

THE GEOMETRID MOTHS (LEPIDOPTERA) OF THE ANCIENT CITY HASANKEYF (BATMAN) AND A NEW SPECIES FOR THE TURKISH FAUNA

Abdulaziz AYKAL¹, Erdem SEVEN^{2*}

¹ Institute of Science, Batman University, Batman, TURKEY

² School of Tourism Faculty and Hotel Management, Batman University, 72060, Batman, TURKEY

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Mehmet Bora Kaydan

*Corresponding Author:

Erdem Seven

erdem_seven@hotmail.com

ORCID iDs of the authors:

AA. orcid.org/0000-0001-5937-4582

ES. orcid.org/0000-0002-7587-5341

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Abstract: This study was conducted on the Geometridae fauna of Hasankeyf district of Batman between 2018 and 2020. 27 different localities were visited and 2.870 specimens in total were collected using insect net and UV light traps mostly in nighttimes, since the majority of Geometridae species are nocturnal. The taxonomic investigations of the collected specimens revealed presence of 66 species within 39 genera in 5 subfamilies (Desmobathrinae, Geometrinae, Ennominae, Larentiinae, Sterrhinae) in the study area. *Gnophos chorista* Wehrli, 1939, is reported as a new record for the Turkish fauna and photographs of the species are given for the first time. *Charissa adjectaria* Staudinger, 1898, *Eupithecia dearmata* Dietze, 1904, *E. reisserata* Pinker, 1976 and *Gnophos sacraria* Staudinger, 1895, which are rarely distributed in Turkey, are recorded in the study area.

Özet: Batman ili Hasankeyf ilçesi Geometridae faunası üzerine yapılan bu çalışma, 2018-2020 yılları arasında yürütülmüştür. 27 farklı lokasyonda çalışılmış ve Geometridae türlerinin çoğunluğu noktürnal olduğundan daha çok gece saatlerinde atrap ve UV ışık tuzakları kullanılarak toplam 2.870 örnek toplanmıştır. Toplanan örneklerin taksonomik incelemeleri ile 5 altfamilya (Desmobathrinae, Geometrinae, Ennominae, Larentiinae, Sterrhinae) ve 39 cins içerisinde 66 tür belirlenmiştir. *Gnophos chorista* Wehrli, 1939 Türkiye faunası için yeni kayıt olarak bildirilmiş ve türün fotoğrafları ilk kez verilmiştir. Türkiye’de nadir yayılış gösteren *Charissa adjectaria* Staudinger, 1898, *Eupithecia dearmata* Dietze, 1904, *E. reisserata* Pinker, 1976 ve *Gnophos sacraria* Staudinger, 1895 türleri çalışma alanında tespit edilmiştir.

Introduction

Hasankeyf is an ancient historical city in Batman Province of Turkey settled between the tributaries of the Tigris River. The city area is very close to Mount Raman, where some petroleum research and drilling stations are located. The area was declared as a protected area in 1981 primarily considering the presence of the historical buildings of the city. However, due to the construction of the Ilisu Dam within the scope of the GAP project, some of the historical buildings were moved elsewhere, and some others were completely submerged (Batman Governorship 2021). Besides, the Ilisu Dam would submerge a portion of the research area has been a significant role in the investigation of the region's moth fauna. Despite the fact that some research has been done on the Lepidoptera fauna in southeastern Turkey for the determination of the species, several places still remain unexplored. In comparison to the surrounding provinces, this research makes contributions to the fauna of the area (Seven 2014,

2019b, 2020, Koçak & Kemal 2018, Seven & Çakır 2019, Akın & Seven 2020). The widespread natural vegetation of Hasankeyf is steppe formation consisting of rocky-stony mountains with sparse oak groves. Although ancient city Hasankeyf is located in ‘Important Natural Area’ (Eken *et al.* 2006, Doga Society 2020), there is not enough research carried out on the geometrid moths and, the flora and fauna of Hasankeyf are not documented. The first and only comprehensive research on moth fauna in the study area is made with this study.

The geometrid moths (Lepidoptera) are distinguished from other families of the order with their distinctive features such as long legs, thin abdomen, and delicate and fragile wings. The hard bristle bundles (chaetosema) between the antenna and the compound eyes and the tympanal organ in the first abdominal segment in adults (except for Archiearinae) are also used to distinguish geometrids from closely related families (Hausmann 2001). The Geometridae family is examined in 9



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subfamilies as Alsophilinae, Archiearinae, Desmobathrinae, Ennominae, Geometrinae, Larentiinae, Oenochrominae, Orthostixinae and Sterrhinae (Hausmann 2001, Scoble & Hausmann 2007, Leraut 2009) and wing venation and banding play a significant role in identifications at subfamily level.

The Geometridae family is represented with approximately 23.000 species in the world (Scoble & Hausmann 2007) and more than 900 species in Europe (Hausmann 2001). In Turkey, nearly 700 Geometridae species have been identified so far (Okyar & Aktaç 1999, Doğanlar 2003, Can & Mironov 2006, Özdemir 2007; 2019, Can 2008; 2010, Koçak & Kemal 2018, Seven 2019a, Seven *et al.* 2019; 2021, Kemal *et al.* 2020, Wanke *et al.* 2020). Investigations on the butterfly and moth fauna (Lepidoptera) of Batman province were conducted by Kemal *et al.* (2008), Kemal & Koçak (2008a, 2008b, 2008c, 2008d), Seven (2019a, 2019b), and Seven *et al.* (2021). From these references Kemal & Koçak 2008d, Koçak & Kemal 2018, Seven 2019a; 2019b and Seven *et al.* 2021 gave geometrid records from Batman. Especially, Seven (2019b) reported first comprehensive faunistic list of lepidopteran species including the geometrid moths, gathered from Centre of Batman Province, Kozluk and Sason districts. According to these sources, the number of known geometrid species in Batman was 31. However, extensive faunistic studies on Lepidoptera fauna of Hasankeyf have not been performed. The only study from the survey based on that scope was published by

Seven *et al.* (2021) on a new described taxon *Perigune jordanaria anatolica* in Hasankeyf.

This study holds the purpose of determining the geometrid fauna of Hasankeyf district and contributing to the distribution of the species.

Materials and Methods

The geometrid moths in Hasankeyf district of Batman, Turkey were collected from 27 different localities (Table 1, Fig. 1) between 2018-2020. Insect nets and UV Led light traps were used to collect the specimens. The collected materials were preserved in insect boxes and, dried specimens were softened to stretch by arranging each specimen on setting boards using insect pins and labelling. Identifications were primarily made according to external morphological features. In cases where external morphological features were not sufficient, genitals were prepared. The preparation of the specimens were performed under a Nikon SMZ1000 microscope and their photographs were taken with the help of a Canon EOS6D macro lens camera. The specimens are kept in the collection of Entomology Laboratory of Biology Department, Faculty of Science and Arts, Batman University (BTU). The references used for diagnosis and terminology were Hausmann (2001, 2004), Mironov (2003, 2013), Leraut (2009), Hausmann & Viidalepp (2012), Rajaei *et al.* (2012, 2017), Stadie & Fiebig (2014), Skou & Sihvonen (2015), Seven (2016, 2017), Kemal & Koçak (2018), Koçak & Kemal (2018), Müller *et al.* (2019).

Table 1. Altitude, coordinate and habitat data of the localities where the moths were sampled.

No	Locality	Altitude	Coordinate	Habitat
1	Kumluca-1	490 m	37°44'10"N, 41°16'08"E	Very sparse oak, steppe
2	Kumluca-2	510 m	37°44'16"N, 41°16'27"E	Stony, rocky steppe
3	Ağlayan Mağara 750 m-N	550 m	37°42'22"N, 41°25'43"E	Stony, rocky steppe
4	Ağlayan Mağara	550 m	37°42'19"N, 41°25'41"E	Stony, rocky steppe
5	Üçyol	630 m	37°41'41"N, 41°27'36"E	Dense gorse area
6	Irmak	500 m	37°43'10"N, 41°29'25"E	Riverside
7	Suçeken	480 m	37°43'58"N, 41°18'12"E	Riverside
8	Urganlı	480 m	37°43'30"N, 41°20'48"E	Riverside
9	Karaköy	920 m	37°40'60"N, 41°24'55"E	Sparse oak
10	Karaköy 3 km NE	620 m	37°42'10"N, 41°26'15"E	Sparse oak and <i>Astragalus</i> sp.
11	Gürbüz	820 m	37°38'20"N, 41°25'39"E	Oak field
12	Saklı	580 m	37°42'58"N, 41°32'22"E	Dense gorse area
13	Akalın 8.3 km NW	530 m	37°43'10"N, 41°32'25"E	Sparse oak
14	Akyar	700 m	37°40'17"N, 41°27'17"E	Oak field
15	Akalın 1 km NW	750 m	37°41'56"N, 41°32'47"E	Oak field
16	Akalın 1 km SW	900 m	37°41'10"N, 41°32'60"E	Oak field
17	Akalın 750 m S	830 m	37°41'15"N, 41°33'15"E	Sparse oak, steppe
18	Büyükdere	950 m	37°40'41"N, 41°32'42"E	Oak field
19	Büyükdere 2 km S	1250 m	37°39'25"N, 41°32'20"E	Oak field
20	Güzelöz	1100 m	37°38'20"N, 41°33'54"E	Oak field
21	İncirli 1.8 km SW	610 m	37°42'45"N, 41°33'16"E	Sparse oak, steppe
22	İncirli 2.1 km SW	500 m	37°42'34"N, 41°33'16"E	Riverside
23	Yolüstü	700 m	37°43'52"N, 41°34'41"E	Mountain steppe
24	Palamut	750 m	37°42'13"N, 41°38'55"E	Mountain steppe
25	Soğucak	1040 m	37°41'02"N, 41°36'42"E	Mountain steppe
26	Uzundere	1000 m	37°39'57"N, 41°22'47"E	Sparse oak steppe
27	Aksu	1010 m	37°39'05"N, 41°21'33"E	Very sparse oak, steppe

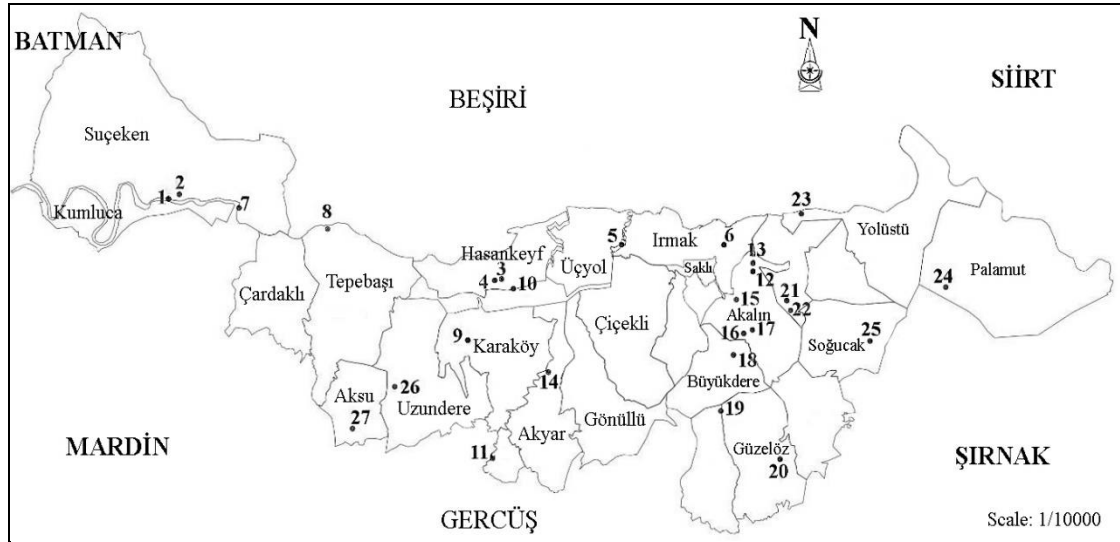


Fig. 1. Map showing the study localities.

Results

A total of 2.870 geometrid specimens were evaluated, and 66 Geometridae (Lepidoptera) species [Desmobathrinae (1), Ennominae (28), Geometrinae (2), Larentiinae (18), Sterrhinae (17)] found naturally occurred within the study area in Hasankeyf. All species collected are new records for Hasankeyf fauna, 46 for Batman (marked with * in the below list) fauna and 1 species (*Gnophos chorista* Wehrli, 1939) for fauna of Turkey.

Family GEOMETRIDAE Leach

Subfamily DESMOBATHRINAE Meyrick

Myinodes Meyrick

Myinodes shohami Hausmann, 1994

Material: 7♂, 7♀, Kumluca-2, 04.03.2019, 13.04.2019; 1♂, Ağlayan Mağara, 11.03.2020; 1♂, 2♀, Irmak, 13.03.2019, 04.04.2019.

General distribution: Cyprus, North Africa, the Eastern Mediterranean, the Middle East (Hausmann 2001, Leraut 2009, Koçak & Kemal 2018).

Distribution in Turkey: Antalya, Çanakkale, Diyarbakır, Elazığ, Kahramanmaraş, Malatya, Mardin, Mersin, Siirt (Koçak & Kemal 2018, Çakır & Seven 2019).

Subfamily GEOMETRINAE Stephens

Aplasta Hübner

Aplasta ononaria Fuessly, 1783*

Material: 1♀, Gürbüz, 08.08.2019.

General distribution: England, Europe, the Balkans, the Eastern Mediterranean, Middle East, Russia (Hausmann 2001, Leraut 2009, Koçak & Kemal 2018).

Distribution in Turkey: Adana, Adıyaman, Amasya, Ankara, Aydın, Bingöl, Bitlis, Bolu, Bursa, Çanakkale, Diyarbakır, Elazığ, Hakkâri, Hatay, Kahramanmaraş,

Kırkkale, Kırklareli, Kırşehir, Kocaeli, Konya, Malatya, Mersin, Muğla, Osmaniye, Siirt, Tekirdağ, Van (Okyar & Aktaç 1999, Doğanlar 2003, Özdemir 2007, Can 2010, Koçak & Kemal 2018, Çakır & Seven 2019).

Phaiogramma Gumpfenberg

Phaiogramma etruscaria (Zeller, 1849)

Material: 53♂, 51♀, Ağlayan Mağara, 19.06.2018, 27.06.2019, 05.07.2019; 1♂, Ağlayan Mağara 750 m N, 19.06.2018; 1♂, 1♀, Gürbüz, 26.06.2018; 1♂, 1♀, Üçyol, 26.06.2018, 02.08.2018; 2♀, Saklı, 24.05.2019; 1♂ 1♀, Kumluca-2, 27.06.2019, 25.07.2019; 2♂, Karaköy 3 km NE, 27.06.2019; 1♂ 1♀, Güzelöz, 22.07.2019.

General distribution: Asia, Central Asia, Europe, Israel, the Balkans, the Caucasus, the Middle East, North Africa (Hausmann 2001, Leraut 2009, Koçak & Kemal 2018).

Distribution in Turkey: Adana, Amasya, Batman, Bartın, Bolu, Bursa, Çanakkale, Diyarbakır, Elazığ, Giresun, Hatay, Iğdır, Isparta, Kahramanmaraş, Kırklareli, Konya, Malatya, Mersin, Ordu, Osmaniye, Siirt, Trabzon, Van (Doğanlar 2003, Özdemir 2007, Can 2008, 2010, Koçak & Kemal 2018, Çakır & Seven 2019, Özdemir 2019, Seven 2019b).

Subfamily ENNOMINAE Duponchel

Agriopis Hübner

Agriopis bajaran [Denis & Schiffermüller], 1775*

Material: 1♂, Irmak, 13.03.2019.

General distribution: Europe, Georgia, Israel, the Balkans, North Africa (Leraut 2009, Koçak & Kemal 2018).

Distribution in Turkey: Amasya, Çanakkale, Elazığ, İstanbul, Manisa, Siirt, Sivas (Koçak & Kemal 2018, Çakır & Seven 2019).

Aleucis Guenée

Aleucis orientalis Staudinger, 1892*

Material: 2♂, Ağlayan Mağara, 04.03.2019.

General distribution: Azerbaijan, Central Europe, the Balkans, the Eastern Mediterranean, Turkey (Skou & Sihvonen 2015, Koçak & Kemal 2018).

Distribution in Turkey: Adana, Amasya, Antalya, Diyarbakır, Hatay, İzmir, Kahramanmaraş, Kırıkkale, Mardin, Siirt, Tekirdağ, Van (Koçak & Kemal 2018).

Alsophila Hübner

Alsophila aceraria [Denis & Schiffermüller], 1775*

Material: 1♂, Ağlayan Mağara, 04.03.2019.

General distribution: Europe, the Balkans, the Caucasus, Russia, Turkey (Leraut 2009, Koçak & Kemal 2018).

Distribution in Turkey: Adana, Bingöl, Elazığ, Siirt (Doğanlar 2003, Koçak & Kemal 2018, Çakır & Seven 2019).

Apochima Agassiz

Apochima flabellaria (Heeger, 1838)

Material: 1♀, Irmak, 13.03.2019.

General distribution: Africa, Asia, Europe (Leraut 2009, Koçak & Kemal 2018).

Distribution in Turkey: Adana, Antalya, Balıkesir, Batman, Çanakkale, Diyarbakır, Elazığ, Eskişehir, Hatay, İstanbul, Kahramanmaraş, Malatya, Manisa, Mardin, Muğla, Siirt, Van (Doğanlar 2003, Koçak & Kemal 2018, Çakır & Seven 2019).

Aspitates Treitschke

Aspitates ochrearia Rossi, 1794

Material: 1♀, İncirli 1.8 km SW, 11.10.2018; 10♂, 23♀, Ağlayan Mağara, 25.10.2018, 10.05.2019, 16.05.2019; 1♂, 3♀, Kumluca-2, 26.04.2019, 05.05.2019, 10.05.2019, 16.05.2019; 1♂, Gürbüz, 10.05.2019; 1♂, Akyar, 16.05.2019; 1♂, Akalın 1 km SW, 11.10.2019; 1♂, İncirli 2.1 km SW, 06.11.2019; 1♂, Akalın 8.3 km NW, 28.04.2020; 1♂, 2♀, Akalın 1 km NW, 28.04.2020; 1♀, Saklı, 28.04.2020.

General distribution: America, Asia, Iraq, Israel, Central Europe, the Balkans, North Africa, Turkey (Leraut 2009, Skou & Sihvonen 2015, Koçak & Kemal 2018).

Distribution in Turkey: Adana, Amasya, Ankara, Batman, Bursa, Çanakkale, Diyarbakır, Edirne, Elazığ, İstanbul, İzmir, Kahramanmaraş, Kırıkkale, Kırklareli, Kilis, Kocaeli, Manisa, Mersin, Osmaniye, Siirt, Tekirdağ, Uşak (Doğanlar 2003, Koçak & Kemal 2018, Çakır & Seven 2019, Seven 2019b).

Biston Leach

Biston achyrus Wehrli, 1936*

Material: 8♂, Ağlayan Mağara, 04.03.2019; 2♂, Büyükdere, 11.03.2020.

General distribution: The Eastern Mediterranean, Turkey (Leraut 2009, Koçak & Kemal 2018).

Distribution in Turkey: Diyarbakır, Kahramanmaraş, Siirt (Koçak & Kemal 2018).

Charissa Curtis

Charissa adjectaria Staudinger, 1898

Material: 9♂, 7♀, Kumluca, 19.10.2018; 1♀, Ağlayan Mağara, 25.09.2019; 1♀, Saklı, 15.10.2019; 1♂, Kumluca-2, 01.11.2019.

General distribution: Central Asia, Israel, Turkey (Koçak & Kemal 2018, Seven 2018).

Distribution in Turkey: Batman (Seven 2018).

Charissa mutilata (Staudinger, 1879) *

Material: 7♂, Kumluca-2, 13.04.2019.

General distribution: Armenia, Turkey (Koçak & Kemal 2018).

Distribution in Turkey: Amasya, Ankara, Bitlis, Bolu, Elazığ, Erzurum, Kahramanmaraş, Konya, Malatya, Mardin, Niğde, Sivas, Trabzon, Van (Koçak & Kemal 2018).

Charissa annubilata Christoph, 1885*

Material: 10♂, 10♀, Ağlayan Mağara, 19.06.2018, 08.08.2018, 19.10.2018, 12.06.2019, 22.07.2019, 24.08.2019; 5♂, 3♀, Akalın 1 km NW, 19.06.2018, 08.08.2018, 12.06.2019, 24.08.2019; 7♂, 5♀, Gürbüz, 19.06.2018, 08.08.2018, 12.06.2019, 22.07.2019, 24.08.2019; 15♂, 14♀, Kumluca, 19.06.2018, 08.08.2018, 19.10.2018; 12.06.2019, 22.07.2019, 24.08.2019.

General distribution: Iran, the Caucasus, Turkey (Koçak & Kemal 2018, Seven 2018).

Distribution in Turkey: Rize, Siirt, Şırnak, Van (Koçak & Kemal 2018, Seven 2018).

Charissa subtaurica Wehrli, 1934*

Material: 1♂, 7♀, Ağlayan Mağara, 01.06.2018, 19.06.2018, 19.10.2018; 2♀, Gürbüz, 26.06.2018; 1♂, 1♀, Kumluca, 19.10.2018; 6♂, Akalın 1 km NW, 03.10.2019; 1♂, Akalın 750 m S, 13.06.2020.

General distribution: The Balkans, the Eastern Mediterranean, Turkey (Koçak & Kemal 2018).

Distribution in Turkey: Adana, Amasya?, Antalya, Bursa?, Diyarbakır, Hatay, Kahramanmaraş, Konya, Mersin, Muğla, Siirt?, Van? (Koçak & Kemal 2018).

Chiasmia Hübner

Chiasmia aestimaria Hübner, 1809

Material: 1♂, Kumluca, 19.06.2018; 1♀, Suçeken, 02.08.2018; 11♂, Ağlayan Mağara, 25.09.2019; 1♀, Kumluca-2, 29.09.2019.

General distribution: Asia, Europe, North Africa, the Balkans, the Caucasus, the Eastern Mediterranean, the Middle East (Leraut 2009, Skou & Sihvonen 2015, Koçak & Kemal 2018).

Distribution in Turkey: Artvin, Batman, Bursa, Diyarbakır, Elazığ, Hakkâri, Kahramanmaraş, Konya, Muğla, Siirt, Van (Koçak & Kemal 2018, Çakır & Seven 2019, Seven 2019b, Seven 2020).

Chiasmia clathrata Linnaeus, 1758*

Material: 1♂, Akalın 1 km NW, 28.04.2020.

General distribution: Africa, Asia, Europe, the Balkans, the Caucasus, Turkey (Leraut 2009, Skou & Sihvonen 2015, Koçak & Kemal 2018).

Distribution in Turkey: Adıyaman, Amasya, Ankara, Ardahan, Balıkesir, Bitlis, Bolu, Bursa, Çankırı, Diyarbakır, Düzce, Edirne, Elazığ, Hakkâri, Hatay, İstanbul, Kahramanmaraş, Kars, Konya, Kırıkkale, Mersin, Muş, Nevşehir, Osmaniye, Siirt, Van (Doğanlar 2003, Koçak & Kemal 2018, Çakır & Seven 2019).

Crocallis Treitschke*Crocallis inexpectata* Warnecke, 1940*

Material: 12♂ 9♀, Ağlayan Mağara, 19.10.2018; 1♂, 2♀, Akalın 750 m S, 11.10.2019; 1♂, Saklı, 11.10.2019; 21♂, Akalın 1 km NW, 15.10.2019; 1♂, 1♀, Büyükdere, 15.10.2019.

General distribution: Greece, Russia, Turkey (Skou & Sihvonen 2015, Koçak & Kemal 2018).

Distribution in Turkey: Amasya, Artvin, Çankırı, Erzurum, Konya, Mersin, Nevşehir, Niğde, Ordu, Siirt, Sivas, Tunceli, Van, Yozgat (Koçak & Kemal, 2018).

Crocallis tusciaria Borkhausen, 1793*

Material: 1♂, 1♀, Ağlayan Mağara, 10.11.2019.

General distribution: Europe, North Africa, Russia, Syria, the Balkans, the Caucasus, Turkey, Turkmenistan (Leraut 2009, Skou & Sihvonen 2015, Koçak & Kemal 2018).

Distribution in Turkey: Adana, Amasya, Çanakkale, Elazığ, Hatay, İstanbul, Kahramanmaraş, Konya, Siirt, Sivas (Okyar & Aktaş 1999, Doğanlar 2003, Koçak & Kemal 2018, Çakır & Seven, 2019).

Dasycorsa Prout*Dasycorsa modesta* Staudinger, 1879*

Material: 12♂, Ağlayan Mağara, 04.03.2019, 11.03.2020; 2♂, Kumluca-2, 04.03.2019; 4♂, Üçyol, 07.03.2019; 3♀, İrmak, 13.03.2019; 1♀, Saklı, 13.03.2019; 2♀, Büyükdere, 11.03.2020; 1♀, Akalın 8.3 km NW, 28.04.2020.

General distribution: Middle East, the Balkans, the Caucasus, the Eastern Mediterranean (Leraut 2009, Skou & Sihvonen 2015, Koçak & Kemal 2018).

Distribution in Turkey: Adana, Amasya, Bolu, Çanakkale, Diyarbakır, Edirne, Elazığ, Hakkâri, Hatay, İstanbul, Kahramanmaraş, Kırıkkale, Kırklareli, Konya, Malatya, Mersin, Muğla, Muş, Siirt, Şırnak, Tekirdağ, Van (Doğanlar 2003, Koçak & Kemal 2018, Çakır & Seven, 2019).

Dyscia Hübner*Dyscia innocentaria* Christoph, 1885*

Material: 13♂, 11♀, Ağlayan Mağara, 19.10.2018, 04.11.2018, 10.05.2019; 3♂, 2♀, Kumluca, 19.10.2018; 3♀, Kumluca-2, 10.05.2019, 16.05.2019; 2♀, Akalın 750 m S, 03.10.2019, 11.10.2019; 1♀, Akalın 1 km SW, 08.10.2019; 1♀, Saklı, 11.10.2019; 1♂, Büyükdere, 15.10.2019; 1♀, Akalın 8.3 km NW, 28.04.2020.

General distribution: Central Asia, Middle East, the Balkans, the Caucasus, the Eastern Mediterranean (Leraut 2009, Skou & Sihvonen 2015, Koçak & Kemal 2018).

Distribution in Turkey: Adana, Amasya, Ankara, Antalya, Bitlis, Bolu, Bursa, Çanakkale, Çankırı, Denizli, Diyarbakır, Elazığ, Erzurum, Gaziantep, Hakkâri, İstanbul, İzmir, Kahramanmaraş, Kars, Kayseri, Konya, Kırıkkale, Malatya, Manisa, Mardin, Nevşehir, Siirt, Van (Koçak & Kemal 2018, Çakır & Seven, 2019).

Eilicrinia Hübner*Eilicrinia cordiaria* Hübner, 1790*

Material: 6♂, 6♀, Gürbüz, 12.06.2018, 26.06.2018; 1♂, Üçyol, 02.08.2018; 1♀, Büyükdere 28.07.2019.

General distribution: Asia, Central Europe, Middle East, the Balkans, the Caucasus (Leraut 2009, Skou & Sihvonen 2015, Koçak & Kemal 2018).

Distribution in Turkey: Adana, Adıyaman, Amasya, Ankara, Aydın, Bitlis, Bolu, Bursa, Çankırı, Diyarbakır, Edirne, Elazığ, Erzincan, Hakkâri, Kahramanmaraş, Kars, Kayseri, Kırıkkale, Konya, Malatya, Manisa, Niğde, Siirt, Sivas Şırnak, Tekirdağ, Trabzon, Van (Okyar & Aktaş 1999, Doğanlar 2003, Özdemir 2007, Can 2008, Koçak & Kemal 2018, Çakır & Seven 2019, Seven, 2020).

Eumera Staudinger*Eumera hoeferi* Wehrli, 1934

Material: 1♂, 1♀, Kumluca, 19.10.2018; 1♀, Akalın 1 km NW, 03.10.2019; 21♂, 21♀, İncirli 1.8 km SW, 11.10.2019, 15.10.2019; 1♂, İncirli 2.1 km SW, 06.11.2019; 1♂, 1♀, Akalın 1 km SW, 11.10.2019; 2♂, 1♀, Saklı, 11.10.2019, 15.10.2019.

General distribution: Azerbaijan, Iran, Iraq, Turkey (Koçak & Kemal 2018).

Distribution in Turkey: Batman, Diyarbakır, Elazığ, Hakkâri, Kayseri, Malatya, Siirt, Şırnak (Koçak & Kemal 2018, Çakır & Seven 2019, Seven, 2019b; Seven, 2020).

Gnopharmia Staudinger*Gnopharmia irakensis* Wehrli, 1938*

Material: Ağlayan Mağara 750 m N, 19.06.2018, 11.07.2018, 28.08.2019; 5♂, Ağlayan Mağara, 31.07.2018, 08.08.2018, 01.06.2019; 1♀, Kumluca, 19.06.2018; 2♀, Gürbüz, 26.08.2018, 02.08.2019; 31♂, 32♀, Karaköy 3 km NE, 27.06.2019; 1♂, Güzelöz, 22.07.2019; 3♂, Kumluca-2, 24.05.2019, 01.06.2019, 27.06.2019; 1♂, Akyar, 01.06.2019; 1♀, Akalın 1 km NW, 20.06.2019; 1♀, Büyükdere, 28.07.2019; 5♂, 3♀, Akalın 750 m S, 13.06.2020; 1♂, Palamut, 13.06.2020.

General distribution: Central Asia, Iran, Iraq, Turkey (Rajaei *et al.* 2012, Koçak & Kemal 2018).

Distribution in Turkey: Adıyaman, Elazığ, Hakkâri, Malatya, Mardin, Siirt, Şanlıurfa, Van (Koçak & Kemal 2018, Çakır & Seven, 2019).

Gnophos Treitschke

Gnophos chorista Wehrli, 1939* (Fig. 3)

Material: 8♂, 3♀, Ağlayan Mağara, 01.06.2019, 12.09.2019, 25.09.2019.

General distribution: Iran, Iraq, Turkey (Koçak & Kemal 2018).

Distribution in Turkey: The locality record is unknown (Koçak & Kemal 2018).

Gnophos pseudosnelleni Rjabov, 1964

Material: 2♀, Gürbüz, 26.06.2018; 5♂, 3♀, Ağlayan Mağara, 19.10.2018, 24.05.2019, 10.05.2019, 19.10.2019, 24.10.2019, 30.10.2019; 32♂, 31♀, Kumluca, 19.10.2018, 19.10.2019; 2♂, 1♀, Kumluca-2, 10.05.2019, 01.06.2019, 01.11.2019; 1♀, Saklı, 24.05.2019; 1♀, Güzelöz, 08.10.2019; 1♀, Akalın 1 km NW, 30.10.2019, 03.10.2019.

General distribution: Iran, the Caucasus, Turkey, Turkmenistan (Koçak & Kemal 2018).

Distribution in Turkey: Batman, Bitlis, Diyarbakır, Elazığ, Hakkâri, Siirt, Tunceli, Van (Koçak & Kemal 2018, Çakır & Seven 2019, Seven 2019b, Seven 2020).

Gnophos sacraria Staudinger, 1895*

Material: 3♂, Ağlayan Mağara, 24.05.2019, 24.10.2019; 43♂, 41♀, Akalın 1 km NW, 11.10.2019, 15.10.2019; 4♂, 2♀, İncirli 1.8 km SW, 11.10.2019, 15.10.2019, 06.11.2019; 4♂, Saklı, 11.10.2019, 15.10.2019; 1♀, Büyükdere, 15.10.2019; 2♀, Gürbüz, 19.10.2019; 2♂, 1♀, Kumluca, 19.10.2018, 11.10.2019.

General distribution: Egypt, Libya, Israel, Turkey (Koçak & Kemal 2018; Seven, 2018).

Distribution in Turkey: Elazığ, Siirt (Seven, 2018; Çakır & Seven, 2019).

Neognopharmia Wehrli

Neognopharmia stevenaria (Boisduval, 1840) *

Material: 1♀, Büyükdere, 20.06.2019; 4♀, Ağlayan Mağara, 05.07.2019; 4♂, Güzelöz, 22.07.2019; 1♂, Gürbüz, 08.08.2019.

General distribution: Central Europe, Middle East, Russia, the Balkans, the Caucasus, the Eastern Mediterranean (Leraut 2009, Skou & Sihvonen 2015, Koçak & Kemal 2018).

Distribution in Turkey: Adana, Adıyaman, Amasya, Ankara, Artvin, Bitlis, Bolu, Bursa, Çanakkale, Diyarbakır, Edirne, Elazığ, Erzurum, Gaziantep, Hakkâri, Hatay, Kahramanmaraş, Kars, Konya, Malatya, Siirt,

Trabzon, Van (Doğanlar 2003, Özdemir 2007, Can 2008, Koçak & Kemal 2018, Çakır & Seven, 2019).

Nychiodes Lederer

Nychiodes divergaria Staudinger, 1892*

Material: 46♂, 46♀, Ağlayan Mağara, 19.06.2018, 26.06.2018, 31.07.2018, 08.08.2018, 16.05.2019, 01.06.2019, 20.06.2019, 22.07.2019, 25.07.2019, 24.08.2019, 29.09.2019, 13.06.2020; 1♀, Akalın 1 km SW, 19.06.2018; 3♂, Akyar, 19.06.2018, 26.06.2018, 31.07.2018; 3♂, Karaköy 3 km NE, 24.08.2019, 29.09.2019; 5♂, 3♀, Kumluca-2, 08.08.2018, 16.05.2019, 01.06.2019, 20.06.2019, 22.07.2019; 3♂, Üçyol, 19.06.2018, 22.07.2019, 25.07.2019; 3♂, Saklı, 08.08.2018, 16.05.2019, 01.06.2019; 3♂, Akalın 8.3 km NW, 26.06.2018, 31.07.2018, 08.08.2018; 4♂, 2♀, Büyükdere, 01.06.2019, 20.06.2019, 22.07.2019, 24.08.2019, 29.09.2019, 13.06.2020; 5♂, 3♀, Büyükdere 2 km S, 01.06.2019, 20.06.2019, 22.07.2019, 25.07.2019, 24.08.2019, 29.09.2019, 13.06.2020; 4♂, Akalın 1 km NW, 20.06.2019, 22.07.2019, 25.07.2019, 24.08.2019; 2♀, Güzelöz, 29.09.2019, 13.06.2020.

General distribution: Armenia, Middle East, Russia, the Eastern Mediterranean (Leraut 2009, Koçak & Kemal 2018, Wanke *et al.* 2020).

Distribution in Turkey: Bitlis, Diyarbakır, Erzincan, Elazığ, Hakkâri, Hatay, Kahramanmaraş, Malatya, Mardin, Osmaniye Siirt, Van (Koçak & Kemal 2018, Wanke *et al.* 2020).

Peribatodes Wehrli

Peribatodes rhomboidaria [Denis & Schiffermüller], 1775*

Material: 1♀, Gürbüz, 26.06.2018; 1♂, Akyar, 10.05.2019.

General distribution: Europe, Middle East, North Africa, the Balkans, the Caucasus (Leraut 2009, Koçak & Kemal 2018).

Distribution in Turkey: Adana, Amasya, Artvin, Bartın, Bolu, Burdur, Bursa, Çanakkale, Düzce, Edirne, Elazığ, Hakkâri, Hatay, İstanbul, Kahramanmaraş, Kars, Kastamonu, Konya, Malatya, Manisa, Mersin, Muğla, Ordu, Siirt, Sinop, Tekirdağ, Tokat, Trabzon, Van, Yalova (Okyar & Aktaş 1999, Doğanlar 2003, Can 2008, Koçak & Kemal 2018, Çakır & Seven 2019, Özdemir 2019).

Pseudopanthera Hübner

Pseudopanthera syriacata Guenée, 1858*

Material: 9♂, 7♀, Ağlayan Mağara, 26.04.2019, 05.05.2019, 10.05.2019, 16.05.2019, 01.06.2019; 1♂, Gürbüz, 10.05.2019; 1♂, Akalın 8.3 km NW, 28.04.2020.

General distribution: Iraq, Israel, Lebanon, Turkey (Leraut 2009, Koçak & Kemal 2018).

Distribution in Turkey: Adana, Adıyaman, Bitlis, Diyarbakır, Hakkâri, Hatay, Kahramanmaraş, Malatya,

Mardin, Mersin, Osmaniye, Siirt, Şırnak, Van (Doğanlar 2003, Koçak & Kemal, 2018).

Selidosema Hübner

Selidosema plumaria [Denis & Schiffermüller], 1775

Material: 11♂, Ağlayan Mağara, 25.09.2019; 1♂, Güzelöz, 29.09.2019; 11♀, Akalın 1 km NW, 03.10.2019.

General distribution: Europe, Iran, Russia, Turkey (Koçak & Kemal 2018).

Distribution in Turkey: Amasya, Batman, Bolu, Diyarbakır, Düzce, Elazığ, Kahramanmaraş, Karaman, Siirt, Sivas, Van (Koçak & Kemal 2018, Çakır & Seven 2019, Seven 2019b, Seven, 2020).

Stueningia Hausmann

Stueningia wolffi Hausmann, 1993

Material: 12♂, 2♀, Ağlayan Mağara, 01.06.2019; 1♂, 1♀, Büyükdere, 20.06.2019, 15.10.2019.

General distribution: Turkey (Koçak & Kemal 2018).

Distribution in Turkey: Adana, Antalya, Batman, Diyarbakır, Hakkâri, Konya, Mersin, Van (Doğanlar 2003, Koçak & Kemal 2018, Seven 2019b, Seven 2020).

Subfamily LARENTIINAE Duponchel

Camptogramma Stephens

Camptogramma bilineata Linnaeus, 1758

Material: 1♂, 1♀, Ağlayan Mağara, 19.06.2018, 31.07.2018; 1♂, Kumluca-2, 12.06.2019.

General distribution: Central Asia, Europe, Middle East, North Africa, the Caucasus, the Eastern Mediterranean (Leraut 2009, Hausmann & Viidalepp 2012, Koçak & Kemal 2018).

Distribution in Turkey: Adana, Adıyaman, Amasya, Ankara, Bartın, Batman, Balıkesir, Bitlis, Bolu, Bursa, Çanakkale, Çankırı, Diyarbakır, Edirne, Elazığ, Giresun, Hakkâri, Hatay, İstanbul, İzmir, Kahramanmaraş, Kars, Kayseri, Kırklareli, Konya, Malatya, Manisa, Mersin, Muğla, Ordu, Osmaniye, Siirt, Sinop, Şırnak, Tekirdağ, Tokat, Van (Okyar & Aktaş 1999, Doğanlar 2003, Özdemir 2007, Can 2008, Koçak & Kemal 2018, Özdemir 2019, Seven, 2019b).

Chesistege Viidalepp

Chesistege korbi Bohatsch, 1910*

Material: 7♂, 7♀, Ağlayan Mağara, 19.10.2018, 25.10.2018, 04.11.2018; 1♀, Palamut, 01.11.2019; 1♀, Soğucak, 01.11.2019; 1♂, Yolüstü, 01.11.2019.

General distribution: Armenia, Iraq, Jordan, Turkey, Turkmenistan (Koçak & Kemal 2018).

Distribution in Turkey: Ankara, Bitlis, Erzincan, Hakkâri, Hatay, Iğdır, Kahramanmaraş, Kırıkkale, Siirt, Sivas, Van (Koçak & Kemal, 2018).

Docirava Walker

Docirava mundulata Guenée, [1858]*

Material: 7♀, Akyar, 10.05.2019; 1♂, Kumluca-2, 16.05.2019.

General distribution: The Eastern Mediterranean, Turkey (Leraut 2009, Koçak & Kemal 2018).

Distribution in Turkey: Bitlis, Diyarbakır, Elazığ, Hakkâri, Hatay, Kahramanmaraş, Mardin, Şanlıurfa, Şırnak, Van (Hausmann & Viidalepp 2012, Koçak & Kemal 2018).

Docirava musculata Staudinger, 1892*

Material: 1♂, 6♀, Akalın 8.3 km NW, 04.04.2019; 1♂, İrmak, 04.04.2019; 1♀, Saklı, 04.04.2019.

General distribution: Greece, Iran, Iraq, Turkey, Turkmenistan (Hausmann & Viidalepp 2012, Koçak & Kemal 2018).

Distribution in Turkey: Amasya, Diyarbakır, Elazığ, Erzurum, Giresun, Hakkâri, Kahramanmaraş, Kayseri, Kırıkkale, Malatya, Mersin, Niğde, Tunceli, Van (Koçak & Kemal 2018, Seven, 2020).

Eupithecia Curtis

Eupithecia breviculata Donzel, 1837

Material: 6♂, 6♀, Ağlayan Mağara, 26.04.2019; 1♂ Kumluca 2, 10.05.2019, 24.05.2019; 1♀, Akalın 1 km NW, 28.04.2020.

General distribution: Central Asia, Europe, North Africa, Middle East, the Balkans, the Caucasus (Mironov 2003, Leraut 2009, Koçak & Kemal 2018).

Distribution in Turkey: Adana, Adıyaman, Amasya, Ankara, Bartın, Batman, Balıkesir, Bolu, Bursa, Çanakkale, Diyarbakır, Hakkâri, Hatay, İzmir, Kahramanmaraş, Kars, Kırıkkale, Kırklareli, Konya, Osmaniye, Siirt, Van (Okyar & Aktaş 1999, Doğanlar 2003, Özdemir 2007; 2019, Koçak & Kemal 2018, Seven 2019b).

Eupithecia brunneata Staudinger, 1900*

Material: 1♂, Ağlayan Mağara, 24.05.2019; 11♂, 11♀, Saklı, 24.05.2019; 1♂, 2♀, Kumluca-2, 10.05.2019, 16.05.2019.

General distribution: Iran, Iraq, Israel, Turkey (Hausmann & Viidalepp 2012, Koçak & Kemal 2018).

Distribution in Turkey: Mardin, Siirt, Şırnak (Koçak & Kemal 2018).

Eupithecia dearmata Dietze, 1904*

Material: 1♀, Büyükdere, 24.08.2019; 1♂, 1♀, Büyükdere 2 km S, 03.10.2019; 1♀, Ağlayan Mağara, 19.10.2019; 1♂, 1♀, Akalın 8.3 km NW, 28.04.2020; 2♀, Akalın 1 km NW, 28.04.2020.

General distribution: Algeria, Chad, Tunisia, Turkey (Koçak & Kemal 2018).

Distribution in Turkey: Mardin (Koçak & Kemal 2018).

Eupithecia ericeata Rambur, 1833*

Material: 2♀, Ağlayan Mağara, 25.10.2018, 30.10.2019; 1♀, Akalın 1 km NW, 30.10.2019; 13♂, 11♀, Palamut, 01.11.2019; 1♀, Yolüstü, 01.11.2019.

General distribution: Europe, Russia, Syria, the Balkans, Turkey (Mironov 2003, Leraut 2009, Koçak & Kemal 2018).

Distribution in Turkey: Amasya, Bartın, Bolu, Siirt (Koçak & Kemal 2018, Özdemir 2019).

Eupithecia oblongata Thunberg, 1784

Material: 1♀, Güzelöz, 29.09.2019.

General distribution: Asia, Africa, Europe (Mironov 2003, Koçak & Kemal 2018).

Distribution in Turkey: Adana, Amasya, Ankara, Batman, Bolu, Bursa, Çanakkale, Diyarbakır, Elazığ, İstanbul, Kahramanmaraş, Kırıkkale, Konya, Malatya, Ordu, Samsun, Siirt, Sivas, Van (Koçak & Kemal 2018, Çakır & Seven 2019, Seven 2019b, Seven 2020).

Eupithecia reisserata Pinker, 1976*

Material: 1♀, Ağlayan Mağara, 19.10.2018.

General distribution: Azerbaijan, Greece, Syria, the Eastern Mediterranean, Turkey (Mironov 2003, Koçak & Kemal 2018).

Distribution in Turkey: Ankara, Siirt (Koçak & Kemal 2018).

Eupithecia schiefereri Dietze, 1904*

Material: 1♂, Karaköy, 26.04.2019; 1♂, Akyar, 10.05.2019.

General distribution: Europe, Russia, the Balkans, the Caucasus, the Eastern Mediterranean, Turkey (Mironov 2003, Leraut 2009, Koçak & Kemal 2018).

Distribution in Turkey: Adana, Ankara, Hatay, Kahramanmaraş, Kırıkkale, Malatya, Siirt (Doğanlar 2003, Can 2008, Koçak & Kemal 2018).

Eupithecia silenicolata Mabille, 1867*

Material: 1♂, 6♀, Ağlayan Mağara, 24.05.2019.

General distribution: Europe, Lebanon, Iran, North Africa, Pakistan, Russia, the Balkans, Turkey (Mironov 2003, Leraut 2009, Koçak & Kemal 2018).

Distribution in Turkey: Amasya, Elazığ, Kahramanmaraş, Konya, Siirt, Van (Doğanlar 2003, Koçak & Kemal 2018, Çakır & Seven 2019).

*Larentia Treitschke**Larentia clavaria* Haworth, 1809*

Material: 1♀, Urganlı, 04.11.2018.

General distribution: Asia, Europe, Middle East, North Africa, the Balkans, the Caucasus, the Eastern Mediterranean (Leraut 2009, Hausmann & Viidalepp 2012, Koçak & Kemal 2018).

Distribution in Turkey: Bolu, Elazığ, Hakkâri, Hatay, Kahramanmaraş, Siirt, Van (Koçak & Kemal 2018, Çakır & Seven 2019).

*Nebula Bruand**Nebula senectaria* Herrich-Schäffer, [1852] *

Material: 170♂, 121♀, Ağlayan Mağara, 04.11.2018, 12.11.2018, 20.11.2018, 04.03.2019, 05.05.2019, 30.10.2019, 01.11.2019, 06.11.2019; 5♂, 5♀, Irmak, 04.11.2018, 12.11.2018, 20.11.2018, 13.03.2019; 5♂, 7♀, Urganlı, 04.03.2019, 05.05.2019, 30.10.2019; 8♂, 7♀, Akalın 8.3 km NW, 13.03.2019, 30.10.2019, 01.11.2019, 06.11.2019; 5♂, 5♀, Üçyol, 01.11.2019, 14.11.2019; 10♂, 8♀, Kumluca-2, 01.11.2019, 06.11.2019; 10♀, 9♀, Akalın 1 km NW, 01.11.2019, 14.11.2019; 7♂, 5♀, Büyükdere 2 km S, 01.11.2019, 06.11.2019; 5♂, 3♀, Palamut, 01.11.2019, 14.11.2019; 5♂, 3♀, Yolüstü, 30.10.2019, 01.11.2019, 06.11.2019, 14.11.2019.

General distribution: Europe, Middle East, the Balkans, the Caucasus (Hausmann & Viidalepp 2012, Koçak & Kemal 2018).

Distribution in Turkey: Amasya, Bolu, Diyarbakır, Elazığ, Erzincan, Erzurum, Iğdır, Kahramanmaraş, Konya, Mardin, Siirt, Sivas (Özdemir 2007, Koçak & Kemal 2018, Çakır & Seven 2019).

*Orthonama Hübner**Orthonama obstipata* Fabricius, 1794

Material: 1♀, Kumluca, 19.10.2018, 2♀, Saklı, 24.05.2019; 8♂, Kumluca-2, 16.05.2019; 1♂, Akalın 1 km NW, 28.04.2020.

General distribution: Asia, Africa, Europe, Middle East (Leraut 2009, Hausmann & Viidalepp 2012).

Distribution in Turkey: Adana, Amasya, Ankara, Antalya, Batman, Bitlis, Bolu, Bursa, Çanakkale, Diyarbakır, Edirne, Hakkâri, Hatay, İstanbul, Kahramanmaraş, Kırıkkale, Konya, Mersin, Osmaniye, Siirt, Van (Okyar & Aktaç 1999, Doğanlar 2003, Koçak & Kemal 2018, Seven 2019b, Seven 2020).

*Oulobophora Staudinger**Oulobophora externaria* Herrich-Schäffer, 1848*

Material: 1♀, Ağlayan Mağara, 26.04.2019.

General distribution: Cyprus, Iran, Iraq, Israel, the Balkans, Turkey (Leraut 2009, Hausmann & Viidalepp 2012, Koçak & Kemal 2018).

Distribution in Turkey: Amasya, Bursa, Diyarbakır, Hakkâri, Hatay, Isparta, İstanbul, İzmir, Kahramanmaraş, Konya, Mersin, Siirt, Şırnak, Van (Koçak & Kemal 2018).

*Protorhoe Herbulot**Protorhoe corollaria* Herrich-Schäffer, 1848*

Material: 28♂, 27♀, Ağlayan Mağara, 19.10.2018, 16.05.2019, 24.10.2019; 2♀, Akalın 8.3 km NW,

19.10.2018, 16.05.2019; 2♂, 1♀, Kumluca-2, 26.04.2019, 24.10.2019; 2♂, 2♀, Saklı, 580 m, 05.07.2019, 24.10.2019.

General distribution: Central Europe, the Balkans, Turkey (Hausmann & Viidalepp 2012, Koçak & Kemal 2018).

Distribution in Turkey: Adana, Amasya, Ankara, Antalya, Bingöl, Elazığ, Hakkâri, Hatay, Kahramanmaraş, Konya, Mardin, Mersin, Nevşehir, Niğde, Şırnak, Van (Koçak & Kemal 2018, Seven 2019a, Çakır & Seven 2019).

Xanthorhoe Hübner

Xanthorhoe inconsiderata Staudinger, 1892*

Material: 8♂, 7♀, Ağlayan Mağara, 25.10.2018, 15.10.2019; 2♂, 1♀, Urganlı, 19.10.2018; 2♂, 3♀, Akalın 1 km NW, 25.10.2018, 25.10.2019; 2♂, Büyükdere, 950 m 25.10.2018, 15.10.2019.

General distribution: Turkey (Koçak & Kemal 2018).

Distribution in Turkey: Amasya, Kahramanmaraş, Siirt, Van (Koçak & Kemal 2018).

Subfamily STERRHINAE Meyrick, 1892

Glossotrophia Prout

Glossotrophia sacraria Bang-Haas, 1910

Material: 428♂, 422♀, Ağlayan Mağara, 26.06.2018, 31.07.2018, 08.08.2018, 19.10.2018, 24.05.2019, 01.06.2019, 27.06.2019, 05.07.2019, 12.07.2019, 24.08.2019, 01.09.2019, 12.09.2019, 29.09.2019, 03.10.2019, 08.10.2019, 30.10.2019; 7♂, 9♀, Kumluca-2, 26.06.2018, 31.07.2018, 08.08.2018, 19.10.2018, 12.09.2019, 03.10.2019, 08.10.2019, 30.10.2019; 4♂, 6♀, Karaköy 3 km NE, 08.08.2018, 19.10.2018, 24.05.2019, 05.07.2019, 12.07.2019, 24.08.2019; 6♂, Üçyol, 08.08.2018, 19.10.2018, 24.05.2019, 01.06.2019; 12♂, 6♀, Akalın 1 km NW, 05.07.2019, 12.07.2019, 24.08.2019, 01.09.2019, 12.09.2019, 03.10.2019; 11♂, 11♀, Büyükdere 2 km S, 1150 m, 24.08.2019, 01.09.2019, 12.09.2019, 29.09.2019, 03.10.2019, 08.10.2019, 30.10.2019; 9♂, 8♀, Güzelöz, 01.09.2019, 12.09.2019, 29.09.2019, 03.10.2019, 08.10.2019, 30.10.2019; 3♂, Kumluca, 12.09.2019, 08.10.2019, 30.10.2019.

General distribution: Central Asia, Greece, Iran, Iraq, the Eastern Mediterranean, Turkey (Hausmann 2004, Leraut 2009, Koçak & Kemal 2018).

Distribution in Turkey: Adıyaman, Batman, Diyarbakır, Gaziantep, Hakkâri, Hatay, Kahramanmaraş, Siirt, Van (Koçak & Kemal 2018, Seven, 2019b).

Idaea Treitschke

Idaea allongata Staudinger, 1898

Material: 1♂, Karaköy, 26.04.2019; 2♀, Kumluca-2, 05.05.2019, 16.05.2019; 12♂, 1♀, Ağlayan Mağara, 10.05.2019, 16.05.2019.

General distribution: Iran, Iraq, the Eastern Mediterranean, Turkey (Koçak & Kemal 2018).

Distribution in Turkey: Batman, Gaziantep, Mardin, Şanlıurfa (Koçak & Kemal, 2018).

Idaea degeneraria Hübner, 1799

Material: 6♂, Akalın 1 km NW, 03.10.2019; 1♀, Akalın 8.3 km NW, 28.04.2020.

General distribution: Central Asia, Europe, Middle East, North Africa, the Balkans, the Caucasus (Hausmann 2004, Leraut 2009, Koçak & Kemal 2018).

Distribution in Turkey: Adana, Adıyaman, Amasya, Ankara, Antalya, Batman, Bartın, Bolu, Bursa, Çanakkale, Diyarbakır, Edirne, Elazığ, Gaziantep, Hakkâri, Hatay, İstanbul, Kahramanmaraş, Kars, Kırıkkale, Kırklareli, Konya, Muğla, Mersin, Osmaniye, Ordu, Siirt, Sivas, Tokat, Trabzon, Van (Okyar & Aktaş 1999, Doğanlar 2003, Özdemir 2007; 2019, Can 2008, Koçak & Kemal 2018, Çakır & Seven 2019, Seven 2019b).

Idaea deversaria Herrich-Schäffer, 1847*

Material: 1♀, Gürbüz, 26.06.2018; 11♀, Ağlayan Mağara, 19.10.2018; 2♂, Karaköy 3 km NE, 01.09.2019; 1♂, Büyükdere, 30.10.2019; 1♂, 1♀, Kumluca-2, 19.06.2018, 01.09.2019; 1♂, Akyar, 01.06.2019; 1♀, Akalın 1 km NW, 28.08.2019; 1♂, Akalın 750 m S, 13.06.2020; 1♂, Büyükdere 2 km S, 13.06.2020; 1♀, Palamut, 13.06.2020.

General distribution: Europe, Iran, North Africa, Russia, the Balkans, the Caucasus, Turkey (Hausmann 2004, Koçak & Kemal 2018).

Distribution in Turkey: Amasya, Ankara, Antalya, Bartın, Bolu, Bursa, Düzce, Elazığ, Gümüşhane, Hakkâri, Hatay, İstanbul, Kırklareli, Konya, Mersin, Osmaniye, Trabzon (Okyar & Aktaş 1999, Koçak & Kemal 2018, Çakır & Seven 2019, Özdemir 2019).

Idaea elongaria Rambur, 1833*

Material: 1♂, Suçeken, 02.08.2018.

General distribution: Asia, Europe, Iraq, North Africa, Russia, the Balkans, the Caucasus, the Eastern Mediterranean, Turkey (Hausmann 2004, Leraut 2009, Koçak & Kemal 2018).

Distribution in Turkey: Adana, Antalya, Bursa, Çanakkale, Diyarbakır, Hatay, İstanbul, Kahramanmaraş, Kırıkkale, Siirt (Koçak & Kemal 2018, Seven 2020).

Idaea ochrata Scopoli, 1763*

Material: 11♂, Akalın 1 km NW, 20.06.2019; ♂, Gürbüz, 26.06.2018.

General distribution: Central Asia, Europe, Iran, North Africa, Russia, the Balkans, the Caucasus, the Eastern Mediterranean, Turkey (Hausmann 2004, Leraut 2009, Koçak & Kemal 2018).

Distribution in Turkey: Adana, Amasya, Ankara, Bolu, Bursa, Düzce, Edirne, Elazığ, Erzurum, Iğdır, İstanbul, Karabük, Kahramanmaraş, Kırklareli, Ordu,

Tekirdağ, Van (Okyar & Aktaç 1999, Özdemir 2007, Koçak & Kemal 2018, Çakır & Seven 2019).

Idaea politaria Hübner, 1799*

Material: 1♂, Gürbüz, 26.06.2018.

General distribution: Europe, North Africa, Russia, the Balkans, the Caucasus, Turkey (Hausmann 2004, Leraut 2009, Koçak & Kemal 2018).

Distribution in Turkey: Adana, Amasya, Antalya, Bartın, Bolu, Bursa, Düzce, Edirne, Elazığ, Hatay, İstanbul, Kırklareli, Manisa, Mersin, Ordu, Van (Doğanlar 2003, Özdemir 2007; 2019, Koçak & Kemal 2018, Çakır & Seven 2019).

Idaea subsericeata (Haworth, [1809]) *

Material: 1♀, Akalın 1 km SW, 20.06.2019; 1♂, Akalın 1 km NW, 28.04.2020; 1♂, Akalın 8.3 km NW, 28.04.2020.

General distribution: Europe, North Africa, Russia, the Balkans, the Caucasus, Turkey (Hausmann 2004, Leraut 2009, Koçak & Kemal 2018).

Distribution in Turkey: Adana, Amasya, Antalya, Bartın, Bursa, Çanakkale, Düzce, Edirne, Elazığ, Hakkâri, Hatay, İstanbul, Kahramanmaraş, Mersin, Niğde, Tekirdağ (Okyar & Aktaç 1999, Doğanlar 2003, Özdemir 2007; 2019, Koçak & Kemal 2018, Çakır & Seven 2019).

Idaea textaria Lederer, 1861*

Material: 1♀, Akalın 1 km NW, 30.10.2019.

General distribution: Cyprus, Greece, Iraq, the Caucasus, Turkey, Turkmenistan (Hausmann 2004, Leraut 2009, Koçak & Kemal 2018).

Distribution in Turkey: Adana, Elazığ, Hatay, Kahramanmaraş, Siirt, Osmaniye (Doğanlar 2003, Koçak & Kemal 2018, Çakır & Seven 2019).

Rhodometra Meyrick

Rhodometra sacraria Linnaeus, 1767

Material: 1♂, Gürbüz, 02.08.2018; 1♂, Suçeken, 02.08.2018; 2♂, 3♀, Ağlayan Mağara 750 m N, 19.06.2018, 31.07.2018, 28.08.2019, 01.09.2019; 30♂, 30♀, Ağlayan Mağara, 19.10.2018, 25.10.2018, 08.08.2019, 12.09.2019, 24.10.2019; 2♀, Kumluca, 19.10.2018; 2♂, Kumluca-2, 27.06.2019, 08.08.2019, 01.11.2019; 1♀, Karaköy 3 km NE, 27.06.2019; 2♂, 1♀, Güzelöz, 22.07.2019, 24.08.2019; 1♂, Saklı, 24.08.2019; 1♂, Büyükdere 2 km S, 03.10.2019; 1♂, Büyükdere, 15.10.2019.

General distribution: Asia, Africa, Europe (Hausmann 2004, Leraut 2009, Koçak & Kemal 2018).

Distribution in Turkey: Adana, Amasya, Ankara, Antalya, Aydın, Batman, Bursa, Bingöl, Bitlis, Çanakkale, Diyarbakır, Edirne, Elazığ, Gaziantep, Hatay, İstanbul, Konya, Malatya, Manisa, Kahramanmaraş, Mersin, Muğla, Niğde, Ordu, Siirt, Sivas, Şanlıurfa, Tekirdağ, Van (Okyar & Aktaç 1999, Doğanlar 2003,

Koçak & Kemal 2018, Çakır & Seven 2019, Seven 2019b; 2020).

Rhodothropia Hübner

Rhodothropia discopunctata Amsel, 1935

Material: 5♂, 6♀, Ağlayan Mağara, 24.05.2019, 01.06.2019.

General distribution: Central Europe, Iraq the Balkans, the Caucasus, the Eastern Mediterranean, Turkey (Hausmann 2004, Leraut 2009, Koçak & Kemal 2018).

Distribution in Turkey: Adıyaman, Amasya, Ankara, Batman, Bartın, Bitlis, Bolu, Bursa, Çanakkale, Çankırı, Diyarbakır, Düzce, Elazığ, Gaziantep, Giresun, Gümüşhane, Hakkâri, Hatay, Kahramanmaraş, Karaman, Kars, Kayseri, Konya, Malatya, Mersin, Muş, Nevşehir, Osmaniye, Siirt, Sivas, Tokat, Van (Can 2008, Koçak & Kemal 2018, Çakır & Seven 2019, Özdemir 2019).

Scopula Schrank

Scopula decorata [Denis & Schiffermüller], 1775*

Material: 1♂, 1♀, Ağlayan Mağara, 01.06.2019.

General distribution: Central Asia, Europe, Iran, the Caucasus, Tunisia, Turkey (Hausmann 2004, Leraut 2009, Koçak & Kemal 2018).

Distribution in Turkey: Afyon, Amasya, Ankara, Bitlis, Bolu, Bursa, Diyarbakır, Elazığ, Gaziantep, Gümüşhane, Hakkâri, Iğdır, Kahramanmaraş, Kayseri, Kırklareli, Kırıkkale, Konya, Kütahya, Malatya, Manisa, Niğde, Osmaniye, Sivas, Tokat, Trabzon, Van (Okyar & Aktaç 1999, Doğanlar 2003, Özdemir 2007, Can 2008, Koçak & Kemal 2018, Çakır & Seven 2019, Seven 2020).

Scopula incanata Linnaeus, 1758*

Material: 1♂, Ağlayan Mağara, 10.05.2019; 1♀, Akalın 1 km NW, 20.06.2019; 1♀, Gürbüz, 08.08.2019.

General distribution: Central Asia, Europe, Greece, the Caucasus, Turkey (Hausmann 2004, Leraut 2009, Koçak & Kemal 2018).

Distribution in Turkey: Amasya, Artvin, Bursa, Erzurum, Gümüşhane, Hakkâri, Kars, Rize, Trabzon, Van, Iğdır (Can 2008, Koçak & Kemal 2018).

Scopula marginepunctata Goeze, 1781

Material: 2♀, Büyükdere 2 km S, 15.08.2019, 13.06.2020; 1♂, Akalın 8.3 km NW, 28.04.2020.

General distribution: Asia, Africa, Europe (Hausmann 2004, Leraut 2009, Koçak & Kemal 2018).

Distribution in Turkey: Adana, Adıyaman, Amasya, Ankara, Batman, Bartın, Bitlis, Bolu, Bursa, Çanakkale, Diyarbakır, Düzce, Edirne, Elazığ, Erzincan, Hakkâri, Iğdır, İstanbul, İzmir, Kahramanmaraş, Kayseri, Kırıkkale, Kırklareli, Konya, Malatya, Mersin, Ordu, Osmaniye, Siirt, Sivas, Tekirdağ, Tokat, Trabzon, Van (Okyar & Aktaç 1999, Doğanlar 2003, Özdemir 2007;

2019, Can 2008, Koçak & Kemal 2018, Çakır & Seven 2019, Seven 2019b).

Scopula ornata Scopoli, 1763*

Material: 1♂, Ağlayan Mağara, 01.06.2019.

General distribution: Central Asia, Greece, Europe, Turkey (Hausmann 2004, Leraut 2009, Koçak & Kemal 2018).

Distribution in Turkey: Adana, Amasya, Ankara, Antalya, Aydın, Bartın, Bilecik, Bitlis, Bolu, Bursa, Çanakkale, Çankırı, Düzcce, Edirne, Elazığ, Gümüşhane, Hakkâri, Iğdır, İstanbul, Kırklareli, Malatya, Ordu, Tekirdağ, Trabzon, Van, Yalova (Okyar & Aktaç 1999, Doğanlar 2003, Özdemir 2007; 2019, Can 2008, Koçak & Kemal 2018, Çakır & Seven 2019).

Scopula submutata Treitschke, 1828

Material: 71♂, 52♀, Ağlayan Mağara, 10.05.2019, 16.05.2019, 24.05.2019; 1♀, Kumluca-2, 16.05.2019; 1♂, Akalın 8.3 km NW, 28.04.2020; 1♀, Saklı, 28.04.2020.

General distribution: Europe, Middle East, North Africa, the Balkans, the Caucasus, the Eastern Mediterranean (Hausmann 2004, Leraut 2009, Koçak & Kemal 2018).

Distribution in Turkey: Adana, Amasya, Ankara, Antalya, Bartın, Batman, Bitlis, Bursa, Çanakkale, Diyarbakır, Elazığ, Erzincan, Gaziantep, Hakkâri, Hatay, Kahramanmaraş, Konya, Kırkkale, Manisa, Mardin, Mersin, Siirt, Sivas, Şırnak, Van (Doğanlar 2003, Koçak & Kemal 2018, Çakır & Seven 2019, Özdemir 2019, Seven 2019b).

Scopula turbulentaria Staudinger, 1870*

Material: 1♂, Akalın 8.3 km NW, 28.04.2020.

General distribution: Armenia, Bulgaria, Europe, Greece, Iran, Russia, Saudi Arabia, the Eastern Mediterranean, Tunisia, Turkey, Turkmenistan, China (Hausmann 2004, Leraut 2009).

Distribution in Turkey: Adana, Amasya, Antalya, Bursa, Çanakkale, Hatay, İstanbul, İzmir, Kahramanmaraş, Kırklareli, Konya, Manisa, Mersin (Koçak & Kemal 2018).

Table 2. Number of geometrid moth species in Batman province before and after the study.

Subfamily	Before the survey	After the survey	Representation rate (%)
Desmobathrinae	-	1	1.2
Ennominae	17	37	44
Geometrinae	1	2	2.4
Larentiinae	9	23	27.4
Sterrhinae	11	21	25
Total	38	84	100

Desmobathrinae subfamily is newly reported from Hasankeyf and Batman. Ennominae is the most represented subfamily with a rate of 44 % and holds the highest increase in the number of species. Former to the investigation, the number of Geometridae species known in Hasankeyf was only 1, and 31 in Batman (Koçak & Kemal 2018, Seven 2019b, Seven *et al.* 2021). The present records increased the species number in Batman to 84 with nearly 171 % increase. There is also a remarkable representation of the Sterrhinae and Larentiinae subfamilies (Table 2).

Discussion

Surveys on the Lepidoptera fauna of Hasankeyf (Batman) was very restricted, and there was almost no information. In this study, 66 Geometridae species are found in the study area and, some of these are rare and spread in limited biotopes.

The comparison of the number of geometrid species in Batman with surrounding provinces (Seven 2014, 2019b, 2020, Koçak & Kemal 2018, Seven & Çakır 2019, Akın & Seven 2020) (Table 3) revealed that Siirt and Bitlis have the highest species, followed by Batman because more research has been done to determine the fauna of these provinces. However, Table 3 shows that some provinces such as Muş, Mardin and Şırnak in the east and southeast of Turkey still have very limited data on the Lepidoptera species.

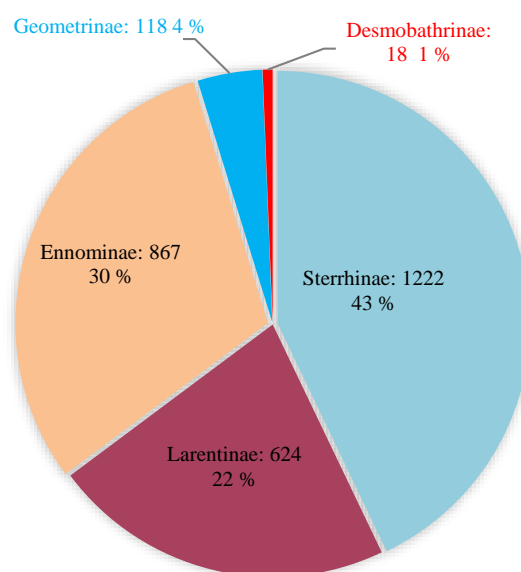


Fig. 2. The numbers of the specimens for each subfamily sampled with their ratio in total.

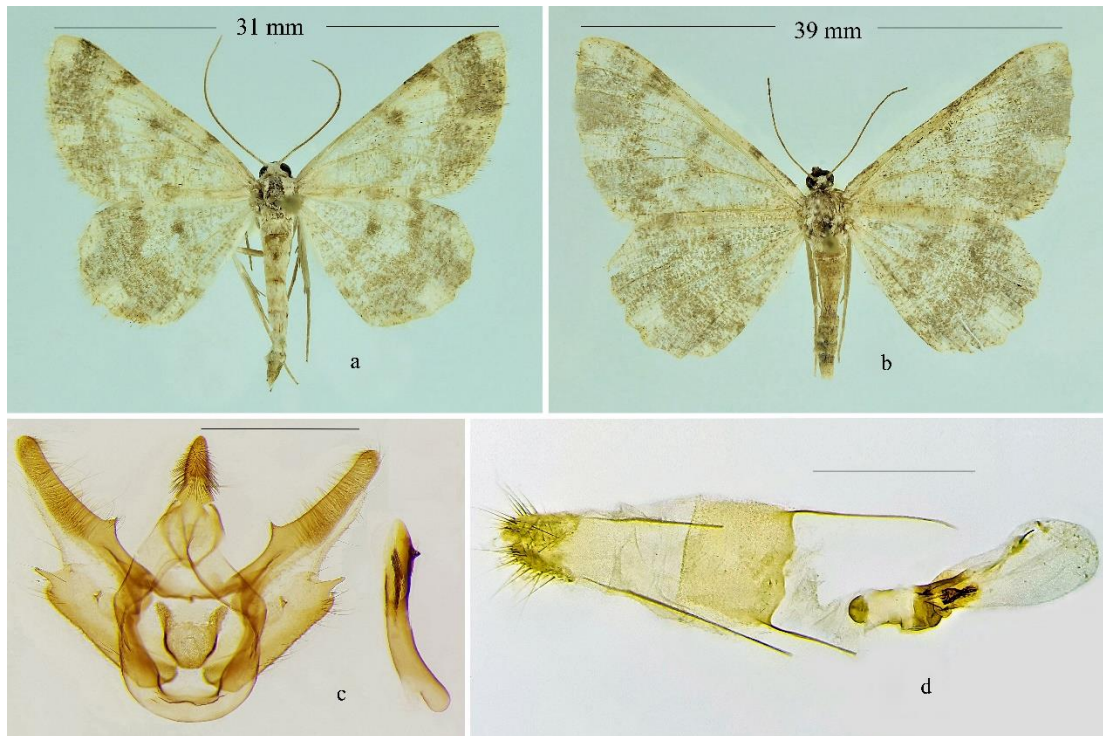
In Hasankeyf, the highest number of moths with respect to subfamilies were sampled in Sterrhinae (1.222 specimens), followed by Ennominae (867 specimens) in direct proportion to the number of Geometridae species (Fig. 2). In Turkey, two species of Desmobathrinae, which have the lowest rate of 1% (18 specimens), are known, and *Myinodes shohami* are found in the study area.

Table 3. Comparison of the geometrid species in Batman and neighboring provinces.

Subfamily	Batman	Diyarbakır	Mardin	Siirt	Muş	Bitlis	Şırnak
Geometrinae	2	3	-	4	-	3	1
Larentiinae	23	15	9	46	3	44	9
Ennominae	37	27	14	57	2	53	15
Sterrhinae	21	17	8	36	5	34	9
Desmobathrinae	1	1	1	1	-	1	-
Orthostixinae	-	1	-	1	2	2	-
Total	84	64	32	145	12	137	34

Table 4. The monthly numerical distribution of specimens for each subfamily.

Subfamily	Month					
	Sterrhinae	Larentinae	Ennominae	Geometrinae	Desmobathrinae	Total
March	-	1	8	-	1	10
April	6	7	6	-	1	20
May	5	8	7	1	-	21
June	11	1	12	1	-	25
July	2	2	5	1	-	10
August	6	1	6	2	-	15
September	3	1	5	-	-	9
October	5	8	12	-	-	25
November	1	5	6	-	-	12

**Fig. 3.** *Gnophos chorista* Wehrli, 1939, a. adult male, b. adult female, c. male genitalia (slide no. GP599), d. female genitalia (slide no. GP603) (scale bar 1 mm, Photographs: E. Seven).

The flight period of each species varies according to the food plant(s) and ecological demands. As seen in Table 3, some of them are active only in the early spring, as in the Desmobathrinae specimens. It is possible to see some specimens with high tolerance for a longer period with a few generations. The number of species in the investigated area increased from March to June, whereas a decrease in was seen in July, August, and September. October and June are the months when most of the

specimens are caught. In November, the number of samples decreased. In general, the number of specimens increased with the warming of the weather, but a decrease was seen in the extremely hot months (June-September), with the cooling of the weather, an increase is observed again (Table 4).

Koçak & Kemal (2018) mentioned the rare species *Gnophos chorista* (Fig. 3) in the Lepidoptera checklist of

Turkey but they did not provide any locational information, making the species doubtful since no authentic specimens have been traced. The first recorded location in Turkey and figures of the species are newly presented with this study. The description of *G. chorista* was given by Wehrli in 1939, based on the samples collected by Wiltshire from northeast of Iraq (Rovanduz), near the border with Turkey (Wehrli 1939, 1939-1954). The identification of *G. chorista* was made by comparing with *G. orthogonius* Wehrli, 1939, which was defined from southern Iran (Shiraz) (Wehrli 1939) and its genitalia was given to be similar to *G. chorista* from Oman (Hausmann 1998). The populations of these two similar species need to be studied in more detail, and the differences between them should be completely investigated.

Some species, possibly they have small populations and restricted ecological tolerance, showing rare distribution in Turkey are also determined: *Charissa adjectaria* – Batman prov. (Seven 2018), *Eupithecia dearmata* – Mardin prov. (Koçak & Kemal 2018), *Eupithecia reisserata* – Ankara, Siirt prov. (Koçak & Kemal 2018), *Gnophos sacraria* – Elazığ, Siirt prov. (Seven 2018, Çakır & Seven 2019).

Charissa adjectaria was described and illustrated by Staudinger in 1897 from Jordan Valley. It is reported at the rocky mountainous steppe area in Batı Raman, 570 m, from Batman province (Seven 2018) and no further record was reported for the species since then. *Eupithecia dearmata* is distributed in North Africa and Anatolia, with a very restricted distribution in the latter (Koçak & Kemal 2018). *Gnophos sacraria* was described by Staudinger from Israel (Jerusalem). It was known from Central Asia, the Middle East, Eastern Mediterranean, the Balkans, and Asia minor. In Turkey, it was found only in Siirt province

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