

## Contributions to the Fauna of Turkish Myrmeleonidae (Neuroptera, Insecta) from Ardahan, Iğdır, and Kars

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**Abstract:** This study is based on 349 specimens belonging to 24 species of 17 genera of Myrmeleonidae of the order Neuroptera, and these insects were collected from Ardahan, Iğdır, and Kars provinces between 2001 and 2003. Among the species, *Deutoleon turanicus* Navas, 1927 and *Distoleon luteomaculatus* Hölzel, 1972 are new to the fauna of Turkish Myrmeleonidae. The distribution of each species in Turkey and in the rest of the world is presented.

**Key Words:** Fauna, Myrmeleonidae, Neuroptera, Turkey

### Ardahan, Iğdır ve Kars İllerinden Türkiye Myrmeleonidae (Neuroptera, Insecta) Faunasına Katkılar

**Özet:** Bu çalışma, Neuroptera takımının Myrmeleonidae familyasının 17 cinsinin 24 türüne ait 349 örneğe dayanmaktadır ve bu böcekler 2001-2003 yılları arasında Ardahan, Iğdır ve Kars illerinden toplanmıştır. Türler arasında *Deutoleon turanicus* Navas, 1927 ve *Distoleon luteomaculatus* Hölzel, 1972 Türkiye Myrmeleonidae faunası için yeni kayıttır. Her bir türün Türkiye'deki ve dünyadaki yayılışı da sunulmuştur.

**Anahtar Sözcükler:** Fauna, Myrmeleonidae, Neuroptera, Türkiye

### Introduction

Myrmeleonidae is the largest family of the order Neuroptera and it contains about 2000 species worldwide (Aspöck et al., 2001). The number of species of Myrmeleonidae in Turkey was reported to be 43 (Schneider, 1845; Esben-Petersen, 1933; Hölzel, 1972; Şengonca, 1979; Aspöck et al., 1980, 1996, 2001; Arı and Kıyak, 2000; Canbulat, 2003).

The fauna of Myrmeleonidae of Turkey has not yet been determined completely. It needs to be studied more comprehensively, and, to achieve this, regional field studies should be carried out in every part of Turkey. This family has hitherto been studied in the western parts of Turkey, while the eastern parts have rarely been studied. It can be expected that Turkish Myrmeleonidae species numbers will increase if studied in detail. The aim of this

study was to determine the fauna of Myrmeleonidae in the provinces of Ardahan, Iğdır, and Kars. To identify the specimens, Navas (1927), Aspöck et al. (1980), and Hölzel (1968, 1969, 1972, 1987) were followed.

### Materials and Methods

A total 349 of specimens were collected from Ardahan, Iğdır, and Kars provinces between 2001 and 2003. To collect and prepare specimens, Kıyak (2000) was followed. Specimens were collected using a sweeping net trap and light trap. A 10% KOH solution was used to prepare genital structures of the specimens. After the specimens were identified by Arı and Kıyak, they were stored as museum materials in the Zoological Museum of the Arts and Sciences Faculty of Gazi University, Ankara, Turkey.

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## Results

### Family: Myrmeleonidae Latreille, 1803

#### Subfamily: Palparinae Banks, 1911

##### *Palpares libelluloides* Linnaeus, 1764

Materials examined: Iğdır (Aralık), 24.6.2002, 1♂, 790 m. Host plant: dry herb.

Distribution in Turkey: Adana, Antalya, Burdur, Çanakkale, Denizli, Isparta, İzmir, İstanbul, Kahramanmaraş, Kayseri, Konya, Mersin, Muğla, and Şanlıurfa (Schneider, 1845; Esben-Petersen, 1933; Şengonca, 1979; Canbulat, 2003).

Distribution in the world: Germany, Albania, Bulgaria, Algeria, Bosnia and Herzegovina, Italy, Macedonia, Morocco, France, Holland, Israel, Iran, Iraq, Spain, Caucasia, Croatia, Cyprus, Hungary, Romania, Syria, Turkey, Tunisia, Jordan, Yugoslavia, and Greece (Brauer, 1876; Navas, 1926, 1932; Hölzel, 1972; Aspöck et al., 1980, 1996, 2001).

#### Subfamily: Myrmeleoninae Latreille, 1803

##### *Acanthaclisis occitanica* (Villers, 1789)

Materials examined: Iğdır (Yenidoğan), 25.6.2002, 1♂, 1085 m.

Host plant: *Spirae crenatae*.

Distribution in Turkey: Ankara, Isparta, İzmir, Konya, and Niğde (Esben-Petersen, 1933; Hölzel, 1972; Şengonca, 1979).

Distribution in the world: Germany, Austria, Anatolia, Afghanistan, Bulgaria, Denmark, Armenia, France, Switzerland, Spain, Italy, Israel, Iran, Kazakhstan, Hungary, Egypt, Pakistan, Poland, Romania, Russia, Slovakia, Ukraine, and Greece (Aspöck et al., 1980, 1996, 2001).

##### *Dendroleon pantherinus* (Fabricius, 1787)

Materials examined: Iğdır (Karakoyunlu), 29.8.2003, 1♀, 860 m; (Küllük), 2.9.2003, 1♀, 895 m. Specimens belonging to this species were caught by light trap.

Distribution in Turkey: North Anatolia (Aspöck et al., 1980, 2001).

Distribution in the world: Germany, Austria, Azerbaijan, Bulgaria, Czechoslovakia, Denmark, France, Georgia, Croatia, Sweden, Italy, Caucasia, North Anatolia,

North China, Hungary, Poland, Romania, Slovakia, Slovenia, Ukraine, and Yugoslavia (Brauer, 1876; Aspöck et al., 1980, 1996, 2001).

##### *Megistopus flavicornis* (Rossi, 1790)

Materials examined: Kars (Cukurayva), 3.7.2002, 1♀, 1480 m. Host plant: *Rosa* sp.

Distribution in Turkey: Antalya, Malatya, and Muğla (Hölzel, 1972).

Distribution in the world: Germany, Albania, Austria, Azerbaijan, Bulgaria, Czechoslovakia, Armenia, Morocco, France, Georgia, Croatia, Spain, Israel, Switzerland, Italy, Caucasia, North Iran, Cyprus, Hungary, Macedonia, Romania, Russia, Slovakia, Turkmenistan, Turkey, Ukraine, and Greece (Hagen, 1860; Brauer, 1876; Aspöck et al., 1980, 1996, 2001).

##### *Solter ledereri* Navas, 1912

Materials examined: Iğdır (Karakoyunlu), 29.8.2003, 1♀, 1♂, 860 m; (Tuzluca), 30.8.2003, 1♂, 1180 m; (Karakoyunlu), 31.8.2003, 1♀, 860 m; (Aralık), 1.9.2003, 1♀, 810 m; (Küllük), 2.9.2003, 2♀♀, 1♂, 895 m; (centre), 3.9.2003, 2♀♀, 1♂, 1070 m; (Karakoyunlu), 4.9.2003, 4♀♀, 860 m. All specimens were caught by light trap.

Distribution in Turkey: Antalya (Aspöck et al., 1980, 2001).

Distribution in the world: Anatolia, Iran, Israel, Lebanon, and Syria (Hölzel, 1969, 1972; Aspöck et al., 2001).

##### *Nohoandus punctulatus* (Waldheim, 1822)

Materials examined: Iğdır (Karakoyunlu), 25.8.2001, 2♀♀, 3♂♂, 860-910 m; (Aralık), 19.8.2001, 17♀♀, 16♂♂, 825-980 m; (Aralık), 23.6.2002, 3♀♀, 1♂, 815-825 m; (Aralık), 24.6.2002, 7♀♀, 4♂♂, 805-815 m; (Tuzluca), 26.6.2002, 1♂, 990 m; Kars (Değirmendere), 13.8.2002, 2♀♀, 1♂, 1335-1380 m. Host plants: *Spirae crenatae* and *Peganum harmala*.

Distribution in Turkey: Ağrı and Konya (Hölzel, 1972).

Distribution in the world: Azerbaijan, Georgia, Kazakhstan, Hungary, Mongolia, Uzbekistan, Romania, Tajikistan, Turkey, Turkmenistan, and Yugoslavia. (Hölzel, 1972; Aspöck et al., 1980, 2001; Krivokhatsky, 1996).

***Myrmecaelurus trigrammus* (Pallas, 1771)**

Materials examined: Iğdır (Aralık), 18.8.2001, 1♀, 805 m; Ardahan (Özbaşı), 29.7.2002, 1♂, 1420 m; (vicinity of Göle), 21.7.2003, 4♀♀, 4♂♂, 1520-1620 m; Kars (Akçay), 10.8.2002, 22♀♀, 4♂♂, 1180-1320 m; (Kötek), 11.8.2002, 2♀♀, 1410 m; (Değirmendere), 13.8.2002, 2♂♂, 1360 m; (Mescitli), 20.8.2002, 1♀, 1♀, 1730 m; (Camuşlu), 10.7.2003, 1♀, 1♂, 1430-1435 m; (Kağızman), 11.7.2003, 3♀♀, 1325-1345 m; (Beşevler), 12.7.2003, 1♀, 1435 m. Specimens of this species were collected from glades of *Quercus* sp., *Juniperus* sp., and steppe vegetations.

Distribution in Turkey: Adana, Ankara, Antalya, Aydın, Burdur, Çanakkale, Denizli, Eskişehir, Hatay, Isparta, İzmir, Kayseri, Konya, Mersin, and Muğla (Hölzel, 1972; Şengonca, 1979; Aspöck et al., 1980; Arı and Kıyak, 2000).

Distribution in the world: Albania, Bulgaria, Czechoslovakia, Palestine, France, South Russia, Iran, Spain, Italy, Caucasia, Kazakhstan, Hungary, Romania, Syria, Tajikistan, Turkistan, Turkey, Ukraine, Greece, and Yugoslavia (Hagen, 1863; Hölzel, 1972; Aspöck et al., 1980, 1996, 2001).

***Myrmecaelurus major* McLachlan, 1875**

Materials examined: Iğdır (Aralık), 24.6.2002, 2♂♂, 805 m; (Tuzluca), 26.6.2002, 1♀, 1005 m; Kars (Mescitli), 20.8.2002, 1♀, 1680 m; (Kağızman), 11.7.2003, 16♀♀, 10♂♂, 1325-1345 m; (Kağızman), 12.7.2003, 1♀, 1435 m. The specimens were collected from steppe vegetations.

Distribution in Turkey: Ankara, Eskişehir, Isparta, Kayseri, Konya, Malatya, and Van (Esben-Petersen, 1933; Hölzel, 1969, 1972; Şengonca, 1979).

Distribution in the world: Anatolia, Afghanistan, Kazakhstan, Romania, Russia, and Turkistan (Hölzel, 1972; Aspöck et al., 1980, 1996, 2001).

***Euroleon nostras* (Fourcroy, 1785)**

Materials examined: Ardahan (surroundings of Göle), 21.7.2003, 1♀, 1♂, 1520-1525 m; Iğdır (Küllük), 2.9.2003, 1♀, 895 m. Host plant: *Juniperus communis*.

Distribution in Turkey: Ankara (Hölzel, 1972).

Distribution in the world: Germany, Anatolia, Austria, Azerbaijan, Belgium, Bulgaria, Bosnia and Herzegovina, Czechoslovakia, Denmark, Armenia, Morocco, Finland,

France, Georgia, Croatia, Holland, England, Spain, Sweden, Italy, Caucasia, Luxemburg, Hungary, Poland, Romania, Ukraine, Yugoslavia, and Greece (Brauer, 1876; Navas, 1932; Hölzel, 1972; Aspöck et al., 1980, 1996, 2001).

***Myrmeleon inconspicuus* Rambur, 1842**

Materials examined: Kars (Karakurt), 24.7.2002, 1♀, 1♂, 1560 m. Host plant: *Poa* sp.

Distribution in Turkey: Antalya (Canbulat, 2003), South Anatolia (Aspöck et al., 1980).

Distribution in the world: Albania, Austria, Bulgaria, Czechoslovakia, Morocco, France, Anatolia, Croatia, Iraq, Spain, Israel, Italy, Caucasia, Kazakhstan, North Iran, Hungary, Moldova, Poland, Romania, Russia, Slovakia, Ukraine, Yugoslavia, and Greece (Brauer, 1868, 1876; Aspöck et al., 1980, 1996, 2001).

***Creoleon plumbeus* (Olivier, 1811)**

Materials examined: Iğdır (Tuzluca), 20.8.2001, 1♀, 2♂♂, 1120 m; Kars (Akçay), 10.8.2002, 8♂♂, 3♀♀, 1180-1320 m; (Kötek), 11.8.2002, 5♀♀, 2♂♂, 1410-1450 m; (Değirmendere), 13.8.2002, 2♀♀, 1♂, 1360-1415 m; (Mescitli), 20.8.2002, 1♀, 2♂♂, 1580-1700 m; (Karakurt), 21.8.2002, 1♀, 1605 m; (Kötek), 10.7.2003, 1♀, 1♂, 1435-1445 m; (Kağızman), 12.7.2003, 1♀, 1440 m. Specimens belonging to this species were collected from steppe vegetations and glades of *Quercus* spp., and *Pinus sylvestris* forest.

Distribution in Turkey: Adana, Ankara, Antalya, Aydın, Burdur, Çanakkale, Denizli, Hatay, Isparta, İzmir, Konya, Mersin, Muğla, Osmaniye, Şanlıurfa (Esben-Petersen, 1933; Şengonca, 1979; Monserrat and Hölzel, 1987; Arı and Kıyak, 2000).

Distribution in the world: Albania, Azerbaijan, Afghanistan, Bulgaria, Armenia, Georgia, Finland, Croatia, Israel, Iran, Italy, Kazakhstan, Cyprus, Kyrgyzstan, Hungary, Macedonia, Moldova, Uzbekistan, Poland, Romania, Russia, Syria, Tajikistan, Turkey, Turkmenistan, Ukraine, Yugoslavia, and Greece (Hölzel, 1972; Aspöck et al., 1980, 1996, 2001).

***Delfimeus irroratus* (Olivier, 1811)**

Materials examined: Ardahan (Posof), 27.7.2003, 1♀, 1525 m; (Göle, near the border of Erzurum), 22.7.2003, 1♀, 1840 m; Iğdır (Karakoyunlu), 4.9.2003, 1♀, 860 m. The specimens were caught by light trap.

Distribution in Turkey: Adana, Amasya, Ankara, Antalya, Isparta, Konya, Mersin, and Muğla (Esben-Petersen, 1933; Hölzel, 1972; Arı and Kıyak, 2000; Canbulat, 2003).

Distribution in the world: Armenia, Croatia, Lebanon, Macedonia, Syria, Turkey, Greece, and Yugoslavia (Hölzel, 1972; Aspöck et al., 1980, 1996, 2001).

***Deutleon turanicus* Navas, 1927**

Materials examined: Ardahan (surroundings of Göle), 3.8.2002, 1♂, 1598 m.

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

Distribution in the world: Mongolia (Krivokhatsky, 1996), Asia (Navas, 1927).

***Distoleon curdicus* Hölzel, 1972**

Materials examined: Ardahan (surroundings of Göle), 3.8.2002, 4♀♀, 3♂♂, 1540-1675 m; (surroundings of Göle), 21.7.2003, 7♀♀, 5♂♂, 1520-1595 m; (surroundings of Göle), 22.7.2003, 3♀♀, 1840-1910 m; (surroundings of Göle), 23.7.2003; 1♀, 1360 m. Specimens belonging to this species were collected in glades of *Quercus* spp.

Distribution in Turkey: Ağrı, Erzurum, Gaziantep, Kayseri, and Van (Hölzel, 1972; Şengonca, 1979).

Distribution in the world: Anatolia (Hölzel, 1972; Aspöck et al., 2001).

***Distoleon luteomaculatus* Hölzel, 1972**

Materials examined: Iğdır (Küllük), 2.9.2003, 1♀, 895 m; Iğdır (Karakoyunlu), 4.9.2003, 1♀, 860 m. The specimens were caught by light trap.

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

Distribution in the world: Afghanistan (Hölzel, 1972).

***Distoleon tetragrammicus* (Fabricius, 1798)**

Materials examined: Ardahan (Özbaşı), 29.7.2002, 4♀♀, 3♂♂, 1380-1410 m; (the banks of Posof stream), 30.7.2002, 1♀, 1450 m; (surroundings of Göle), 21.7.2003, 1♀, 1♂, 1595 m. The specimens were collected from glades of *Quercus* sp.

Distribution in Turkey: Adana, Antalya, Aydın, Burdur, Çanakkale, Denizli, Hatay, Isparta, İzmir, Kayseri, Konya, Mersin, and Muğla (Schneider, 1845; Esben-Petersen,

1933; Şengonca, 1979; Arı and Kıyak, 2000; Canbulat, 2003).

Distribution in the world: Austria, Albania, Germany, Azerbaijan, Bulgaria, Czechoslovakia, South Siberia, Georgia, Armenia, France, Morocco, Croatia, Iraq, Iran, Switzerland, Spain, Israel, Italy, Hungary, Moldova, Poland, Portugal, Romania, Russia, Slovenia, Slovakia, Syria, Turkey, Ukraine, Yugoslavia, and Greece (Hagen, 1860; Brauer, 1876; Hölzel, 1972; Aspöck et al., 1980, 1996, 2001).

***Macronemurus bilineatus* Brauer, 1868**

Materials examined: Iğdır (Aralık), 23.6.2002, 1♀, 1♂, 825 m; Kars (Karakurt), 24.7.2002, 25♀♀, 12♂♂, 1560-1670 m; (Akçay), 10.8.2002, 2♀♀, 1180 m; (Değirmendere), 13.8.2002, 12♀♀, 4♂♂, 1335-1415 m; (Mescitli), 20.8.2002, 2♀♀, 1700 m; (Kağızman), 11.7.2003, 2♂♂, 1345 m; (Kağızman), 12.7.2003, 1♀, 1435 m. Host plant: *Centaurea depressa*.

Distribution in Turkey: Afyon, Ankara, Antalya, Burdur, Çanakkale, Denizli, Edirne, Isparta; İzmir, Kayseri, Nevşehir, Konya, Mersin, Niğde, and Van (Hölzel, 1972, 1987; Şengonca, 1979; Canbulat, 2003).

Distribution in the world: Bulgaria, Armenia, Croatia, Hungary, Macedonia, Romania, Russia, Turkey, Ukraine, Yugoslavia, and Greece (Brauer, 1868; Aspöck et al., 1980, 2001; Hölzel, 1987).

***Mesonemurus steineri* Hölzel, 1972**

Materials examined: Iğdır (surroundings of Aralık), 24.6.2002, 2♀♀, 805 m; (Yenidoğan), 25.6.2002, 6♀♀, 5♂♂, 930-1170 m; (Tuzluca), 26.6.2002, 3♀♀, 3♂♂, 990-1005 m; (Gaziler), 1.7.2002, 2♀♀, 2♂♂, 1015-1030 m. Host plants: *Peganum harmala* and *Spirae crenata*.

Distribution in Turkey: East Anatolia (Hölzel, 1972, 1987; Aspöck et al., 1996, 2001).

Distribution in the world: Anatolia (Aspöck et al., 2001).

***Neuroleon egenus* (Navas, 1915)**

Materials examined: Iğdır (Karakoyunlu), 29.8.2003, 1♀, 860 m; (Karakoyunlu), 31.8.2003, 2♀♀, 860 m; (Karakoyunlu), 1.9.2003, 1♀, 1♂, 860 m; (Küllük), 2.9.2003, 2♀♀, 1♂, 895 m; (centre), 3.9.2003, 2♀♀, 1070 m. The specimens were caught by light trap.



Distribution in Turkey: Anatolia (Muğla) (Aspöck et al., 1980; Canbulat, 2003).

Distribution in the world: Anatolia, Algeria, Morocco, France, Israel, Italy, Cyprus, Syria, Yugoslavia, and Greece (Hölzel, 1972; Aspöck et al., 1980).

***Neuroleon microstenus* (McLachlan, 1898)**

Materials examined: Iğdır (Karakoyunlu), 29.8.2003, 1♀, 860 m; (Tuzluca), 30.8.2003, 1♀, 1180 m; (Karakoyunlu), 31.8.2003; 2♀♀, 860 m. The specimens were caught by light trap.

Distribution in Turkey: Ankara and Çanakkale (Hölzel, 1972; Canbulat, 2003).

Distribution in the world: Albania, Bulgaria, Algeria, Israel, Italy, Cyprus, North Iran, Lebanon, Central and South Anatolia, Syria, Yugoslavia, and Greece (Hölzel, 1972; Aspöck et al., 1980).

***Neuroleon assimilis* (Navas, 1915)**

Materials examined: Kars (Değirmendere), 13.8.2002, 3♂♂, 1365-1380 m; Iğdır (Aralık), 1.9.2003, 1♀, 810 m; (Karakoyunlu), 4.9.2003, 1♀, 860 m. The specimens were caught by light trap.

Distribution in Turkey: Antalya, Burdur, Çanakkale, Denizli, Isparta, İzmir, Muğla, and Şanlıurfa (Şengonca, 1979; Kacirek, 1998; Canbulat, 2003).

Distribution in the world: Anatolia, Armenia, Iran, Syria, and Greece (Hölzel, 1972; Aspöck et al., 1980, 1996, 2001).

***Neuroleon nemausiensis* (Borkhausen, 1791)**

Materials examined: Ardahan (Eminbey), 28.7.2003, 1♂, 1575 m; Iğdır (Karakoyunlu), 31.8.2003, 1♀, 860 m. The specimens were caught by light trap and found on *Quercus* sp.

Distribution in Turkey: Anatolia (Denizli) (Aspöck et al., 1980; Canbulat, 2003).

Distribution in the world: Anatolia, Algeria, Morocco, France, Italy, Spain, Hungary, Malta, Poland, Romania, Ukraine, and Greece (Brauer, 1876; Aspöck et al., 1980, 1996, 2001).

***Nicarinus poeciliopterus* (Stein, 1863)**

Materials examined: Ardahan (surroundings of Göle), 21.7.2003, 1♀, 1580 m. Host plant: *Quercus* sp.

Distribution in Turkey: Adana, Antalya, Denizli, Mersin, West and South Anatolia (Hölzel, 1972; Şengonca, 1979; Aspöck et al., 1980; Canbulat, 2003).

Distribution in the world: Afghanistan, Anatolia, Croatia, Italy, Iran, Syria, Turkmenistan, Yugoslavia, and Greece (Brauer, 1876; Aspöck et al., 1980, 1996, 2001).

***Cueta beieri* Hölzel, 1969**

Materials examined: Iğdır (Aralık), 24.6.2002, 1♂, 805 m; (Küllük), 2.9.2003, 1♀, 895 m; Karakoyunlu, 4.9.2003, 1♀, 860 m; Kars (Karakurt), 24.7.2002, 1♀, 1560 m; (Kağızman), 11.7.2003, 1♂, 1345 m. The specimens belonging to this species were collected from steppe vegetations and the banks of the Aras River.

Distribution in Turkey: Antalya, Aydın, Denizli, Isparta, Osmaniye, and Muğla (Şengonca, 1979; Canbulat, 2003).

Distribution in the world: Anatolia, Lebanon, and Greece (Aspöck et al., 1996, 2001).

## Discussion

All species determined in this study are confined to the Palaearctic region. Of the 24 species, 7 have been found in Europe, Asia, and North Africa. Twelve of the 24 species have been found in Asia and Europe, while the rest have been recorded only from Asia. These species are *Mesonemurus steineri* Hölzel, 1972, *Distoleon luteomaculatus* Hölzel, 1972, *Distoleon curdicus* Hölzel, 1972, *Deutleon turanicus* Navas, 1927, and *Solter ledereri* Navas, 1912. Among these, the type locality of *Mesonemurus steineri* Hölzel, 1972 and *Distoleon curdicus* Hölzel, 1972 is located in East Anatolia and these 2 species have been recorded only from Anatolia. The other 2 species were known from Mongolia and Afghanistan, and their distribution range has been extended to North-east Anatolia with this study. Before this study, the distribution range of *Solter ledereri* Navas, 1912 had been confined to the east Mediterranean countries and Iran. However, its distribution area has been enlarged to East Anatolia.

The Turkish Myrmeleonidae fauna was represented by 43 species. The number in Turkey has reached 45 as a result of this study.

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