

The geometrid moths (*Lepidoptera*, *Geometridae*, *Ennominae*) collected in the Azerbaijan part of the Lesser Caucasus and Middle Araz regions

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This article describes the distribution of 38 species of 26 genera of genus the Ennominae subfamily of the Geometridae family from the Lesser Caucasus and Middle Araz Region and their distribution around the world. Two species of the genera Semiothisa and Dysia are dominant. 16 species were collected from both the Lesser Caucasus and the Middle Araz regions, 10 species only from the Middle Araz region, and 15 species only from the Lesser Caucasus region. According to our information, at least in the middle Araz region, 5 genera and 8 species (*N.divergaria*, *N.waltheri*, *S.latirata*, *D.sicanaria*, *D.crassipunctata*, *P.strigillaria*, *S.sosiararia*, *S.aesthimata*) are found, there are 12 genera and 16 species in the Lesser Caucasus part of Azerbaijan and 12 genera and 14 species in both regions. One species (*B.betularis* Linnaeus, 1758) is new to Azerbaijan and the Lesser Caucasus part of Azerbaijan.

Keywords: Azerbaijan, Geometridae, geometrid moths, distribution, genus, family, species, GNM

INTRODUCTION

Geometrid butterflies live in many different biotopes and play a key role in biocenoses and agrocenoses. In the years of mass reproduction, they also cause serious damage to pastures and forest trees. Many of these butterflies are of great economic importance because they are involved in the pollination of flowering plants. The text is based on collection and literature information.

The geometer moths compose one of the largest families of the Lepidoptera including 23000 species from 2000 genera (Didmanidze, 2016). Geometridae is the second largest group of Lepidoptera. Because of their great economic importance, we decided to focus on the history of their studies. The study of geometrid moths in Azerbaijan started in the 19th century. In the second volume of the work of H.Romanov, A.Zeitz, Q.Xristoff, K.Lampert, etc., a large number of butterflies collected from the Caucasus (970 species) were mentioned, 105 species and 2 subspecies of which were geometrid moths. The

list of the works of scientists who studied this group until the end of the twentieth century is presented in the references. A.Piriyev systematically studied the geometrid moths of Absheron (127 species) for the first time. S.Hajiyeva identified 162 species for Mountainous Shirvan, of which 10 species are new to the fauna of Azerbaijan.

In Azerbaijan, this family was studied in the Absheron-Gobustan region only by A.Piriyev (1989), and in the Montier Shirvan region only by S.Hajiyeva (2019).

The Azerbaijan part of the Lesser Caucasus and Middle Araz province includes the districts below: Nakhchivan AR, Ganja, Gazakh, Tovuz, Aghstafa, Gadabay, Kalbajar, Fizuli, Lachin, Zangilan, Aghdam, and Shusha.

The Ennominae subfamily of the Geometridae collection of the Institute of Zoology of the MSE of AR contains 38 geometrid species belonging to 26 genera collected in the above-mentioned regions.

MATERIALS AND METHODS

The geometer moths of the Azerbaijan part of the Lesser Caucasus were collected mainly by A.Bogachev, R.Effendi, S.Aliyev, and A.Piriyev from Nakhchivan AR (Nakhchivan, Ordubad, Julfa, Shahbuz, Babek, Sharur), Ganja, Kazakh, Tovuz, Aghstafa, Gadabay, Kalbacar, Fizuli, Lachin, Aghdam, Zengilan and Shusha (Fig.). According to the labels, the species were collected in a light trap. Species were identified according to different keys (Lampert, 1913; Romanoff, 1884-1901; Radde, 1899; Viydalep, 1991).

Butterflies are collected by entomological method - during the day through a hand net, and at night from light sources using the wood stain impregnated with ethyl acetate. After death, they are placed on cotton mattresses. In the laboratory, the wings are straightened and they are placed in the collection after identification.

RESULTS AND DISCUSSION

The modern names of the districts on labels:

Yelenendorf, Xanlar – Goygol

Yelizavetpol, Kirovabad – Ganja

Abbreviations: GNM – Georgian National Museum

Family *Geometridae* Leach, 1815

Subfamily *Ennominae* Duponchel, 1845

Genus *Abraxas* Leach, 1815

Abraxas grossulariata Linnaeus, 1758

Material: Azerbaijan - Yelenendorf v. Hajikend, Guetchnan, VI-VIII (Romanoff, 1885), A.Boqacev 1♂; Nakhchivan AR v. Buzgov, 29.05.1974, R.Effendi 1♂, Goygol v. Hajikend, 06.06.2021, S.Hajiyeva 2♂.

Distribution: Western, Eastern and Middle Europa, Caucasus, Transcaucasia, Crimea, Southern Siberia, China, Japan.

Genus *Tephрина (Ísturgia)* Hübner, 1823

Tephрина (Ísturgia) arenacearia Denis et Schiffermüller, 1775

Material: Azerbaijan - Nakhchivan AR, Yelizavetpol, Yelenendorf, Darychichek, VI (Romanoff, 1885), Kirovabad, 12.09.1939,

A.Boqacev, 1♂; 29.05.1974, Nakhchivan AR v. Buzgov, R.Effendi 1♂; Ganja, 02.06.2021, S.Hajiyeva 1♂ 2♀.

Distribution: Southern Europe, Caucasus, Transcaucasia, Wednesday, Southern Siberia, Primorye, Mongolia.

Genus: *Nychiadea* Lederer, 1853

Nychiades divergaria Staudinger, 1892

Material: Azerbaijan - Nakhchivan AR, v. Kuku, 15.07.1970, R.Effendi 1♂.

Distribution: Iran, Azerbaijan, Turkiye.

Nychiades waltheri Hübner, 1813

Material: Azerbaijan - Nakhchivan AR v. Kuku, 15.07.1970, R.Effendi 1♀; Nakhchivan AR, v. Kuku, 18.05.1990 A.Piriyev 2♀ 1♂.

Distribution: Soviet Primorye, Korea, Japan.

Genus *Dycia* Hübner, 1825

Dycia conspersaria Denis et Schiffermüller, 1775

= *Dycia conspersaria* (Fabricius, 1775)

Material: Azerbaijan - Yelenendorf v. Garayazi (Romanoff, 1885; Radde, 1899); Karabakh, Nakhchivan AR Ordubad, 1♂ 1♀ (GNM), Ganja v. Hajikend 23.07.2019 S. Hajiyeva 1♂.

Distribution: Southern Europa, Southern Urals, Mid Asia.

Dycia fagaria Hubner, 1813

Material: Azerbaijan - Nakhchivan AR Ordubad v. Bilev 23.05.1957, Zagulyaev 1♀, v. Garmachatakh, 15.06.1967, S.Aliyev, 1♀; Nakhchivan AR, v. Buzgov, 18.05.1974 R.Effendi 1♂; Goygol v. Asigli 05.06.2019 S.Hajiyeva 1♂,

Distribution: Europe, Eastern Ural, Asia Minor.

Dycia sicanaria Obertur, 1923

Material: Azerbaijan - Nakhchivan AR v. Buzgov, R.Effendi 2♂♂, Zengilan v. Vejneli, 15.05.1982, R.Effendi 4♂♂ 2♀♀.

Distribution: South. Europ. h. Russia, Crimea, Caucasus, Transcaucasia, North. Kazakhstan.

Dycia innocentaria christoph, 1885

Material: Azerbaijan - Zengilan v. Vejneli, 19.05.1982, R.Effendi 2♂♂; Ganja v. Hajikend 03.06.2019, S.Hajiyeva 1♂.

Distribution: Caucasus, Transcaucasia, Armenia.

Dycia crassipunctaria Rebel, 1825

Material: Azerbaijan - Nakhchivan AR, v. Buzgov, R.Effendi 2♂♂, Zengilan v. Vejneli, 20.05.1970, R.Effendi 3♂♂.

Distribution: Caucasus, Transcaucasia, Armenia.

Genus *Perconia* Hübner, 1825

Perconia strigillaria Hübner, 1825

Material: Azerbaijan - Ordubad (Alferaki, 1875), GNM 1♂; Nakhchivan AR v. Kuku, 18.05.1970, R.Effendi 2♀ 1♂.

Distribution: European, Southern Siberia, Caucasus, Ural, Mid Asia, Yakutiya, Mongolia, Reserve and Middle Siberia.

Genus *Siona* Dupenchel, 1829

Siona lineata Scopoli, 1763

Material: Azerbaijan - Darychichek (Yelenendorf), Guetchinan (Ordubad), IV-VI (Romanoff, 1885, GNM), Kelbecer v. Yanshakh 29.06.1965, R.Effendi 2♂1♀, Nakhchivan AR v. Bicenek, 12.07.1974, R.Effendi 1♂.

Distribution: Western, Mid. and Eastern Europa, Crimea, Caucasus, Kazakhstan, South Siberia, Amur region, Primorye, Mongolia, Mid Asia.

Genus *Ligdia* Guenne, 1857

Ligdia adustata Denis et Schiffermüller, 1775

Material: Azerbaijan - Elenendorf Darychichek, VI-VII (Romanoff 1885), Ganja v. Hajikend 17.07.2021, S.Hajiyeva 2♂ 1♀.

Distribution: South of the European part of Russia, Caucasus, Crimea, Southern Caucasus, Asia Minor, Iran.

Genus *Synopsia* Hübner, 1825

Synopsia sostiaria Hübner, 1799 (= *S.unitaria* Brout, 1915)

Material: Azerbaijan - Nakhchivan AR v. Buzgov 20.05.1970, R.Effendi 2♂, v. Kuku 09.06.1973, R.Effendi 2♂.

Distribution: Southern Europa, Caucasus, Mid Asia.

Genus *Chariaspilates* Wehrli, 1825

Chariaspilate formosaria Eversmann, 1953

Material: Azerbaijan - Nakhchivan AR

Ordubad 22.06.1973, E.Didmanudze 4♂♂, (GNM); Ganja Hajikend 12.07.2021, S.Hajiyeva 1♂.

Distribution: South European part of Russia, Urals, Northern Kazakhstan, South Siberian, Amur region, Primopye, Kurile Islands, Mongolia, China, Korean peninsula, Japan.

Genus *Semiothisa* Hübner, 1818

=*Chiasma* Hübner, 1823

=*Diastiotis* Hübner, 1823

=*Jsturgia* Hübner, 1823

=*Macaria* Curtis, 1825

Semiothisa aesthimaia Hübner, 1809

Material: Azerbaijan - Nakhchivan AR - Ordubad IV-VI (Romanoff, 1885), (GNM); Nakhchivan AR v. Julfa 18.06.1973, E.Didmanidze 1♂.

Distribution: South European part of Russia, Crimea, Transcaucasia, Mid Asia, Iran, Afghanistan.

Semiothisa notata Linnaeus, 1758

Material: Azerbaijan - Yelizavetapol Goygol 07.1913, 4♂♂ (GNM); Nax. AR Ordubad IV-VI (Romanoff, 1885), (GNM); Goygol, v. Ashigli, 08.07.2021, S. Hajiyeva 2♂♂.

Distribution: Western, Mid and Eastern Europa, Caucasus, Transcaucasia, Asia Minor, Iran, Afghanistan

Semiothisa clathrata Linnaeus, 1758

Material: Azerbaijan - Yelizavetapol Goygol, 07.1913, 4♂♂ (GNM); Goygol v. Hajikend 12.07.2021, S. Hajiyeva 2♂.

Distribution: Wester, Eastern and Middle Europa, Caucasus, Transcaucasia, Kazakhstan, China, Japan.

Semiothisa lutirata Clerck, 1759

Material: Azerbaijan - Nakhchivan AR Ordubad, 04.07 (Romanoff, 1885), 17.05.1974 1♂; Julfa, 18.06.1973, R.Effendi 1♂.

Distribution: Wester, Eastern and Middle Europa, Western Siberian, Northern Kazakhstan, Caucasus, Transcaucasia.

Semiothisa artesiaria Denis & Schiffermüller, 1775

Material: Azerbaijan - Yelenendorph Varvara 1♂ 1♀; (Romanof, 1885) GNM; Goygol v. Hajikend 12.07.2021, S.Hajiyeva 1♂.

Distribution: Northem, average and Middle Europa, Caucasus, Kazakhstan, south Siberia,

Amur region.

Genus *Mannia* Prout, 1915

Mannia oppositaria Mann, 1864

=*Tephronia oppositaria* Mann, 1864

Material: Azerbaijan - Nakhchivan AR Julfa, 18.06.1973, E.Didmanidze 1♂ 1♀; Goygol v. Ashigli, 05.06.2021, S.Hajiyeva 2♂♂.

Distribution: South Europa, Caucasus, Asia Minor.

Genus *Peribatodes* Wehrli, 1943

Peribatodes rhomboidaria Denis & Schiffermüller, 1775

Material: Azerbaijan - Yelizavetapol Goygol, 07.1913, 4♂♂ (GNM); Nakhchivan AR Julfa, 18.06.1973 E.Didmanidze 1♂ 1♀; Goygol v. Ashigli 05.06.2021, S.Hajiyeva 2♂♂.

Distribution: South Europa, Crimea, Caucasus, Transcaucasia, West. Middle Asia, Altai, Northern Iran.

Peribatodes umbraria Hübner, 1809

Material: Azerbaijan - Nakhchivan AR Ordubad v. Keleki 23.05.1970 R.Effendi 2♂ 1♀; 10.05.1974 Zengilan v. Vejneli R.Effendi 2♂♂; Goygol v. Ashigli 05.06.2021, S.Hajiyeva 2♂♂.

Distribution: Crimea, Caucasus, Transcaucasia, West Middle Asia, Altai, Northern Iran, Afghanistan.

Genus *Biston* Leach, 1815

Biston betularis Linnaeus, 1758

= *Biston huberaria* (Ballion, 1866).

Material: Azerbaijan - Hajikend, 06.1910, 2♂♂ 1♀; Yelizavetapol, Goygol, 07.1913 (GNM); Goygol, 05.06.2017, S.Hajiyeva 2♂♂.

Note: The species was found in Yelenendorf by K.Romanoff (1885) and A.Radde (1889).

Distribution: Western, Middle and Eastern Europa, Caucasus, Urals, Kazakhstan, Western Siberia, China, Japan, North America.

Biston stratarius Linnaeus, 1758

Material: Azerbaijan – Ordubad Isti dara 06.03.1884 1♂, 1♀ (GNM); Goygol v. Hajikend, 10.04.2019, S.Hajiyeva 2♂♂.

Distribution: Western, Middle and Eastern Europa, Caucasus, Transcaucasia, North-West Africa, Minor Asia.

Genus *Costaconvexa* Agenio, 1949

Costaconvexa polygrammata Borkhausen, 1794

1794

Material: Azerbaijan, Yelenendorf, Varvara, Goytapa, 10.07.1915 (Romanoff, 1887).

Distribution: South Europa, the Crimea, Caucasus, Mid Asia.

Genus *Orthonama* Ectropis

Orthonama obstipata Fabricius, 1794

=*Geometra fluviata* Hübner, 1799

Material: Azerbaijan – Yelenendorf Gankunda, VI-VII (Romanoff, 1887), GNM.

Distribution: South and Central Europa, Crimea, Sakhalin, Caucasus, Mid Asia.

Genus *Scotopteryx* Hübner, 1825

Scotopteryx bipunctaria (Denis & Schiffermüller, 1775)

=*Oetholicha bipunctaria* (Denis & Schiffermüller, 1775)

Material: Azerbaijan - Yelizavetapol Goygol, 07.1913, 2♂♂ 2♀♀, (GNM), Goygol v. Hajikend 14.07.2017, S.Hajiyeva 2♂.

Distribution: South and Central Europa, Urals, Caucasus.

Genus *Hylaea* Hübner, 1822

(=*Ellopi*a Treitschke, 1825)

Hylaea fasciaria Linnaeus, 1758 (= *prosapiaria* Linnaeus, 1758)

Material: Azerbaijan - Azerbaijan, Yelizavetapol Kasikapan 21.07.1887, Goygol v. Ashigli, 14.07.2017, S.Hajiyeva 2♂♂.

Distribution: Western, Middle and Eastern Europa, Caucasus, Altay, Yakutiya.

Genus *Ascotis* Hübner, 1823

(=*Himera* Düpenchel, 1829)

Ascotis selenaria (Linnaeus, 1761)

Material: Azerbaijan - Goygol v. Ashigli 12.07.2017, S.Hajiyeva 2♂♂ 1♀.

Distribution: Noth, Middle and Eastern Europa, Caucasus, Transcaucasia, Middle Asia, Noth of Iran.

Genus *Colotois* Hübner, 1825

Colotois pennaria Hübner, 1822

Material: Azerbaijan - Gorge.r. Arax, 17.10.1974, R.Effendi, 2♂♂; Goygol v. Ashigli 9.06.2021, S.Hajiyeva 2♂♂.

Distribution: Spare, Med. and Eastern

Europa, Caucasus, Transcaucasia, West Middle
Asiya Minor, North of America.

Genus *Ennomos* Treitschke, 1825

Ennomos erosaria (Denis & Schiffermüller,
1775)

Material: Azerbaijan, Goygol v. Ashigli,
09.06.2021, S.Hacıyeva, 1♂ 2♀.

Distribution: Western, Middle and Eastern
Europa, Caucasus, Transcaucasia, North of
Africa.

Genus *Ectropis* Hübner, 1825

Ectropis luridata Borkhausen, 1794
(=*extersaria* Hübner, 1799)

Material: Azerbaijan - Yelenendorph,
Gankunda, VI (Romanof, 1885), Ordubad
(Kubistek), 1888 2♂♂, (GNM.), Goygol v.
Hacikend 24.06.2019, S.Hacıyeva, 1♂.

Distribution: Western, Middle and Eastern
Europa, Caucasus, Transcaucasia.

Genus *Campaea* Lamarck, 1816

=*Metacampa* Latreilla, 1825

Campaea margaritata (Linnaeus, 1767)

= *Metrocampa margaritata* Linnaeus, 1767

Distribution: Middle and Southern Europa,
Caucasus.

Material: Azerbaijan - Yelizavetapol, v.
Hajikend, 05.1916, 1♂; Göygöl, 07.1913, 1♀

(GNM); Göygöl, Hajikend 05.07.1919,
S.Hacıyeva 1♀.

Genus *Alcis* Curtis, 1825

Alcis jubata Fhunberg, 1788 (= *glabraria*
Hübner, 1790)

Material: Azerbaijan - Yelizavetapol, v.
Hajikend, 02.07.1910, 2♂♂ (GNM); Goygol v.
Hacikend 05.07.2019, Goygol v. Ashigli,
09.06.2021 S.Hacıyeva, 1♂ 2♀.

Distribution: North, Middle Europa, Ural,
Siberia, Amur region, Seaside mountains, Saxalin,
Kuril islands, Mongolia, Japan.

Alcis repandata Linnaeus, 1761

Material: Azerbaijan - Yelizavetapol v.
Hajikend, 02.09.1910, 2♂♂ (GNM); Goygol v.
Hacikend 05.09.2019, S.Hacıyeva, 1♂.

Distribution: North, Middle Europa,
Caucasus, Transcaucasia, Altay.

Genus *Gnophos* Treischke, 1827

Gnophos onustaria Hübner, 1853

Material: Azerbaijan - Yelenendorf Istisu,
(Romanoff, 1885; Radde, 1899), Fizuli
01.09.1988 A. Priyev 1♂.

Distribution: Southern Caucasus, Western
Asia Minor.

Gnophos obscuraria Hübner, 1853.



Fig. Records of geometrids in Azerbaijan, localities (filled circles).

Material: Azerbaijan - Lake Gokcha VI-VII (Romanoff, 1885, Yelizavetopol lake Goygol, 07.1913 1♂ (GNM), Goygol 09.06.2021, S.Haciyeva, 2♂.

Distribution: Europa, Asia Minor (North Turkiye).

Gnophos sartata Treitschke, 1827

Material: Azerbaijan - Yelenendorf Istisu (Radde, 1899) (GNM); Naxçıvan AR, v. Buzgov 19.05.1970, R.Effendi, 2♂, Goygol v. Hacikend 24.09.2019, S.Haciyeva 2♂.

Distribution: South of the European part of Russia, Caucasus, Transcaucasia, Asia Minor.

Gnophos pseudosnelleni Rjabov, 1964

Material: Azerbaijan - Arpachay 06.07.1937 Ryabov (GNM); Naxçıvan AR, v. Buzgov 19.05.1970, R.Effendi 1♀.

Distribution: Transcaucasia, Western. Wed. Asia.

Genus *Personia* Hübner, 1823

Personia strigillaria Hübner, 1789

Material: Azerbaijan - Nakhchivan AR Ordubad, 1875 1♂, (Alferaki, GNM); Goygol, 15.07.1988, A.Piriyeu, 2♂♂.

Distribution: Europa, Caucasus, Urals, Middle Siberia, Yakutia, Asia Minor, Mongolia.

Genus *Calospilos* Hübner, 1825

Calospilos sylvato Scopoli, 1767

Material: Azerbaijan - Nakhchivan AR v. Bichenek, 05.06.1964, R.Effendi 1♂, Goygol v. Ashigli, 09.06.2021, S.Haciyeva, 1♂.

Distribution: Western, Middle and Eastern Europa, Caucasus, Crimea, Siberia reserve, China, Japan.

Among 26 genera of *Ennominae* subfamily belonging to geometer moths of the Lesser Caucasus and Middle Araz region of Azerbaijan, *Abraxas*, *Thephrina*, *Perconia*, *Siona*, *Ligdia*, *Synopsia*, *Chariaspilares*, *Mannia*, *Costaconvexa*, *Ortonama*, *Scotopteryx*, *Hylaea*, *Ascotis*, *Campaea*, *Personia*, and *Calospilos* are represented by one species, the genera *Nychiodes*, *Peribatotes*, *Biston*, and *Alcis* by 2 species, the

genus *Gnophos* by 4 species, the genera *Dysia* and *Semiothisa* by 5 species. The genera *Semiothisa* and *Gnophos* predominate in terms of the number of species.

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