

ORIGINAL ARTICLE

Erythraeid mites (Acariformes: Actinedida: Erythraeidae) of the Greater Caucasus region of Azerbaijan

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The summary is given in the article about the observed species of the Erythraeidae Robineau-Desvoidy, 1828 mites in the Greater Caucasus Region of Azerbaijan. 25 species belonging to 8 genera of 5 sub-families have been found. Among them 1 sub-family (Balaustiinae Grandjean, 1947), 4 genera (*Erythraeus Latreille*, 1806, *Curteria* Southcott, 1961, *Balaustium* v. Heyden, 1826, *Neobalaustium* Willmann, 1951) and 22 species are new for the Caucasian fauna. 2 subfamilies (*Callidosomatinae* Southcott, 1961 and *Abrolophinae* Witte, 1995), 2 genera (*Charletonia oudemans*, 1910 and *Abrolophus Berlese*, 1891) and 1 species (*Charletonia cardinalis* (Pallas, 1772)) are new for the studied area. *Abrolophus* Berlese, 1891 genera are rich with species, 8 species have been found. The found species are spread over the altitudes and landscape zones, landscapes and forest biotopes. Also, the zoogeographic analysis of the erythraeid mites was carried out and they were divided into ecological groups. The studies show that the base of the fauna of the Erythraeidae Robineau-Desvoidy, 1828 mites in the Greater Caucasus region consists of 3 zoogeographic groups: European species (9 species), Central European species (5 species), Holarctic species (4 species).

Key words: Acari; Erythraeidae; Greater caucasus; Landscapes; Biotopes; Zoogeographic groups

Introduction

The fauna of the Caucasian Erythraeidae mites have not been studied almost carefully before our studies. Totally, 6 species belonging to 5 genera of 5 sub-families have been found: *Eatoniana plumifera* (Birula 1893), *Leptus molochinus* (C.L.Koch, 1837), *Leptus* species, *Abrolophus* species, *Charletonia cardinalis*, *Myrmicothrombium* species (Aslanov 2015; Beron 2008; Noei 2015; Makol and Sevsay 2015). The aim of our research is detailed study Erythraeid mites of the Greater Caucasus region of Azerbaijan. However, only 2 species of 2 genera (*Leptus molochinus*, *Eatoniana plumifera*) have been known in the Greater Caucasian part of Azerbaijan (Aslanov and Musayeva 2003). Today, 28 species of the Erythraeidae mites belonging to 9 genera of 6 sub-families are known in the Caucasian fauna thanks to our studies. As well as, 25 species belonging to 8 genera have been studied in the Greater Caucasus region. 1 sub-family (Balaustiinae), 4 genera (*Erythraeus*, *Curteria*, *Balaustium*, *Neobalaustium*) and 22 species are new for the Caucasian fauna. 2 sub-families (*Callidosomatinae* and *Abrolophinae*), 2 genera (*Charletonia* and *Abrolophus*) and 1 species (*Charletonia cardinalis*) are new for the studied area.

Materials and Methods

The Erythraeid mites are collected by different methods. The Erythraeidae mites are collected from the plant by means of shaking method. The Erythraeidae mites are collected by a fluffy thin brush soaked with water that fixes the mites from the walls of the buildings, trunks of the trees and bushes, the surface of soil and under the rocks. The collection of the Erythraeidae mites emerging in the soil, on the floor, in the autumn leaves, in the mosses and lichens, and on the tree trunks is carried out by means of eclector or sifter (Winkler device). Also, the hunting boxes (Barber traps) with fixed water are used for the collection of the Erythraeidae mites living in the soil. The 7x - 10x hand lens is used for the collection of the Erythraeidae mites. The mites collected by different methods are included into the test tubes which have fixed water (70-75% ethyl alcohol). Each test tube is labelled. In order to decolorize the mites, 50% lactic acid is used. The post-larval stage of the Erythraeidae mites is softened at KOH before the fixation. In order to define the mites and to study the morphological characteristic of them, the permanent drugs are made from these mites under the binocular (MBS-1 microscope) in the Phorate liquid (composition: 30 gr hummiarabic, 200 gr chloral- hydrate, 20 gr glycerine, 50 gr water). The prescription of the preparations is carried out by means of suitable MBIS-3, Olympus CX-41, MBI-15U4.2 microscopes. When working with the MBI-3 and MBI-15U4.2 microscopes, a phased contrast, oil or water immersion is used. The mites are measured by an ocular micrometre. The photos are taken by means of RA-6 painting apparatus or camera (Aslanov and Alizade 2018; Noei et al. 2019; Makol and Sevsay 2015).

The study was carried out in different localities of the Greater Caucasus natural region during 2017–2019 (Table 1 and Figure 1).

Table 1. Localities and coordinates of sampling areas.

Absheron peninsula			
Guzdek Village	40°22'24"N//49°40'50"E	Incirlik Village	40°28'21"N//50°5'44,8"E
Hokmeli Village	40°25'51"N//49°44'16"E	Bayil forest	40°21'0"N//49°50'0"E
Gobu Village	40°24'17"N//49°42'45"E	Badamdar plateau	40°20'22"N//49°48'14"E
Lokbatan Village	40°19'38"N//49°43'48"E	Zabrat Settlement	40°28'44"N//49°56'52"E
Merdekan Village	40°29'32"N//50°8'20"E	Jeyranbatan Settlement	40°32'24"N//49°39'34"E
Gobustan district			
Sundu Village	40°19'22"N//49°02'46"E	Giceki mountain	40°25'6"N//48°56'36"E
Khilmilli Village	40°41'31"N//48°51'49"E	Jeyrankechmez river	40°29'19"N//40°03'40"E
Shamakhi district			
Chuxuryurd Village	40°42'54"N//48°38'6"E	Demirchi Village	40°50'32"N//48°33'45"E
Dedegunesh Village	40°38'42"N//48°38'2"E	Gizmeydan Village	40°46'11"N//48°44'52"E
Khizi district			
Bakhishli Village	40°53'59"N//48°58'57"E	Altiaghac Village	40°51'29"N//48°56'10"E
Saphbulaq Village	40°48'18"N//48°52'32"E	Aladash range	40°51'59"N//48°59'17"E
Garabulaqchay Village			40°50'0"N//49°5'23"E
Siyazan district			
Beshbarmaq mountain	40°57'30"N//49°13'56"E	Zarat Village	40°56'42"N//49°16'41"E
Shabran district			
Erebler Village	41°16'30"N//48°51'30"E	Devechi port lake	41°20'39"N//49°3'35"E
Khachmaz district			
Lecet Village	41°41'45"N//48°37'17"E	Murshudoba Village	41°30'33"N//48°45'22"E
Guba district			
Ispik Village	41°18'32"N//48°25'5"E	Susay Village	41°18'40"N//48°17'17"E
Jimi Village	41°3'21"N//48°21'55"E	Uzunmeshe Village	41°21'35"N//48°21'55"E
Gusar district			
Kuzun Village			41°20'27"N//48°8'9"E
Ismayilli district			
Qalaciq Village	40°57'33"N//48°3'9"E	Basqal Settlement	40°45'20"N//48°23'47"E
Tircan Village	40°44'20"N//48°20'1"E	Lahij Village	40°50'57"N//48°23'1,4"E
Gabala district			
Hemzeli Village	41°0'9"N//47°48'19"E	Qemervan	41°3'47"N//47°47'31"E
Sheki district			
Baş Layski	41°21'3"N//47°5'8"E	Bash Goynuk Village	41,33°0'0"N//47,12°0'0"E
Bash Shabalid Village			41°18'12"N//47°7'11"E
Gakh district			
İlisu Village	41°28'0,72"N//47°03'31,5"E	Qum Village	41°27'26"N//46°54'35"E
Lekit Village	41°29'03"N//46°50'38"E	Gashgachay Village	41°32'34"N//47°02'33"E
Zagatala district			
Jar Village	41°40'19"N//46°41'14"E	Perzivan Village	41°34'9"N//46°42'15"E
Qazangul Village			41°35'0"N//46°38'0"E
Balakan district			
Zagatala State Reserve			41°48'7"N//46°37'40"E

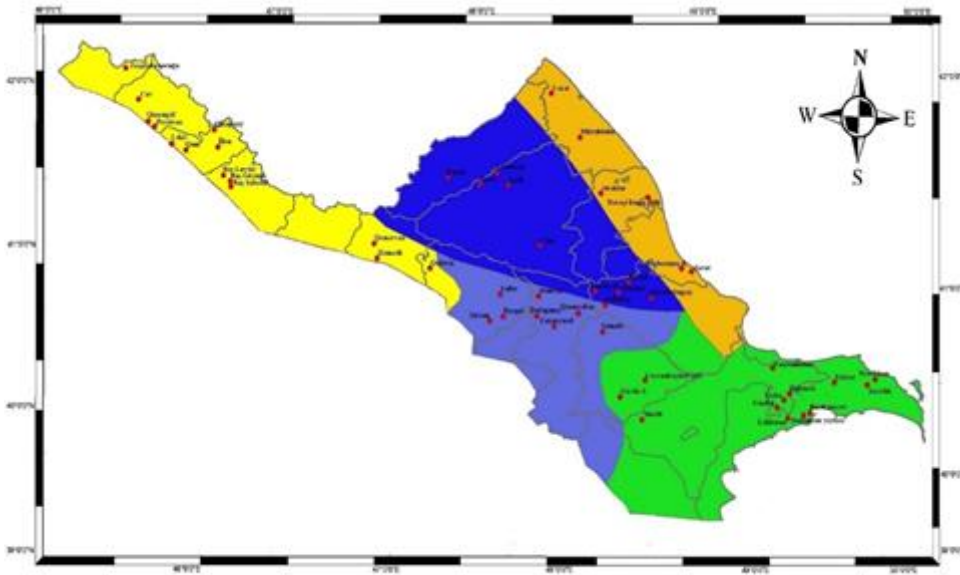


Figure 1. Map of study area.

Results and Discussion

Erythraeidae

Erythraeinae Robineau-Desvoidy, 1828; *Erythraeus latreille*, 1806; *Erythraeus gorcensis*, Gabrys 2016

Materials examined: Absheron peninsula, Baku, artificial forest, under the rocks, 20.V.1984 (1 f≠) (collected by O.Aslanov); Lerik district, Gosmalian village 28.V.1985 (1 f≠) (collected by Kh.Aliyev).

Distribution: Central Europe, Poland, Switzerland (Beron 2008). The larvae and deutonymph were not found.

Erythraeus phalangoides (De Geer, 1778)

Materials examined: Absheron peninsula, Baku, artificial forest, under the rocks, 15. X.1984 (2 spp.) (collected by O. Aslanov).

Distribution: Europe; Caucasus: Azerbaijan; Asia: Kuril Islands; Greenland (Beron 2008) (Figure 2).

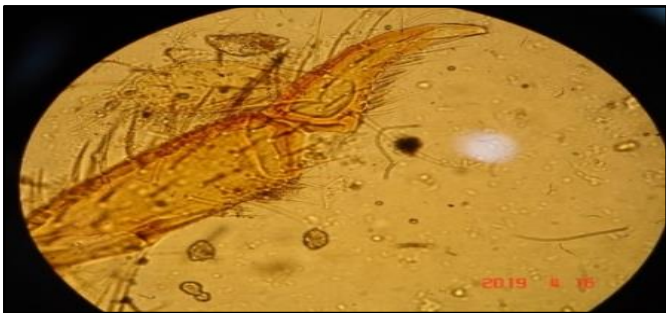


Figure 2. Pedipalp's genu and tibia of the *Erythraeus phalangoides*.

Erythraeus regalis (C.L. Koch, 1837)

Materials examined: Absheron peninsula, Baku, under the rocks, 20.V.1984 (3 spp.) (collected by O. Aslanov); Baku, Garden of the Institute of Zoology of ANAS, over the red-berry mite (Homoptera suborder), 18.V.1988 (1 larva) (collected by O. Aslanov); Gobustan region, Sundu village, different grassy steppe, plants, 15.V.2018 (1 spp.); Gakh district, Gum village, chestnut forest, plants, 29.VI.2018 (2 spp.).

Distribution: Europe; Caucasus: Azerbaijan; North-Western Africa: Algeria (Beron 2008), (Figure 3).



Figure 3. *Erythraeus regalis*: Pedipalp (tarsus, tibia and genu); b) tibia of the first leg.

Erythraeus opilionoides (C.L. Koch, 1837)

Materials examined: Ismayilli district, Galacig village, broad-leaved forest, under the rocks, 22.VI.2014 (1 spp.) (collected by O. Aslanov). Lerik district, Gosmalian village, 28.V.1985 (1 f≠) (collected by Kh. Aliyev).

Distribution: Europe; Caucasus: Azerbaijan (Wohltmann 2013) (Figure 4).

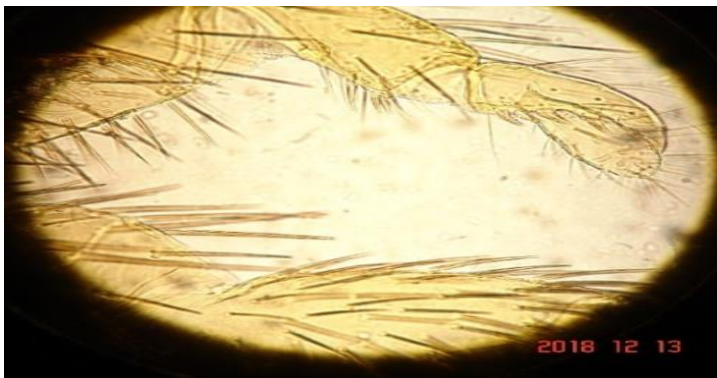


Figure 4. Pedipalp of the *Erythraeus opilionoides*.

Erythraeus adpendiculatus (Schrank, 1781)

Materials examined: Absheron peninsula, Baku, artificial forest, under the rocks, 12.V.1984, (1spp.) (collected by O. Aslanov); 20.V.1984 (5 spp.) (collected O. Aslanov) (Figures 5 and 6).

Distribution: Caucasus: Azerbaijan (Wohltmann 2013).



Figure 5. III and IV legs' genu, tibia and tarsus of *Erythraeus adpendiculatus*.

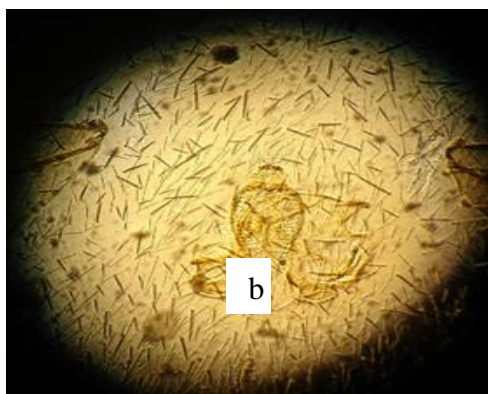


Figure 6. *Erythraeus adpendiculatus*: a) pedipalp; b) Genital apparatus of male.

Eatoniana Cambridge, 1898; *Eatoniana plumifera* (Birula, 1893)

Materials examined: Absheron peninsula, Anjirlik, sandy places, 27.V.1984, (4 m≠) (collected by Kh. Aliyev).

Distribution: The Southern Caucasus; Middle Asia: Turkmenistan (Beron 2008)

Eatoniana plumifera species are the indicator of the eol-sand landscape (Figure 7).

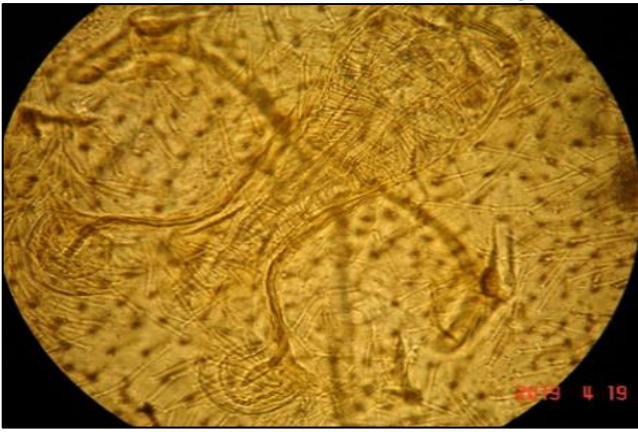


Figure 7. Genital apparatus of male of the *Eatoniana plumifera*.

Curteria; *Curteria episcopalis* (C.L. Koch, 1837)

Materials examined: Absheron peninsula, Anjirlik, sandy places, 1 adult individual, 27.V.1984 (1 spp.) (collected by Kh. Aliyev); Gakh district, Gashgachay village, middle mountain haw-peanuts forest, plants, 30.VI.2018 (1 larva).

Distribution: Central (Germany, Netherland and Poland) and Northern Europe (Switzerland and Finland); Asia: Iran (Jamshidian et al. 2014 (Figure 8)).



Figure 8. General view of the *Curteria episcopalis*.

Leptinae, Southcott, 1957; *Leptus Latreille*, 1796; *Leptus slivovi* Beron, 1975

Materials examined: Guba district, Jimi village, oak-peanut forest (with Caucasian oak), trunks of tree, 29.VI.990 (1 larva) (collected by O. Aslanov); Guba district, Jimi village, oak forest (with Caucasian oak), plants, 5.VIII.2018 (1 larva); Guba district, Susay village, Gizilaghaj forest, harvestman (*Opilio* species), 4.VIII.2018 (1 larvae and 2 nymphochrysalis (pup I)); Shabran district, Arablar village, mountainous forest-desert, plants, 9.V.2018 (1 larva); Gobustan region, Chalov village, steppe, grasses, 17.V.2019 (1 larva) (Figure 9).



Figure 9. *Leptus slivovi*: a) General view of larva; b) Nymphochrysalis.

Distribution: Northern (Norway), Central (Poland, Liechtenstein) and Southern (Bulgaria) Europe; Southern Caucasus (Azerbaijan); Asia: South-Eastern Kazakhstan (Aslanov 2015; Beron 2008).

Leptus clethrionomydis Haitlinger, 1987

Materials examined: Zagatala district, ether-oil sovkhos plant, tea plantation, tea bush, 12.VIII.2017 (1 larva).

Distribution: Central Europe: Poland (*Clethrionomys glareolus* was found in European striped field mouse), Hungary; Southern Caucasus: Azerbaijan (Aslanov and Alizade 2018; Beron 2008).

Leptus molochinus (C.L. Koch, 1837)

Materials examined: Khachmaz district, Murshudoba village, fruit garden, on the foot of harvestman, 15.VIII.1985 (1larva) (collected by Z. Musayeva); Guba district, Ispik village, peanut forest, moss, 5.VIII.2018 (1 larva); Guba district, Uzunmeshe village, alder forest (with grey alder tree), plants, 4.VIII.2018 (1 larva); Siyazan region, Galaalti village, oak forest (with Georgian oak trees), plants, 25.V.2019 (1 larva).

Distribution: Europe; Caucasus: Azerbaijan; Northern America: USA, Greenland Island (Beron 2008) (Figure 10).



Figure 10. Scutum of the larva of the *Leptus molochinus*.

Leptus longipilis (Berlese, 1910)

Materials examined: Zagatala district, Parzivan village, mountain broad-leaved forest, floor, II.1986 (1 spp.) (collected by I. Kulagina).

Distribution: Central (Poland and Hungary) and Southern (Italy) Europe; Southern Caucasus (Azerbaijan) (Beron, 2008)

Comments: *Leptus longipilis* species are an indicator of the landscape of broad-leaved forests of the mountain-forest zone and low-mountains

Leptus rubricatus (C.L. Koch, 1837)

Materials examined: Zagatala district, Parzivan village, mountain broad-leaved forest, II.1986 (1 spp.) (collected by I. Kulagina); Zagatala district, Parzivan village, mountain broad-leaved forest, floor, IV.1986 (1 spp.) (collected by I. Kulagina); Gakh district, Ilisu village, broad-leaved forest, under the stones, 5.V.2013 (1 spp.) (collected by O. Aslanov); Balakan district, Zagatala preserve, mountain broad-leaved forest, soil decoy, 2.V.2015 (1 spp.) (collected by N. Sneqovaya) (Figure 11).

Distribution: Europe; Caucasus: Azerbaijan (Beron 2008)



Figure 11. General view of the *Leptus rubricatus*.

Callidosomatinae; Charletonia; *Charletonia globigera* (Berlese, 1885)

Materials examined

Lankaran district, in the forest floor, IX.1984 (2 spp.) (collected by Kh. Aliyev). Siyazan district, Zarat settlement, Gangiz desert, 26.V.2017 (9 spp.); Khizi district, Garabulagchay, slippery fields, plants, 26.VIII.2017 (2 spp.); Khizi district, Bakishli village, thorn shiblyak, thorn, 26.VIII.2017 (2 spp.); Shabran district, Arablar village, forest-steppe, plants, 8.V.2018 (1 f \neq); Siyazan district, Beshbarmaq mountain, shoranga desert, shoranga, 15.IX.2018 (8 spp.); Khizi district, Bakhishli village, arid spruce forest consisting of dwarf pear trees, a dwarf pear, 1.VI.2018 (1 sp.); Ismayilli district, Tirjan village, birch-oak forest (with marvellous birch), 2.IX.2018 (5 spp.); Gakh district, Lakit village, oak forest (with Georgian oak tree), plants, 29.VI.2018 (1 f \neq); Zagatala district, Jar village, hornbeam forest, plants, 30.VI.2018 (1 sp.).

Distribution: Europe; Southern Caucasus (Azerbaijan) (Beron 2008)

Charletonia cardinalis, Pallas 1772

Materials examined: Siyazan district, Beshbarmaq Mountain, shoranga desert, shoranga, 15.IX.2018 (1 sp.); Babak district, Garachuq village, inside the wheat, (2 larvae) (collected by E. Abdullayeva); Sabirabad district, over the striped bee, VI.1972 (5 larvae) (collected by Sokolova).

Distribution: is cosmopolit species (Haitlinger 1987) (Figure 12).

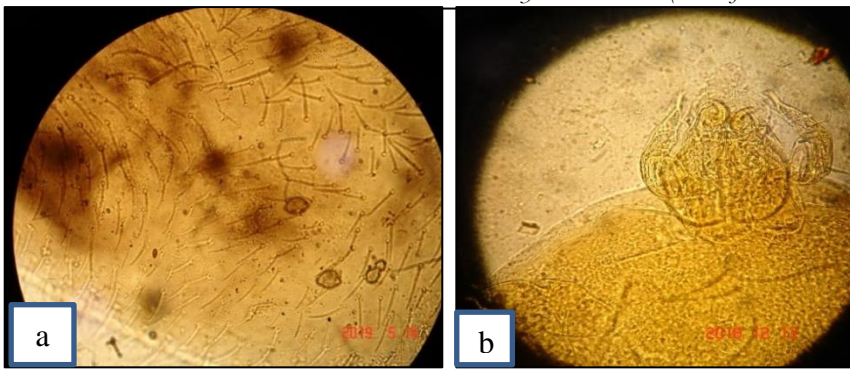


Figure 12. *Charletonia cardinalis*. a) Dorsal opistosomal setae of adult; b) Larva's gnatosom.

Abrolophinae; *Abrolophus*; *Abrolophus artemisiae* (Schrank, 1803)

Materials examined: Absheron peninsula, Baku city, artificial-forest massive, floor of the pine tree, 31.V.1986 (1 sp.) (collected by O. Aslanov).

Distribution: Europe; Southern Caucasus (Azerbaijan) (Beron 2008)

Abrolophus miniatus (Hermann, 1804)

Materials examined: Khizi district, Garabulagchay, slippery fields, plants, 26.VIII.2017 (1 f \neq); Khizi district, Bakhishli village, thorn shiblyak, thorn, 26.VIII.2017 (3 spp.); Khizi district, Bakhishli village, oak forest (with Georgian oak tree), plants, 1.VI.2018 (1 sp.); Gakh district, Saribash village, field-bush, plants, 29.VI.2018 (1 sp.); Gakh district, Gashgachay village, hornbeam-beech forest, plants, 30.VI.2018 (2 f \neq); Guba district, Uzunmeshe village, alder-hornbeam forest, plants, 4.VIII.2018 (1 sp.); Guba district, Ispik village, beech forest, moss, 5.VIII.2018 (1 f \neq); Khizi district, Aladash chain, forest-steppe, plants, 15.IX.2018 (1 f \neq); Gabala district, Gamarvan village, hornbeam forest, plants, 30.IX.2018 (1 sp.).

Distribution: Europe; Caucasus: Azerbaijan; North-Western Africa (Algeria); Greenland Island (Beron 2008)

Abrolophus crassitarsus (Schweizer, 1951)

Materials examined: Zagatala district, ether-oil sovkhos-plant, tea plantation, tea bush, 12.VIII.2017 (1 sp.); Khizi district, Bakhishli village, oak forest (with Georgian oak tree), grasses, 26.VIII.2017 (1 sp.); Khizi district, Bakhishli village, oak forest, plants, 26.VIII.2017 (1 m \neq); Khizi district, Bakhishli village, palid forest, tree corona, 26.VIII.2017 (5 spp.); Khachmaz district, Lajat village, plain forest, plants, 9.V.2018 (3 spp.); Khizi district, Bakhishli village, arid spruce forest (with dwarf pear trees), 1.VI.2018 (2 spp.); Gakh district, Saribash village, field-bush, 29.VI.2018 (1 sp.); Guba district, Jimi village, oak forest (with eastern oak), plants, 5.VIII.2018 (5 spp.); Ismayilli district, Lahij village, forest, plants, 2.IX.2018 (3 spp.); Ismayilli district, Basgal village, hornbeam forest, plants, 2.IX.2018 (2 spp.); Ismayilli district, Lahij village, forest, plants, 2.IX.2018 (3 spp.); Shabran district, Arablar village, semi-desert, plants, 25.V.2019 (2 spp.); Shamakhi district, Dadagunash village, oak forest (with Georgian oak tree), plants, 17.V.2019 (11 spp.); Shamakhi district, Chukhuryurd village, arid spruce forest (consisting of dwarf pear), plants, 17.VI.2019 (2 spp.).

Distribution: Central Europe; Southern Caucasus (Azerbaijan) (Beron 2008) (Figure 13).



Figure 13. Anus of the *Abrolophus crassitarsus*.

Abrolophus rhopalicus (C.L. Koch, 1837)

Materials examined: Shamakhi district, Chukhuryurd village, field-steppe, plants, 15.V.2018 (3 f \neq).

Distribution: Europe; Southern Caucasus (Azerbaijan) (Beron 2008).

Comments: *Abrolophus rhopalicus* is an indicator of mountain forest-steppe landscape.

Abrolophus passerinii (Berlese, 1904)

Materials examined: Absheron district, Jeyranbatan settlement, artificial forest massive, mint, 20.VI.1985 (1 sp.) (collected O. Aslanov); Khizi district, Altiaghac settlement, forest, grass, 26.V.2011 (1 sp., 3 larvae) (collected by O. Aslanov).

Distribution: Ireland Island, Central (Poland) and Southern (Italy) Europe; Southern Caucasus (Azerbaijan) (Beron, 2008)

***Abrolophus strojnii* Gabrys, 1992**

Materials examined: Khizi district, Yarimja village, oak forest (with Georgian oak tree), plants, 20.VI.2012 (1 sp.) (collected by O. Aslanov); Gakh district, Ilisu village, juniper-keeping, juniper, 5.V.2013 (3 spp.) (collected by O. Aslanov); Zagatala district, Jar village, hornbeam forest, plants, 30.VI.2018 (4 spp.).

Distribution: Central Europe (Poland), Hungary; Southern Caucasus (Azerbaijan) (Beron 2008).

Comments: *Abrolophus strojnii* is an indicator of montane forest zone (Figure 14).



Figure 14. Crista metopica of the adult of the *Abrolophus strojnii*.

***Abrolophus quisquiliarus* (Hermann, 1804)**

Materials examined: Absheron peninsula, Baku city, rocks, 10.V.1985 (1 ♀) (collected by O. Aslanov); Khizi district, Bakhishli village, oak forest (with Georgian oak tree), 1.VI.2018 (4 spp.); Khizi district, Bakhishli village, arid spruce forest (consisting of dwarf pear trees), a dwarf pear, 1.VI.2018 (1 sp.). Lerik district, Gosmalian village, under the rocks, 28.VI.1985 (1 sp.) (collected by Kh. Aliyev).

Distribution: Europe; Caucasus: Azerbaijan (Beron 2008)

Comments: *Abrolophus quisquiliarus* is an indicator of mountainous-forest zone.

***Abrolophus norvegicus* (Thor, 1900)**

Materials examined: Gusar district, Kuzun village, sub-alp birch forest, Radde birch, 4.VIII.2018 (4 spp.); Ismayilli district, Tirjan village, birch forest (including marvelous birch), plants, 2.IX.2018 (1 sp.). Shamkir district, Ashagi Seyfali village, in the black clover field, 25.VIII.1985 (1 sp.) (collected by O. Aslanov).

Distribution: Europe; Caucasus: Azerbaijan (Beron 2008).

Comments: *Abrolophus norvegicus* species are the effective regulator of the number of the sucking pests of the black clover in the black-clover fields of Shamkir district. Also, these species are an indicator of mountainous-forest zone.

Balaustiinae; Balaustium; *Balaustium xerothermicum* Gabrys, 2000**Materials examined**

Zagatala district, Parzivan village, mountain broad-leaved forest, floor, IV.1986 (2 spp.) (collected by I. Kulagina); Zagatala district, tea plantation, 7.VII.2019 (1 sp.).

Distribution: Central Europe (Poland); Southern Caucasus (Azerbaijan) (Beron 2008) (Figure 15).



Figure 15. Gnathosoma of the *Balaustium xerothermicum*.

***Balaustium unidentatum* (Tragardh, 1904)**

Materials examined: Absheron peninsula, Mardakan settlement, over the pool, 19.V.1985 (6 spp.) (collected by O. Aslanov); Baku city, Garden of the Institute of Zoology of ANAS, *Azadirachta indica*, 19.V.1988 (1 sp.) (collected by O. Aslanov); Shamakhi district, Chuxuryurd village, forest- steppe, plants, 15.V.2018 (2 spp.) (Figure 16).



Figure 16. *Balaustium unidentatum*: a) general view; b) urnulae and eyes; c) pedipalp.

Distribution: Central Europe (Poland and Switzerland); Caucasus: Azerbaijan; Greenland Island (Beron 2008)

Comments: Female individuals come into surface massively in order to lay an egg in the second half of May. In addition, at that time, the surface of soil and rocks are seen dark red.

***Neobalaustium*; *Neobalaustium* species**

Materials examined: Gakh district, Ilisu village, mountain broad-leaved forest, under the rocks, 5.V.2013, (3 spp.) (collected by O.Aslanov); Khizi district, Garabulaqchay, slippery fields, plants, 25.VIII.2017 (2 spp.); Siyazan district, Zarat settlement, shoranga desert, shoranga, 25.VIII.2017 (1 sp.); Siyazan district, Beshbarmaq mountain, Gangiz desert, Gangiz Village 25.VIII.2017 (31 spp.); Shamakhi district, Chuxuryurd village, forest-steppe, plants, 15.V.2018 (2 spp.); Siyazan district, Beshbarmaq mountain, shoranga desert, shoranga, 15.IX.2018 (1 f \neq); Shabran district, Arablar village, forest-steppe, plants, 25.V.2019 (3 spp., 3 larvae); Siyazan district, Beshbarmaq mountain, arid spruce forest (consisting of dwarf pear trees), over the rocks, 25.V.2019 (5 f \neq); Gobustan district, Chalov village, steppe, grasses, 17.V.2019 (5 spp.).

Comments: Female individuals come into surface massively in order to lay an egg in the second half of May, and at that time, the surface of soil and rocks are seen dark red. 6 eggs increase in the body of the female individuals at the same time.

During our research we investigated distribution of erythraeid mites of the Greater Caucasus by landscape belts (Table 2), by altitudinal zonation (Table 3), by landscapes (Table 4) and by forest biotopes (Table 5), too.

Table 2. Distribution of erythraeid mites of the Greater Caucasus by landscape belts.

Species	Landscape belts			
	A	B	C	D
<i>Erythraeus gorcensis</i>				+
<i>Erythraeus opilionoides</i>		+		
<i>Erythraeus phalangoides</i>				+
<i>Erythraeus adpendiculatus</i>				+
<i>Erythraeus regalis</i>		+	+	
<i>Curteria episcopalis</i>		+		+
<i>Neobalaustium species</i>		+	+	+
<i>Eatonia plumifera</i>				+
<i>Leptus rubricatus</i>		+		+
<i>Leptus longipilis</i>		+		
<i>Leptus slivovi</i>		+	+	
<i>Leptus molochinus</i>		+		+
<i>Leptus clethrionomydis</i>		+		
<i>Abrolophus artemisae</i>				+
<i>Abrolophus miniatus</i>		+	+	+
<i>Abrolophus crassitarsus</i>		+	+	+
<i>Abrolophus rhopalicus</i>			+	
<i>Abrolophus passerinii</i>			+	+
<i>Abrolophus strojnyi</i>		+		

<i>Abrolophus norvegicus</i>	+	+		
<i>Abrolophus quisquiliarum</i>			+	
<i>Charletonia globigera</i>	+	+	+	
<i>Charletonia cardinalis</i>				+
<i>Balaustium xerothermicum</i>	+			
<i>Balaustium unidentatum</i>				+

Note: A – Subalpine zone; B – Montane forest; C – Alpine meadow; D – Semidesert.

Table 3. Distribution of erythraeid mites of the Greater Caucasus by altitudinal zonation.

Species	Altitudinal zonation				
	A	B	C	D	E
<i>Erythraeus gorcensis</i>	+				
<i>Erythraeus opilionoides</i>			+		
<i>Erythraeus phalangoides</i>	+				
<i>Erythraeus adpendiculatus</i>	+				
<i>Erythraeus regalis</i>			+		
<i>Curteria episcopalis</i>	+		+	+	
<i>Neobalaustium species</i>		+	+	+	
<i>Eatonia plumifera</i>	+				
<i>Leptus rubricatus</i>	+		+	+	
<i>Leptus longipilis</i>			+		
<i>Leptus slivovi</i>		+		+	
<i>Leptus molochinus</i>	+			+	
<i>Leptus clethrionomydis</i>		+			
<i>Abrolophus artemisiae</i>	+				
<i>Abrolophus miniatus</i>		+	+	+	
<i>Abrolophus crassitarsus</i>		+	+	+	
<i>Abrolophus rhopalicus</i>			+		
<i>Abrolophus passerinii</i>	+		+		
<i>Abrolophus strojni</i>			+	+	
<i>Abrolophus norvegicus</i>			+		+
<i>Abrolophus quisquiliarum</i>			+		
<i>Charletonia globigera</i>		+	+		
<i>Charletonia Cardinalis</i>			+		
<i>Balaustium xerothermicum</i>			+		
<i>Balaustium unidentatum</i>	+				

Note: A – Lowland zone (-28-200 m); B – Foothill zone (200-500 m); C – Thermo-mediterranean zone (500-1000 m); D – Mesomediterranean zone (1000-2000 m); E – Super-mediterranean zone (>2000 m)

Table 4. Distribution of erythraeid mites of the Greater Caucasus by landscapes.

Landscapes	Number species		Number specific species	
	by number	of by percent	of by number	of by percent
The meadow-forest landscape of the super-mediterranean zone	2	8	-	-
The broadleaf forests and meadow-shrub landscapes after forest of the mesomediterranean zone	8	32	-	-
The broadleaf forests of the thermo-mediterranean zone	12	48	5	20
Forest-steppe landscape of the thermo-mediterranean zone (partially mesomediterranean zone)	3	12	-	-
Steppe and phryganoid landscapes	2	8	1	4
Foothill, partially flatlands and arid sparse forest landscape	1	4	-	-
Riparian forests of the thermo-mediterranean zone	1	4	-	-
Subtropic semi-desert landscape	4	16	1	4

Eol-sand landscape of the lowland zone	2	8	1	4
Artificial forests	6	24	4	16
Agro-landscapes	2	8	1	4

Table 5. Distribution of erythraeid mites of the Greater Caucasus by forest biotopes.

Biotopes	Number of species	
	by numbers	by percent
The hornbeam forests of thermo-mediterranean zone	7	28
The chestnut forests of thermo-mediterranean zone	1	4
The oak forests of thermo-mediterranean zone (with <i>Quercus iberica</i>)	4	16
The maple forests of thermo-mediterranean zone	2	8
The beech and beech-hornbeam forests of mesomediterranean zone	3	12
The oak and oak-beech forests of mesomediterranean zone	2	8
The <i>Alnus</i> forests of mesomediterranean zone (with <i>Alnus incana</i>)	2	8
The birch forests of super-mediterranean zone (with <i>Betula raddeana</i>)	2	8
The Tuqay forests	1	4

Conclusion

25 species of the erythraeid mites belonging to 8 genera of 5 sub-families in the Greater Caucasus region were found. Among them, 1 sub-family (Balaustiinae), 4 genera (*Curteria*, *Erythraeus*, *Balaustium* and *Neobalaustium*) and 22 genera are new for the Caucasian fauna. 2 sub-families, 2 genera and 1 species are new for the studied field. The most of the species are found as 10 species belonging to 5 genera in Absheron peninsula and 8 species belonging to 6 genera in Gakh district.

Acknowledgments

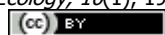
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