

Taxonomic survey on the Rogadinae Förster, 1862 (Hymenoptera, Braconidae) in the northeastern Anatolian region, Turkey

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Abstract: In order to study the fauna of Rogadinae (Hym., Braconidae) of Turkey, adult specimens were collected from different habitats of the provinces of Ardahan, Erzurum, Iğdır, Kars, and Muş (partially) in the northeastern Anatolian region of Turkey between 2011 and 2014. Specimens were collected from a total of 115 localities. All specimens were obtained from natural vegetation or agricultural areas by using either a sweeping net, Malaise traps, or light traps. In total, 14 species belonging to the genus *Aleiodes* Wesmäl were collected and identified from the studied regions; among them, 6 species are recorded for the first time from Turkey: *Aleiodes (Aleiodes) albitibia* (Herrich-Schäffer, 1838); *A. (A.) esenbeckii* (Hartig, 1838); *A. (A.) moldavicus* Tobias, 1986; *A. (A.) varius* (Herrich-Schäffer, 1838); *Aleiodes (Chelonorhogas) miniatus* (Herrich-Schäffer, 1838); and *Aleiodes (Tetrasphaeropyx) arcticus* (Thomson, 1892).

Key words: Braconidae, Rogadinae, fauna, Turkey, Ardahan, Erzurum, Iğdır, Kars

1. Introduction

The Rogadinae differ from other cyclostome braconids by the presence of a deep groove between the first and second metasomal tergites, and the posteroventral margin of the first tergite and anteroventral margin of the second tergite being distinct (Tobias, 1986).

Rogadinae is one of the most diversified subfamilies in Braconidae (Shenefelt, 1975). More than 960 Rogadinae species have been described in 57 recognized genera; most of them are restricted to northern Europe, Asia, and North America (Shaw et al., 2006; Buther et al., 2012; Yu et al., 2012; Shimbori and Shaw, 2014). The first studies aiming to reveal the Rogadinae fauna of Turkey were done in 1979 and covered the majority of Turkey (except Ağrı, Ardahan, Bingöl, Bitlis, Hakkari, Iğdır, Kars, Mardin, Siirt, and Şanlıurfa provinces) by recording 21 species of the genus *Aleiodes* (Fahringer, 1922; Beyarslan et al., 2002; Aydogdu and Beyarslan, 2005, 2006; Quicke et al., 2006).

The species of *Aleiodes* are internal parasitoids of caterpillars, especially macrolepidopterans of the superfamilies Noctuoidea and Geometroidea, and, to a lesser extent, Arctioidea, Sphingoidea, and Papilionoidea. All are koinobionts, which means that the host caterpillar is not permanently paralyzed but continues to feed and grow for a period of time after it is parasitized. This method of parasitism, unique to the tribe Rogadini (including *Aleiodes*), is very distinctive and noteworthy (Quicke and

Shaw, 2005). The larvae of *Aleiodes* species complete their feeding and pupate within the shrunken and mummified remains of the host caterpillar. In all known cases, the form of the mummy caused by a particular *Aleiodes* species is characteristic for that host and parasitoid; thus, the mummified caterpillar remains are of considerable diagnostic value and should be retained with the parasitoid when reared. Host caterpillar mummies are usually found attached to the host plant substrate on leaves, stems, or bark. Most caterpillar mummies are firmly attached to the substrate by a glue-like substance that is exuded through a prosternal hole chewed by the parasitoid larva. The inside of the mummy is lightly lined with silk by the parasitoid larva, but the main support for the mummy seems to come from a premature cuticle of host pupa below the remaining larval cuticle (Shaw, 1983, 1997, 2002; Shaw and Huddleston, 1991; Shaw et al., 1997, 2006; Marsh and Shaw, 2003; Quicke and Shaw, 2005).

The species of the parasitoid wasp genus *Aleiodes* are distributed in all zoogeographic regions; many are found in association with caterpillars that feed in the canopy of trees or large shrubs and so would be defined as arboreal and are, therefore, true forest insects (van Achterberg, 1985; van Achterberg and Polaszek, 1996; Shaw, 2006). *Aleiodes* species are highly beneficial because they serve as biological control agents for the natural suppression of populations of these forest insect pests (Shaw et al., 2006).

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Plants in this region are divided into the following vegetation formations according to their physiognomic and ecological characteristics: herbages (steppes) becoming green in the month of April, blooming and setting seed in the month of May, turning yellow in the months of June and July, and drying out after leaving their seeds in depression areas in eastern Anatolia at heights of up to 2000 m (steppes); mountain steppes; high meadows (steppe meadows); anthropogenic steppes found in steppe areas in fields where oak, juniper, and black pine forests are destroyed, i.e. in dry forest fields; bush groups found in relatively humid areas surrounding dams and streams in damaged forests; arid and semiarid areas; and dry and sparse forest groups consisting of oak, juniper, and black pine. Most of the plant communities in this region are of Irano-Turanian origin (Zohary, 1950).

Fourteen rogadine species were identified within 1 genus and 4 subgenera in this study. Six Rogadinae species were recorded for the first time for the fauna of Turkey. These species are as follows: *A. (Aleiodes) albitibia* (Herrich-Schäffer, 1838); *A. (A.) esenbeckii* (Hartig, 1838); *A. (A.) moldavicus* Tobias, 1986; *A. (A.) varius* (Herrich-Schäffer, 1838); *A. (Chelonorhogas) miniatus* (Herrich-Schäffer, 1838); and *A. (Tetrasphaeropyx) arcticus* (Thomson, 1892). The following species have been recorded previously: *A. (A.) bicolor* (Spinola, 1808), *A. (A.) circumscriptus* (Nees, 1834), *A. (A.) gastritor* (Thunberg, 1822), *A. (A.) nocturnus* (Telenga, 1941), *A. (A.) pallidator* (Thunberg, 1822), *A. (A.) signatus* (Nees, 1811), *Aleiodes (Neorhogas) dissector* (Nees, 1834), and *A. (N.) ductor* (Thunberg, 1822). Thus, the number of Rogadinae species in Turkey has increased from 21 to 27.

2. Materials and methods

In order to determine the Braconidae fauna of Turkey, adult specimens of Rogadinae were collected from different habitats in the provinces of Ardahan, Erzurum, Iğdır, and Kars of the northeastern Anatolian region of Turkey between 2011 and 2014. Adult specimens of Rogadinae were collected by Malaise and light traps and sweeping nets. Publications consulted for distribution data include those of Tobias (1986), Belokobylskij (1996), Shaw (2002), and Yu et al. (2012).

Relevant literature was used for taxonomical examination of the material (Tobias, 1986; Shaw et al., 2006). Information on parasitoids, hosts, general distributions (in terms of zoogeographical region), and hosts of the species are given according to Yu et al. (2012). The subgenera and species are tabulated alphabetically therein. The terminology and measurements follow van Achterberg (1993). All specimens are deposited in the collection of the Department of Entomology, Bitlis Eren University, Bitlis, Turkey. An asterisk is used within the text for the species that were recorded as new to Turkey.

3. Results

3.1. Family: Rogadinae Förster, 1862

3.1.1. Genus: *Aleiodes* Wesmael, 1838

3.1.1.1. Subgenus: *Aleiodes* s. str. Wesmael, 1838

**Aleiodes (Aleiodes) albitibia* (Herrich-Schäffer, 1838)

(syn. *Aleiodes heterogaster* Wesmael, 1838 (Yu et al., 2012))
Material examined: Erzurum, Şenkaya, Değirmenlidere Köyü, (40°43'53"N, 42°31'09"E), 1820 m a.s.l., 20.08.2013, Leg.: Ö. Şahsuvaroğlu, 1♀.

Distribution: Palearctic, Nearctic, and Neotropical.

Hosts: **Lepidoptera, Arctiidae:** *Atolmis rubricollis* (Linnaeus, 1758). **Crambidae:** *Anania crocealis* (Hübner, 1796). **Gelechiidae:** *Caryocolum amaurella* (M. Hering 1924). **Geometridae:** *Abraxas grossulariata* (Linnaeus 1758); *Bupalus piniarius* (Linnaeus, 1758); *Cyclophora ruficiliaria* (Herrich-Schäffer, 1855); *Epirrhoe galiata* (Denis and Schiffermüller, 1775); *Epirrita autumnata* (Borkhausen, 1794); *Eupithecia alliaria* (Staudinger, 1870); *E. linariata* (Denis and Schiffermüller 1775); *E. subfasciata* (Haworth, 1809); *Gymnoscelis rufifasciata* (Haworth, 1809); *Hylaea fasciaria* (Linnaeus, 1758); *Lycia isabellae* (Harrison, 1914); *Thera variata* (Denis and Schiffermüller 1775). **Lymantriidae:** *Leucoma salicis* (Linnaeus, 1758). **Noctuidae:** *Apamea crenata* (Hufnagel, 1766); *Autographa gamma* (Linnaeus, 1758); *Diarsia rubi* (Vieweg, 1790); *Helicoverpa armigera* (Hübner, 1808); *Hoplodrina octogenaria* (Goeze, 1781); *Lithomoia solidaginis* (Hübner, 1803); *Mamestra brassicae* (Linnaeus, 1758); *Noctua fimbriata* (Schreber, 1759); *N. pronuba* (Linnaeus, 1758); *Notodonta dromedaria* Linnaeus, 1767; *Orthosia gracilis* (Denis and Schiffermüller, 1775); *O. incerta* (Hufnagel, 1766); *O. stabilis* (Denis and Schiffermüller, 1775); *Pammene amygdalana* (Duponchel, 1842); *Penicillaria jocosatrix* Guenee, 1852; *Pseudaletia unipuncta* (Haworth, 1809); *Spodoptera exigua* (Hübner, 1808); *Xestia agathina* (Duponchel, 1827); *X. baja* (Denis and Schiffermüller, 1775); *X. xanthographa* (Denis and Schiffermüller, 1775). **Pyralidae:** *Dioryctria abietella* (Denis and Schiffermüller, 1775). **Pterophoridae:** *Pterophorus pentadactyla* (Linnaeus, 1758). **Tortricidae:** *Archips rosana* (Linnaeus, 1758); *Croesia bergmanniana* (Linnaeus, 1758); *C. holmiana* (Linnaeus, 1758); *Cydia conicolana* (Heylaerts, 1874); *C. strobilella* (Linnaeus, 1758); *Pammene gallicolana* (Lienig and Zeller, 1846); *Tortrix viridana* (Linnaeus, 1758); *Zeiraphera griseana* (Hübner, 1799).

Aleiodes (Aleiodes) bicolor (Spinola, 1808)

Material examined: Ardahan, Çıldır, Eskibeyrehatun Köyü (41°07'47"N, 42°54'32"E), 1950 m a.s.l., 16.09.2012, Leg.: Ö. Şahsuvaroğlu, 3♀♀; Ardahan, Posof (41°30'30"N, 42°44'03"E), 1445 m a.s.l., 23.06.2012, Leg.: S. Molkoç, 1♀, 3♂♂; Erzurum, Aziziye, Eskipolat (40°04'08"N, 40°56'00"E), 1860 m a.s.l., 16.08.2013, Leg.: E. Çoban, 1♂; Erzurum, Horasan-Orman İşletme Müdürlüğü

(40°02'06"N, 42°10'41"E), 1585 m a.s.l., 17.08.2013, Leg.: M. Yurtcan, 1♀; Erzurum, İspir-Köprüküy (39°58'01"N, 41°52'17"E), 1602 m a.s.l., 11.09.2012, Leg.: A. Beyarslan, 1♂; Erzurum, İspir-Yeşilyurt Köyü (40°31'29"N, 41°04'55"E), 1570 m a.s.l., 26.06.2013, Leg.: Ö. Şahsuvaroğlu, 1♀; Erzurum, Oltu, Güzelsu (40°36'15"N, 42°4'31"E), 1200 m a.s.l., 12.09.2012, Leg.: Ö. Keleş, 1♂; Erzurum, Oltu, İnanmış (40°27'46"N, 41°42'27"E), 1820 m a.s.l., 13.09.2012, Leg.: M. Yurtcan, 2♂♂; Erzurum, Olur (40°48'46"N, 42°9'37"E), 655 m a.s.l., 12.09.2012, Leg.: A. Beyarslan, 1♂; Erzurum, Yakutiye, Köse Mehmet (39°57'16"N, 41°24'14"E), 1870 m a.s.l., 17.08.2013, Leg.: M. Yurtcan, 2♀♀; Iğdır, Tuzluca, Gaziler (40°06'36"N, 43°25'31"E), 1035 m a.s.l., 21.09.2013, Leg.: M. Yurtcan, 1♀; Iğdır, Tuzluca, İncesu (40°06'36"N, 43°25'31"E), 1057 m a.s.l., 23.06.2013, Leg.: Ö. Şahsuvaroğlu, 1♀, 1♂; Kars, Boğazköy (40°41'19"N, 43°6'47"E), 1693 m a.s.l., 17.09.2012, Leg.: Ö. Şahsuvaroğlu, 1♀; Kars, Kağızman, Aydıncavak (40°09'11"N, 43°19'14"E), 1115 m a.s.l., 20.09.2012, Leg.: E. Çoban, 2♀, 1♂; Kars, Kağızman, Morpet (40°15'16"N, 42°58'36"E), 1486 m a.s.l., 20.09.2012, Leg.: Ö. Keleş, 6♀♀; Kars-Kağızman, Paslı, (40°16'36"N, 42°57'22"E), 1785 m a.s.l., 21.09.2012, Leg.: E. Çoban, 1♀; Kars, Sarıkamış, Taş Ocakları (40°20'17"N, 42°34'23"E), 2102 m a.s.l., 19.09.2012, Leg.: A. Beyarslan, 1♀; Kars, Sarıkamış, Uzungazi (40°07'33"N, 42°31'00"E), 1510 m a.s.l., 19.08.2013, Leg.: A. Beyarslan, 1♀.

Distribution: Palearctic.

Hosts: Lepidoptera, Crambidae: *Loxostege sticticalis* (Linnaeus, 1761); *Pyrausta purpuralis* (Linnaeus, 1758); *P. sanguinalis* (Linnaeus, 1767). Geometridae: *Apocheima cinerarius* (Erschoff, 1874); *Archiearis parthenias* (Linnaeus, 1761); *Eupithecia linariata* (Denis and Schiffermüller, 1775); Operophtera (Hübner, 1825). Lycaenidae: *Aricia agestis* (Denis and Schiffermüller, 1775); *A. artaxerxes* (Fabricius, 1793); *Cupido alcetas* (Hoffmannsegg, 1804); *C. minimus* (Fuessly 1775); *Lysandra coridon* (Poda, 1761); *Plebejus idas* (Linnaeus, 1761); *Polyommatus albicans* (Gerhard, 1851); *P. damon* (Denis and Schiffermüller, 1775); *P. eros* (Ochsenheimer, 1808); *P. icarus* (Rottemburg, 1775). Lymantriidae: *Dasychira albodentata* Bremer, 1864; *Leucoma salicis* (Linnaeus, 1758). Noctuidae: *Apamea sordens* (Hufnagel, 1766). Nymphalidae: *Maniola jurtina* (Linnaeus, 1758); *Aglais urticae* (Linnaeus, 1758). Pterophoridae: *Emmelina monodactyla* (Linnaeus, 1758); *Hellinsia tephrodactyla* (Hübner, 1813). Zygaenidae: *Jordanita chloros* (Hübner, 1813); *J. graeca* (Jordan, 1907); *Rhagades pruni* (Denis and Schiffermüller, 1775); *Zygaena filipendulae* (Linnaeus, 1758); *Z. lonicerae* (Scheven, 1777); *Z. purpuralis* (Brünnich, 1763); *Z. viciae* (Denis and Schiffermüller, 1775).

***Aleiodes (Aleiodes) circumscriptus* (Nees, 1834)**

Material examined: Ardahan, Bilbilan Yaylası (41°6'37"N, 42°42'7"E), 1900 m a.s.l., 15.09.2012, Leg.: M. Yurtcan, 2♀♀, 1♂; Ardahan, Çıldır, Eskibeyrehatun Köyü (41°07'47"N, 42°54'32"E), 1950 m a.s.l., 22.08.2013, Leg.: E. Çoban, 1♀, 1♂; Ardahan, Çıldır, Eskibeyrehatun Köyü (41°07'47"N, 42°54'32"E), 1950 m a.s.l., 22.08.2013, Leg.: Ö. Şahsuvaroğlu, 1♀; 16.09.2012, 1♀; Ardahan, Hanak, Kent Ormanı (41°13'47"N, 42°50'24"E), 1821 m a.s.l., 14.09.2012, Leg.: E. Çoban, 2♀♀; Ardahan, Merkez, Değirmenli Köyü (41°10'5"N, 42°35'46"E), 1848 m a.s.l., 22.06.2012, Leg.: Ö. Keleş, 1♀; Ardahan, Posof (41°30'30"N, 42°44'03"E), 1445 m a.s.l., 23.06.2012, Leg.: Ö. Şahsuvaroğlu, 1♀; Ardahan, Tepeler (41°2'54"N, 42°35'10"E), 1934 m a.s.l., 22.06.2012, Leg.: M. Yurtcan, 1♀; Artvin, Yusufeli-Morkaya (40°42'47"N, 41°40'50"E), 680 m a.s.l., 12.09.2012, Leg.: M. Yurtcan, 1♂; Erzurum, Aziziye, Gelinkaya (40°1'25"N, 40°54'50"E), 1792 m a.s.l., 11.09.2012, Leg.: M. Yurtcan, 1♀; Erzurum, Aziziye, Yoncalık (40°01'47"N, 40°54'54"E), 1800 m a.s.l., 20.06.2013, Leg.: Ö. Şahsuvaroğlu, 1♂; Erzurum, Azort Yaylası (39°54'5"N, 41°15'35"E), 1871 m a.s.l., 18.06.2012, Leg.: M. Yurtcan, 1♂; Erzurum, Horasan-Orman İşletme Müdürlüğü (40°02'06"N, 42°10'41"E), 1585 m a.s.l., 25.08.2013, Leg.: Ö. Şahsuvaroğlu, 1♂; Erzurum, Horasan, Orman İşletme Müdürlüğü (40°02'06"N, 42°10'41"E), 1585 m a.s.l., 17.08.2013, Leg.: M. Yurtcan, 1♀; Erzurum, İspir, Yeşilyurt Köyü (40°31'29"N, 41°04'55"E), 1570 m a.s.l., 26.06.2013, Leg.: Ö. Şahsuvaroğlu, 2♀♀, 1♂; Erzurum, Narman, Demirdağ (40°20'40"N, 41°38'30"E), 1500 m a.s.l., 27.06.2013, Leg.: M. Yurtcan, 1♀; Erzurum, Narman, Demirdağ (40°20'40"N, 41°38'30"E), 1500 m a.s.l., 27.06.2013, Leg.: E. Çoban, 1♂; Erzurum, Oltu, Güzelsu (40°36'15"N, 42°4'31"E), 1200 m a.s.l., 12.09.2012, Leg.: Ö. Keleş, 1♂; Erzurum, Olur (40°48'46"N, 42°9'37"E), 655 m a.s.l., 12.09.2012, Leg.: M. Yurtcan, 1♀; Erzurum, Pasinler, Övenler (39°59'16"N, 41°34'38"E), 1740 m a.s.l., 17.08.2013, Leg.: E. Çoban, 1♀; Erzurum, Şenkaya, Gözalan (40°39'33"N, 42°16'33"E), 1168 m a.s.l., 18.06.2012, Leg.: M. Yurtcan, 1♀; 13.09.2012, 1♀; 13.09.2012, Leg.: E. Çoban, 2♂♂; Erzurum, Şenkaya, İkizpınar (40°36'28"N, 42°21'00"E), 1700 m a.s.l., 27.06.2013, Leg.: M. Yurtcan, 1♀; Erzurum, Tortum (40°17'57"N, 41°32'52"E), 1450 m a.s.l., 12.09.2012, Leg.: M. Yurtcan, 1♂; Erzurum, Yakutiye, Köse Mehmet (39°57'16"N, 41°24'14"E), 1870 m a.s.l., 17.08.2013, Leg.: E. Çoban, 1♀; Erzurum, Yakutiye, Köse Mehmet (39°57'16"N, 41°24'14"E), 1870 m a.s.l., 17.08.2013, Leg.: A. Beyarslan, 1♀; Erzurum, Yakutiye, Köse Mehmet (39°57'16"N, 41°24'14"E), 1870 m a.s.l., 17.08.2013, Leg.: M. Yurtcan, 1♂; Iğdır, Tuzluca (40°02'51"N, 43°42'54"E), 1038 m a.s.l., 25.08.2013, Leg.: M. Yurtcan, 1♀; Iğdır, Tuzluca, Gaziler (40°06'36"N, 43°25'31"E), 1035 m a.s.l., 21.09.2013, Leg.: A. Beyarslan,

1♀, 1♂; Iğdır, Tuzluca, Köprübaşı Köyü (40°2'35"N, 43°41'19"E), 1100 m a.s.l., 20.09.2012, Leg.: M. Yurtcan, 1♀; Kars, Arpaçay, Çanakısu (41°00'51"N, 43°18'14"E), 1975 m a.s.l., 22.08.2013, Leg.: M. Yurtcan, 1♀; Kars, Boğazköy (40°41'19"N, 43°6'47"E), 1693 m a.s.l., 17.09.2012, Leg.: Ö. Şahsuvaroğlu, 1♀; Kars Kağızman, Aydınkavak (40°09'11"N, 43°19'14"E), 1115 m a.s.l., 20.09.2012, Leg.: E. Çoban, 1♀; Kars, Kağızman, Aydınkavak (40°09'11"N, 43°19'14"E), 1115 m a.s.l., 20.09.2012, Leg.: A. Beyarslan, 1♀; Kars, Kağızman, Morpet (40°15'16"N, 42°58'36"E), 1486 m a.s.l., 20.09.2012, Leg.: A. Beyarslan, 6♀♀, 5♂♂; Kars, Kağızman, Morpet (40°15'16"N, 42°58'36"E), 1486 m a.s.l., 23.8.2013, Leg.: E. Çoban, 1♀; 20.09.2012, 1♀, 1♂; Kars, Kağızman, Paslı (40°16'36"N, 42°57'22"E), 1785 m a.s.l., 21.09.2012, Leg.: Ö. Şahsuvaroğlu, 1♀; Kars, Sarıkamış Ormanları (40°16'50"N, 42°39'01"E), 2045 m a.s.l., 24.08.2013, Leg.: A. Beyarslan, 1♀; Kars, Sarıkamış (40°19'47"N, 42°35'24"E), 1668 m a.s.l., 27.06.2012, Leg.: A. Beyarslan, 1♀; Kars, Sarıkamış, Kayak Tesisleri, Birinci Etap (39°50'57"N, 41°16'59"E), 2455 m a.s.l., 19.09.2012, Leg.: Ö. Şahsuvaroğlu, 1♀; Kars, Sarıkamış, Söğütlüçeşme (40°16'58"N, 42°34'18"E), 2350 m a.s.l., 24.06.2013, Leg.: A. Beyarslan, 1♀; Kars, Sarıkamış, Taş Ocakları, Turna Gölü (40°13'1"N, 42°32'4"E), 2200 m a.s.l., 19.09.2012, Leg.: Ö. Şahsuvaroğlu, 2♂♂; Kars, Sarıkamış, Uzungazi (40°07'33"N, 42°31'00"E), 1510 m a.s.l., 19.08.2013, Leg.: A. Beyarslan, 1♀; Kars, Selim, Gürbüzler (40°27'36"N, 42°46'48"E), 2040 m a.s.l., 18.09.2012, Leg.: Ö. Şahsuvaroğlu, 1♀; Muş, Mercimekkale (38°56'11"N, 41°30'27"E), 1263 m a.s.l., 20.06.2013, Leg.: E. Çoban, 1♀; Muş, Mercimekkale (38°56'11"N, 41°30'27"E), 1263 m a.s.l., 20.06.2013, Leg.: M. Yurtcan, 1♀; Muş, Varto (39°09'55"N, 41°27'52"E), 1525 m a.s.l., 23.06.2013, Leg.: A. Beyarslan, 1♀.

Distribution: Palearctic.

Hosts: Lepidoptera, Arctiidae: *Atolmis rubricollis* (Linnaeus, 1758); **Lymantriidae:** *Leucoma salicis* (Linnaeus, 1758). **Gelechiidae:** *Caryocolum amaurella* (Hering, 1924). **Geometridae:** *Thera variata* (Denis and Schiffermüller, 1775); *Abraxas grossulariata* Linnaeus, 1758; *Bupalus piniarius* Linnaeus, 1758; *Cyclophora ruficiliaria* (Herrich-Schäffer, 1855); *Epirrhoe galiata* (Denis and Schiffermüller 1775); *Epirrita autumnata* (Borkhausen, 1794); *Eupithecia alliararia* (Staudinger, 1870); *E. linariata* (Denis and Schiffermüller, 1775); *E. subfuscata* (Haworth, 1809); *Gymnoscelis rufifasciata* (Haworth, 1809); *Hylaea fasciaria* (Linnaeus, 1758); *Lycia isabellae* (Harrison, 1914). **Noctuidae:** *Apamea crenata* (Hufnagel, 1766); *Autographa gamma* (Linnaeus, 1758); *Diarsia rubi* (Vieweg, 1790); *Helicoverpa armigera* (Hübner, 1808); *Hoplodrina octogenaria* (Goeze, 1781); *Lithomoia solidaginis* (Hübner 1803); *Mamestra brassicae* (Linnaeus, 1758); *Noctua fimbriata* (Schreber, 1759); *N.*

pronuba (Linnaeus, 1758); *Orthosia gracilis* (Denis and Schiffermüller 1775); *Orthosia incerta* (Hufnagel, 1766); *O. stabilis* (Denis and Schiffermüller, 1775); *Penicillaria jocosatrix* Guenee, 1852; *Pseudaletia unipuncta* (Haworth, 1809); *Spodoptera exigua* (Hübner, 1808); *Xestia agathina* (Duponchel, 1827);

X. baja (Denis and Schiffermüller, 1775); *X. xanthographa* (Denis and Schiffermüller, 1775). **Pterophoridae:** *Pterophorus pentadactyla* (Linnaeus 1758). **Pyralidae:** *Dioryctria abietella* (Denis and Schiffermüller 1775); *Ebulea crocealis* (Denis and Schiffermüller, 1775). **Tortricidae:** *Archips rosana* (Linnaeus, 1758); *Croesia bergmanniana* Linnaeus, 1758; *C. holmiana* Linnaeus, 1758; *Cydia conicolana* (Heylaerts, 1874); *C. strobilella* (Linnaeus, 1758); *Pammene amygdalana* (Duponchel, 1842); *P. gallicolana* (Lienig and Zeller, 1846); *Tortrix viridana* (Linnaeus, 1758); *Zeiraphera griseana* (Hübner, 1799).

**Aleiodes (Aleiodes) esenbeckii* (Hartig, 1838)

Material examined: Kars, Susuz, Kırkpınar (40°53'11"N, 43°00'20"E), 2155 m a.s.l., 28.06.2013, Leg.: M. Yurtcan, 1♀.

Distribution: Palearctic, Oriental.

Hosts: Lepidoptera, Endromidae: *Endromis versicolora* (Linnaeus, 1758). **Lasiocampidae:** *Dendrolimus albolineatus* Matsumura, 1921; *D. pini* (Linnaeus, 1758); *D. punctatus* Walker, 1855; *D. sibiricus* (Tschetverikov, 1908); *D. spectabilis* (Butler, 1877); *D. superans* (Butler 1877); *D. tabulaeformis* Tsai and Liu, 1962; *Selenephera lunigera* (Esper, 1911). **Zygaenidae:** *Zygaena lonicerae* (Scheven, 1777).

Aleiodes (Aleiodes) gastritor (Thunberg, 1822)

Material examined: Ardahan, Çamlıçatak (41°07'18"N, 42°50'19"E), 1850 m a.s.l., 15.09.2012, Leg.: A. Beyarslan, 1♂; Ardahan, Hanak, Kent Ormanı (41°13'47"N, 42°50'24"E), 1821 m a.s.l., 14.09.2012, Leg.: Ö. Keleş, 1♀; Ardahan, Posof (41°30'30"N, 42°44'03"E), 1445 m a.s.l., 23.06.2012, Leg.: S. Molkoç, 1♂; Erzurum, Horasan, Orman İşletme Müdürlüğü (40°02'06"N, 42°10'41"E), 1585 m a.s.l., 17.08.2013, Leg.: M. Yurtcan, 1♀; Erzurum, Köprüköy, Ilıcasu (40°8'1"N, 41°53'51"E), 2144 m a.s.l., 20.06.2012, Leg.: M. Yurtcan, 2♂♂; Erzurum, Narman, Yanıktaş (40°17'31"N, 41°52'26"E), 1602 m a.s.l., 20.06.2012, Leg.: Ö. Şahsuvaroğlu, 1♀; Erzurum, Tekman, Hacıömer (39°35'01"N, 41°44'39"E), 1840 m a.s.l., 20.06.2013, Leg.: E. Çoban, 1♀; Kars, Kağızman, Morpet (40°15'16"N, 42°58'36"E), 1486 m a.s.l., 20.09.2012, Leg.: E. Çoban, 1♀, 1♂; Kars, Kağızman, Paslı (40°16'36"N, 42°57'22"E), 1785 m a.s.l., 21.09.2012, Leg.: E. Çoban, 1♀.

Distribution: Holarctic, Oceanic, Oriental.

Hosts: Lepidoptera, Crambidae: *Ostrinia nubilalis* (Hübner, 1796); *Phlyctaenia coronata* (Hufnagel, 1767). **Drepanidae:** *Cilix glaucata* (Scopoli, 1763). **Elachistidae:**

Depressaria absynthiella (Herrich-Schäffer, 1865).
Geometridae: *Alsophila pomataria* (Harris, 1841); *Apocheima cinerarius* (Erschoff, 1874); *A. hispidaria* (Denis and Schiffermüller, 1775); *Chiasmia clathrata* (Linnaeus, 1758); *Chloroclystis v-ata* (Haworth, 1809); *Digrammia gnophosaria* (Guenée, 1857); *Epirrita autumnata* (Borkhausen, 1794); *Erannis defoliaria* (Clerck, 1759); *Eupithecia allitaria* (Staudinger, 1870); *E. miserulata* (Grote, 1863); *E. pusillata* (Denis and Schiffermüller, 1775); *Glennia cribrataria* (Guenée, 1858); *Hylaea fasciaria* (Linnaeus, 1758); *Hypagyrtis unipunctata* (Haworth, 1809); *Isturgia limbaria* (Fabricius, 1775); *Lycia hirtaria* (Clerck, 1760); *Lycia pomonaria* (Hübner, 1790); *Operophtera brumata* (Linnaeus, 1758); *Phthonandria atrilineata* (Butler 1881); *Tephрина arenacearia* (Denis and Schiffermüller, 1775).
Lasiocampidae: *Malacosoma neustria* (Linnaeus, 1758).
Lymantriidae: *Euproctis chrysochora* (Linnaeus, 1758); *E. similis* (Fuessly, 1775); *Hypena scabra* (Fabricius, 1798); *Leucoma salicis* (Linnaeus, 1758).
Noctuidae: *Agrapha agnata* (Staudinger, 1892); *Autographa gamma* (Linnaeus, 1758); *Harpyia hermelina* (Stephens, 1829); *Helicoverpa armigera* (Hübner, 1808); *Pseudaletia unipuncta* (Haworth, 1809); *Spodoptera exigua* (Hübner, 1808); *Trichoplusia ni* (Hübner, 1803).
Notodontidae: *Cerura vinula* (Linnaeus, 1758); *Thaumetopoea processionea* (Linnaeus, 1758).
Yponomeutidae: *Prays oleae* (Bernard, 1788).
Tortricidae: *Archips rosana* (Linnaeus, 1758); *Lobesia botrana* (Denis and Schiffermüller, 1775).

**Aleiodes (Aleiodes) moldavicus* Tobias, 1986

Material examined: Ardahan, Çamlıçatak (41°07'18"N, 42°50'19"E), 1850 m a.s.l., Leg.: Ö. Şahsuvaroğlu, 22.08.2013, 1♀; Ardahan, Hanak, Kent Ormanı (41°13'47"N, 42°50'24"E), 1821 m a.s.l., 14.09.2012, Leg.: E. Çoban, 1♀; Erzurum, Aşkale, Çayköy (39°56'43"N, 40°48'21"E), 1715 m a.s.l., 18.08.2013, Leg.: E. Çoban, 1♀; Erzurum, Aziziye, Eskipolat (40°04'08"N, 40°56'00"E), 1860 m a.s.l., 16.08.2013, Leg.: M. Yurtcan, 2♀♀; Erzurum, Çat, Tuzlataşı (39°27'28"N, 41°03'21"E), 2090 m a.s.l., 29.06.2013, Leg.: E. Çoban, 1♀, 1♂; Erzurum, Horasan, Orman İşletme Müdürlüğü (40°02'06"N, 42°10'41"E), 1585 m a.s.l., 17.08.2013, Leg.: A. Beyarslan, 1♀; Erzurum, Narman (40°20'46"N, 41°54'51"E), 1567 m a.s.l., 27.06.2013, Leg.: M. Yurtcan, 1♀; Erzurum, Şenkaya, Gözalan (40°39'33"N, 42°16'33"E), 1168 m a.s.l., 13.09.2012, Leg.: Ö. Şahsuvaroğlu, 1♂; Erzurum, Yakutiye, Köse Mehmet (39°57'16"N, 41°24'14"E), 1870 m a.s.l., 17.08.2013, Leg.: A. Beyarslan, 3♀♀, 1♂; İğdır, Tigem (39°47'10"N, 44°37'05"E), 858 m a.s.l., 22.06.2013, Leg.: Ö. Şahsuvaroğlu, 2♀♀; İğdır, Tuzluca, Gaziler (40°06'36"N, 43°25'31"E), 1035 m a.s.l., 24.08.2013, Leg.: A. Beyarslan, 1♀; İğdır, Tuzluca, Köprübaşı Köyü (40°2'35"N, 43°41'19"E), 1100 m a.s.l., 20.09.2012, Leg.: M. Yurtcan, 1♂; Kars-Kağızman, Aydıncavak

(40°09'11"N, 43°19'14"E), 1115 m a.s.l., Leg.: A. Beyarslan, 20.09.2012, 1♀, 1♂; Kars, Kağızman, Kuloğlu (40°05'49"N, 42°57'49"E), 1287 m a.s.l., 23.06.2013, Leg.: M. Yurtcan, 1♀; Kars, Kağızman, Morpet (40°15'16"N, 42°58'36"E), 1486 m a.s.l., 20.09.2012, Leg.: Ö. Keleş, 2♀♀, 1♂; Kars, Sarıkamış, Söğütluçeşme (40°16'58"N, 42°34'18"E), 2350 m a.s.l., 24.06.2013, Leg.: M. Yurtcan, 1♀; Kars, Sarıkamış, Uzungazi (40°07'33"N, 42°31'00"E), 1510 m a.s.l., 19.08.2013, Leg.: A. Beyarslan, 2♀♀.

Distribution: Western Palearctic.

Hosts: Unknown.

Aleiodes (Aleiodes) nocturnus (Telenga, 1941)

Material examined: Erzurum, Aziziye, Eskipolat (40°04'08"N, 40°56'00"E), 1860 m a.s.l., 16.08.2013, Leg.: E. Çoban, 1♂.

Distribution: Palearctic.

Hosts: **Lepidoptera,** **Lymantriidae:** *Euproctis karghalica* (Moore, 1878); **Noctuidae:** *Helicoverpa armigera* (Hübner, 1808); *H. zea* (Boddie, 1850). **Notodontidae:** *Cerura menciana* (Moore, 1877); *C. vinula* (Linnaeus, 1758); *Harpyia hermelina* (Goeze, 1781).

Aleiodes (Aleiodes) pallidator (Thunberg, 1822)

Material examined: Ardahan, Altaş (41°9'22"N, 42°52'16"E), 1750 m a.s.l., 14.09.2012, Leg.: E. Çoban, 1♂; Ardahan, Bilbilan Yaylası (41°6'37"N, 42°42'7"E), 1900 m a.s.l., 15.09.2012, Leg.: M. Yurtcan, 1♂; Ardahan, Çamlıçatak (41°07'18"N, 42°50'19"E), 1850 m a.s.l., 22.08.2013, Leg.: Ö. Şahsuvaroğlu, 1♀; Ardahan, Çıldır, Eskibeyrehatun Köyü (41°07'47"N, 42°54'32"E), 1950 m a.s.l., 22.08.2013, Leg.: Ö. Şahsuvaroğlu, 1♂; Ardahan, Göle, Yiğitkonağı (40°56'47"N, 42°34'53"E), 1993 m a.s.l., 22.06.2012, Leg.: M. Yurtcan, 1♂; Ardahan, Hanak, Kent Ormanı (41°13'47"N, 42°50'24"E), 1821 m a.s.l., 14.09.2012, Leg.: Ö. Keleş, 1♀; Ardahan, Hanak, Kent Ormanı (41°13'47"N, 42°50'24"E), 1821 m a.s.l., 14.09.2012, Leg.: Ö. Keleş, 1♀; Ardahan, Posof (41°30'30"N, 42°44'03"E), 1445 m a.s.l., 21.08.2013, Leg.: M. Yurtcan, 1♂; Ardahan, Tepeler (41°2'54"N, 42°35'10"E), 1934 m a.s.l., 22.06.2012, Leg.: M. Yurtcan, 3♂♂; Erzurum, Aziziye, Eskipolat (40°04'08"N, 40°56'00"E), 1860 m a.s.l., 16.08.2013, Leg.: E. Çoban, 1♂; Erzurum, Horasan, Orman İşletme Müdürlüğü, (40°02'06"N, 42°10'41"E), 1585 m a.s.l., 25.08.2013, Leg.: Ö. Şahsuvaroğlu, 1♀; Erzurum, İspir, Çamlıkaya (40°37'49"N, 41°10'52"E), 950 m a.s.l., 16.08.2013, Leg.: M. Yurtcan, 1♂; Erzurum, İspir, Köprüköy (39°58'01"N, 41°52'17"E), 1602 m a.s.l., 11.09.2012, Leg.: E. Çoban, 1♂; 17.06.2012, 1♂; Erzurum, İspir, Yeşilyurt Köyü, (40°31'29"N, 41°04'55"E), 1570 m a.s.l., 26.06.2013, Leg.: E. Çoban, 1♀; Erzurum, Şenkaya, Değirmenlidere Köyü (40°43'53"N, 42°31'09"E), 1820 m a.s.l., 20.08.2013, Leg.: E. Çoban, 1♀; Erzurum, Şenkaya, İkizpınar (40°36'28"N, 42°21'00"E), 1700 m a.s.l., 27.06.2013, Leg.: Ö. Şahsuvaroğlu, 1♂; Erzurum,

Yakutiye, Köse Mehmet (39°57'16"N, 41°24'14"E), 1870 m a.s.l., 17.08.2013, Leg.: E. Çoban, 1♂; Erzurum, Yakutiye, Köse Mehmet (39°57'16"N, 41°24'14"E), 1870 m a.s.l., 17.08.2013, Leg.: M. Yurtcan, 1♀, 1♂; Iğdır, Tuzluca 5 km kala (40°02'51"N, 43°42'54"E), 1038 m a.s.l., 23.06.2013, Leg.: M. Yurtcan, 1♀; Iğdır, Tuzluca, Gaziler (40°06'36"N, 43°25'31"E), 1035 m a.s.l., 21.09.2013, Leg.: Ö. Şahsuvaroğlu, 1♂; Kars, Kağızman, Morpet (40°15'16"N, 42°58'36"E), 1486 m a.s.l., 23.8.2013, Leg.: E. Çoban, 1♀, 3♂♂; Kars, Sarıkamış Ormanları (40°16'50"N, 42°39'01"E), 2045 m a.s.l., 24.08.2013, Leg.: A. Beyarslan, 2♀♀; Kars, Sarıkamış, Bayrakepe (40°17'29"N, 42°36'0"E), 2644 m a.s.l., 19.09.2012, Leg.: M. Yurtcan, 2♂♂; Kars, Sarıkamış, Karakurt (40°10'03"N, 42°36'36"E), 1475 m a.s.l., 23.06.2013, Leg.: E. Çoban, 2♂♂; Kars, Sarıkamış, Kayak Tesisleri, Birinci Etap (39°50'57"N, 41°16'59"E), 2455 m a.s.l., 19.09.2012, Leg.: Ö. Keleş, 1♀; Kars, Sarıkamış, Söğütluçeşme (40°16'58"N, 42°34'18"E), 2350 m a.s.l., 24.06.2013, Leg.: M. Yurtcan, 1♀; Kars, Sarıkamış, Taş Ocakları, Turna Gölü (40°13'1"N, 42°32'4"E), 2200 m a.s.l., 19.09.2012, Leg.: E. Çoban, 1♀; Kars, Sarıkamış, Uzungazi (40°07'33"N, 42°31'00"E), 1510 m a.s.l., 19.08.2013, Leg.: A. Beyarslan, 1♂.

Distribution: Holarctic, Neotropical, Oriental.

Hosts: **Lepidoptera, Gelechiidae:** *Anarsia lineatella* (Zeller, 1839); *Caryocolum amaurella* (Hering, 1924). **Geometridae:** *Bupalus piniarius* (Linnaeus, 1758); *Cyclophora pendularia* (Hufnagel, 1767); *C. punctaria* (Linnaeus 1758); *C. quercimontaria* (Bastelberger 1897); *Dyscia conspersaria* (Denis and Schiffermüller, 1775); *Eupithecia pimpinellata* (Hübner, 1813); *Hylaea fasciaria* (Linnaeus 1758). **Lasiocampidae:** *Selenophera lobulina* (Schiffermüller, 1775). **Lymantriidae:** *Euproctis karghalica* (Moore, 1878); *Orgyia definita* (Packard, 1865); *O. leucostigma* (Smith, 1797). **Noctuidae:** *Agrotis segetum* (Denis and Schiffermüller, 1775); *Heliothis viriplaca* (Hufnagel, 1766); *Helicoverpa armigera* (Hübner, 1808); *H. zea* (Boddie, 1850); *Spodoptera exigua* (Hübner, 1808). **Notodontidae:** *Cerura menciana* (Moore, 1877); *C. vinula* (Linnaeus, 1758); *Harpyia hermelina* (Goeze, 1781). **Psychidae:** *Megalophanes viciella* (Denis and Schiffermüller, 1775). **Tortricidae:** *Apotomis sororculana* (Zetterstedt, 1839).

Aleiodes (Aleiodes) signatus (Nees, 1811)

Material examined: Ardahan, Posof (41°30'30"N, 42°44'03"E), 1445 m a.s.l., 14.09.2012, Leg.: E. Çoban, 8♀♀; Erzurum, Aziziye, Yoncalık (40°01'47"N, 40°54'54"E), 1800 m a.s.l., 26.06.2013, Leg.: A. Beyarslan, 2♂♂; Erzurum, Aziziye, Yoncalık (40°01'47"N, 40°54'54"E), 1800 m a.s.l., 26.06.2013, Leg.: E. Çoban, 1♂; Erzurum, Azort Yaylası (39°54'5"N, 41°15'35"E), 1871 m a.s.l., 18.06.2012, Leg.: M. Yurtcan, 1♀; Erzurum, İspir, Köprüköy (39°58'01"N, 41°52'17"E), 1602 m a.s.l., 11.09.2012, Leg.: M. Yurtcan, 1♀; Erzurum, Narman, Demirdağ (40°20'40"N, 41°38'30"E), 1500 m a.s.l., 27.06.2013, Leg.: A. Beyarslan,

1♀; Erzurum, Oltu, İnanmış (40°27'46"N, 41°42'27"E), 1820 m a.s.l., 13.09.2012, Leg.: E. Çoban, 1♀; Erzurum, Şenkaya, Eğirmendere Köyü (40°43'53"N, 42°31'09"E), 1820 m a.s.l., 21.06.2012, Leg.: E. Çoban, 1♀, 1♂; Erzurum, Tortum, Serdarlı (40°28'58"N, 41°16'33"E), 1722 m a.s.l., 19.06.2012, Leg.: M. Yurtcan, 1♀; Iğdır, Tuzluca, Gaziler (40°06'36"N, 43°25'31"E), 1035 m a.s.l., 24.08.2013, Leg.: A. Beyarslan, 1♀. Kars, Sarıkamış, Büyükkumru (40°25'05"N, 42°28'13"E), 2400 m a.s.l., 16.09.2012, Leg.: A. Beyarslan, 2♀♀; Kars, Sarıkamış, Kızılçubuk (40°21'59"N, 42°32'10"E), 2472 m a.s.l., 18.09.2012, Leg.: M. Yurtcan, 1♀; Kars, Sarıkamış, Söğütluçeşme (40°16'58"N, 42°34'18"E), 2350 m a.s.l., 24.06.2013, Leg.: A. Beyarslan, 1♀; Kars, Sarıkamış, Tekçam (40°23'10"N, 42°30'09"E), 2460 m a.s.l., 25.06.2013, Leg.: Ö. Şahsuvaroğlu, 1♀.

Distribution: Palearctic.

Hosts: **Lepidoptera, Arctiidae:** *Arctia caja* (Linnaeus, 1758); *Coscinia cribraria* (Linnaeus, 1758); *Epicallia villica* (Linnaeus, 1758); *Ocnogyna baetica* (Rambur, 1837). **Lymantriidae:** *Euproctis chrysoorrhoea* (Linnaeus, 1758); *E. similis* (Fuessly, 1775); *Gynaephora selenitica* (Esper, 1789); *Orgyia antiqua* (Linnaeus, 1758); *O. aurolimbata* (Guenée, 1835). **Lasiocampidae:** *Euthrix potatoaria* (Linnaeus, 1758). **Noctuidae:** *Acronicta psi* (Linnaeus, 1758); *A. rumicis* (Linnaeus, 1758); *Autographa gamma* (Linnaeus, 1758); *Noctua fimbriata* (Schreber, 1759); *N. pronuba* (Linnaeus, 1758). **Notodontidae:** *Taumatopoea pityocampa* (Denis and Schiffermüller, 1775); *T. processionea* (Linnaeus, 1758). **Tortricidae:** *Silonota ocellana* (Denis and Schiffermüller, 1775).

***Aleiodes (Aleiodes) varius** (Herrich-Schäffer, 1838)

Material examined: Ardahan, Bilbilan Yaylası (41°6'37"N, 42°42'7"E), 1900 m a.s.l., 15.09.2012, Leg.: M. Yurtcan, 1♀.

Distribution: Palearctic.

Hosts: Unknown.

3.1.1.2. Subgenus: Chelonorhogas Enderlein, 1912

***Aleiodes (Chelonorhogas) miniatus** (Herrich-Schäffer, 1838)

Material examined: Kars, Sarıkamış, Erzurum Yolu 10 km (40°15'03"N, 42°39'11"E), 2016 m a.s.l., 23.06.2013, A. Beyarslan, 1♀.

Distribution: Palearctic.

Hosts: Unknown.

3.1.1.3. Subgenus: Neorhogas Szépliget, 1906

Aleiodes (Neorhogas) dissector (Nees, 1834)

Material examined: Ardahan, Çamlıçatak (41°07'18"N, 42°50'19"E), 1850 m a.s.l., 23.06.2012, Leg.: M. Yurtcan, 1♀.

Distribution: Palearctic.

Hosts: **Lepidoptera, Noctuidae:** *Acronicta rumicis* (Linnaeus, 1758); *A. tridens* (Denis and Schiffermüller, 1775); *Orthosia incerta* (Hufnagel, 1766).

***Aleiodes (Neorhogas) ductor* (Thunberg, 1822)**

Material examined: Ardahan, Posof (41°30'30"N, 42°44'03"E), 1445 m a.s.l., 23.06.2012, Leg.: Ö. Şahsuvaroğlu, 1♂; Ardahan, Sugöze (41°4'55"N, 42°38'58"E), 1839 m a.s.l., 22.06.2012, Leg.: Ö. Keleş, 1♂; Erzurum, İspir, Ardıçlı (40°33'59"N, 41°14'0"E), 1560 m a.s.l., 19.06.2012, Leg.: M. Yurtcan, 1♀; Erzurum, İspir, Yeşilyurt Köyü (40°31'29"N, 41°04'55"E), 1570 m a.s.l., 26.06.2013, Leg.: E. Çoban, 1♂; Erzurum, KöprükÖy, İlicasu (40°8'1"N, 41°53'51"E), 2144 m a.s.l., 20.06.2012, Leg.: E. Çoban, 2♂♂, 1♀; Erzurum, Narman, Yanıktaş (40°17'31"N, 41°52'26"E), 1602 m a.s.l., 20.06.2012, Leg.: M. Yurtcan, 1♀; Erzurum, Tortum, Serdarlı (40°28'58"N, 41°16'33"E), 1722 m a.s.l., 19.06.2012, Leg.: A. Beyarslan, 2♂♂; İğdır, Karakoyun, Gökçeli (39°59'09"N, 44°10'16"E), 850 m a.s.l., 21.06.2013, Leg.: Ö. Şahsuvaroğlu, 1♂; İğdır, Karakoyunlu, Taşburun (39°58'55"N, 44°12'03"E), 839 m a.s.l., 26.06.2012, Leg.: A. Beyarslan, 1♀; Muş, Mercimekkale (38°56'11"N, 41°30'27"E), 1263 m a.s.l., 20.06.2013, Leg.: M. Yurtcan, 1♂.

Distribution: Palearctic.

Hosts: **Lepidoptera, Lasiocampidae:** *Anarta (Calocestra) trifolii* (Hufnagel, 1766); *Autographa gamma* (Linnaeus, 1758); *Euthrix patoraria* (Linnaeus, 1758); *Mamestra brassicae* (Linnaeus, 1758). **Nymphalidae:** *Brenthis ino* (Rottemburg, 1775). **Sesiidae:** *Synanthedon scoliaeformis* (Borkhausen, 1789).

3.1.1.4. Subgenus: *Tetrasphaeropyx* Ashmead, 1889****Aleiodes (Tetrasphaeropyx) arcticus* (Thomson, 1892)**

Material examined: Ardahan, Çamlıçatak (41°07'18"N, 42°50'19"E), 1850 m a.s.l., 15.09.2012, Leg.: Ö. Şahsuvaroğlu, 2 ♀♀; 22.08.2013, 1♀, 1♂; Ardahan, Çıldır, Eskibeyrehatun Köyü (41°07'47"N, 42°54'32"E), 1950 m a.s.l., 24.06.2012, Leg.: E. Çoban, 1♀; Ardahan, Çıldır, Eskibeyrehatun (41°07'47"N, 42°54'32"E), 1950 m a.s.l., 16.09.2012, Leg.: Ö. Şahsuvaroğlu, 3♀♀; Ardahan, Hanak, Kent Ormanı (41°13'47"N, 42°50'24"E), 1821 m a.s.l., 15.09.2012, Leg.: A. Beyarslan, 2♀♀; Ardahan, Posof (41°30'30"N, 42°44'03"E), 1445 m a.s.l., 14.09.2012, 2 ♀♀; 23.06.2012, Leg.: E. Çoban, 1♀, 1♂; Ardahan, Posof (41°30'30"N, 42°44'03"E), 1445 m a.s.l., 16.09.2012, Leg.: M. Yurtcan, 1♀; Ardahan, Posof (41°30'30"N, 42°44'03"E), 1445 m a.s.l., 23.06.2012, Leg.: Ö. Keleş, 1♂; Ardahan, Posof (41°30'30"N, 42°44'03"E), 1445 m a.s.l., 24.06.2012, Leg.: Ö. Şahsuvaroğlu, 1♂, 14.09.2012, 1♀; Artvin, Yusufeli, Morkaya (40°42'47"N, 41°40'50"E), 680 m a.s.l., 12.09.2012, Leg.: E. Çoban, 1♀; Erzurum, Çat, Tuzlataşı (39°27'28"N, 41°03'21"E), 2090 m a.s.l., 29.06.2013, Leg.: M. Yurtcan, 1♀; Erzurum, Horasan, Orman İşletme Müdürlüğü (40°02'06"N, 42°10'41"E), 1585 m a.s.l., 17.08.2013, Leg.: M. Yurtcan, 4♀♀; Erzurum, İspir, Ardıçlı (40°33'59"N, 41°14'0"E), 1560 m a.s.l.,

19.06.2012, Leg.: A. Beyarslan, 1♂; Erzurum, İspir, Petekli (40°25'38"N, 40°54'48"E), 1400 m a.s.l., 14.09.2012, Leg.: M. Yurtcan, 2♀♀; Erzurum, Oltu, Güzelsu (40°36'15"N, 42°4'31"E), 1200 m a.s.l., 12.09.2012, Leg.: A. Beyarslan, 1♀; Erzurum, Oltu, İnanmış (40°27'46"N, 41°42'27"E), 1820 m a.s.l., 13.09.2012, Leg.: M. Yurtcan, 1♂, 1♀; Erzurum, Oltu, Orçuk (40°29'47"N, 41°49'4"E), 1560 m a.s.l., 12.09.2012, Leg.: Ö. Keleş, 1♀; Erzurum, Pasinler, Övenler (39°59'16"N, 41°34'38"E), 1740 m a.s.l., 17.08.2013, Leg.: M. Yurtcan, 1♀; Erzurum, Şenkaya, Gözalan (40°39'33"N, 42°16'33"E), 1168 m a.s.l., 13.09.2012, Leg.: E. Çoban, 1♀; Erzurum, Şenkaya, İkizpınar (40°36'28"N, 42°21'00"E), 1700 m a.s.l., 27.06.2013, Leg.: Ö. Şahsuvaroğlu, 1♀; Erzurum, Yakutiye, Köse Mehmet (39°57'16"N, 41°24'14"E), 1870 m a.s.l., 17.08.2013, A. Beyarslan, 1♀; İğdır, Karakoyunlu, Taşburun (39°58'55"N, 44°12'03"E), 26.06.2012, 839 m a.s.l., Leg.: Ö. Şahsuvaroğlu, 1♂; İğdır, Tuzluca, Gaziler (40°06'36"N, 43°25'31"E), 1035 m a.s.l., 21.09.2013, Leg.: M. Yurtcan, 1♂; İğdır, Tuzluca, Gaziler (40°06'36"N, 43°25'31"E), 1035 m a.s.l., 24.08.2013, Leg.: A. Beyarslan, 1♀; Kars, Arpaçay, Çanaksu (41°00'51"N, 43°18'14"E), 1975 m a.s.l., 16.09.2012, Leg.: A. Beyarslan, 2♀♀; Kars, Boğazköy (40°41'19"N, 43°6'47"E), 1693 m a.s.l., 17.09.2012, Leg.: A. Beyarslan, 2♀♀; Kars, Boğazköy (40°41'19"N, 43°6'47"E), 1693 m a.s.l., 17.09.2012, Leg.: Ö. Keleş, 1♂; Kars, Kağızman (40°9'53"N, 43°5'49"E), 1214 m a.s.l., 24.09.2012, Leg.: A. Beyarslan, 1♀; Kars, Kağızman, Aydıncavak (40°09'11"N, 43°19'14"E), 1115 m a.s.l., 20.09.2012, Leg.: Ö. Şahsuvaroğlu, 1♀; Kars-Kağızman-Aydıncavak (40°09'11"N, 43°19'14"E), 1115 m a.s.l., 24.08.2013, Leg.: A. Beyarslan, 1♀; 20.09.2012, 1♀; Kars, Kağızman, Morpet (40°15'16"N, 42°58'36"E), 1486 m a.s.l., 20.09.2012, Ö. Keleş, 11♀♀, 3♂♂; Kars, Kağızman, Morpet (40°15'16"N, 42°58'36"E), 1486 m a.s.l., 20.09.2012, Leg.: M. Yurtcan, 1♂; Kars, Kağızman, Morpet (40°15'16"N, 42°58'36"E), 1486 m a.s.l., 23.08.2013, Leg.: Ö. Şahsuvaroğlu, 1♀; 20.09.2012, 3♂♂, 4♀♀; Kars, Kağızman, Paslı (40°16'36"N, 42°57'22"E), 1785 m a.s.l., 21.09.2012, Leg.: E. Çoban, 1♀; Kars, Kağızman, Paslı (40°16'36"N, 42°57'22"E), 1785 m a.s.l., 21.09.2012, Leg.: Ö. Şahsuvaroğlu, 1♀, 1♂; Kars, Sarıkamış, Büyükkumru (40°25'05"N, 42°28'13"E), 2400 m a.s.l., 16.09.2012, Leg.: A. Beyarslan, 1♀; Kars, Sarıkamış, Kayak Tesisleri, Birinci Etap (39°50'57"N, 41°16'59"E), 2455 m a.s.l., 19.09.2012, Leg.: A. Beyarslan, 1♂; Kars, Sarıkamış, Kaynak Yaylası (40°23'36"N, 42°29'35"E), 2410 m a.s.l., 25.06.2013, E. Çoban, 1♂; Kars, Sarıkamış, Taş Ocakları, Turna Gölü (40°13'1"N, 42°32'4"E), 2200 m a.s.l., 19.09.2012, Leg.: Ö. Şahsuvaroğlu, 1♀; Kars, Selim, Gürbüzler (40°27'36"N, 42°46'48"E), 2040 m a.s.l., 18.09.2012, Leg.: Ö. Şahsuvaroğlu, 1♀.

Distribution: Palearctic.

Hosts: Lepidoptera, Arctiidae: *Arctia caja* (Linnaeus, 1758). **Geometridae:** *Itame wanaria* (Linnaeus, 1758); *Macaria brunneata* (Thunberg, 1784); *M. fusca* (Thunberg, 1792).

4. Discussion

The project area includes the provinces of Ardahan, Erzurum, Iğdır, and Kars in the eastern Anatolian region. One of the most important gates that allowed living creatures to enter Anatolia is located in this region: the gate of Caucasian fauna, consisting of Siberian and cold steppe elements in the northeast, is the Kars-Erzurum Plateau (Demirsoy, 2002; Çiplak, 2004).

At the end of this study, *A. (A.) circumscriptus* (Nees, 1834) was collected from 46 localities, *A. (T.) arcticus* (Thomson, 1892) from 40 localities, and *A. (A.) pallidator* (Thunberg, 1822) from 28 localities; they were recorded as the most common species. The hosts of *A. (A.) moldavicus* Tobias, 1986; *A. (A.) varius* (Herrich-Schäffer, 1838); and *A. (C.) miniatus* (Herrich-Schäffer, 1838) are unknown. *A. (A.) circumscriptus* (Nees, 1834) has a Palearctic distribution. However, it uses 46 species of Erebidae, Euteliinae, Gelechiidae, Geometridae, Noctuidae, Pterophoridae, Pyralidae, and Tortricidae of Lepidoptera as host organisms. For this reason, it can be considered as a potential biological control agent. The numbers of host species of each *Aleiodes* species are as follows: *A. (A.) albitibia* (Herrich-Schäffer, 1838), 45; *A. (A.) bicolor* (Spinola, 1808), 31; *A. (A.) esenbeckii* (Hartig, 1838), 10; *A. (A.) gastritor* (Thunberg, 1822), 41; *A. (A.) nocturnus* (Telenga, 1941), 6; *A. (A.) pallidator* (Thunberg, 1822), 23; *A. (A.) signatus* (Nees, 1811), 17; *Aleiodes (Neorhogas) dissector* (Nees, 1834), 3; *A. (N.) ductor* (Thunberg, 1822), 6; and *A. (T.) arcticus* (Thomson, 1892), 4.

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The distribution area of *A. (A.) bicolor* (Spinola, 1808), *A. (A.) circumscriptus* (Nees, 1834), *A. (A.) signatus* (Nees, 1811), *A. (A.) varius* (Herrich-Schäffer, 1838), *A. (C.) miniatus* (Herrich-Schäffer, 1838), *A. (N.) dissector* (Nees, 1834), *A. (N.) ductor* (Thunberg, 1822), and *A. (T.) arcticus* (Thomson, 1892) is the Palearctic region. Thus, these are endemic species of the Palearctic region. The biodiversity of *A. (A.) moldavicus* Tobias, 1986 is in the West Palearctic region (Moldova and Turkey); this species is endemic to the West Palearctic. *A. (A.) albitibia* (Herrich-Schäffer, 1838) is distributed in the Palearctic, Nearctic, and Neotropical regions; *A. (A.) esenbeckii* (Hartig, 1838) in the Palearctic and Oriental regions; *A. (A.) gastritor* (Thunberg, 1822) in the Holarctic, Oceanic, and Oriental regions; and *A. (A.) pallidator* (Thunberg, 1822) in the Holarctic, Neotropical, and Oriental regions. These last 4 species are cosmopolitan.

Aleiodes wasps attack and kill various species of leaf-feeding caterpillars. *Aleiodes* species are highly beneficial because they serve as biological control agents for the natural suppression of populations of these forest insect pests. Therefore, *A. (A.) pallidator* (Thunberg, 1822) has been introduced into Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Washington in the United States.

Members of the family Braconidae are dependent on certain plant formations. As in other regions of Turkey where we conducted field surveys, chemicals were applied in agricultural areas in this region as well, and therefore, the population of beneficial fauna was found to be very low.

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