

ENNOMINAE, GEOMETRINAE AND LARENTIINAE (LEPIDOPTERA: GEOMETRIDAE) FAUNA IN GAZIANTEP PROVINCE, TURKEY

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ABSTRACT. This study was based on Geometridae species collected from Gaziantep province in spring and summer of 2009, 2010 and 2011. During the study, samples were collected from research area using by Robinson type light trap, portable light trap and insect net. In the study, 12 species belonging to 12 genera from 3 subfamilies have been determined. In addition, adult figures, material examined and distribution all species were given and.

1. INTRODUCTION

Geometridae is a family belonging to the Macrolepidoptera group of the order Lepidoptera, which includes all moths and butterflies. While the majority of geometrid moths display a nocturnal lifestyle, many fly by day [1]. Compared to other macrolepidopteran families, Geometridae species tend to be picky about living in certain habitats. Considering this characteristic of the family, the Geometridae species are regarded as useful environmental indicators by some researchers [2,3].

The larvae of species belonging to the family Geometridae are fed with annual plants, perennial forest plants and agricultural cultivated plants. Therefore, the diversity of plants to which larvae can be fed is quite more. More than 100 species belonging to the Larentiinae subfamily belong to the genus *Eupithecia* Curtis 1825 [4]. Generally, individuals are small. The forewings are generally brown or whitish, and the rear wings are generally colorless. The wing pattern is transverse. There are M_1 vein and areole in the forewing [3]. The aim of the present study is to contribute to the of the Geometridae fauna of Gaziantep provinces and to summarize the geographic spread of the species.

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2. MATERIALS AND METHODS

Adult Geometridae specimens were collected with a Robinson Type Light Trap, insect net and stored in the laboratory. Then, these specimens were killed in ethyl acetate killing jars, they were brought to the Gaziantep University Entomology Laboratory. Then, they were prepared as standard museum materials.

Gaziantep is located in Turkey's southeast Anatolia. To the west of the region has been the Mediterranean and to the north has been the eastern Anatolia region (Figure 1).

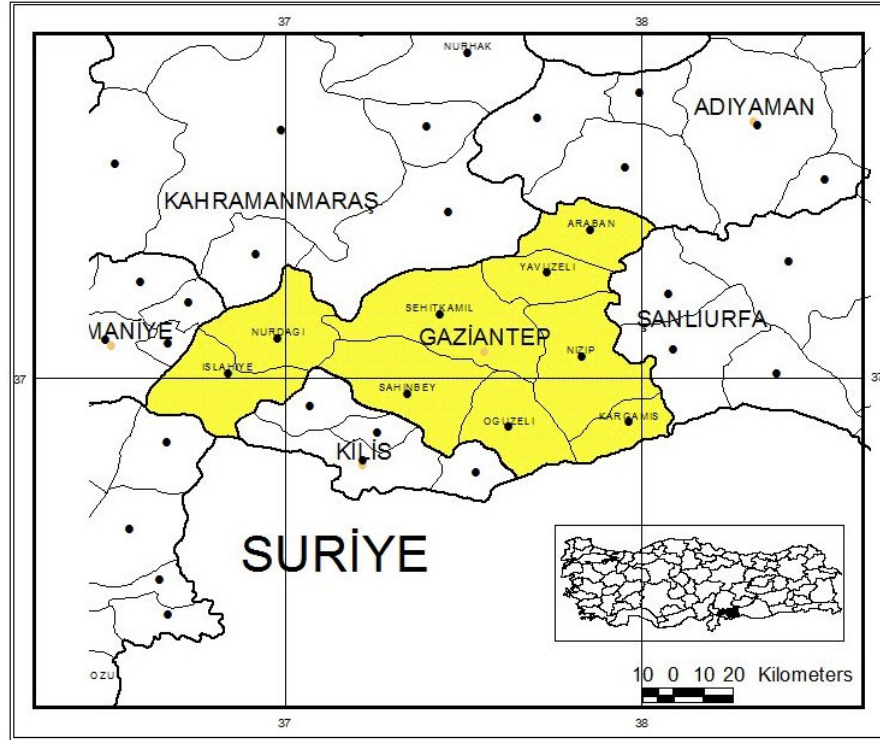


FIGURE 1. Study region (Gaziantep province in Turkey).

The genital structures were prepared according to Kornoşor [5]. Species were identified by using the keys of Okyar and Aktaş [6], Hausmann [3], Doğanlar [7],

Mironov [8], Hausmann [9], Özdemir [10], Can [11], Redondo et al. [4] and Soku and Sihvonen, [12]. Adult specimens were deposited in the insect laboratory of Gaziantep University.

The elevation of is approximately the Gaziantep region varies between 450 and 1500 m. Summers are dry and hot, while winters are cold and rainy (Figure 2).



FIGURE 2. Some regions where adult Geometridae samples are collected.

3. RESULTS

In this study, 12 species from 12 genera belonging to 3 subfamily (Ennominae, Geometrinae and Larentiinae) were determined from Gaziantep province. Subfamilies and species listed alphabetical order (Table 1) and their photographs were given in Figure 3 and 4.

TABLE 1. Identified taxa

Subfamily	Genus	Specimens
Ennominae	<i>Aspitates</i>	<i>Aspitates ochrearia</i>
	<i>Chiasmia</i>	<i>Chiasmia clathrata</i>
	<i>Neognopharmia</i>	<i>Neognopharmia stevenaria</i>
Geometrinae	<i>Aplasta</i>	<i>Aplasta ononaria</i>
	<i>Phaiogramma</i>	<i>Phaiogramma etruscaria</i>
	<i>Proteuchloris</i>	<i>Proteuchloris neriaria</i>
Larentiinae	<i>Aplocera</i>	<i>Aplocera annexata</i>
	<i>Camptogramma</i>	<i>Camptogramma bilineata</i>
	<i>Costaconvexa</i>	<i>Costaconvexa polygrammata</i>
	<i>Eupithecia</i>	<i>Eupithecia centaureata</i>
	<i>Protorhoe</i>	<i>Protorhoe unicata</i>
	<i>Xanthorhoe</i>	<i>Xanthorhoe fluctuata</i>

All the collected material was preserved in the Entomological Laboratory of the Department of Biology, Gaziantep University. The altitudes, collecting dates and geographic coordinates of all collecting localities, are chronologically listed in Material examined.

Subfamily: Ennominae Duponchel, 1845

3 species belonging to 3 genera in Ennominae were determined.

Aspitates ochrearia (Rossi, 1794)

Material examined: Gaziantep, Burç, 36° 52' N, 35° 52' E, 640 m, 18.05.2011, 1 ♂.

World Distribution: Palearctic. Europe, North Africa, Turkey, Syria, England [13] and France [14].

Turkey Distribution: Çanakkale, Mersin, İstanbul, Amasya, Diyarbakır, Ankara, Edirne, Kırklareli, Kırıkkale, Kocaeli, Tekirdağ, Manisa, Kahramanmaraş, Kilis, Bursa, Uşak, Osmaniye [15].

Chiasmia clathrata (Linnaeus, 1758)

Material examined: Gaziantep, Huzurlu, 36° 58' N, 36° 26' E, 1030 m, 13.07.2010, 4 ♂♂.

World Distribution: Palearctic. North Africa, Europe and Turkey, Transcaucasia, Kazakhstan, Russia, Northwest China, Korea and Japan [4].

Turkey Distribution: Mersin, Van, Çankırı, İstanbul, Nevşehir, Amasya, Diyarbakır, Ankara, Edirne, Kırıkkale, Balıkesir, Konya, Ardahan, Bolu, Kahramanmaraş, Bursa, Osmaniye, Düzce [15].

Neognopharmia stevenaria (Boisduval, 1840)

Material examined: Gaziantep, Gökçük Village, 37° 27' N, 37° 35' E, 575 m, 18.09.2009, 4 ♀♀; İbrahimli Village, 37° 05' N, 37° 18' E, 936 m, 11.04.2011, 5 ♂♂; İbrahimli Village, 37° 05' N, 37° 19' E, 944 m, 26.05.2011, 4 ♂♂.

World Distribution: Mediterranean-Turan, Mediterranean-Europe, Turkey, Cantabria Although there is a new record in the Iberian peninsula where there is the most widely peninsula [2].

Turkey Distribution: Çanakkale, Van, Diyarbakır, Ankara, Siirt, Konya, Malatya, Bitlis, Trabzon, Bolu, Kahramanmaraş, Hatay, Mardin, Bursa, Amasya [15].

Subfamily: Geometrinae Leach, 1815

3 species belonging to 3 genera in Geometrinae were determined.

Aplasta ononaria (Fuessly, 1783)

Material examined: Gaziantep, Yazıbağı Village, 37° 01' N, 37° 07' E, 768 m, 01.07.2010, 4 ♂♂.

World Distribution: Mediterranean "in southern Europe: Turkey, Transcaucasia, northern Iran, Israel, Lebanon and Syria. [2].

Turkey Distribution: Çanakkale, Mersin, Van, Amasya, Diyarbakır, Ankara, Elazığ, Kırklareli, Kırıkkale, Kırşehir, Aydın, Kocaeli, Konya, Tekirdağ, Bitlis, Bolu, Kahramanmaraş, Hatay, Bursa, Muğla, Osmaniye, Amasya [15].

Phaiogramma etruscaria (Zeller, 1849)

Material examined: Gaziantep, Oğuzeli, 37° 55' N, 37° 32' E, 641m, 17.06.2010, 4 ♂♂; Araban, 37° 31' N, 37° 43' E, 769 m, 29.06.2010, 3 ♂♂; Oğuzeli, 36° 55' N, 37° 32' E, 650 m, 03.07.2010, 3 ♂♂; İbrahimli Village, 37° 05' N, 37° 18' E, 936 m,

06.06.2011, 2 ♂♂; İbrahimli Village, 37° 05' N, 37° 19' E, 944 m, 06.06.2011 6 ♂♂; İbrahimli Village, 37° 05' N, 37° 18' E, 936 m, 05.07.2011, 7 ♂♂.

World Distribution: Turan Mediterranean, North Africa, Southern Europe, Turkey, Transcaucasia, northern Iran, Iraq, Kazakhstan, Turkmenistan, Uzbekistan, Tajikistan and Afghanistan [4].

Turkey Distribution: Çanakkale, Mersin, Van, Amasya, Kırklareli, Konya, Giresun, Trabzon, Bolu, Kahramanmaraş, Bursa, Osmaniye [15].

Proteuchloris neriaris (Herrich-Schäffer, 1852)

Material examined: Gaziantep, Oğuzeli, 37° 55' N, 37° 32' E, 641 m, 17.06.2010, 3 ♂♂.

World Distribution: It is a common species in Southern Europe. South Balkans, Turkey, Syria, Cyprus and Armenia [3] and Greece [2].

Turkey Distribution: Çanakkale, Mersin, Amasya, Bolu, Kahramanmaraş, Bursa, Osmaniye [15].

Subfamily: Larentiinae Duponchel, 1845

6 species belonging to 6 genera in Larentiinae were determined.

Aplocera annexata (Freyer, 1830)

Material examined: Gaziantep, Oğuzeli, 36° 55' N, 37° 32' E, 650m, 03.07.2010, 6 ♀♀.

World Distribution: It is a common species in Anatolia, Turkey, Azerbaijan, Caucasus, Armenia [13] and Ukraine [2].

Turkey Distribution: Çanakkale, Mersin, Van, Amasya, Diyarbakır, Ankara, Elazığ, Kırklareli, Kırıkkale, Kırşehir, Aydın, Kocaeli, Konya, Tekirdağ, Bitlis, Bolu, Kahramanmaraş, Hatay, Bursa, Muğla, Osmaniye [15].

Camptogramma bilineata (Linnaeus, 1758)

Material examined: Gaziantep, Gökçük Village, 37° 27' N, 37° 35' E, 575 m, 18.09.2009, 7 ♂♂; Oğuzeli, 37° 55' N, 37° 32' E, 641 m, 17.05.2011, 5 ♂♂; Oğuzeli, 37° 55' N, 37° 32' E, 641 m, 30.05.2011, 6 ♂♂.

World Distribution: Palearctic. It is widely headquartered in North Africa, Europe and Asia [4].

Turkey Distribution: Çanakkale, Mersin, Van, Çankırı, İstanbul, İzmir, Kars, Ordu, Amasya, Ankara, Edirne, Kayseri, Elazığ, Kırklareli, Siirt, Sinop, Şırnak, Balıkesir, Konya, Tekirdağ, Giresun, Malatya, Tokat, Bitlis, Manisa, Bolu, Kahramanmaraş, Bursa, Muğla, Osmaniye [15].

Costaconvexa polygrammata (Borkhausen, 1794)

Material examined: Gaziantep, Oğuzeli, 37° 55' N, 37° 32' E, 641 m, 17.06.2010, 1 ♀.

World Distribution: West palaeartic region, North Africa, Europe, Turkey and central Asia [4].

Turkey Distribution: Adana, Mersin, (Doğanlar, 2003), Çankırı, Amasya [15].

Eupithecia centaureata (Denis & Schittermüllerl, 1775)

Material examined: Gaziantep, Huzurlu, 36° 58' N, 36° 26' E, 1030 m, 13.07.2010, 5 ♂♂.

World Distribution: Palearctic region. North of Africa, Europe, Turkey, central Asia, Mongolia and China [4].

Turkey Distribution: Çanakkale-Gelibolu [16], Çanakkale, Edirne, Kırklareli, Tekirdağ [6].

Protorhoe unicata (Guenée, 1858)

Material examined: Gaziantep, Burç, 36° 52' N, 35° 52' E, 640 m, 17.05.2011, 5 ♂♂; Burç, 36° 52' N, 35° 52' E, 640 m, 24.05.2011, 7 ♂♂.

World Distribution: It is a species found in Anatolia and the Balkans [7].

Turkey Distribution: Mersin, Amasya, Kayseri, Kırıkkale, Konya, Manisa, Bolu, Osmaniye, Düzce [15].

Xanthorhoe fluctuata (Linnaeus, 1758)

Material examined: Gaziantep, İbrahimli Village, 37° 05' N, 37° 18' E, 936 m, 26.05.2011, 3 ♂♂.

World Distribution: North Africa, Europe, Turkey, Asia, and is a common species in North America [4].

Turkey Distribution: Çanakkale, Mersin, Van, İstanbul, Niğde, Amasya, Ankara, Edirne, Kırklareli, Konya, Sivas, Bolu, Kahramanmaraş, Bursa, Muğla [15].

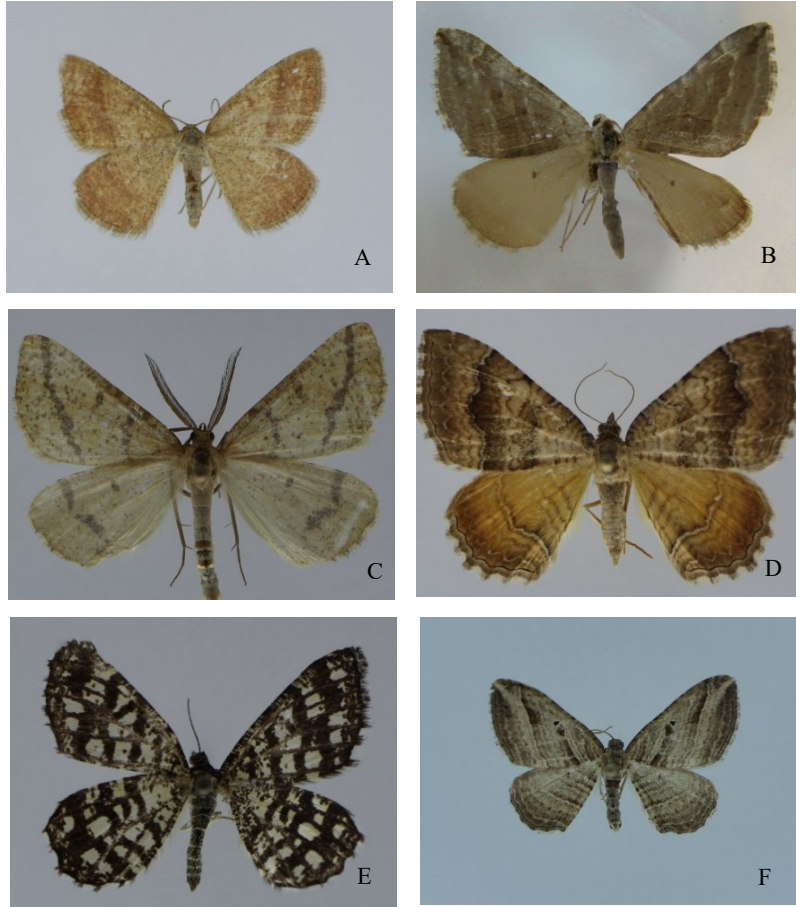


FIGURE 3. Geometridae adult: A. *Aplasta ononaria* B. *Aplocera annexata* C. *Aspitates ochrearia* D. *Campptogramma bilineata* E. *Chiasmia clathrate* F. *Costaconvexa polygrammata*.

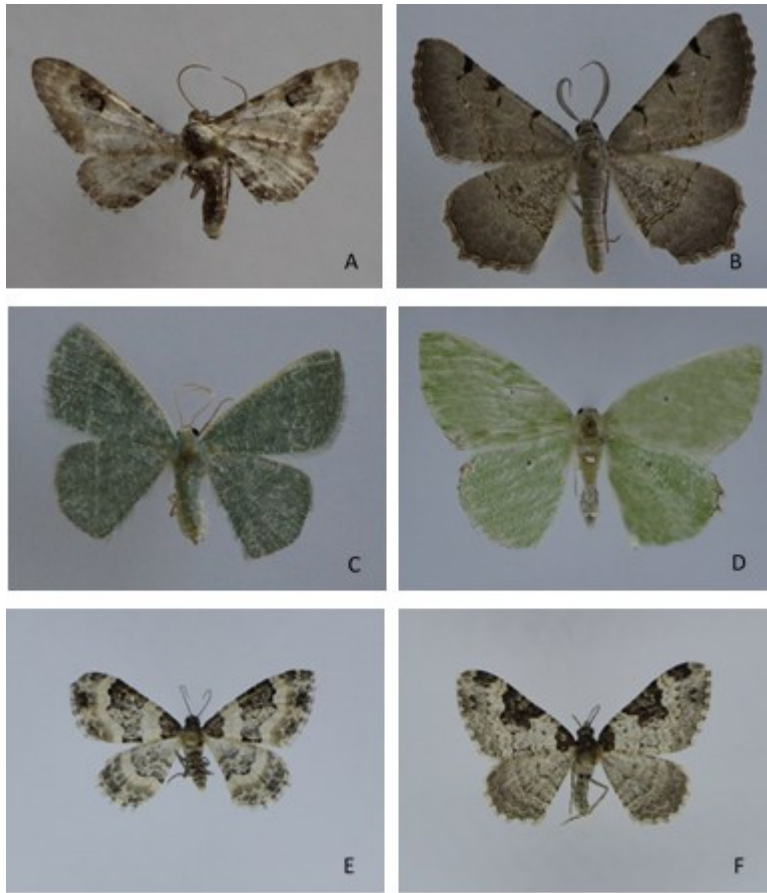


FIGURE 4. A. *Eupithecia centaureata* B. *Neognopharmia stevenaria* C. *Phaiogramma etruscaria* D. *Proteuchloris neriaria* E. *Protorhoe unicata* F. *Xanthorhoe fluctuate*.

4. DISCUSSION

Gaziantep is located in southeastern Turkey. Elevation is between 450 and 1500 m. There are significant temperature differences between summer and winter in Gaziantep. Winters are cold and rainy summers are hot and rainless. Therefore, it is similar to the desert climate in the region.

This study is based on the Geometridae specimens collected from Gaziantep province during 2009-2011 spring and summer period. In the study, we determined most common subfamily as Larentiinae with 6 species. Ennominae and Geometrinae distributed with respectively 3 species in the study region. There is no comprehensive study in Gaziantep province up to date. Together with this study, we contributed to distribution of Geometridae.

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