Lacewing (Insecta: Neuroptera) fauna of Başkonuş Mountain National Park (Kahramanmaraş Province-Turkey)

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Abstract

Kahramanmaraş (Turkey), has a great deal of endemic biodiversity and worthwhile environmental features for both animal and plant species. Başkonuş Mountain is a National Park belongs to Andırın town, Kahramanmaraş. In this study, 172 Neuroptera samples were collected from Başkonuş Mountain, during the years 2009-2011. Totaly, 12 species belonging to 5 families were determined and all these species are new records for the Başkonuş Mountain. Among these species Dichochrysa prasina (Burmeister), Chrysoperla carnea (Stephens), Cunctochrysa albolineata (Killington), Chrysopa septempunctata (Wesmael), Chrysopa viridana Schneider, Italochrysa italica (Rossi), Osmylus fulvicephalus (Scopoli), Wesmaelius (Kimminsia) subnebulosus (Stephens), Rexa raddai (Hölze), Micromus angulatus (Stephens), Libelloides macaronius (Scopoli), Mantispa perla Pallas were founded to be second record for Kahramanmaraş province.

Keywords: *Başkonuş Mountain National Park, fauna, Neuroptera, Kahramanmaras, Turkey.*

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Başkonuş Milli Parkı dantela kanatlı (Insecta: Neuroptera) faunası (Kahramanmaraş, Türkiye)

Özet

*Kahramanmaraş hem bitki hem de hayvan türleri için önemli bir endemik biyoçeşitliliğe sahiptir. Başkonuş Dağı, Kahramanmaraş'ın Andırın ilçesine bağlı bir Milli Park'tır. Bu çalışmada Başkonuş Dağı'ndan 2009-2011 yılları arasında 172 Neuroptera örneği toplanmıştır. Toplamda 5 familyaya ait 12 tür tanımlanmıştır. Bu çalışmada tespit edilen türlerin tamamı Başkonuş Dağı için yeni kayıt durumundadır. Dichochrysa prasina (Burmeister), Chrysoperla carnea (*Stephens*), Cunctochrysa albolineata (*Killington*), Chrysopa septempunctata (*Wesmael*), Chrysopa viridana Schneider, Italochrysa italica (Rossi), Osmylus fulvicephalus (Scopoli),Wesmaelius (*Kimminsia*) subnebulosus (*Stephens*), Rexa raddai (*Hölzel*), Micromus angulatus (*Stephens*), Libelloides macaronius (*Scopoli*)* ve *Mantispa perla* Pallastürleri ise Kahramanmaraş şehri için ikinci kayıt olarak bulunmuştur.

Anahtar kelimeler: *Başkonuş Dağı Milli Parkı, fauna, Neuroptera, Kahramanmaraş, Türkiye*

1. Introduction

Neuropterids (Insecta: Neuroptera) commonly known as lacewings or nerve-winged insects, are important group of predacious insects which includes many small to large sized, soft bodied arthropods, particularly aphids (Hemiptera: Aphidoidea) and coccoids (Hemiptera: Coccomorpha). They feed on soft-bodied insects including pests in their larval and adult stages thus considered as valuable allies of biological control and for this reason there are of interest to farmers and biologists [1-3].

Forests, with their various habitat types (inner forest, forest edges) serve as reservoirs for lacewings that may have a role in control of pests of cultivated plants. In many cases, field crop colonisation of lacewings is enhanced by the presence of forests nearby. Most forest of both temperature and tropical zones are under sylvicultural management and these procedures have a significant effect on forest-inhabitant lacewing assemblages [4].

Başkonuş Mountain is a National Park belongs to Andırın town, Kahramanmaraş, Turkey. It contains commonly 4 soil formations and 3 main vegetation types respectively machiie (300-600 m), forest (*Lonicera implexa*, *Celti saustralis*, *Laurusnobilis sp.*, *Phillyrea latifolia*, *Juniperus oxycedrus*, *Pistaciaterebinthus*, sp.*Smilax aspera*, *Asparagusacutifolius*, *Ruscus aculeatus*, *Osyris alba*) (600-1780 m) and steppe vegetation (above 1600 m). The precipitation regime is rainy in all (winter, autumn, summer, spring) seasons [5]. In Başkonuş Mountain there are 1010 hectare forest field that carries a worthwhile importance among Turkish forests [6].

The Başkonuş Mountain and its surrounding is nearly height of 800-1700 m above the sea level. This Mountain is among the most diverse ecological areas in Kahramanmaraş province, having 35 plant taxons. It is located at North 37°-34.8' latitudes, East 36°55.8'

longitudes. In this area among 1000-1779 m altitudes forest formation condensed that in this regard; it is the most important forest resources of the province of Kahramanmaraş [7]. Due to its rich forest endemic trees and special situations when compared to other Kahramanmaraş habitats, the Başkonuş Mountain has a more developed and more diverse indigenous entomological fauna [8].

Insufficiency of data initiated us to identify the green lacewing fauna of the Başkonuş Mountain where lacewings have an improvement biotops. The aim of this present current study was to determine Neuropterid fauna of Başkonuş Mountain.

2. Materials and methods

In the course of this study during the years 2009-2011, the Neuroptera fauna in the Başkonuş Mountain was sampled by means of regular visits to fixed recording sites representing different habitats (Fig. 1). For the surveying of the Neuroptera fauna of the Başkonuş Mountain mainly two traditional sampling techniques were used: sweep net sampling, light trapping (replacement lamp bulb).

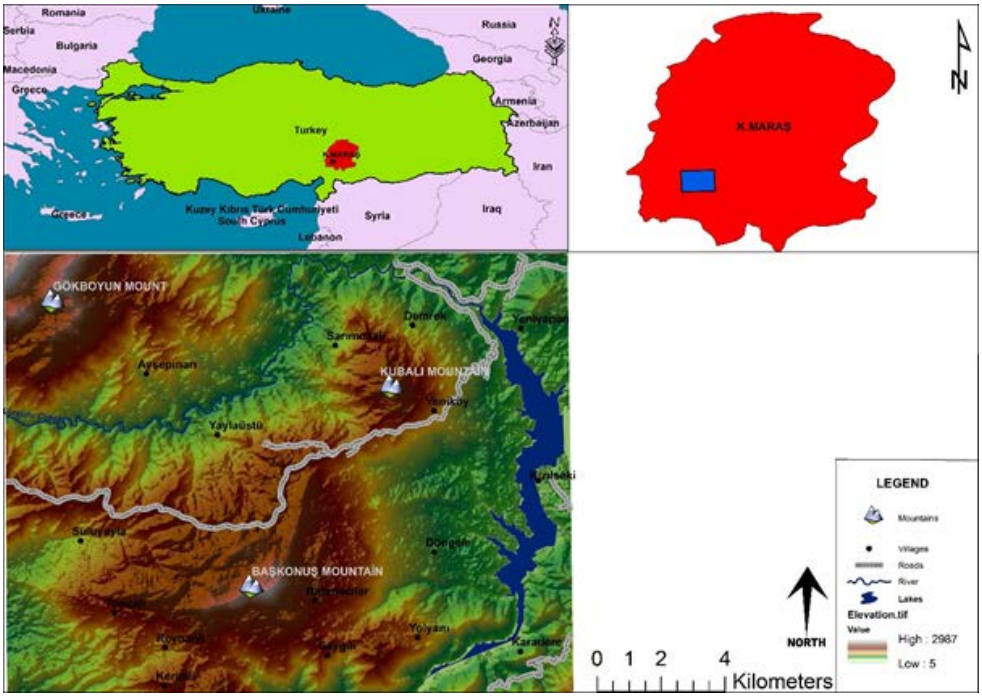

Figure 1. Area of surveyed Neuroptera Fauna of the Başkonuş Mountain National Park (Kahramanmaraş-Turkey): Location map of Başkonuş Mountain National Park.

3. Diagnosis process

Having been killed in the jars filled with ethyl acetate or cyanide, the Neuroptera samples were prepared and labelled as museum material then, deposited in the collection of the Zoological Museum of KSU University, Turkey. Species identification process relied much heavily on elements of male-female genitale organe and wing morphology. To study the wings were detached from the body and mounted dry on microscope slides. Following illustration, wings were glued to cards pinned beneath the

appropriate specimen. The apical part of the abdomens were broken off with fine forceps and macerated in 10% KOH for cleaning digestion residues and preserved in a glycerin-filled arthropod microvial to other investigations. In the diagnosis process Agnew and Mc Ewen et al. were followed [4, 8, 9].

4. Results

At the result of survey carried out in Başkonuş Mountain, totally 12 species were identified between 2009 and 2011 years. Taxonomical informations were given in each species.

Order : Neuroptera

Family: Chrysopidae Schneider, 1851

Dichochrysa prasina (Burmeister, 1839)
Sinonym:*Chrysopa aspersa* Wesmael, 1841; *Chrysopa coerulea* Brauer, 1850; *Hemerobiusramburii* Costa, 1855; *Chrysopa mariana* Navas, 1905; *Chrysopa sachalinensis* Matsumura, 1911; *Chrysopa caucasica* Navas, 1914; *Chrysopavemalis* Navas, 1926.

Material examined: 3 ♀♀, 2 ♂♂; Kahramanmaraş, Başkonuş Mountain, Gavurdağı Village, 27.V.2009 1482 m; 1 ♀, 4 ♂♂; Kasarca Village, 23.VI.2009, 1500 m; 1 ♀, 2 ♂♂, Yılanlı Hill, 30.VII.2010, 1187 m; 2 ♀♀, 2 ♂♂, Fakıyeri Village, 1390 m, 26.VI.2011.

Zoogeographic Origin: Siberian [4,24].

Turkey distribution: Adana, Adıyaman, Antalya, Aydın, Ankara, Antakya, Ardahan, Batman, Çanakkale, Denizli, Diyarbakır, Edirne, Elazığ, Hakkari, Iğdır, Isparta, Kahramanmaraş, Kars, Kayseri, Kırşehir, Konya, Mardin, Mersin, Muğla, Samsun, Şanlıurfa, Siirt [10,24].

World distribution: Afghanistan, Albania, Algeria, Andorra, Armenia, Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece, Holland, Hungary, Iran, Iraq, Italy, Japan, Kyrgyzstan, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Moldova, Mongolia, Morocco, Norway, Poland, Portugal, Romania, Russia, Sakhalin, Slovenia, Spain, Sweden, the former Yugoslavia, Tunisia, Ukraine [11,24,38].

Chrysoperla carnea (Stephens, 1836) s.l.
Sinonym: *Chrysopa affinis* Stephens, 1836; *Chrysopa microcephala* Brauer, 1850; *Chrysopaplorabunda* Ficth, 1856; *Chrysopa proxima* Navas, 1918; *Chrysopa kolthoffi* Navas, 1927; *Chrysopamohave* Banks, 1938.

Material examined:3♀,5♂; Kahramanmaraş, Başkonuş Mountain; Kaledibi Village, 08.VI.2009, 1120 m; 5♀,8♂; Buzluk Village, 07.V.2009, 1150m;3♀,7♂;Ziyaret Hill, 27.VI.2010, 1360m; 1♀,2♂; Rahmacılar Village, 07. VII.2011, 1280 m.

Zoogeographic Origin: Holoarctic [24, 39].

Turkey distribution: Adana, Adıyaman, Ağrı, Amasya, Ankara, Antalya, Artvin. Ardahan, Aydın, Batman, Burdur, Bitlis, Çanakkale, Denizli, Diyarbakır, Edirne, Elazığ, Erzurum, Gaziantep, Hakkari, Iğdır, Isparta, İstanbul, İzmir, Kahramanmaraş, Kars, Kayseri, Kırşehir, Konya, Malatya Mardin, Mersin, Muğla, Nevşehir, Niğde, Samsun, Siirt, Şanlıurfa, Şırnak, Tokat, Trabzon, Van [40-56].

World distribution: Algeria, Austria, Bulgaria, Canary Islands, Cyprus, Egypt, Georgia, Hungary, Iran, Israel, Italy, Lebanon, Libya, Mongolia, Morocco, Norway, Russia, Spain, Syria, Tunisia
[24].

Anisochrysa (*Cunctochrysa*) *albolineata* (Killington 1935)

Sinonym: *Chrysopa albolineata* Killington 1935

Material examined:1♀,2♂;Kahramanmaraş, Başkonuş Mountain, Araplan Village, 04.VII.2009, 1050m; 1♀,3♂; Söğütoğluğu Village, 14.VI.2009, 1220m; 2♀,2♂; Saçıkesik Village, 03.VII.2010, 1200m; 2♀, 6♂; Hacıbel Hill, 30.VI.2011, 1180m.

Zoogeographic Origin: Siberian [57].

Turkey distribution: Ankara, Kahramanmaraş [58].

World distribution: Germany, Hungary, Turkey [24].

Chrysopa septempunctata (Wesmael, 1841)
Sinonym: *Nothochrysa robusta* Kuwayama 1962; *Hemerobius mauricianus* Killington 1937; *Chrysopa nobilis* Brauer 1850.

Material examined:1♀,2♂; Kahramanmaraş, Başkonuş Mountain, Bitdüşen Village, 22.VI.2009, 1270m; 1♀,2♂; Orhan Village, 28.VII.2009, 1270m; 2♀,4♂; Kısırdut Village, 18.VI.2010, 1050m; 2♀,4♂; Hacıbel Village, 05.VII.2011; 1050m.

Zoogeographic Origin: Holomediteryan [13,14].

Turkey distribution: Adana, Ankara, İçel, İstanbul, Kahramanmaraş [40], Nevşehir, İzmir [42, 59].

World distribution: Afghanistan, China, Germany, Iran, Iraq, Israel, Japan, Korea, Lebanon, Morocco, Pakistan, Syria [13, 24].

Chrysopa viridana Schneider, 1845

Sinonym: *Chrysopa geniculata* Pictet 1865; *Chrysopa marginalis* Navas 1905; *Chrysopa collina* Navas 1934 ; *Chrysopa zelenyi* Steinmann 1964.

Material examined:3♀,2♂; Kahramanmaraş, Başkonuş Mountain, Yediardıç Village, 06.VI.2009, 1300m; 2♀,3♂; Beyleryurdu Village, 29.VI.2009, 1270m; 2♀,4♂; Kısırdut Village, 20.VII.2010, 1050m; 1♀,1♂; Hacıbel Hill, 17.VII.2011, 1180 m.

Zoogeographic Origin: Holomediterranian [13, 14].

Turkey distribution: Ankara, Antalya, Aydın, Burdur, Denizli, Edirne, Isparta, Kahramanmaraş, Mersin, Muğla [10, 45, 58,51].

World distribution: Afghanistan, Austria, Armenia, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus Czech Republic, France, Georgia, Greece, Hungary, Iran, Israel, Italy, Libya, Moldova, Morocco, Poland, Portugal, Romania, Russia, Slovenia, Spain, Switzerland, Tunisia, Turkmenistan, Ukraine, the former Yugoslavia [12, 16, 18-20, 24, 30, 36, 37].

Italochrysa italica (Rossi, 1790)

Sinonym: *Hemerobius lateralis* Olivier, 1792; *Hemerobius italicus* Rossi, 1790; *Chrysopa italica*, Burmeister 1839.

Material examined:1♀,2♂;Kahramanmaraş, Başkonuş Mountain, Köklükbağları Village, 01. VI.2009, 950m; 1♀,3♂; Yavşanboğazı Village, 11.VI.2009, 1500m; Kısırdut Village, 12.V.2010, 1050m; 2♀,1♂; Yavşanboğazı Village, 10.VII.2011, 1500m.

Turkey distribution: Ankara, Aydın, Çanakkale, Isparta, İzmir, Kahramanmaraş, Konya, Mersin, Muğla [41, 46, 49-51].

World distribution: Bulgaria, Croatia, France, Greece, Iraq, Israel, Italy, Lebanon, Macedonia, Malta, Portugal, Romania, Slovenia, Spain, Switzerland, Ukraine, the former Yugoslavia [24].

Zoogeographic Origin: Holomediterranian [14, 57].

Rexa raddai (Hölzel, 1966)

Sinonym: *Chrysopa raddai* Hölzel 1966; *Eurochrysa raddai* Hölzel 1970.

Material examined:1♀,2♂; Kahramanmaraş, Başkonuş Mountain, Kaledibi Hill, 04.VI.2009, 1120 m; 3♀,3♂; Sumaklık Village, 04.VI.2009, 1300m; 1♀,2♂; Çolaklı Village, 13.VII.2010, 1050m; 2♀,4♂; Orhan Village, 30.VI.2011, 1230m.

Zoogeographic Origin: Anatolia-Balkan-Pontomediteryan [14].

Turkey distribution: Bilecik, Adana, Ankara, Muğla [60].

World distribution: Greece, Turkey [23, 33].

Family: Osmylidae Leach in Brewster, 1815

Osmylus fulvicephalus (Scopoli, 1763)

Sinonym: *Hemerobius maculatus* Fabricius, 1787; *Hemerobius laurifoliaeformis* Razoumowsky, 1789; *Osmylusmaculatus* v. *vittatus* Costa, 1855.

Material examined: 2♀,2♂;Kahramanmaraş, Başkonuş Mountain, Hacıbel Hill, 05.V.2009, 1180m; 1♀,1♂; Yılanlı Hill, 02.VII.2010, 1187m; 1♀,1♂; Buzluk Village, 19.VI.2011, 1150m.

Zoogeographic Origin: Holomediterranian [13, 14, 24].

Turkey distribution: Antalya, Ardahan, Burdur, Isparta, Muğla [24, 51, 54, 61].

World distribution: Albania, Austria, Belgium, Bulgaria, Bosnia and Herzegovina, Croatia, Czech Republic, Denmark, Estonia, France, Germany, Great Britain, Greece, Hungary, Ireland, Italy, Latvia, Liechtenstein, Luxembourg, Macedonia, the Netherlands, Poland, Romania, Russia, Slovenia, Spain, Sweden, Switzerland, Ukraine, the former Yugoslavia [21, 23, 26, 36, 37, 44].

Family: Hemerobiidae Latreille, 1802

Wesmaelius (*Kimminsia*) *subnebulosus* (Stephens, 1836)
Hemerobius subnebulosus Stephens 1836; *Hemerobius fuscus* Stephens 1836; *Boriomyiasubnebulosa* Bank 1905; *Kimminsa subnebulosa* Dorokhova 1973.

Material examined:1♀,2♂;Kahramanmaraş, Başkonuş Mountain, Orhan Village, 23.VII.2009, 1230m; 1♀,3♂;Beyleryurdu Village, 25.VII.2010, 1270m; 1♀,1♂;Beyleryurdu Village, 30.VI.2011,1270m.

Zoogeographic Origin: Holomediterranian [13, 14,57].

Turkey distribution: Burdur, Bursa, Denizli, Elazığ, Isparta, İzmir, Kahramanmaraş, Kırşehir, Mersin [51, 55, 58, 59].

World distribution: Andorra, Armenia, Austria, Azores, Belgium, Bulgaria, Canada, Canary islands, China, Croatia, Cyprus, Czech Republic, Denmark, France, Finland, Georgia, Germany, Great Britain, Greece, Hungary, Iran, Ireland, Italy, Latvia, Liechtenstein, Luxembourg Morocco, the Netherlands, Norway, Poland, Portugal, Romania, Russia, Spain, Switzerland, Uzbekistan, Slovenia, Turkmenistan, Ukraine, United States, the former Yugoslavia [24, 26, 28, 31, 37].

Micromus angulatus (Stephens, 1836)
Sinonym: *Hemerobius villosus* Zetterstedt, 1840; *Hemerobius intricatus* Wesmael, 1841; *Micromus tendinosus* Rambur, 1842; *Hemerobius lineatus* Göszy, 1852. *Micromus theryanus* Navas, 1910.

Material examined:1♀,1♂; Kahramanmaraş, Başkonuş Mountain, Göz Village, 16.VI.2009, 1440m; 2♀,1♂; Kısırdut Village, 08.VIII.2010, 1050m; 1♀,3♂;Sumaklık Village, 15.VI.2011,1300m.

Zoogeographic Origin: Holoarctic [13, 14].

Turkey distribution: Isparta [62], Edirne [63].

World distribution: Armenia, Austria, Belgium, Canada, China, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Ireland, Israel, Italy, Japan, Kazakhstan, Latvia, Liechtenstein, Luxembourg, Malta, Mongolia, Morocco, Netherlands, Norway, Poland, Portugal, Romania, Russia, Siberia, Slovenia, Spain, Sweden, Switzerland, Ukraine, USA [14].

Family: Mantispidae, Leach 1815

Mantispa perla Pallas, 1772

Sinonym: *Mantispa christiana* Charpentier, 1825; *Mantispa victorii* Guerin, 1845; *Mantispa perla* var. Pictet, 1865.

Material examined:1♀,4♂; Kahramanmaraş, Başkonuş Mountain, Rahmacılar Village, 16.VII.2009, 1250m; 1♀,1♂; Bakacak Village, 20.VII.2010, 1078m; 2♀,2♂;Nebikayası Village, 26.V.2011, 1500m.

Zoogeographic Origin: Holomediteryan [13, 14, 57].

Turkey distribution: Denizli, Isparta, Kütahya [51, 59].

World distribution: Bulgaria, Armenia, Morocco, Spain, the Caucasus, Iran, Hungary, Macedonia, Mongolia, Russia, Slovenia, Turkey, Turkmenistan, Ukraine, the former Yugoslavia, Greece [23, 24].

Family: Ascalaphidae Rambur, 1842

Libelloides macaronius (Scopoli, 1763)

Sinonym: *Myrmeleon kolvanense* Laxmann, 1770; *Ascalaphus oculatus* Brulle, 1832; *Ascalaphus pupillatus* Rambur, 1842; *Ascalaphus intermedius* Menetries, 1848; *Acalaphus* dubius Eversmann, 1850; *Ascalaphus macaranius* var. *semipupullatus* Taborsky, 1939.

Material examined: 2♀,5♂; Kahramanmaraş, Başkonuş Mountain, Beyleryurdu Village, 27.V.2009, 1250m; 1♀,3♂; Bitdüşen Village, 12.V.2010, 1270m; 1♀,3♂; Çolaklı Village, 18.VII.2010, 1060m; 3♀, 4♂; Söğütoğluğu Village, 11.VII.2011,1220m.

Zoogeographic Origin: Pontomediteryan: Anatolia [13, 14, 57].

Turkey distribution: Ankara, Burdur, Çanakkale, Edirne, Hakkari, Kayseri, Niğde [10, 63].

World distribution: Albania, Austria, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Czech Republic, Armenia, Georgia, Croatia, Italy, the Caucasus, Kazakhstan, Cyprus, Kyrgyzstan, Lebanon, Hungary, Macedonia, Moldova, Iran, Uzbekistan, Poland,

Romania, Russia, Slovenia, Tajikistan, Turkmenistan, Ukraine, the former Yugoslavia, Greece [14, 23, 24, 37].

5. Discussion

As in this research, many researches about the diversity of numerous insect orders and effect of habitat structure on several families of lacewings were accomplish in the forestry areas and national parks of different countries [64-67].

Honeydew has a high quality of food for adult Neuroptera members and it has been demonstrated by several authors who have noted the presence of the mono-and disaccharides fructose, glucose, and sucrose and such trisaccharides as raffinose and gluco-sucrose. Several more complex sugars are also present along with many of the essential amino acids. We accept this general definition that Neuroptera species (especially Chrysopidae and Hemerobiidae) need to those biomolecules to fulfil its grow metabolic process up. Some families such as Asteraceae and Leguminosae presented more than one type of pollen, which indicated that the insects had fed on different plants. It is clear that predators (Ascalaphidae, Myrmeleontidae, Mantispidae, Nemopteridae) and predators of aphids (Chrysopidae, Hemerobiidae) become active rather late in spring, thus allowing the prey population to build up before the natural enemies begin feding, reproducing and other methobolic reactions [4].

We suggest that (Chrysopidae, Hemerobiidae, Coniopterygidae) and probably other Neuropteroids may have some use as biological control agents for periodic or none-periodic colonization very early in the season (during May-November). Under these, conditions other predators and parasites are precluded from becoming active because the temperature has not yet reached their lower temperature thresholds. It should be kept in mind, however, that the lower thermal threshold is only one, though an important, aspect of a predator's biology determining its appearance and activity in spring. Ovipositional stimuli and temperature thresholds for mating and egg production as well as possible migration behavior may also become critical.

Devetak (1998); collected several Neuroptera species in different habitats (such as transitions macchia/garrigue, grassy steppes, sand and rockyareas in his study. Mediterranean sclerophyll forest and macchia, garrigue) in Slovenia. These vagetation types occur in Başkonuş Mountain as well [65].

What do these observations say about the likelihood that lacewing larvae and adults are dwelling or prefer to live in area endowed with forestry areas due to fed on with mainly polen and other plant seconder products? It seems likely Neuroptera order members prefer it both shelters and feding as in our study area contained so many plant clusters [4].

Seasonality of lacewings in oak forests has also been examined in Mediterranean areas of Europe. The composition of lacewing assemblages living in dry and warm oak forests (for instance, *Quercetumilicis.*Dal (Fagaceae)was similar in these areas. For this reason features of Neuroptera seasonality are given for each species. Data on seasonal activity patterns of the most dominant chrysopid species oak forest are derived from southern France Canard [69], and Italy Pantaleoni [70-72].

In the Mediterranean region, *Chrysoperla carnea* showed great plasticity regarding possible number of generations per annum. Because it overwinters as adults, adult activity can be detected from March to December. The seasonal flight pattern of *Chrysoperla carnea* has five peaks in Spain as follows: at the end of June, end of July, first half of September, and in early October; prior to generation also form adistinct period of increasing activity. In France, the activity of overwintered adults was in March. From May to December three further peaks were recorded, the first in the second half of June, the largest one in mid-October, with a small peak in early August. A two modal seasonality pattern was characteristic for *C. carnea* in Italy with one peak in the second half of June and another smaller peak in mid-September. In so many investigations carried out in Turkey (Adapazarı, Antalya, Ardahan, Diyarbakır, Iğdır, Kocaeli) demonstrate that Neuroptera species play an active role in biological control during May-September [73, 54].

The conclusion that lacewing larvae and adults are omnivorous is only important if the plant-based foods support lacewing foraging activity, survival, or development.

Oaks are host plants for numerous moth species, many of which are serious defoliating pests. Homoptera prey, eggs and young larvae of certain moth groups can become food sources for lacewings. Also, *Chrysopa viridanais* one of the typical and abundant lacewing species im Mediterranean oak forests (Pantaleoni, 1984). In this study there are so many oak trees in Başkonuş Mountain that confirms our claim [71].

Barnard et al. (1986), in their investigations found that, the flight activity of *Cunctachrysaalbolineata* was from mid June to the mid October. Likewise *C.albolineata* captured in July. *Ch. carnea*, *Chrysopa pallens* and *Dichochrysa prasina* are the most frequent and abundant in the hornbeams forests that we observed exessively *Carpinus orientalis* in the survey area [74].

Monserrat & Marin (1996); reported that numbers of hemerobiid species on oaks in Europa. *W. subnebulosus*captured from *Q. infectoria*that get along with our results [75].

In our study, considering the species richness of Mantispidae and Osmylidae in Turkey, the fauna is average, although the number of individuals collected in this study seems to be normal.

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