

## High mountain range (Aladağlar National Park) Lygaeoidea (Hemiptera: Heteroptera) fauna of Türkiye, with three new records

Kaan Yence<sup>1</sup> Meral Fent<sup>1\*</sup>

<sup>1</sup> Trakya University, Faculty of Science, Department of Biology, Edirne Türkiye  
E-mail: kaanyence@trakya.edu.tr ORCID iD 0000-0002-3961-1402  
E-mail: m\_fent@hotmail.com ORCID iD 0000-0001-5787-6714  
\*Corresponding author e-mail: m\_fent@hotmail.com

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**ABSTRACT:** The study was carried out between 2016 and 2017 in Aladağlar National Park within the borders of Niğde-Kayseri in Central Anatolia. In order to detect Lygaeoidea fauna of the region, as a result of this study conducted in 38 locations, 57 species belonging to 37 genera and 6 families were identified. Of these species *Lygaeus melanostolus* (Kiritshenko, 1931), *Plinthinus brevipennis* (Latreille, 1807) and *Tropidophlebia costalis* (Herrich & Schaeffer, 1850) are recorded for the first time in Türkiye. The record of *L. melanostolus* in this study constitutes the westernmost point of its distribution. In addition, the rare species recorded from only one locality in Türkiye up to now, *Emblethis latus* Seidenstücker, 1963, *Emblethis nox* Kiritshenko, 1912, *Ischnocoris punctulatus* Fieber, 1861, *Taphropeltus hamulatus* (Thomson, 1870) and the very sporadic species *Apterola lownii* (Saunders, 1876), *Brachyplax tenuis* (Mulsant & Rey, 1852), *Callistonotus nigroruber* (Stål, 1859), *Diomphalus hispidulus* Fieber, 1864, *Eremocoris podagricus* (Fabricius, 1775), *Ischnocoris hemipterus* (Schilling, 1829), *Megalonotus chiragra* (Fabricius, 1794) and *Trapezonotus arenarius arenarius* (Linnaeus, 1758) are also significant findings in this study.

**KEY WORDS:** Lygaeoidea fauna, Heteroptera, high mountain range, Aladağlar National Park, Türkiye

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## INTRODUCTION

Aladağlar National Park is one of the biggest National Parks in Türkiye with an area of approximately 55 thousand hectares, located within the borders of Adana, Niğde and Kayseri provinces (Figure 1).

The Aladağlar forms a part of the Taurus Mountains, which are a part of the Alpine-Himalayan mountain belt (Tüzel, 2001).

Aladağlar region, which is an important center both in terms of mountaineering activities and nature tourism, was declared a National Park in 1995 and taken under protection.

Aladağlar is an important region in terms of the fact that the highest intertwined peaks of the Middle Taurus Mountains coexist, there are many peaks above 3500 m and deep valleys between these peaks and a wide height scale.

The northern part of the region is composed of Paleozoic strata and is called "Black Aladağlar". The southern part is composed of Mesozoic layers and is called the "White Aladağlar". In the northern part, the structure is in the form of soft scree cones, while the southern part consists of higher, steep and hard rocks.

The natural boundaries of the region are Develi Plain in the north, Zamantı River in northeast-southwest direction, Ecemiş Corridor in the west and Karsanti Basin in the south (Toroğlu & Ünalı, 2008). It is also possible to see glacial remains and glacial bowls belonging to the last glacial period in Aladağlar. Cımbar Valley, Mangırcı Valley, Hacer Strait and Sıyrma Strait are valleys in the form of "V-shaped valleys" formed by glacial movements in the past. In addition, ice troughs present formed by glacial depressions in Yedigöller Plateau (Ülker, 2006). In this respect, the region is a very important study area, both because it is capable of creating a refuge for species during the last glacial period and as an important geographical barrier. The region is also important in terms of

phytogeography because it is located on the Anatolian diagonal (Toroğlu & Ünalı, 2008).

Aladağlar is an important flora area due to its different climatic features (Tüfekçi et al., 2002). In the north-western part of Aladağlar, semi-arid steppe climate is observed, while the south-eastern part has mediterranean climate (Toroğlu & Ünalı, 2008).

Aladağlar National Park is also very rich in terms of vegetation, and the dominant species forming the forest are black pine and red pine. Mixed stands formed by these two species are occasionally encountered in the red pine transition zone. In the south-facing parts of the larch distribution area, cedars, which do not form a stand, and firs are also found in the north-facing and more favorable moisture-wise areas.

The "Alpine zone" starts from the upper limit of the forest. Alpine meadows are located in this zone. In the Alpine zone and higher parts, bare rocky areas are reached due to height and slope (Anonym, 2023).

Tüfekçi et al. (2002) determined 1566 taxa belonging to 95 families and 473 genera in their study upon the flora of Aladağlar National Park. They stated that 392 of them are endemic to Türkiye and 26 taxa are endemic only to Aladağlar National Park. Starting from the northern and western borders, there are fruit orchards, mainly apple and cherry, in and around the villages of Pınarbaşı, Demirkazık, Çukurbağ, Elekgölü, Yelatan, around Ecemiş Suyu.

In addition, a small number of grains are planted. As you go towards the mountains from these orchards, the altitude increases and the steppe vegetation in and around Çamardı catches the eye. It is possible to observe some species belonging to *Euphorbia* L., *Astragalus* L., *Acantholimon* Boiss., *Verbascum* L. and *Ornithogalum* L. genera. As you go higher, the depth of the soil decreases and the soil surface becomes covered with

eroded rock pieces. Vegetation gradually decreases on the valley walls and rock surfaces. Although the land above 2500 m generally has a bare appearance, plants belonging to *Ranunculus* L., *Aethionema* R.Br., *Anthyllis* L., *Sedum* L., *Androsace* L. genera can be seen in rock cracks and areas sheltered from the wind. In addition, there is a forest that still exists in the Emli Valley and Mangırcı Valley in the western part of the area. *Abies cilicica* Carrière (Taurus Fir), which is the dominant tree species in this forest area in the valley, is an important species for the area (Tüfekçi et al., 2002).

If we look at the vegetation of the Kayseri side of the area, the maquis formation stands out in the section up to Kapuzbaşı Waterfalls due to the effect of the Mediterranean climate. *Styrax officinalis* L. and *Pistacia terebinthus* L. are common species in this area. As you move from Kapuzbaşı towards Ulupınar Village, there are deciduous forests where *Ostrya carpinifolia* Scop. *Sambucus ebulus* L., *Populus tremula* L., *Pyrus syriaca* Boiss., *Acer sempervirens* L., *Juniperus excelsa* M. Bieb., *J. oxycedrus* L. subsp. *oxycedrus*, *Pinus nigra* J.F.Arnold, *Platanus orientalis* L., and *Rhus coriaria* L. are other important tree species in the area. Higher up there is Hacer Forest, the largest forest

area of the National Park, where *P. nigra* and *A. cilicica* species are dominant (Halıcı & Aksoy, 2009).

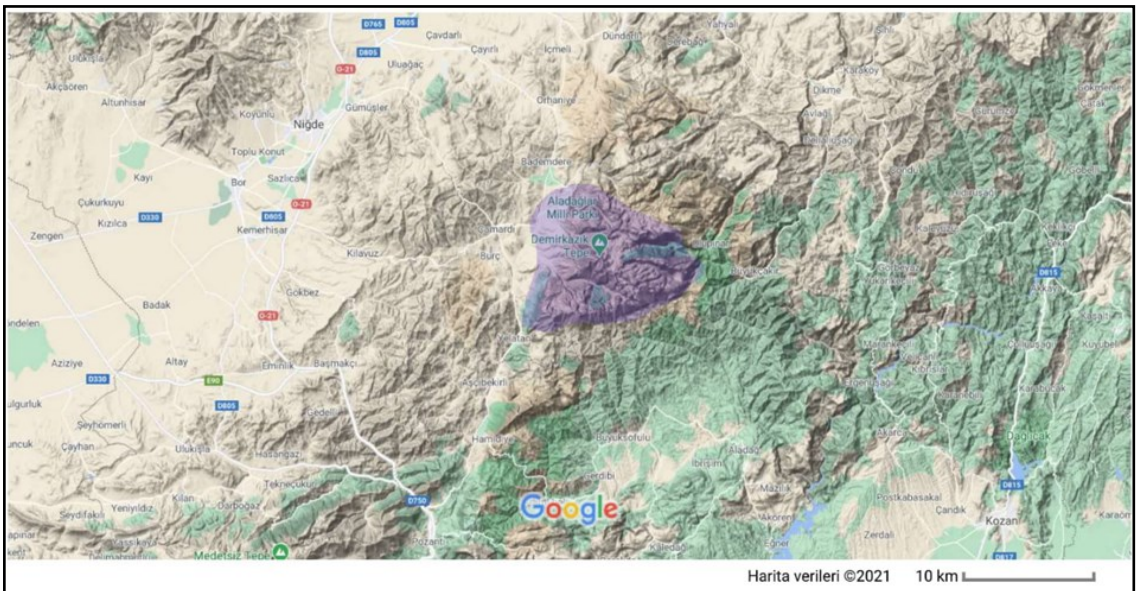
The family classification within the Lygaeoidea has fluctuated considerably in recent years.

Henry (1997) concluded that Lygaeidae were polyphyletic and gave family status to 10 subfamilies and transferred Henicocorinae as a family to Idiostoloidea.

As a result, he formed a more broadly defined Lygaeoidea consisting of 15 families. With this change, Lygaeoidea is represented by 240 genera and 995 species belonging to 13 families in the Palearctic Region (Henry, 2017).

The first studies about the Lygaeoidea superfamily in Türkiye are based on the end of the 1800s.

Pioneer researchers such as Reuter (1890), Puton (1892), Puton & Noualhier (1895), Escherich (1897), Horváth (1883, 1901, 1905, 1918), Kiritshenko (1918, 1924), Gadeau de Kerville (1939) gave records from various parts of Anatoli (Asian part of Türkiye). Hoberlandt (1956) determined the number of species belonging to the Lygaeoidea superfamily with previous records, as well as the species he recorded from Thrace and



**Figure 1.** Location of Aladağlar National Park in Central Anatolia.

Anatolia. In the following years, Seidenstücker (1957, 1958, 1960), Wagner (1959, 1966, 1967), Linnavuori (1965) and Péricart (1999a, b, c) gave faunistic records in different provinces in Anatolia and Thrace. Lodos et al. (1978) found 64 species belonging to 9 subfamilies from the Lygaeidae family in their study to identify pest fauna of the Marmara and Aegean Region. Later, Lodos et al. (1999) recorded 149 species in these three regions in their detailed study to detect pest insect fauna in the Western Black Sea, Central Anatolia and Mediterranean Region. Çakır & Önder (1990) studied the Geocoridae family (at that time Geocorinae subfamily), which contains important predator species and identified 8 species from it.

Although there are a limited number of records in its nearby regions, there are no specific studies upon the Lygaeoidea fauna that have been carried out in the Aladağlar National Park. So far, only Lodos et al. (1999) have identified 10 species in Çamardı in the immediate vicinity of the national park, and 17 species from Pozantı in the south of the study area. In addition, Péricart (1999a, b, c) states that 22 Lygaeoidea species were registered from Pozantı.

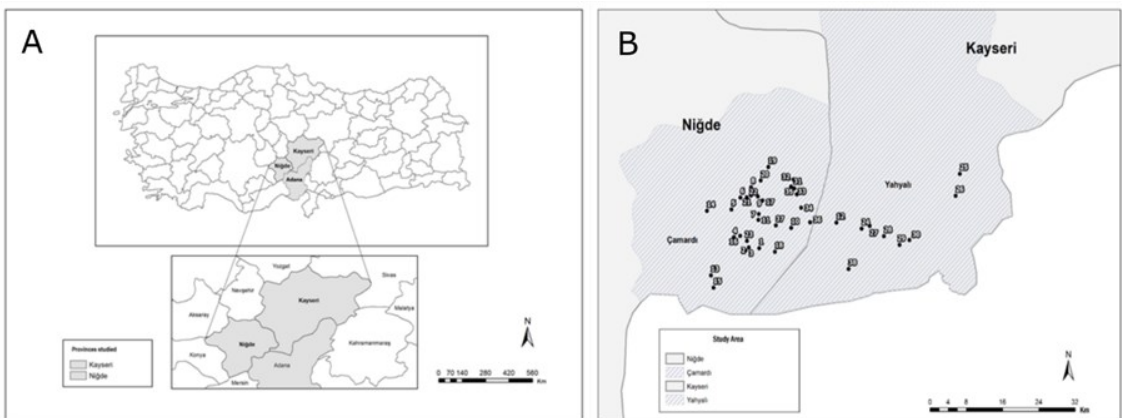
## MATERIALS AND METHODS

Adult specimens were collected from 38 different localities located in a vertical

range from 750 m to 3726 m (Table 1, Figure 2) in Aladağlar National Park between May 2016 – July 2017. Among the 38 sampling localities, only 5 located at altitudes below 1000 m.

Sampling studies were carried out on short herbaceous plants according to habitat conditions by using sweeping nets and beating tray from shrubs and trees. An insect collecting aspirator was used for specimens living on the soil surface and lower parts of the plants. The samples collected in the field were preserved in 70% alcohol solution, prepared in the laboratory and diagnosed with stereo microscope. The works of Kerzhner (1964), Péricart (1999a,b,c), Stichel (1962) and Seidenstücker (1967) was used for diagnosis of collected samples. In the identification process, pygophore and paramere structures of some male individuals were used. For the removal of genitalia, the sample materials were kept in hot water for a period of time and then fin tipped forceps and preparation needles were used. Collected specimens are preserved in the Department of Biology in Trakya University.

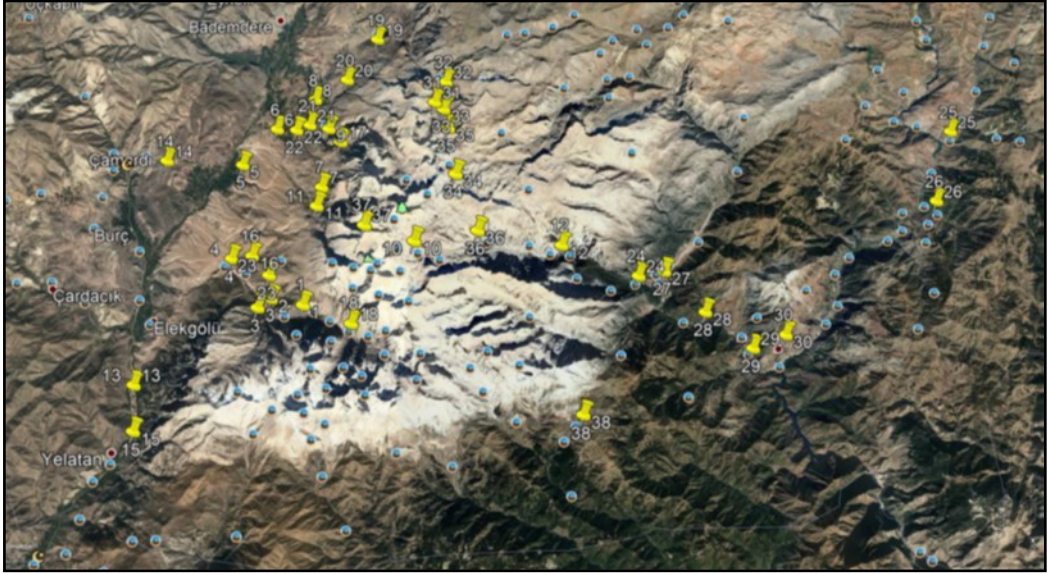
In the results and discussion section, material examined for each species identified during the research; Palaearctic distributions, redescrptions, general body and paramere photos for the species recorded for the first time in Türkiye; previous records in Türkiye for rare species are given.



**Figure 2. A.** Aladağlar National Park area **B.** Studied localities in Aladağlar National Park.

**Table 1.** The localities, altitudes, coordinates and dates of study areas (Altitude: m)

	<b>Locality</b>	<b>(m)</b>	<b>Coordinate</b>	<b>Date</b>
1	Niğde-Emlî Valley	1885	37 ° 45,986 N 35°06,932 E	30.06.2016/ 30.05.2017
2	Niğde-Sarımemetler camp site	1751	37° 46,073 N 35° 05,684 E	01.07.2016/ 04.06.2016
3	Niğde-Oluksekisi Pasture	2050	37° 45,751 N 35° 05,302 E	01.07.2016/ 02.06.2017
4	Niğde-Kazıklı Ali Canyon	1600	37° 47,139 N 35° 03,921 E	01.07.2016/ 01.06.2017
5	Niğde-Çukurbağ Village apple orchard	1509	37° 50,064 N 35° 03,622 E	01.07.2016
6	Niğde-Demirkazık Village road	1570	37° 51,322 N 35° 04,693 E	01.07.2016
7	Niğde-Sokullupınarı camp site	1990	37° 49,583 N 35° 06,874 E	02.07.2017
8	Niğde-Cımbar Canyon	1803	37° 51,438 N 35° 06,76 E	02.07.2017/ 29.05.2017
9	Niğde-Yedigöller Plateau	3090	37° 48,133 N 35° 10,760 E	04.07.2016/ 04.07.2017
10	Niğde-Karayalak Valley entrance	2100	37° 49,17 N 35° 06,828 E	05.07.2016
11	Niğde-Hacer Pass 1	1682	37° 48,676 N 35° 16,140 E	06.07.2016
12	Kayseri-Eleggölü-Yelatan	1305	37° 43,129 N 35° 01,178 E	28.05.2017
13	Niğde-Çamardı Province	1571	37° 49,920 N 35° 00,702 E	28.05.2017
14	Niğde-Yelatan Village	1300	37° 42,197 N 35° 01,576 E	28.05.2017
15	Niğde-Ziyaret Locality	1710	37° 47,287 N 35° 04,669 E	29.05.2017
16	Niğde-Arpalık Pasture	2280	37° 51,014 N 35° 07,344 E	29.05.2017
17	Niğde-Akşampınarı Valley	2150	37° 45,603 N 35° 08,816 E	30.05.2017
18	Niğde-Maden Valley entrance	1945	37° 54,546 N 35° 08,036 E	31.05.2017
19	Niğde-Pınarbaşı Canyon	1755	37° 53,109 N 35° 07,117 E	31.05.2017
20	Niğde-Demirkazık Hatıra Forest	1616	37° 51,552 N 35° 05,940 E	31.05.2017
21	Niğde-Demirkazık Village	1608	37° 51,351 N 35° 05,457 E	31.05.2017
22	Niğde-Elmasekisi Pasture	1840	37° 46,753 N 35° 05,470 E	01.06.2017
23	Kayseri-Hacer Forest lower part	1415	37° 48,060 N 35° 19,137 E	03.06.2017
24	Kayseri-Çamlıca 3 HEP	803	37° 53,825 N 35° 30,858 E	03.06.2017
25	Kayseri-Balıçakırın Village	826	37° 51,507 N 35° 30,350 E	03.06.2017
26	Kayseri-Ulupınar Village	1113	37° 48,321 N 35° 20,110 E	03.06.2017
27	Kayseri-Kapuzbaşı Village (upper part)	830	37° 47,260 N 35° 21,798 E	03.06.2017
28	Kayseri-Kapuzbaşı Falls	750	37° 46,343 N 35° 23,663 E	03.06.2017
29	Kayseri-Büyükçakır Village	830	37° 46,857 N 35° 24,846 E	03.06.2017
30	Kayseri-Karagöl	2875	37° 52,482 N 35° 10,743 E	02.07.2017
31	Niğde-Meydan Pasture	2600	37° 53,230 N 35° 11,019 E	02.07.2017
32	Niğde-Çömçü Lake	2963	37° 52,277 N 35° 11,119 E	02.07.2017
33	Niğde-MTA Pass	3337	37° 50,249 N 35° 11,941 E	03.07.2017
34	Niğde-Hasta Hoca Pasture	3070	37° 49,295 N 35° 11,415 E	03.07.2017
35	Niğde-Yıldız Lake	2963	37° 51,673 N 35° 11,406 E	03.07.2017
36	Niğde-Hacer Pass 2	2578	37° 48,716 N 35° 12,992 E	05.07.2017
37	Niğde-Emler Peak	3726	37° 48,380 N 35° 08,917 E	05.07.2017
38	Kayseri-Acıman Pasture	1870	37° 43,807 N 35° 17,591 E	06.07.2017



**Figure 3.** Satellite image of the researched localities in Aladağlar National Park

## RESULTS and DISCUSSION

### Family Cymidae Baerensprung, 1860

#### Subfamily Cyminae Baerensprung, 1860

#### Tribe Cymini Baerensprung, 1860

#### Genus *Cymus* Hahn, 1832

#### *Cymus melanocephalus* Fieber, 1861

**Material examined.** Demirkazık Village road (1570 m): 01.07.2016, 1♀; Hacer Pass (1682 m): 06.07.2016, 1♀.

### Family Heterogastridae Stål, 1872

#### Subfamily Heterogastrinae Stål, 1872

#### Genus *Heterogaster* Schilling, 1829

#### *Heterogaster affinis* Herrich & Schaeffer, 1835

**Material examined.** Yedigöller Plateau (3100 m): 04.07.2016, 1♀; 04.07.2017, 3♂♂; Hacer Pass (1682 m): 06.07.2016, 1♀; Ziyaret Locality (1710 m): 29.05.2017, 1♀; Pınarbaşı Canyon (1755 m): 31.05.2017, 2♀♀, 2♂♂; Kazıklı Ali Canyon (1600 m): 01.06.2017, 3♀♀, 2♂♂.

#### *Heterogaster artemisiae* Schilling, 1829

**Material examined.** Pınarbaşı Canyon (1755 m): 31.05.2017, 1♂; Balçıcakırı Village (830 m): 03.06.2017, 9♀♀, 7♂♂.

### Family Geocoridae Baerensprung, 1860

#### Subfamily Geocorinae Dahlbom, 1851

#### Genus *Geocoris* Fallen, 1814

#### Subgenus *Geocoris* Fallen, 1814

***Geocoris ater* (Fabricius, 1787)**

**Material examined.** Yelatan (1300 m): 28.05.2017, 1♂; Arpalık Pasture (2280 m): 29.05.2017, 2♀♀.

***Geocoris lineola lineola* (Rambur, 1839)**

**Material examined.** Çamlıca 3 HES (803 m): 03.06.2017, 1♂.

**Subgenus *Piocoris* Stål, 1872*****Geocoris erythrocephalus* (Lepelletier & Serville, 1825)**

**Material examined.** Karayalak Valley entrance (2100 m): 05.07.2016, 1♀; Çamardı (1571 m): 28.05.2017, 4♀♀, 4♂♂; Ziyaret Locality (1710 m): 29.05.2017, 1♀; Maden Valley entrance (1945 m): 31.05.2017, 1♂; Pınarbaşı Canyon (1755 m): 31.05.2017, 1♀; Elmasekisi (1840 m): 01.06.2017, 1♀, 4♂♂; Kazıklı Ali Canyon (1600 m): 01.06.2017, 2♂♂; Oluksekisi (1990 m): 02.06.2017, 15♀♀, 6♂♂.

**Family Lygaeidae Schilling, 1829****Subfamily Lygaeinae Schilling, 1829****Genus *Apterola* Mulsant & Rey, 1866*****Apterola lownii* (Saunders, 1876)**

**Material examined.** Kazıklı Ali Canyon (1600 m): 01.06.2017, 1♂; Ziyaret Locality (1710 m): 29.05.2017, 1♂; Çamardı (1571 m): 28.05.2017, 5♀♀, 6♂♂.

**Distribution in Türkiye.** Adana, Ankara, Edirne, Kahramanmaraş, Karaman, Kayseri, Konya, Malatya, Mardin, Mersin (Horváth, 1898, 1905; Hoberlandt, 1956; Péricart 1998; Önder et al; 2006; Kiyak & Özdamar, 2017; Çerçi & Koçak, 2023).

**Genus *Horvathiolus* Josifov, 1965*****Horvathiolus superbus* (Pollich, 1781)**

**Material examined.** Kazıklı Ali Canyon (1600 m): 01.06.2017, 1♂; Demirkazık Village (1608 m): 31.05.2017, 1♀, 2♂♂; Oluksekisi (1990 m): 02.06.2017, 1♀.

**Genus *Lygaeosoma* Spinola, 1837*****Lygaeosoma sardeum sardeum* Spinola, 1837**

**Material examined.** Arpalık Pasture (2280 m): 29.05.2017, 1♀, 2♂♂; Cımbar Canyon (1803 m): 29.05.2017, 1♂; Akşampınarı (2150 m): 30.05.2017, 2♀♀, 1♂; Emli Valley (1885 m): 30.06.2016, 1♀; Maden Valley entrance (1945 m): 31.05.2017, 1♀; Kazıklı Ali Canyon (1600 m): 01.06.2017, 4♂♂.

**Genus *Lygaeus* Fabricius, 1794*****Lygaeus creticus* Lucas, 1854**

**Material examined.** Hacer Pass 2 / Beli (2578 m): 05.07.2017, 1♂.

***Lygaeus equestris* (Linnaeus, 1758)**

**Material examined.** Sarımemetler Camp site (1751 m): 04.06.2016, 2♀♀, 1♂; Yedigöller Plateau (3100 m): 04.07.2016, 1♂; Demirkazık Village (1608 m): 31.05.2017, 1♀; Kazıklı Ali Canyon (1600 m): 01.06.2017, 1♂.

***Lygaeus melanostolus* (Kiritshenko, 1931)**

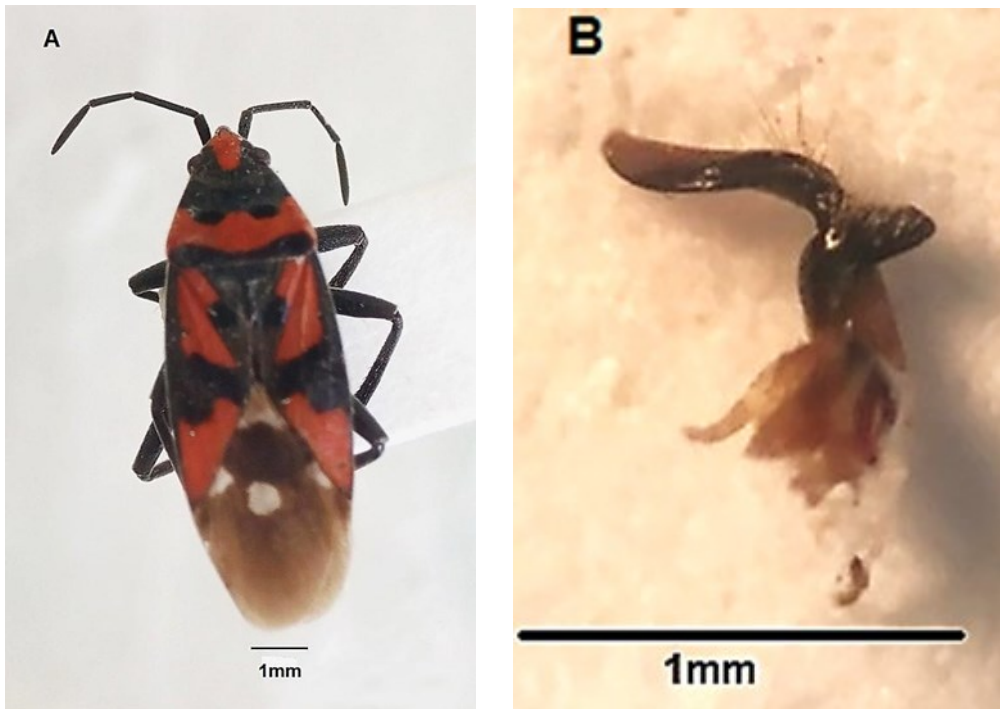
**Material examined.** Yedigöller Plateau (3100 m): 04.07.2016, 1♂; 04.07.2017, 4♂♂;

Meydan Pasture (2600 m): 02.07.2017, 2♀♀, 2♂♂; Hasta Hoca Pasture (3070 m): 03.07.2017, 1♂; MTA Pass (3337 m): 03.07.2017, 4♂♂.

**Distribution in Türkiye.** This study, new record for Türkiye

**Distribution in Palaearctic Region. Asia:** China (Northern Territory, Western plateau), Iran, Kirgizia, Mongolia, Tadzhikistan. **Extralimital:** North India? (Aukema, 2020)

**Redescription.** Head red, a broad latero-posterior border which encompasses the eyes black, clypeus black at the apex. Antennae black. Anterior part of the pronotum broadly black, including two lobes protruding on the disc, posterior margin broadly black, narrow in the middle, wider and arched towards the edges. Scutellum completely black, with Y shaped carina. Distal part of clavus darkened behind the glabrous black circular spot, proximal part red. Corium red, transverse black median band of corium widening towards the lateral margin; lateral margin black, thicker in the area in front of the median black band. Membrane proximally black, distally dark brown, with whitish anal angle, the middle of the membrane with a circular white spots, and another along the middle of their basal border. Venter of the thorax entirely black. Legs black. Posterior margin of the abdomen red. Paratergite bicolorous. Paramere is as in (Figure 4). Body length 8-9 mm.



**Figure 4.** *Lygaeus melanostolus* (Kiritshenko, 1931) **A.** Habitus **B.** Paramere

**Comment.** Perhaps the most interesting of the determined species is *Lygaeus melanostolus*, which is distributed only in Asian part of the Palaearctic region (Aukema, 2020). In this study, *L. melanostolus* was recorded for the first time in Türkiye. It was found in rocky ridges and high mountain deserts in the mountains at altitudes of 3400 – 4000 m in Central Asia (Winkler & Kerzhner, 1977). During the study, *L. melanostolus* was found at high localities from 2600 to 3337 meters.



**Identification.** Among the *Lygaeus* species identified in this study, *L. equestris* is the closest morphologically to *Lygaeus melanostolus* L. differs from *L. equestris* in having a smaller size (*L. melanostolus* 8-9 mm, *L. equestris* 12 mm) and a black band on the lateral margin of the exocorium.

**Genus *Melanocoryphus* Stål, 1872**

***Melanocoryphus tristrami* (Douglas & Scott, 1868)**

**Material examined.** Cımbar Canyon (1803 m): 02.07.2017, 1♀; 29.05.2017, 7♀♀, 5♂♂; Arpalık Pasture (2280 m): 29.05.2017, 1♂; Akşampınarı (2150 m): 30.05.2017, 1♂; Kazıklı Ali Canyon (1600 m): 01.06.2017, 7♂♂, 5♂♂; Oluksekisi (1990 m): 02.06.2017, 1♂.

**Genus *Spilostethus* Stål, 1868**

***Spilostethus pandurus* (Scopoli, 1763)**

**Material examined.** Cımbar Canyon (1803 m): 02.07.2017, 1♀, 29.05.2017, 3♂♂; Sarımemetler Camp site (1751 m): 04.06.2016, 1♂; Yedigöller Plateau (3100 m): 04.07.2016, 1♂, 04.07.2017, 3♀♀, 1♂; Elekgözü-Yelatan (1305 m): 28.05.2017, 1♂; Ziyaret Locality (1710 m): 29.05.2017, 1♂; Emlı Valley (1885 m): 30.05.2017, 1♀; Kazıklı Ali Canyon (1600 m): 01.06.2017, 1♂; Kapuzbaşı Fall (750 m): 03.06.2017, 1♂; Ulupınar (1113 m): 03.06.2017, 1♀; Karagöl (2875 m): 02.07.2017, 2♀♀, 3♂♂; Yıldız Lake (2963 m): 02.07.2017, 1♀, 1♂; MTA Pass (3337 m): 03.07.2017, 1♂; Hasta Hoca Pasture (3070 m): 03.07.2017, 4♀♀, 2♂♂; Emler Peak (3726 m): 05.07.2017, 1♂.

***Spilostethus saxatilis* (Scopoli, 1763)**

**Material examined.** Cımbar Canyon (1803 m): 02.07.2017, 1 ♀, 29.05.2017, 8♀♀, 11♂♂; Arpalık Pasture (2280 m): 29.05.2017, 1♂; Emlı Valley (1885 m): 30.05.2017, 1♂; Hasta Hoca Pasture (3070 m): 03.07.2017, 1♂.

**Subfamily Orsillinae Stål, 1872**

**Tribe Nysiini Uhler, 1876**

**Genus *Nysius* Dallas, 1852**

***Nysius cymoides* (Spinola, 1837)**

**Material examined.** Cımbar Canyon (1803 m): 02.07.2017, 1♀; Sokullupınarı camp site (1990 m): 02.07.2017, 1♀; Çamardı (1571 m): 28.05.2017, 1♀; Ulupınar (1113m): 03.06.2017, 2♂♂; Yedigöller Plateau (3100 m): 04.07.2017, 2♂♂.

***Nysius graminicola graminicola* (Kolenati, 1845)**

**Material examined.** Kazıklı Ali Canyon (1600 m): 01.07.2016, 1♀; Hacer Pass (1682 m): 06.07.2016, 2♀♀; Kapuzbaşı upper part (830 m): 03.06.2017, 5♂♂; Ulupınar (1113 m): 03.06.2017, 1♀, 3♂♂; Yedigöller Plateau (3100 m): 04.07.2017, 3♀♀, 1♂.

***Nysius helveticus* (Herrich & Schaeffer, 1850)**

**Material examined.** Yedigöller Plateau (3100 m): 04.07.2016, 1♀.

**Tribe Orsillini Stål, 1872**

**Genus *Orsillus* Dallas, 1852**

***Orsillus depressus* (Mulsant & Rey, 1852)**

**Material examined.** Oluksekisi (1990 m): 02.06.2017, 3♀♀, 3♂♂.

**Genus *Ortholomus* Stål, 1872**

***Ortholomus carinatus* (Lindberg, 1932)**

**Material examined.** Kazıklı Ali Canyon (1600 m): 01.07.2016, 2♀♀, 3♂♂; Hasta Hoca Pasture (3070 m): 03.07.2017, 1♀.

**Family Oxycarenidae Stål, 1862****Subfamily Oxycareninae Stål, 1862****Genus *Brachyplax* Fieber, 1860*****Brachyplax tennuis* (Mulsant & Rey, 1852)**

**Material examined.** Kazıklı Ali Canyon (1600 m): 01.07.2016, 1♀.

**Distribution in Türkiye.** Edirne, Gaziantep, Hatay, İzmir, Kayseri, Mersin, Niğde (Horváth, 1901; Linnavuori, 1953; Hoberlandt, 1956; Çağatay, 1985; Lodos et al., 1999; Matocq et al., 2014).

**Genus *Macroplax* Fieber, 1860*****Macroplax fasciata fasciata* (Herrich-Schaeffer, 1835)**

**Material examined.** Demirkazık Village road (1570m): 01.07.2016, 1♂; Çukurbağ apple orchard (1509 m): 01.07.2016, 2♂♂; Kazıklı Ali Canyon (1600 m): 01.06.2017, 2♂♂, 2♂♂.

**Genus *Metapoplax* Fieber, 1860*****Metopoplax fuscinervis* Stål, 1872**

**Material examined.** Meydan Pasture (2600 m): 02.07.2017, 1♀.

**Genus *Microplax* Fieber, 1860*****Microplax interrupta* (Fieber, 1837)**

**Material examined.** Balçıcakırı Village (826 m): 03.06.2017, 3♀♀, 1♂.

**Genus *Tropidophlebia* Kerzhner, 1964*****Tropidophlebia costalis* (Herrich & Schaeffer, 1850)**

**Material examined.** Akşampınarı (2150 m): 30.05.2017, 1♂; Emli Valley (1885 m): 30.05.2017, 1♂.

**Distribution in Türkiye.** This study, new record for Türkiye

**Distribution in Palaearctic Region. Europe:** Austria, Bulgaria, Czech Republic, Estonia, France, Germany, Italy, European Kazakhstan, Netherlands, Sweden, Switzerland, Poland, Romania ?, Russia (Central, Western and Eastern European Territory), Slovakia, Ukraine. **Asia:** Asian Kazakhstan, Mongolia, Russia (East and West Siberia) (Aukema, 2020).

**Redescription.** Body mostly brown except on hemelytra, bearing pale erect, somewhat glandular bristles, the largest of which, on the head and pronotum, as long as 2/3 of the antennal segment I. Head dark, elongated forward, 1.2-1.3 times longer than its width. Ocelli absent. In lateral view, the buccula extends to the middle of the lower edge of the head. Antennae more or less dark brown. articles II and III generally lighter. Antennal segment II as long as twice time length of segment I and almost as long as the interocular distance, segment III hardly longer than I and IV subequal to II. Rostrum extending to procoxa. Pronotum 1.2-1.5 times as wide as its long, brown, sometimes lightened in front and behind its midline. Scutellum brown,

with shiny hairs. Veins of the hemelytra, membrane included, prominent, largely darkened along their entire length; posterior edge of corium with a prominent black vein; membranes usually barely overlapping, only touching, or rarely half overlapping. Membrane usually not reaching the end of the abdomen, rarely covers abdomen. Femur dark brown, tibia and tarsus light brown or yellowish color. Abdomen reddish-brown with black apical region. Length: 2.5 mm. In our study, we found two newly emerged specimens: their cuticles had not yet hardened and acquired their natural color. Therefore, they appear red in color except for the very prominent wing veins (Figure 5).

**Comment.** The distribution of *Tropidophlebia costalis* in Asia is limited to Kazakhstan (Asian part), Mongolia and Russia (East and West Siberia), although it has a wide distribution in Europe (Aukema, 2020). This species is known as Euro-Siberian fauna element (Šeat, 2013). *T. costalis*, which is valued among the rare species in Bulgaria, has been suggested to be protected by local entomologists (Gueorguiev et al., 1998). However, it is also classified in the “Near Threatened” (NT) category in the Czech Republic (Kment et al., 2013). *T. costalis* feeds on seeds of various plants, can be seen on dunes, barren lands, and on sun-exposed lichen-bearing rocks (Stehlík and Vavřínová, 1997). In a study comparing species compositions in 4 different desert types in Kazakhstan, it was stated that *T. costalis* was detected in deserts with dune characteristics (Yesenbekova & Homziak, 2013). In this study, when we look at the localities where *T. costalis* was collected, we see that there are areas that can be described as arid, with rocks of various sizes in places that are exposed to the sun, even though they do not show dune characteristics (Figure 6.). The locality of *T. costalis* in this study is its southernmost limit in its Asian distribution area.



**Figure 5.** *Tropidophlebia costalis* (Herrich & Schaeffer, 1850). Habitus



**Figure 6.** Akşampınarı Valley- One of the two localities where *Tropidophlebia costalis* was detected.

**Family Rhyparochromidae Amyot & Serville, 1843**

**Subfamily Rhyparochrominae Amyot & Serville, 1843**

**Tribe: Antillocorini Ashlock, 1964**

**Genus *Tropistethus* Fieber, 1860**

***Tropistethus holosericus* (Schultz, 1846)**

**Material examined.** Arpalık Pasture (2280 m): 29.05.2017, 1♀; Cımbar Canyon (1803 m): 29.05.2017, 1♀; Kazıklı Ali Canyon (1600 m): 01.06.2017, 1♀.

***Tropistethus lanternae* Linnavuori, 1960**

**Material examined.** Ulupınar (1113 m): 03.06.2017, 1♂.

**Distribution in Türkiye.** Adana, Adıyaman, Ankara, Diyarbakır, Gaziantep, Hatay, Karaman, Kahramanmaraş, Mersin, Siirt (Hoberlandt 1956; Çağatay 1985; Péricart 1999b; Matocq & Özgen 2010; Çerçi & Koçak, 2023).

**Tribe: Drymini Stål, 1872**

**Genus *Eremocoris* Fieber, 1860**

***Eremocoris fenestratus* (Herrich-Schaeffer, 1839)**

**Material examined.** Yedigöller Plateau (3100 m) : 04.07.2016, 1♀, 1♂; Arpalık Pasture (2280 m): 29.05.2017, 1♀.

***Eremocoris podagricus* (Fabricius, 1775)**

**Material examined.** Cımbar Canyon (1803 m): 29.05.2017, 1♀.

**Distribution in Türkiye.** Bitlis, Hakkari, Mersin, Yalova (Péricart, 1999b).

**Genus *Ischnocoris* Fieber, 1860**

***Ischnocoris hemipterus* (Schilling, 1829)**

**Material examined.** Elmasekisi (1840 m): 01.06.2017, 1♀.

**Distribution in Türkiye.** Edirne, Kayseri (Péricart, 1999b, Fent & Okyar, 2022).

***Ichnocoris punctulatus* Fieber, 1861**

**Material examined.** Kazıklı Ali Canyon (1600 m): 01.06.2017, 1♂.

**Distribution in Türkiye.** Ankara (Péricart, 1999b).

**Genus *Taphropeltus* Stål, 1872**

***Taphropeltus hamulatus* (Thomson, 1870)**

**Material examined.** Cımbar Canyon (1803 m): 29.05.2017, 1♀, 1♂.

**Distribution in Türkiye.** Konya (Péricart, 1999b).

**Tribe Gonianotini Stål, 1872**

**Genus *Diomphalus* Fieber, 1864**

***Diomphalus hispidulus* Fieber, 1864**

**Material examined.** Karagöl (2875 m): 02.07.2017, 1♂; Çömçü Lake (2963 m): 02.07.2017, 1♂.

**Distribution in Türkiye.** Antalya, Kahramanmaraş, Karaman (Lodos et al., 1999).

**Genus *Emblethis* Fieber, 1860**

***Emblethis denticollis* Horváth, 1878**

**Material examined.** Yedigöller Plateau (3100 m): 04.07.2016, 1♀, 1♂.

***Emblethis griseus* (Wolff, 1802)**

**Material examined.** Hacer Pass (1682 m): 06.07.2016, 1♂; Çamardı (1571 m): 28.05.2017, 1♂; Elmasekisi (1840 m): 01.06.2017, 2♀♀; Acıman Pasture (1870 m): 06.07.2017, 1♂.

***Emblethis latus* Seidenstücker, 1963**

**Material examined.** Elekgölü-Yelatan (1305 m): 28.05.2017, 1♂.

**Distribution in Türkiye.** Kars (Seidenstücker, 1967).

***Emblethis nox* Kiritshenko, 1912**

**Material examined.** Oluksekisi (1990 m): 02.06.2017, 3♂♂, 3♀♀.

**Distribution in Türkiye.** Kayseri (Seidenstücker, 1987).

**Distribution in Palaearctic Region.** Asia: Iran, Uzbekistan (Aukema, 2020).

**Identification.** The most important differences of *E. nox* from other species of *Emblethis* found in the area is that it has a darker body color (dark brown), black punctures are very prominent, the dorsal surface is shiny and it has a slit on the dorsal surface of the pygophore. The pygophore is similar to the *E. sabulosus*, which has been identified in Anatolia. However, the slit in *E. nox*'s pygophore is shorter than that of *E. sabulosus* and divides the proximal capsule wall in half (Seidenstücker, 1967).

**Comment.** *E. nox* are known except Türkiye only in Iran and Uzbekistan (Aukema, 2020). Seidenstücker (1987) reported this species from Iran at very high altitudes (between 1700 – 3950 m). In the same article, he emphasizes that he found this species at an altitude of 3000 m in Kayseri (Erciyes Mountain) in Türkiye and that

this record is the most western locality of the species. Aladağlar, which is an extension of the Middle Taurus and considered the highest point is approximately 110 km southwest from Erciyes Mountain. In this study, this species was recorded at 1990 m and for now this record constitutes the westernmost distribution limit of the species.

***Emblethis setifer* Seidenstücker, 1966**

**Material examined.** Kazıklı Ali Canyon (1600 m): 01.06.2017, 1♂, 3♀♀.

***Emblethis verbasci* (Fabricius, 1803)**

**Material examined.** Çamardı (1571 m): 28.05.2017, 1♀; Yelatan (1300 m): 28.05.2017, 1♀, 2♂♂; Demirkazık Village (1608 m): 31.05.2017, 10♀♀, 4♂♂; Maden Valley entrance (1945 m): 31.05.2017, 1♀.

**Genus *Ischnopeza* Fieber, 1860**

***Ischnopeza hirticornis* (Herrich-Schaeffer, 1850)**

**Material examined.** Elekgölü-Yelatan (1305 m): 28.05.2017, 2♂♂; Yelatan (1300 m): 28.05.2017, 2♀♀, 2♂♂; Demirkazık Memorial Forest (1616 m): 31.05.2017, 1♂; Demirkazık Village (1608 m): 31.05.2017, 6♀♀, 5♂♂; Pınarbaşı Canyon (1755 m): 31.05.2017, 1♂; Kazıklı Ali Canyon (1600 m): 01.06.2017, 2♀♀.

**Genus *Neurocladus*, Fieber, 1860**

***Neurocladus brachiidens* (Dufour, 1851)**

**Material examined.** Pınarbaşı Canyon (1755 m): 31.05.2017, 1♀.

**Genus *Trapezonotus* Fieber, 1860**

***Trapezonotus arenarius arenarius* (Linnaeus, 1758)**

**Material examined.** Arpalık Pasture (2280 m): 29.05.2017, 4♀♀, 7♂♂; Akşampınarı (2150 m): 30.05.2017, 1♂; Meydan Pasture (2600 m): 02.07.2017, 2♀♀, 1♂.

**Distribution in Türkiye.** Bursa, Kayseri, Kars (Horváth, 1905; Vinokurov, 1990; Péricart, 1999c).

**Tribe Lethaenini Stål, 1872**

**Genus *Lethaeus* Dallas, 1852**

***Lethaeus cribratissimus* (Stål, 1859)**

**Material examined.** Cımbar Canyon (1803 m): 29.05.2017, 5♀♀, 2♂♂; Pınarbaşı Canyon (1755 m): 31.05.2017, 1♀, 1♂; Kazıklı Ali Canyon (1600 m): 01.06.2017, 1♀, 1♂; Hacer Forest lower part (1415 m): 03.06.2017, 1♀, 2♂♂.

**Tribe Megalonotini J.A. Slater, 1957**

**Genus *Icus* Fieber, 1860**

***Icus angularis* Fieber, 1861**

**Material examined.** Yedigöller Plateau (3100 m) : 04.07.2016, 1♀; Arpalık Pasture (2280 m): 29.05.2017, 1♀, 1♂; Cımbar Canyon (1803 m): 29.05.2017, 1♀, 1♂.

**Genus *Megalonotus* Fieber, 1860**

***Megalonotus chiragra* (Fabricius, 1794)**

**Material examined.** Cımbar Canyon (1803 m): 29.05.2017, 1♀.

**Distribution in Türkiye.** Afyonkarahisar, Edirne, İzmir (Linnavouri, 1953; Hoberlandt, 1956).

***Megalonotus praetextatus* (Herrich-Schaeffer, 1835)**

**Material examined.** Cımbar Canyon (1803 m): 29.05.2017, 3♀♀, 5♂♂; Pınarbaşı Canyon (1755 m): 31.05.2017, 1♀; Kapuzbaşı Fall (750 m): 03.06.2017, 1♀; Ulupınar (1113 m): 03.06.2017, 1♀.

***Megalonotus sabulicola* (Thomson, 1870)**

**Material examined.** Yedigöller Plateau (3100 m): 04.07.2016, 1♀, 1♂; Emli Valley (1885 m): 30.05.2017, 2♀♀, 1♂.

**Genus *Proderus* Fieber, 1860*****Proderus bellevoeyi* Puton, 1874**

**Material examined.** Kazıklı Ali Canyon (1600 m): 01.06.2017, 1♀.

**Tribe *Plinthisini* J.A. Slater & Sweet, 1961****Genus *Plinthisus* Stephens, 1829****Subgenus *Plinthisus* Stephens, 1829*****Plinthisus brevipennis* (Latreille, 1807)**

**Material examined.** Balçıcakırı Village (826 m): 03.06.2017, 1♀, 3♂♂.

**Distribution in Türkiye.** This study, new record for Türkiye

**Distribution in Palaearctic Region.** Europe: Albania, Andorra, Austria, Belgium, Bosnia Hercegovina, Bulgaria, Croatia, Czech Republic, Denmark, Finland, France, Great Britain, Germany, Greece, Hungary, Ireland, Italy, Liechtenstein, Luxembourg, Macedonia, Moldavia, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Russia (Central and Southern European Territory), Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine. North Africa: Algeria, Azores, Canary Islands? Morocco, Madeira? Tunisia. Asia: Azerbaijan, Iran, Israel, Kirgizia, Tadjhikistan. Extralimital (introduced): North America (Canada, USA) (Aukema, 2020).

**Redescription.** Usually brachypterous, more rarely macropterous. Body color shiny, black-brown to black with brownish antennae and legs. Antennae barely half as long as the body; antennal segment I extending the clypeus by nearly half of its length, segment II, 1.2-1.3 times as long as the interocular distance, segment III, 0.8-0.9 times as long as segment II; segment IV subequal to III. Rostrum reaching the middle of the mesocoxae. Pronotum subrectangular (brachypterous), or clearly trapezoidal (macropterous). Anterior part with fine and sparse punctuation, posterior part with coarser and dense punctuation, but the points not touching each other. Scutellum densely punctuated, points smaller than those of posterior part of pronotum and anterior part of hemelytra. Hemelytra of the brachypterous specimens leaving the tergite VII and the middle of VI uncovered, rudiments of membrane always well developed. Punctuation of clavus and anterior part of the corium dense and rather coarse as that of the posterior part of pronotum, comprising 2 rows (clavus) and 1 row (corium) of aligned points; posterior part of the corium with smaller and more scattered points, at least in the brachypterous specimens. Profemur with 2 rows of spines on their ventral surface: one with 3 spines, the other with 4-5 spinules. Length: ♀: 3.6 mm, ♂: 2.8 mm (Figure 7.)

**Comment.** *Plinthisus brevipennis* has a wide distribution in Europe and it is reported from Asia and North Africa. However, *P. brevipennis* is also found in Canada and USA apart from Palaearctic (Aukema, 2020). *P. brevipennis* has been recorded as a mesophilic species that can be seen at altitudes up to 1000 meters (Péricart, 1999c).

However, this limit increased with samples collected from 1300 m, 1500 m and 1700 m in the Iberian peninsula, according to the study conducted by Costas et al. (2004). Although it is observed that this species prefers mossy moist areas according to many capture data obtained, it is also found on the leaf shoots of shrubs and trees like *Quercus* sp., *Pinus* sp. and *Juniperus* sp. (Costas et al., 2004). Similarly, *P. brevipennis* specimens found in this study were collected from a reforestation pine forest near Balcıçakırı Village (826 m).



**Figure 7.** *Plinthisus brevipennis* (Latreille, 1807). Habitus

***Plinthisus longicollis* Fieber, 1861**

**Material examined:** Çamardı (1571 m): 28.05.2017, 2♀♀; Arpalık Pasture (2280 m): 29.05.2017, 2♀♀, 1♂; Cımbar Canyon (1803 m): 29.05.2017, 1♀, 1♂; Emli Valley (1885 m): 30.05.2017, 1♀; Demirkazık Village (1608 m): 31.05.2017, 1♀, 1♂; Kazıklı Ali Canyon (1600 m): 01.06.2017, 1♂; Kapuzbaşı Fall (750 m): 03.06.2017, 2♀♀, 1♂.

**Tribe Rhyparochromini Amyot & Serville, 1843**

**Genus *Aellopus* Wolff, 1811**

***Aellopus atratus* (Goeze, 1778)**

**Material examined.** Hacer Pass (1682 m): 06.07.2016, 1♀; Akşampınarı (2150 m): 30.05.2017, 1♀, 1♂.

**Genus *Beosus* Amyot & Serville, 1843**

***Beosus maritimus* (Scopoli, 1763)**



**Material examined.** Emli Valley (1885 m): 30.05.2017, 1♀; Kazıklı Ali Canyon (1600 m): 01.06.2017, 4♀♀, 1♂.

***Beosus quadripunctatus* (Müller, 1766)**

**Material examined.** Yelatan (1300 m): 28.05.2017, 2♀♀, 1♂.

**Genus *Callistonotus* Horváth, 1906**

***Callistonotus nigroruber* (Stål, 1859)**

**Material examined.** Cımbar Canyon (1803 m): 29.05.2017, 1♀.

**Distribution in Türkiye.** Ankara, Gaziantep, Hatay, Kahramanmaraş, Kayseri, Niğde (Hoberlandt, 1956; Seidenstücker, 1958; Péricart, 1999c).

**Genus *Raglius* Stål, 1872**

***Raglius alboacuminatus* (Goeze, 1778)**

**Material examined.** Emli Valley (1885 m): 30.05.2017, 1♂; Oluksekisi (1990 m): 02.06.2017, 2♀♀; Sarımemetler camp site (1751 m): 04.06.2016, 1♀.

**Genus *Rhyparochromus* Hahn, 1826**

***Rhyparochromus phoeniceus* (Rossi, 1794)**

**Material examined.** Elekgölü-Yelatan (1305 m): 28.05.2017, 1♀; Yelatan (1300 m): 28.05.2017, 2♀♀; Emli Valley (1885 m): 30.05.2017, 1♀; Demirkazık Memorial Forest (1616 m): 31.05.2017, 2♀♀; Demirkazık Village (1608 m): 31.05.2017, 1♀; Kazıklı Ali Canyon (1600 m): 01.06.2017, 1♀; Oluksekisi (1990 m): 02.06.2017, 1♀.

**Genus *Xanthochilus* Stål, 1872**

***Xanthochilus minusculus* (Reuter, 1885)**

**Material examined.** Kazıklı Ali Canyon (1600 m): 01.06.2016, 4♀♀.

**DISCUSSION**

In 2016 and 2017, 432 samples belonging to Lygaeoidea superfamily were collected as a result of field studies carried out in 38 localities in and around Aladağlar National Park.

As a result of the identification of these samples, 57 species belonging to 37 genera from 6 families of Lygaeoidea were identified: 32 species and 20 genera from Rhyparochromidae, 14 species and 9 genera from Lygaeidae, 5 species and 5 genera from Oxycarenidae, 3 species and 1 genus from Geocoridae, 2 species and 1 genus from Heterogastridae, and 1 species and 1 genus from Cymidae were identified. The rhyparochromid genus *Emblethis* with 6 species was identified as the most numerous.

In this study, *Lygaeus melanostolus*,

*Plinthisus brevipennis* and *Tropidophlebia costalis* are recorded for first time in Türkiye. *Emblethis latus*, *E. nox*, *Ischnocoris punctulatus*, and *Taphropeltus hamulatus*, are rare species and recorded from only one locality in Anatolia in Türkiye up to now. While *T. hamulatus* (Konya), *E. nox* (Kayseri) and *I. punctulatus* (Ankara) were previously recorded from provinces close to the research area, *E. latus* was recorded from Kars province from the eastern border of the country. In addition, the very sporadically distributed species *Apterola lownii*, *Brachyplax tenuis*, *Callistonotus nigroruber*, *Diomphalus hispidulus*, *Eremocoris podagricus*, *Ischnocoris hemipterus*, *Megalonotus chiragra* and *Trapezonotus arenarius arenarius* are also significant findings in this study (Horváth, 1905; Linnavouri, 1953; Hoberlandt, 1956; Seidenstücker, 1967; Vinokurov, 1990; Lodos et al., 1999;

Péricart, 1999a,b,c; Matocq et al.,2014; in the Yedigöller Plateau over 3000 meters Yazıcı et al.; 2015; Fent & Dursun, 2016). (Figure 8).

*Orsillus depressus*, an arboreal species that is mostly seen in parks on species such as *Chamaecyparis* and *Thuja* and has also been detected in natural *Juniperus* species after 2002 (Aukema, 2001), was found in Fir trees in Emlir Valley and Oluksekisi Plateau.

In the field studies, samples were taken from many different habitats such as agricultural lands such as orchards and wheat fields, symmetrical and asymmetrical deep valleys, canyons, high mountain rocky formations, alpine meadows and coniferous forests. Considering the localities of the identified species, the species richness is highest in the habitats with canyon characteristics and in the entrance or exit regions of these canyons. Kazıklı Ali Canyon, where 22 different species are diagnosed, and Cımbar Canyon, where 14 species are found, are the most species rich localities. Following these localities, 12 species were identified

When the study is evaluated according to the height parameter; 8 species belonging to 7 genera in 5 localities between 500-1000 m, 11 species belonging to 10 genera in 4 localities between 1000-1500 m, 36 species belonging to 31 genera in 16 localities between 1500-2000 m, 17 species belonging to 16 genera in 4 localities between 2000-2500 m, 6 species belonging to 6 genera in 5 localities between 2500-3000 m, and 13 species belonging to 9 genera in 4 localities above 3000 m were identified (Table 2).

*Spilostethus pandurus* that has been collected 14 localities out of 38 was found to be the most widespread species in the study area. However, the fact that *Spilostethus pandurus* is located at the summit of Emlir Peak (3726 m), which has the highest altitude among the studied localities, can be interpreted as having a high tolerance in both widespread and vertical distribution. *Emblethis*



**Figure 8.** A. Hacer Pass B. Kazıklı Ali Canyon C. Yedigöller Plateau D. Cımbar Canyon

*denticollis* and *Nysius helveticus* were considering the floral and ecosystem found only in localities over 3000 m. diversity. However, the new species *Lygaeus melanostolus*, one of the new records and the existence of species such species for Türkiye, could not be detected as *L. melanostolus*, whose distribution under 2500 meters (Table 2). The results of limits are above a certain height, are also this study show us that Aladağlar National important for future studies in this Park is rich in Lygaeoidea species, region.

**Table 2.** Composition of species detected in Aladağlar and its surroundings according to altitude

Species/Altitude	500-1000 m	1000-1500 m	1500-2000 m	2000-2500 m	2500-3000 m	3000 m <
<i>Cymus melanocephalus</i>			x			
<i>Heterogaster affinis</i>			x			x
<i>Heterogaster artemisiae</i>	x					
<i>Geocoris ater</i>		x	x	x		
<i>Geocoris lineola</i>	x					
<i>Geocoris erythrocephalus</i>			x	x		
<i>Apterola lownii</i>			x			
<i>Horvathiolus superbus</i>			x	x		
<i>Lygaeosoma sardeum</i>			x	x		
<i>Lygaeus creticus</i>					x	
<i>Lygaeus equestris</i>			x			x
<i>Lygaeus melanostolus</i>					x	x
<i>Melanocoryphus tristrami</i>			x	x		
<i>Spilostethus pandurus</i>	x	x	x		x	x
<i>Spilostethus saxatilis</i>			x	x		x
<i>Nysius cymoides</i>		x	x			x
<i>Nysius graminicola</i>	x	x	x			x
<i>Nysius helveticus</i>						x
<i>Orsillus depressus</i>				x		
<i>Ortholomus carinatus</i>			x			x
<i>Brachyplax tenuis</i>						
<i>Macroplox fasciata</i>			x			
<i>Metopoplax fuscinervis</i>					x	
<i>Microplax interrupta</i>	x					
<i>Tropidophlebia costalis</i>			x	x		
<i>Tropistethus holosericus</i>			x	x		
<i>Tropistethus lanternae</i>		x				
<i>Eremocoris fenestratus</i>				x		x
<i>Eremocoris podagricus</i>			x			
<i>Ischnocoris hemipterus</i>						
<i>Ischnocoris punctulatus</i>			x			
<i>Taphropeltus hamulatus</i>			x			
<i>Diomphalus hispidulus</i>					x	
<i>Emblethis denticollis</i>						x
<i>Emblethis griseus</i>			x			
<i>Emblethis latus</i>		x				
<i>Emblethis nox</i>				x		

**Table 2.** Continued.

<i>Emblethis setifer</i>			x			
<i>Emblethis verbasci</i>		x	x			
<i>Ischnopeza hirticornis</i>		x	x			
<i>Neurocladus brachiidens</i>			x			
<i>Trapezonotus arenarius</i>				x	x	
<i>Lethaeus cribratissimus</i>		x	x			
<i>Icus angularis</i>			x	x		x
<i>Megalonotus chiragra</i>			x			
<i>Megalonotus praetextatus</i>	x		x			
<i>Megalonotus sabulicola</i>			x			x
<i>Proderus bellevoeyi</i>			x			
<i>Plinthisus brevipennis</i>	x					
<i>Plinthisus longicollis</i>	x		x	x		
<i>Aellopus atratus</i>			x	x		
<i>Beosus maritimus</i>			x			
<i>Beosus quadripunctatus</i>		x				
<i>Callistonotus nigroruber</i>			x			
<i>Raglius alboacuminatus</i>			x	x		
<i>Rhyparochromus phoeniceus</i>		x	x	x		
<i>Xantochilus minusculus</i>			x			

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