

Remarks on Neuroptera of Southeastern Turkey

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The abundance of species of the insect order Neuroptera was studied in the traditionally cultivated landscape of southeastern Turkey. A total of 544 specimens were collected from seven localities during 2000, 2001 and 2002, representing 28 species, 19 genera, and five families of the order. Sixteen species were recorded as new for southeastern Anatolia. Chrysopidae and Myrmeleontidae were the best represented families in the region. Neuroptera occurred both in cultivated fields and natural habitats. Species occurrences were evaluated zoogeographically, and some observations and recommendations were made on the species that could be useful for controlling crop pests.

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1. Introduction

The southeastern part of Turkey is known as one of the best preserved and undamaged natural habitats of Turkey, thanks to the traditional farming methods applied there. The biological diversity is high in the region probably due to the climatic heterogeneity: it is influenced by Eremial, Mediterranean and Siberian climates. Only a few studies of its neuropteran fauna exist (Gerstaecker 1894, Gepp 1974, Şengonca 1979, Şengonca 1980a, Şengonca 1981a, b), but those indicate a high species diversity. For example, thirteen species of Neuropteridae alone have been reported to exist in the study area of the present paper. The aim of our study was, therefore, to provide information on the presence and distribution of different Neuroptera in the southeastern Turkey.

2. Material and methods

Neuroptera from seven localities (Fig. 1) were obtained from May to September in 2000, 2001 and 2002. The localities (all within 37° 42' – 43° 33' E, 36° 40' – 38° 42' N) included Adıyaman (site nr. 1), Batman (2), Diyarbakır (3), Mardin (4), Siirt (5), Şanlıurfa (6) and Şırnak (7). The region as a whole is characterized by Iran-Turan steppe biome (Saya & Ertekin 1997). Three sites (nrs. 1, 5, 7) represented natural habitat of vegetation typical for southeastern Turkey, viz. forests predominated by *Quercus infectoria*, *Q. brantii*, *Q. libani* and *Q. cedrorum*. Four other sites (nrs. 2, 3, 4 and 6) were on agricultural land such as meadows located between fields.

We collected larvae and adults twice a month using net, beating branches of bushes and trees over an umbrella, hand-collecting larvae, and light-trapped specimens at night.

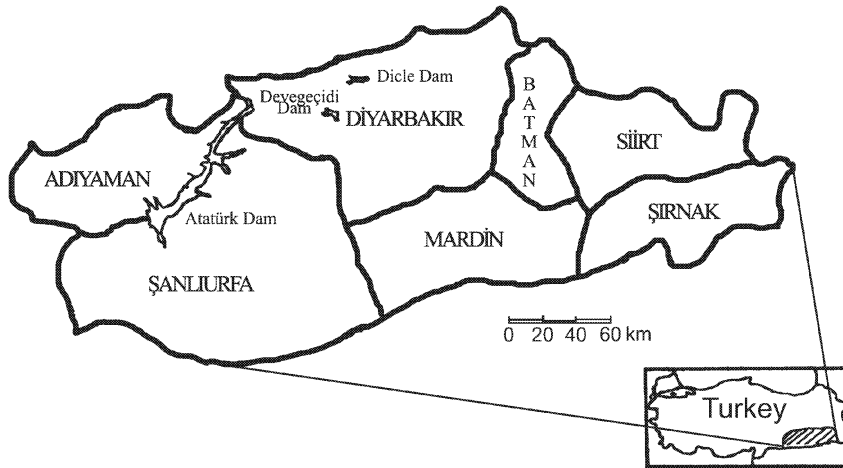


Fig. 1. The collecting sites.

3. Results

Twenty-eight species from 19 genera were identified, representing the families Chrysopidae (4 genera, 6 species), Myrmeleontidae (10 genera, 15 species), Nemopteridae (3 genera, 4 species), Ascalaphidae (1 genus, 2 species), and Mantispidae (1 genus, 1 species). Some of these species have also been shown to be present in other parts of Turkey, e.g., see Aspöck *et al.* (1976, 1978, 1980, 1984, 2001), Canbulat (1998, 2000), Demirsoy (1990), Hölzel *et al.* (1967, 1968, 1972), Satar (2002), and Şengonca (1979, 1980a, b, 1981a, b, c). The species and their localities are as follows.

3.1. Chrysopidae Schneider, 1851

Italochrysa italica (Rossi, 1970)

Material. 2 ♀ 21.X.2001, Adıyaman-Merkez, 800 m a.s.l.; 1 ♀, 21.X.2001, Adıyaman-Besni, 805 m a.s.l.. Holo-Mediterranean faunal element.

Chrysoperla carnea (Stephens, 1836) *sensu lato*

Material. 2 ♀ 17.VI.2000, Şanlıurfa-Akçakale, 450 m a.s.l.; 3 ♀ 5 ♂ 13.VI.2000, Batman-BeŞiri, 950 m; 2 ♀ 1 ♂ 22.VI.2000, Diyarbakır-Kocaköy, 930 m a.s.l.; 3 ♀ 2 ♂ 15.VII.2000, Adıyaman-Gerger, 1200 m a.s.l.; 4 ♀ 2 ♂ 16.VIII.2000, Mardin-YeŞilli; 5 ♀ 2 ♂ 26.V.2001, Şırnak-Merkez; 4 ♀ 1 ♂ 08.VI.2002,

Mardin-Nusaybin, 440 m a.s.l.; 3 ♀ 2 ♂ 09.VI.2002, Siirt-Eruh, 1650 m a.s.l.; 5 ♀ 2 ♂ 09.VI.2001, Siirt-Pervari, 1450 m a.s.l..

Note. Şengonca (1980a) previously reported this species from Diyarbakır Mardin, Siirt and Şanlıurfa province in 1976. Siberian-Mediterranean faunal element.

Chrysopa dubitans McLachlan, 1887

Material. 2 ♀ 1 ♂ 19.IX.2001, Mardin-YeŞilli; 3 ♀ 2 ♂ 02.VII.2002, Mardin-Savur, 1100 m a.s.l..

Note. Şengonca (1980a) previously reported this species from Mardin and Siirt province in 1976. Policentric Eremial faunal element.

Dichocrysa venosa (Rambur, 1842)

Material. 1 ♀ 12.VI.2002, Diyarbakır-Dicle, 930 m a.s.l..

Note. Gepp (1974) previously reported this species from Mardin province in 1974. Eremial faunal element.

Dichocrysa flavifrons (Brauer, 1850)

Material. 3 ♀ 22.VI.2000, Diyarbakır-Kocaköy, 930 m a.s.l.; 2 ♀ 1 ♂ 15.VII.2000, Adıyaman-Merkez, 720 m a.s.l.; 3 ♀ 2 ♂ 16.VIII.2000, Mardin-YeŞilli; 2 ♀ 3 ♂ 26.V.2001, Şırnak-Merkez; 3 ♀ 2 ♂ 19.IX.2001, Mardin-Savur; 5 ♀ 2 ♂ 08.VI.2002, Mardin-Sultan köy; 2 ♀ 2 ♂ 09.VI.2002, Siirt-Eruh, 1650 m a.s.l.; 2 ♀ 3 ♂ 09.VI.2001, Siirt-Pervari, 1800 m a.s.l..

Note. Şengonca (1980a) previously reported this species from Mardin province in 1976. Holo-Mediterranean faunal element.

Dichocrysa prasina (Burmeister, 1839)

Material. 2 ♀ 1 ♂ 13.VI.2000, Batman-BeŞiri, 1000 m; 2 ♀ 1 ♂ 22.VI.2000, Diyarbakır-Kulp, 1200 m a.s.l.; 1 ♀ 3 ♂ 15.VII.2000, Adıyaman-Gerger, 900 m a.s.l.; 2 ♀ 2 ♂ 16.VIII.2000, Mardin-Savur, 1020 m a.s.l.; 2 ♀ 3 ♂ 19.IV.2001, Mardin-Sultan köy; 2 ♀ 2 ♂ 26.V.2001, Şırnak-Merkez; 5 ♀ 2 ♂ 09.VI.2001, Siirt-Pervari, 1450 m a.s.l.; 2 ♀ 3 ♂ 08.V.2002, Mardin-BeŞ Evler; 2 ♀ 3 ♂ 08.VI.2002, Mardin-Nusaybin, 430 m a.s.l.; 3 ♀ 2 ♂ 09.VI.2002, Şanlıurfa-Siverek, 900 m a.s.l..

Note. Şengonca (1980a) previously reported this species from Mardin province in 1976. Siberian-Mediterranean faunal element.

3.2. Myrmeleontidae Latreille, 1803

Palpares libelluloides (Linnaeus, 1767)

Material. 3 ♀ 1 ♂ 13.VI.2000, Siirt-Pervari, 1450 m a.s.l.; 2 ♀ 1 ♂ 15.IX.2000, Diyarbakır-Çınar, 714 m a.s.l.; 1 ♀ 1 ♂ 15.IX.2000, Şırnak-Merkez; 1 ♀ 2 ♂ 20.V.2001, Batman-BeŞiri, 1120 m a.s.l.; 1 ♀ 26.V.2001, Siirt-Eruh, 1680 m a.s.l.; 3 ♀ 1 ♂ 14.IX.2001, Adıyaman-Merkez, 750 m a.s.l.; 1 ♀ 2 ♂ 12.VI.2002, Diyarbakır-Dicle, 1135 m a.s.l.; 3 ♀ 1 ♂ 08.VI.2002, Siirt-Pervari, 1450 m a.s.l.; 2 ♀ 2 ♂ 09.VI.2002, Şanlıurfa-Hilvan, 800 m a.s.l..

Note. Holo-Mediterranean faunal element.

Acanthaclisis occitanica (Villers, 1789)

Material. 1 ♀ 14.IX.2001, Adıyaman-Gerger, 1030 m a.s.l..

Note. Holo-Mediterranean faunal element.

Myrmeleon inconspicuus Rambur, 1842

Material. 2 ♀ 1 ♂ 10.VIII.2000, Diyarbakır-Çermik; 3 ♀ 14.IX.2001, Adıyaman-Gerger, 1150 m a.s.l.; 1 ♀ 2 ♂ 21.X.2001, Adıyaman-Besni, 700 m a.s.l.; 1 ♀ 2 ♂ 14.VIII.2002, Diyarbakır-Merkez, 695 m a.s.l..

Note. Holo-Mediterranean faunal element.

Myrmecaelurus trigrammus (Palas, 1781)

Material. 2 ♀ 3 ♂ 13.VI.2000, Batman-BeŞiri, 800 m a.s.l.; 2 ♀ 1 ♂ 13.VI.2000, Batman-Kurtalan, 700 m a.s.l.; 3 ♀ 1 ♂ 15.IX.2000, Şırnak-Merkez; 2 ♀ 1 ♂ 08.VI.2002, Mardin-Nusaybin, 450 m a.s.l.; 1 ♀ 2 ♂ 12.VI.2002, Diyarbakır-Merkez, 700 m a.s.l.; 3 ♀ 02.VII.2002, Mardin-Savur, 1000 m a.s.l..

Note. Holo-Mediterranean faunal element.

Myrmecaelurus maior McLachlan, 1875

Material. 2 ♀ 3 ♂ 15.VII.2000, Adıyaman-Gerger, 1200 m a.s.l.; 1 ♀ 19.VII.2002, Diyarbakır-Ergani, 890 m a.s.l..

Note. Irano-Eremial faunal element.

Solter ledereri Navás, 1912

Material. 1 ♂ 15.OIX.2000, Diyarbakır-Çınar; 720 m a.s.l.; 1 ♀ 18.X.2000, Mardin-Ömerli, 1050 m a.s.l.; 2 ♂ 21.X.2001, Adıyaman-Merkez, 760 m a.s.l..

Note. Syro-Eremial faunal element.

Cueta lineosa (Rambur, 1842)

Material. 1 ♂ 15.VII.2000, Adıyaman-Gerger, 970 m a.s.l.; 2 ♀ 27.V.2001, Adıyaman, 1 ♀ 1 ♂ 29.V.2002, Diyarbakır-Çermik.

Note. Eremial faunal element.

Neuroleon assimilis Navás, 1914

Material. 2 ♀ 1 ♂ 11.V.2000, Diyarbakır-Merkez, 769m a.s.l.; 3 ♀ 13.VI.2000, Batman-Merkez, 770 m a.s.l.; 1 ♂ 13.VI.2000, Batman-Kurtalan, 700 m a.s.l.; 4 ♀ 1 ♂ 08.VI.2002, Mardin-Kızıltepe, 435m a.s.l.; 2 ♀ 12.VI.2002, Diyarbakır-Merkez, 690 m a.s.l..

Note. Ponto-Mediterranean faunal element.

Neuroleon tenellus (Klug, 1834)

Material. 4 ♀ 2 ♂ 11.V.2000, Diyarbakır-Merkez, 750 m a.s.l.; 2 ♀ 2 ♂ 13.VI.2000, Batman-Merkez, 735m a.s.l.; 3 ♀ 1 ♂ 13.VI.2000, Batman-Kurtalan, 700 m a.s.l.; 2 ♀ 1 ♂ 08.VI.2002, Mardin-Nusaybin, 430 m a.s.l.; 2 ♀ 12.VI.2002, Diyarbakır-Merkez, 769m a.s.l..

Note. Şengonca (1979) previously reported this species from Siirt province in 1976. Afro-Irano-Eremial faunal element.

Neuroleon egenus (Navás, 1915)

Material. 1 ♀ 11.V.2001, Diyarbakır-Merkez, 690 m a.s.l.; 1 ♀ 20.V.2001, Batman-Beşiri, 1000 m a.s.l.; 1 ♀ 27.V.2001, Adıyaman-Besni, 825m a.s.l.

Note. Holo-Mediterranean faunal element.

Neuroleon microstenus (McLachlan, 1898)

Material. 2 ♀ 2 ♂ 09.VI.2001, Diyarbakır-Merkez; 1 ♀ 2 ♂ 13.VI.2001, Diyarbakır-Lice, 1100 m a.s.l.; 3 ♀ 2 ♂ 08.VI.2002, Mardin-Nusaybin, 430 m a.s.l.

Note. Irano-Eremial faunal element.

Creoleon plumbeus (Oliver, 1811)

Material. 2 ♀ 1 ♂ 13.VI.2000, Batman-Kurtalan, 700 m a.s.l.; 3 ♀ 13.VI.2000, Batman-Merkez, 800 m a.s.l.; 3 ♀ 2 ♂ 15.IX.2000, Şırnak-Merkez; 2 ♀ 1 ♂ 17.VI.2001, Şanlıurfa-Merkez, 700 m a.s.l.; 2 ♀ 3 ♂ 14.IX.2001, Adıyaman-Gerger, 1050 m a.s.l.; 1 ♀ 1 ♂ 08.VI.2002, Mardin-Nusaybin, 430 m a.s.l.; 2 ♀ 2 ♂ 06.IX.2002, Siirt-Eruh, 1680 m a.s.l.; 1 ♀ 2 ♂ 12.VI.2002, Diyarbakır-Merkez, 718m a.s.l.

Note. Şengonca (1979) previously reported this species from Şanlıurfa province in 1976. Ponto-Mediterranean faunal element.

Distoleon tetragrammicus (Fabricius, 1798)

Material. 1 ♀ 1 ♂ 11.V.2000, Diyarbakır-Merkez, 700 m a.s.l.; 1 ♂ 25.V.2000, Diyarbakır-Kulp, 1200 m a.s.l.; 1 ♀ 2 ♂ 25.V.2000, Diyarbakır-Eski Lice; 1 ♀ 15.IX.2000, Şırnak-Merkez; 1 ♀ 1 ♂ 13.VI.2001, Diyarbakır-Kocaköy, 930 m a.s.l.; 1 ♀ 1 ♂ 08.VI.2002, Şırnak-Cizre; 2 ♀ 1 ♂ 08.VI.2002, Şırnak-Silopi; 1 ♀ 2 ♂ 12.VI.2002, Diyarbakır-Merkez, 705m a.s.l.

Note. Holo-Mediterranean faunal element.

Distoleon curdicus Hölzel, 1972

Material. 1 ♂ 25.V.2000, Diyarbakır-Kulp, 1150 m a.s.l.; 1 ♀ 15.VII.2000, Adıyaman-Gerger, 1020 m a.s.l.; 1 ♀ 1 ♂ 13.VI.2001, Diyarbakır-Lice, 1200 m a.s.l.; 1 ♀ 2 ♂ 12.VI.2002, Diyarbakır-Merkez, 695m a.s.l.; 1 ♀ 19.VII.2002, Diyarbakır-Ergani, 1100 m a.s.l.

Note. Syro-Eremial faunal element.

Nedroledon striatus (Klug, 1834)

Material. 1 ♀ 25.V.2000, Diyarbakır-Kocaköy, 930 m a.s.l.

Note. Irano-Eremial faunal element.

3.3. Ascalaphidae Rambur, 1842*Bubopsis hamata* Klug, 1834

Material. 2 ♀ 16.VIII.2000, Mardin-YeŞilli; 1 ♂ 18.X.2000, Mardin-Ömerli, 1025m a.s.l.; 1 ♂ 13.VI.2001, Diyarbakır-Merkez, 725m a.s.l.; 2 ♀ 13.VI.2002, Siirt-Pervari, 1800 m a.s.l.

Note. Şengonca (1979) previously reported this species from Şanlıurfa province in 1976. Syro-Eremial faunal element.

Bubopsis zarudnyi Alexandrova-Martynova, 1926

Material. 2 ♀ 17.VII.2002, Diyarbakır, Karacadağ Mountain, 930 m a.s.l.

Note. Satar (2002) previously reported this species from Diyarbakır province in 2002. Irano-Eremial faunal element.

3.4. Nemopteridae Burmeister, 1839*Nemoptera sinuata* Oliver, 1811

Material. 1 ♀ 13.VII.2000, Şanlıurfa-Ceylanpınar, 436 m a.s.l.; 1 ♀ 2 ♂ 09.VII.2001, Şanlıurfa-Ceylanpınar, 420 m a.s.l.

Note. Şengonca (1981b) previously reported this species from Şanlıurfa province in 1981. Ponto-Mediterranean faunal element.

Lertha extensa (Oliver, 1811)

Material. 10 ♀ 8 ♂ 09.VI.2001, Diyarbakır-Merkez, 690 m a.s.l.; 1 ♀ 13.VI.2000, Karacadağ, 1150 m a.s.l.; 2 ♀ 1 ♂ 13.VI.2001, Diyarbakır-Lice, 1100 m a.s.l.; 4 ♀ 3 ♂ 08.VI.2002, Mardin-Nusaybin, 435 m a.s.l.; 20 ♀ 27 ♂ 09.VI.2002, Şırnak-Merkez; 1 ♀ 2 ♂ 09.VI.2002, Siirt-Kozluk, 800 m a.s.l.; 2 ♀ 3 ♂ 09.VI.2002, Siirt-Eruh, 920 m a.s.l.; 1 ♀ 1 ♂ 10.VI.2002, Siirt-Baykan, 930 m a.s.l.

Note. Şengonca (1981b) previously reported this species from Şanlıurfa province in 1981. Syro-Eremial faunal element.

Lertha sheppardi (Kirby, 1904)

Material. 1 ♀ 7 ♂ 17.VI.2000 Diyarbakır-Bismil; 2 ♀ 8 ♂ 9.V.2001, Şanlıurfa-Siverek, 950 m a.s.l.; 10 ♀ 7 ♂ 09.VI.2001, Karacadağ, 1150 m a.s.l.; 30 ♀ 18 ♂ 09.VI.2002, Diyarbakır-Merkez, 710 m a.s.l.; 17 ♀ 13 ♂ 09.VI.2002, Karacadağ, 1150 m a.s.l..

Note. Eremial faunal element.

Dielocroce ephemera (Gerstaecker, 1894)

Material. 7 ♀ 3 ♂ 03.VII.2002, Batman-Beşiri, 1020 m a.s.l..

Note. Gerstaecker (1894) previously reported this species from Mardin province in 1894. Irano-Eremial faunal element.

3.5. Mantispidae Leach in Brewster, 1815*Mantispa scabricollis* McLachlan, 1875

Material. 2 ♂ 02.VII.2002, Mardin-Savur, 1100 m a.s.l..

Note. Ponto-Mediterranean faunal element.

4. Discussion

Of the 28 species identified here, 16 were new for southeastern Anatolia: *Italochrysa italica*, *Palpares libelluloides*, *Acanthaclisis occitanica*, *Myrmeleon inconspicuus*, *Myrmecaelurus trimammus*, *Myrmecaelurus maior*, *Solter ledereri*, *Cueta lineosa*, *Neuroleon assimilis*, *Neuroleon egenus*, *Neuroleon microstenus*, *Distoleon tetragrammicus*, *Distoleon curdicus*, *Nedroledon striatus*, *Lertha sheppardi* and *Mantispa scabricollis*. Families Chrysopidae and Myrmeleontidae are well represented in the region, with species found both in cultivated fields and in “natural” habitats. Because the larvae of most neuropteran families feed largely on soft-bodied herbivorous insects and mites (e.g. Stange 1980, Stelzl & Devetak 1999), keeping the vegetation structure of the surroundings of neuropteran habitat in good condition is an excellent way of controlling insect crop pests (Stelzl & Devetak 1999).

A part of the Eremial region, southeastern Turkey hosts particularly high biological diversity due to its disparate climate. Mediterranean

conditions are found in the southern and southeastern Turkey, while Siberian climate characterizes northern and northeastern regions (Demirsoy 1996). We hope that this study of the neuropteran fauna of southeastern Turkey, together with existing and future faunal works on other groups of plants and animals living in this region, will help to elucidate broader zoogeographic features of this area.

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