonca, 1981).

General Distribution: Israel and Turkey (Aspöck et al., 1980, 1996, 2001).

Dichochrysa flavifrons (Brauer, 1850)

Materials examined: Kars (Sarıkamış), 2075 m, 13.8.2001, 1♀; Kağızman (Kötek), 1410 m, 11.8.2002, 2♂♂, Ardahan (Göle, near Değirmenlidere), 1590 m, 3.8.2002, 1♀, total: 4 specimens.

Distribution in Turkey: Adana, Adıyaman, Amasya, Ankara, Antalya, Burdur, Çanakkale, Diyarbakır, Denizli, Edirne, Isparta, İstanbul, İzmir, Mardin, Mersin, Muğla, Siirt and Şırnak (Hölzel, 1967a; Arı and Kıyak, 2000; Onar and Aktaş, 2002; Satar and Özbay, 2004; Canbulat and Kıyak, 2005).

General Distribution: Albania, Austria, Belgium, Bulgaria, Algeria, Czechoslovakia, Morocco, Finland, France, Holland, England, Iran, Israel, Switzerland, Sweden, Italy, Ireland, Spain, Cyprus, Lebanon, Luxemburg, Hungary, Malta, Mongolia, Norway, Portugal, Romania, Siberia, Tunisia, Yugoslavia and Greece (Brauer, 1876; Aspöck et al., 1980, 1996; Mirmoayedi, 2002).

Dichochrysa zelleri (Schneider, 1851)

Materials examined: Kars, 1760-1780 m, 20.7.2001, 3♀♀, 4♂♂; Kağızman (Paslı), 1655 m, 3.7.2002, 1♀; Ardahan (Çamlıçatak), 1860 m, 28.7.2001, 2♀♀, 1♂; (Center), 1820 m, 1.8.2001, 2♀♀, (Posof), 5.8.2001; 1♀, 1520 m; (Posof), 1450 m, 7.8.2001, 2♀♀, total: 16 specimens.

Distribution in Turkey: Antalya, Aydın, Burdur, Çanakkale, Denizli, Isparta, Mersin and Muğla (Aspöck et al., 1980; Canbulat, 1998; Arı and Kıyak, 2000; Canbulat and Kıyak, 2005).

General Distribution: France, Iran, Spain, Italy, Lebanon, Turkey, Yugoslavia and Greece (Brauer, 1876; Aspöck et al., 1980; Santas, 1984).

Dichochrysa prasina (Burmeister, 1839)

Materials examined: Kars (Sarıkamış), 2050-2100 m, 10.7.2001, 2♀♀, 3♂♂; (Kağızman), 1250 m, 14.7.2001, 1♀; (Center), 1775 m, 20.7.2001, 1♀; (Sarıkamış), 2025 m, 13.8.2001, 3♀♀; (Center), 1760 m, 22.6.2002, 1♀, 1♂; Kağızman (Kötek), 1410 m, 11.8.2002, 1♀; Ardahan (Çamlıçatak), 1860-1950 m, 28.7.2001, 3♀♀, 4♂♂; (Center), 1800 m, 29.7.2001, 1♀, 1♂; (Göle), 2005 m, 2030 m, 30.7.2001, 4♀♀, 1♂; (side of Ardahan-Göle road), 2005-2100 m, 1.8.2001, 11♀♀, 5♂♂; (Hanak), 1950-2050 m, 2.8.2001, 5♀♀, 1♂; (Posof), 1540 m, 5.8.2001, 1♀; Posof (Yeniköy), 1510-1650 m, 6.8.2001, 5♀♀, 1♂; Posof (Asmakonak), 1540-1600 m, 7.8.2001, 8♀♀, 2♂♂; (the high plateau of Posof), 1850-1950 m, 9.8.2001, 2♀♀, 1♂; (Posof), 1450-1550 m, 10.8.2001, 2♀♀, 1♂; Posof (Çamyazı), 1585-1610 m, 28.7.2002, 6♀♀, 8♂♂; Posof (Eminbey), 1445-1500 m, 30.7.2002, 3♀♀, 1♂; Damal (Söğütören), 2200 m, 1.8.2002, 1♂; (Göle), 1660 m, 3.8.2002, 3♀♀; Göle (Budaklı), 1990 m, 4.8.2002, 1♂; Çıldır (Beyrehatun), 1900-1950 m, 6.8.2002, 4♀♀, 4♂♂; (Göle), 1520-1600 m, 21.7.2003, 6♀♀, 1♂; Posof (Segre), 1410-1450 m, 26.7.2003, 1♀, 1♂; Çıldır (Kurtkale), 1950-2000 m, 21.8.2003, 5♀♀; Iğdır (Aralık-Yenidoğan), 900 m, 19.8.2001, 1♀, total: 117 specimens.

Distribution in Turkey: Antalya, Antakya, Aydın, Batman, Çanakkale, Denizli, Diyarbakır, Edirne, Hakkari, Isparta, Kahramanmaraş, Kırşehir, Mardin, Mersin, Muğla, Samsun, Siirt, Şanlıurfa and Şırnak (Hölzel, 1967a; Gepp, 1974; Aspöck et al., 1980; Arı and Kıyak, 2000; Canbulat and Özsaraç, 2004; Satar and Özbay, 2004; Canbulat and Kıyak, 2005).

General Distribution: Afghanistan, Germany, Austria, Bulgaria, Algeria, Czechoslovakia, France, South Russia, Holland, England, Iran, Spain, Sweden, Switzerland, Italy, Japan, Luxembourg, Hungary, Norway, Poland, Portugal, Romania, Siberia, Turkey, Yugoslavia and Greece (Brauer, 1876; Aspöck et al., 1980, 1996; Alrouechdi, 1984; Santas, 1984; Paulin, 2002; Popov, 2002b).

Dichochrysa venosa (Rambur, 1842)

Materials examined: Iğdır (Karakoyunlu-Taşburun), 905 m, 28.5.2003, 1♂, 1♀, total: 2 specimens.

Distribution in Turkey: Mardin, Toros Mountains and Diyarbakır (Hölzel, 1967a; Şengonca, 1981; Satar and Özbay, 2004).

General Distribution: Afghanistan, Algeria, Morocco, southern Anatolia, southern France, southern Russia, Spain, Israel, Iran, Lebanon, Egypt, Mongolia, Pakistan, Portugal, Sudan, Saudi Arabia, Tunisia, Oman and Yemen (Brauer, 1876; Aspöck et al., 1980, 1996, 2001).

Nineta pallida (Schneider, 1846)

Materials examined: Ardahan (Posof-Asmakonak), 1525-1535 m, 6.8.2001, 7♀♀, 2♂♂, total: 9 specimens.

Distribution in Turkey: South-western Anatolia (Canbulat and Kiyak, 2002).

General Distribution: Austria, Germany, Czechoslovakia, Sweden, Italy, Finland, France, Hungary, Poland, Romania, Slovenia, Ukraine and Yugoslavia (Brauer, 1876; Aspöck et al., 1980, 1996, 2001).

Nineta carinthiaca (Hölzel, 1965)

Materials examined: Ardahan (Çıldır), 1925 m, 4.8.2001, 1♀; (Göle, near the Göle-Erzurum border), 1605 m, 3.8.2002, 1♀; (Göle, near Değirmenlidere), 1605 m, 21.7.2003, 3♀♀, total: 5 specimens.

Distribution in Turkey: Ankara and north-eastern Anatolia (Şengonca, 1981).

General Distribution: Austria, Hungary, Slovenia and Turkey (Aspöck et al., 1980, 2001).

Peyerimhoffina gracilis (Schneider, 1851)

Materials examined: Ardahan (bank of Posof Stream), 1530 m, 6.8.2001, 2♀♀, 1♂; (Posof - Yeninköy), 1400 m, 26.7.2003, 3♀♀, total: 6 specimens.

Distribution in Turkey: Antalya, Isparta and north-western Anatolia (Aspöck et al., 1980; Canbulat and Kiyak, 2005).

General Distribution: Austria, Germany, Bosnia and Herzegovina, Algeria, Czechoslovakia, Morocco, Finland, France, Holland, Spain, Switzerland, Italy, Caucasia, Hungary, Macedonia, Moldova, Poland, Romania, Slovenia, Yugoslavia and Greece (Brauer, 1876; Aspöck et al., 1980, 2001; Santas, 1984).

Suaris nanus (McLachlan, 1839)

Materials examined: Kars (Sarıkamış-Mescitli), 1670 m, 20.8.2002, 1 ♀; Iğdır (Karakoyunlu), 860 m, 4.9.2003, 2♀♀, total: 3 specimens.

Distribution in Turkey: Adana, Ankara, Antalya, Aydın, Burdur, Denizli Elazığ, Isparta, İzmir, Konya, Mardin, Mersin and Sivas (Hölzel, 1967a, 1978; Şengonca, 1979, 1981; Canbulat and Kiyak, 2005).

General Distribution: Afghanistan, Anatolia, Algeria, Iraq, Iran, Cyprus, Kyrgyzstan, Lebanon, Macedonia, Pakistan and Greece (Hölzel, 1966; Aspöck et al., 1980, 2001).

Discussion

At the study's conclusion, it was determined that all the specimens belonged to 23 species of 10 genera of Chrysopidae. *Brinckochrysa* Tjeder, 1966 (n = 1), *Chrysoperla* Steinmann, 1964 (n = 282), *Chrysopa* Leach in Brewster, 1815 (n = 74), *Chrysotropia* Navas, 1911 (n = 9), *Cunctochrysa* Hölzel, 1970 (n = 6), *Dichochrysa* Yang, 1991 (n = 157), *Italochrysa* Principi, 1946 (n = 6), *Nineta* Navas, 1912 (n = 14), *Peyerimhoffina* Lacroix, 1920 (n = 6) and *Suaris* Navas, 1914 (N = 4) are presented in this work.

All species identified in this study are new records for the collection site. *Dichochrysa ventralis* Curtis, 1834 is new to the Turkish Chrysopidae fauna, but *Nineta pallida* (Schneider, 1846), *Chrysopa abbreviata* Curtis, 1834 and *Chrysopa curdica* Hölzel, 1967 are second records for the Turkish Chrysopidae fauna. *Nineta pallida* (Schneider, 1846) was recorded from south-western Turkey (Canbulat and Kiyak, 2002). With this study, its distribution range has been extended to the north-east part of Turkey. *Chrysopa abbreviata* was first recorded from Patara, a district of Muğla, 160 years ago (Schneider, 1845), but it was also found in Posof, a district of Ardahan, as a second record for the Turkish neuropteran fauna. *Chrysopa curdica* Hölzel, 1967 was described and recorded from Van (Hölzel, 1967b) and its distribution range has been expanded to include Kars in this study.

Of the 23 species, 12 have a larger distribution range and they are found in 3 phytogeographical regions. Of the 23 species, 7 are present in 2 different phytogeographical regions (Table). *Chrysopa astarte* Hölzel, 1967, *C. curdica* Hölzel, 1967, *Dichochrysa subflavifrons* (Tjeder, 1949) and *Nineta carinthiaca* (Hölzel, 1965) are confined to one region. *Chrysopa astarte* Hölzel, 1967 and *C. curdica* Hölzel, 1967 are present in the Irano-Turanian region, *Dichochrysa subflavifrons* (Tjeder, 1949) was found in the Mediterranean region and the distribution of *Nineta carinthiaca* (Hölzel, 1965) is limited to the European-Siberian region (Table). The most unexpected result was related to *Dichochrysa subflavifrons* (Tjeder, 1949), with a distribution previously limited to the

Table. Distribution of species in 3 phytogeographical regions.

Taxa	Mediterranean	Euro-Siberian	Irano-Turanian
<i>Italochrysa italica</i>	+	+	-
<i>Brinckochrysa amseli</i>	+	-	+
<i>Chrysoperla carnea</i>	+	+	+
<i>Chrysopa dorsalis</i>	+	+	-
<i>C. perla</i>	+	+	+
<i>C. formosa</i>	+	+	-
<i>C. astarte</i>	-	-	+
<i>C. curdica</i>	-	-	+
<i>C. walkeri</i>	+	+	+
<i>C. abbreviata</i>	+	+	+
<i>C. pallens</i>	+	+	+
<i>Chrysotropia ciliata</i>	+	+	+
<i>Cunctochrysa albolineata</i>	+	+	-
<i>Dichochrysa ventralis</i>	+	+	-
<i>D. subflavifrons</i>	+	-	-
<i>D. flavifrons</i>	+	+	+
<i>D. zelleri</i>	+	+	+
<i>D. prasina</i>	+	+	+
<i>D. venosa</i>	+	+	+
<i>Nineta pallida</i>	+	+	-
<i>N. carinthiaca</i>	-	+	-
<i>Peyerimhoffina gracilis</i>	+	+	-
<i>Suarius nanus</i>	+	+	+

Mediterranean region; it was determined in this study that this species exists in north-east Anatolia. Specimens belonging to *Chrysotropia ciliate* (Wesmael, 1841), *Italochrysa italica* (Rossi, 1970), *Brinckochrysa amseli* (Hölzel, 1967) and *Suarius nanus* (McLachlan, 1839) were caught by light trap.

Dichochrysa ventralis Curtis, 1834 is similar to the species *Dichochrysa prasina* (Burmeister, 1839). The main diagnostic character of *D. ventralis* Curtis, 1834 is that all sternites of the abdomen are black; thus it makes

D. ventralis Curtis, 1834 different from *D. prasina* (Burmeister, 1839).

The Turkish Chrysopidae fauna was previously represented by 47 species and 1 subspecies (Hölzel, 1967a, 1967b; Arı and Kıyak, 2000; Aspöck et al. 2001; Onar and Aktaş, 2002; Canbulat and Kıyak, 2002, 2003, 2004, 2005). With this study, however, the number of species of Chrysopidae in Turkey has increased to 48 species and 1 subspecies.

References

- Alrouechdi, K. 1984. Les Chrysopides (Neuroptera) en Oliveraie -In Progress in World's Neuropterology. Proceedings of the 1st International Symposium on Neuropterology, (Eds. Gepp, J., Aspöck, H. and Hölzel, H.), Graz, Austria, pp. 147-152.
- Aspöck, H., Aspöck, U. and Hölzel, H. 1980. Die Neuropteren Europas. Goecke and Evers, Krefeld, Oesterreich, pp. 1-495, pp. 1-355.
- Aspöck, H. and Hölzel, H. 1996. The Neuropteroidea of North Africa, Mediterranean Asia and of Europe. Pure and applied research in Neuropterology. Proceedings of the fifth international symposium on Neuropterology, Cairo, Egypt, 1994 (Eds. Canard, M, Aspöck, H. and Mansell M.W), Toulouse, France, pp. 31-86.

- Aspöck, H., Hölzel, H. and Aspöck, U. 2001. Kommentierter Katalog der Neuropterida (Insecta: Raphidioptera, Megaloptera, Neuroptera) der Westpaläarktıs, Denisia 02. Biologiezentrum des Oberösterreichischen Landesmuseums, Austria, pp. 69-124.
- Arı, İ. and Kiyak, S. 2000. New and additional distributional and faunistic data of Turkish Planipennia. Journal of the Entomological Research Society. 2: 9-15.
- Brooks, S.J. and Barnard, P.C. 1990. The green lacewings of the world: a generic review (Neuroptera: Chrysopidae). The Bulletin of the British Museum (Natural History). 59: 117-286.
- Borrer, J.D., Triplehorn, A.C. and Johnson, F.N. 1992. An Introduction to the Study of Insects. Sixth edition, Harcourt Brace College Publishers, Fort Worth, Texas, pp. 357-368.
- Brauer, F. 1876. Die Neuropteren Europas und insbesondere Österreichs mit Rücksicht auf ihre Geographisch Verbreitung. Festschrift zum 25 jährigen Bestehen der k. u. k. Zoologisch-Botanischen, Gesellschaft, Wien, pp. 263-300.
- Canbulat, S. 1998. Çanakkale Planipennia (Insecta: Neuropteroidea) türlerinin sistematik ve faunistik yönden incelenmesi. Yüksek Lisans Tezi, Gazi Üniversitesi Fen Bilimleri Enstitüsü, Ankara, 99 s.
- Canbulat, S. 2002. Contribution to the knowledge of Turkish Neuroptera from Kayseri Province (Insecta: Neuroptera). Journal of the Institute Sciences and Technology of Gazi University. 15: 633-639.
- Canbulat, S. and Kiyak, S. 2002. *Nineta pallida* (Schneider, 1846) New for Turkey (Neuroptera: Chrysopidae). Journal of the Entomological Research Society. 4: 11-14.
- Canbulat, S. and Kiyak, S. 2003. A new species of the genus *Nineta* from Turkey (Neuroptera: Chrysopidae). Deutsche Entomologische Zeitschrift. 50: 129-131.
- Canbulat, S. and Kiyak, S. 2004. Four species of lacewings (Insecta; Neuroptera) new to the fauna of turkey. Zoology in the Middle East. 32: 113-114.
- Canbulat, S. and Özaraç, Ö. 2004. Neuropterida (Insecta; Neuroptera, Raphidioptera) Fauna of Çiçekdağı (Kırşehir province), Journal of the Institute of Science and Technology of Gazi University. 17: 1-9.
- Canbulat, S. and Kiyak, S. 2005. Contribution of the fauna of Neuroptera (Insecta) of the South-Western Anatolia. Annals of the Upper Silesian Museum (Entomology). 13: 9-60
- Dinkins, R.L., Tedders, W.L. and Reid, W. 1994. Predaceous neuropterans in Georgia and Kansas pecan trees. Journal of Entomological Science. 29: 165-175.
- Duelli, P. 1996. The working group "carnea-complex": report on activities, results and cooperative projects. Pure and Applied Research in Neuropterology. Proceedings of the Fifth International Symposium on Neuropterology (Eds. Canard, M, Aspöck, H., Mansell, M.W.), pp 307-311.
- Gepp, J. 1974. Beitrag zur Kenntnis der Neuropteren der Türkei. Entomologische Berichten, Amsterdam. 34: 102-104.
- Hölzel, H. 1965. Beitrag zur Kenntnis der Chrysopidae: Die *Nineta* gruppe, Zeitschr. des Arbeitsgemeinschaft österr. Entomologen. 17: 91-98.
- Hölzel, H. 1966. Beitrag zur Kenntnis der Chrysopiden des Iran (Planipennia, Chrysopidae). Stuttgarter Beiträge zur Naturkunde. 148: 1-7.
- Hölzel, H. 1967a. Die Neuropteren Vorderasiens II. Chrysopidae. Beiträge zur Naturkundlichen Forschung in Südwestdeutschland. 26: 19-45.
- Hölzel, H. 1967b. Zwei neue *Chrysopa* Arten aus Anatolien (Neuroptera: Chrysopidae). Nachrichtenblatt der Bayerischen Entomologen. 16: 92-95.
- Hölzel, H. 1978. Beitrag zur Kenntnis der gattung *Suaris Navas*: Die Arten des nanus komplexes (Planipennia: Chrysopidae). Zeitschrift der Arbeitsgemeinschaft Österreichischer Entomologen. 30: 3-12.
- Kiyak, S. and Özdikmen, H. 1993. Über Einige Neuropterenarten von Soğuksu Nationalpark (Kızılcahamam, Ankara). Priamus. 6: 156-160.
- Kiyak, S. 2000. Entomolojik Müze Metotları. Öğün Matbaacılık, Ankara.
- Makarkin, V.N. 1990. A check list of the Neuroptera – Planipennia of the USSR, Far East, with some taxonomic remarks. Acta Zoologica Hungarica. 36: 37-45.
- Mirmoayedi, A. 2002. New records of Neuroptera from Iran. Acta Zoologica Academiae Scientiarum Hungaricae. 48: 197-201.
- Monserrat, V.J. and Hölzel, H. 1987. Contribucion al Conocimiento de los Neuropteros de Anatolia (Neuroptera. Planipennia). Revista Espanola de Entomologia, Eos. 63: 133-142.
- Onar, N. and Aktaç, N. 2002. Edirne yöresi Chrysopidae (Neuroptera) faunası üzerine taksonomik ve faunistik arařtırmalar. Türk Entomol. Derg. 26: 121-134.
- Paulian, M. 2002. Recent additions green lacewing fauna of Romania (Neuroptera: Chrysopidae). Acta Zoologica Academiae Scientiarum Hungaricae. 48: 265-269.
- Popov, A. 1990. Zur verbreitung der Chrysopiden (Neuroptera) in Bulgarien. Acta Zoologica Bulgarica. 39: 47-52.
- Popov, A. 2002a. Zoogeographical analysis of Neuroptera in Bulgaria, Acta Zoologica Academiae Scientiarum Hungaricae. 48: 271-280.
- Popov, A. 2002b. Neuropterida of Northern Europe. Acta Zoologica Academiae Scientiarum Hungaricae. 48: 281-291.
- Santas, L.A. 1984. On some Chrysopidae of Greece. In Progress in World's Neuropterology. Proceedings of the 1st International Symposium on Neuropterology (Eds. Gepp, J. Aspöck, H. and Hölzel, H.), Graz, Austria, pp. 167-172.
- Satar, A. and Özbay, C. 2004. Remarks on Neuroptera of Southeastern Turkey, Entomologica Fennica. 15: 119-224.
- Schneider, W. G. 1845. Verzeichnis der von Hr. Prof. Dr. Loew im sommer 1842 in der Türkei und Kleinasien gesammelten Neuroptera, nebst kurzer Beschreibung der neuen Arten. Stettiner Entomologische Zeitung. 6: 110-116, 153-155.
- Şengonca, Ç. 1979. Beitrag zur Neuropteren fauna der Türkei. Nachrichtenblatt der Bayerischen Entomologen. 28: 10-15.
- Şengonca, Ç. 1980. Türkiye Chrysopidae (Neuroptera) faunası üzerinde sistematik ve taksonomik arařtırmalar. Zirai Mücadele ve Zirai Karantina Genel Müdürlüğü Matbaa Şubesi Müdürlüğü, Ankara.
- Şengonca, Ç. 1981. Die Neuropteren Anatoliens. 1. Chrysopidae. Mitteilungen der Münchener Entomologischen Gesellschaft. 71: 121-137.