

## **Contributions to the knowledge of Geometridae fauna (Lepidoptera) of Ordu province**

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### **ABSTRACT**

In this study, 546 specimens were collected from Nazife Tuatay Plant Protection Museum belong Geometridae family collected by light trap from Ordu province between 1994 and 2007 were investigated. Totally 79 species belong to 4 subfamily were identified and 66 of which were reported for the first time from Ordu province. Distributions of species in Turkey were presented.

**Keywords:** Geometridae, fauna, Ordu, Turkey

### **ÖZ**

#### **Ordu ili Geometridae (Lepidoptera) faunasına katkılar**

Bu çalışmada Nazife Tuatay Bitki Koruma Müzesi koleksiyonunda bulunan, 1994-2007 yılları arasında Ordu ilinden ışık tuzağıyla toplanmış Geometridae familyasına ait 546 örnek değerlendirmeye alınmıştır. 4 alt familyaya ait toplam 79 tür tespit edilmiş ve bu türlerin 66'sı Ordu ilinden ilk kez kaydedilmiştir. Türlerin Türkiye'deki yayılışları verilmiştir.

**Anahtar kelimeler:** Geometridae, fauna, Ordu, Türkiye

### **INTRODUCTION**

Geometrid moths belong to the macrolepidopterous grade within the order Lepidoptera. Most geometrid species are nocturnal, but they often fly preferably at dusk. Others are said to be active mainly after midnight. Compared with most other macrolepidopterous families, species of Geometridae tend to be more specific to certain habitats and also highly suitable for use as an environmental indicator group. (Scoble 1999, Hausmann 2001).

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The geometrids are the most species-rich family of Lepidoptera apart from Noctuidae and Pyralidae. There are over 12.000 decripted species known in worldwide, 3.000 in Palaearctic region, 900 in Europe (Hausmann 2001) and 608 in Turkey (Koçak and Kemal 2009).

Ordu province located eastern Black Sea region of Turkey and it has plants formations consist of different plant communities proper with general structure of region; bushes spread in coastal areas, deciduous, deciduous and coniferous mixed in forests, coniferous forests and alpine meadows. Ordu state in Euxin province as biogeographically. Euxin province divided into two parts with Melet River where east of Ordu province. East part called Colchic and differs to other as species composition (Avcı 2005).

The studies to determine the geometrid fauna of the Black Sea region were firstly started with Mann (1859, 1861) in Amasya and Schwingenschuss (1939a, 1939b) in Bolu province. Seven (1991, 1995, 1996), Koçak and Seven (1991, 1996), Özdemir (2007), Can (2008) and Okyar (2010a) could be given as important studies on Geometridae fauna from different part of Black Sea. Some significant records were given especially from Eastern Anatolia and the Black Sea region and listed Geometridae species of Turkey by Riemis (1996). Koçak et al. (2007), Toper Kaygın et al. (2009), Göktürk (2011) and Okyar (2012) studied on Lepidoptera in some locations of this region and presented some geometrid records recently. But knowledge on Geometridae fauna related with Ordu province base on Can (2008), and Koçak and Kemal (2009). There are 21 species known form Ordu according to these studies.

The aim of the present study is investigated of specimens collected from Ordu province in Nazife Tuatay Plant Protection Museum collection (Plant Protection Central Research Institute, Ankara-Turkey) and contribution to Geometridae fauna of this province, Black Sea region also Turkey.

## **MATERIALS AND METHODS**

In this study the specimens in Nazife Tuatay Plant Protection Museum collected by light trap from Ordu province during the years 1994-2007 were investigated. The specimens were determined according to external characters and male or female genitalia morphology. For genitalia preparations the abdomens of materials were boiled in 10% KOH solution, dissected under a stereo microscope, and slides were mounted with Entellan. Prout (1912-1916, 1934-1939), Sterneck (1940), Bleszynski (1960, 1965, 1966), Vardikjan (1985), Hausmann (2001, 2004), Mironov (2003), Hausmann and Viidalepp (2012) were used for the identification.

## RESULTS

**Geometrinae Stephens, 1829**

*Comibaena bajularia* ([Denis and Schiffermüller], 1775)

Material Examined: Perşembe: Çaytepe, 200 m 10.VII.1996 1 ♀; 300 m 20.VII.1997 1 ♂.

Distribution in Turkey: Antalya, Bitlis, Bolu, Hatay, Isparta, Kastamonu, Kırklareli, Konya, Sinop, Tokat, Trabzon (Doğanlar 2003, Koçak and Kemal 2009, Can 2010).

*Hemitha aestivaria* (Hübner, [1799])

Material Examined: Perşembe: Çaytepe, 300 m 04.VI.1995 1 ♂.

Distribution in Turkey: Amasya, Bolu, Bursa, Düzce, Edirne, İstanbul, Ordu, Trabzon, (Okyar and Mironov 2008, Koçak and Kemal 2009).

*Jodis lactearia* (Linnaeus, 1758)

Material Examined: Perşembe: Çaytepe, 200 m 11.VIII.1996 5 ♂♂; 200 m 15.VIII.1996 1 ♂; 300 m 20.VII.1997 1 ♂ (Genital slide number: GP4549, GP0040).

Distribution in Turkey: Bolu, Bursa, Kastamonu, Kayseri, Ordu, Tekirdağ, Trabzon, Düzce (Koçak and Kemal 2009).

*Phaiogramma etruscaria* (Zeller, 1849)

Material Examined: Perşembe: Çaytepe, 200 m 08.VII.1996 2 ♀♀, 1 ♂; 200 m 25.VII.1996 4 ♀♀; 200 m 07.VIII.1996 1 ♀; 300 m 15.VIII.1997 1 ♀ (Genital slide number: GP4550).

Distribution in Turkey: Artvin, Adana, Amasya, Bolu, Bursa, Çanakkale, Edirne, Giresun, Hatay, Isparta, İçel, Kırklareli, Konya, Kahramanmaraş, Osmaniye, Siirt, Trabzon, Van (Doğanlar 2003, Okyar and Mironov 2008, Koçak and Kemal 2009; Can 2010, Göktürk 2011, Kemal and Seven 2012).

*Pseudoterpna pruinata* (Hufnagel, 1767)

Material Examined: Perşembe: Çaytepe, 200 m 04.VII.1996 1 ♂ (Genital slide number: GP0023).

Distribution in Turkey: Ankara, Bolu, Bursa, Karabük, Muğla, Sinop (Koçak and Kemal 2009, Okyar 2012).

**Sterrhinae Meyrick, 1892**

*Cyclophora linearia* (Hübner, [1799])

Material Examined: Perşembe: Çaytepe, 100 m 15.VIII.1994 1 ♀; 200 m 17.VII.1996 1 ♀; 200 m 07.VIII.1996 1 ♂; 200 m 15.VIII.1996 1 ♂; 200 m 25.VIII.1996 1 ♂; 300 m 22.VIII.1997 1 ♀; 300 m 20.VIII.1998 1 ♂ (Genital slide number: GP4539, GP0041, GP4562).

Distribution in Turkey: Adana, Bolu, Düzce, Edirne, Hatay, İstanbul, Kastamonu, Kırklareli Ordu, Rize, Trabzon, (Koçak and Kemal 2009, Okyar 2010a)

*Cyclophora punctaria* (Linnaeus, 1758)

Material Examined: Perşembe: Çaytepe, 300 m 15.VIII.1999 1 ♀, 100 m 16.VIII.1994 1 ♀; 200 m 25.VII.1996 1 ♂; 300 m 20.VIII.1998 1 ♀.

Distribution in Turkey: Adana, Amasya, Artvin, Bursa, Çanakkale, Düzce, İstanbul, Konya, Kahramanmaraş, Samsun, Tokat (Koçak and Kemal 2009).

*Cyclophora puppillaria* (Hübner, [1799])

Material Examined: Perşembe: Çaytepe, 300 m 15.VIII.1999 1 ♂; 200 m 07.VIII.1996 1 ♀; 300 m 22.VIII.1997 1 ♀; 300 m 20.VIII.1998 1 ♀ (Genital slide number: GP4557).

Distribution in Turkey: Adana, Ankara, Antalya, Bolu, Bursa, Çanakkale, Düzce, Hatay, İçel, İstanbul, Kahramanmaraş, Konya, Manisa, Muğla, Osmaniye, Sivas (Doğanlar 2003, Koçak and Kemal 2009).

*Cyclophora quercimontanaria* (Bastelberger, 1897)

Material Examined: Perşembe: Çaytepe, 200 m 25.VII.1996 1 ♀; 300 m 05.VIII.1999 1 ♀.

Distribution in Turkey: Artvin, Bolu, Düzce, Van (Koçak and Kemal 2009)

*Idaea aversata* (Linnaeus, 1758)

Material Examined: Perşembe: Çaytepe, 300 m 15.VIII.1999 1 ♀ 1 ♂; 100 m 30.VIII.1994 1 ♂; 200 m 08.VII.1994 2 ♂♂; 200 m 08.VII.1996 3 ♂♂; 200 m 10.VII.1996 1 ♀; 200 m 17.VII.1996 1 ♂; 200 m 25.VII.1996 1 ♂; 200 m 12.VIII.1996 1 ♂; 250 m 01.VII.1995 1 ♂; 300 m 20.VII.1997 2 ♂♂; 300 m 22.VIII.1997 1 ♀; 300 m 20.VIII.1998 2 ♂♂; 230 m 20.V.2007 1 ♂ 1 ♀.

Distribution in Turkey: Amasya, Ardahan, Bolu, Bursa, Çanakkale, Düzce, Edirne, Hatay, İstanbul, Kırklareli, Konya, Sakarya, Siirt, Tekirdağ, Trabzon, Van (Doğanlar 2003, Okyar and Mironov 2008, Koçak and Kemal 2009, Okyar 2012)

*Idaea biselata* (Hufnagel, 1767)

Material Examined: Perşembe: Çaytepe, 250 m 01.VII.1995 1 ♀; 200 m 04.VII.1996 2 ♀♀ 2 ♂♂; 200 m 08.VII.1996 7 ♀♀ 2 ♂♂; 200 m 10.VII.1996 2 ♀♀; 200 m 17.VII.1996 1 ♀ 6 ♂♂; 200 m 25.VII.1996 1 ♂; 300 m 20.VII.1997 1 ♂; Ortatepe, 800 m 25.VII.1997 4 ♀ 1 ♂ (Genital slide number: GP4531, GP0020).

Distribution in Turkey: Amasya, Bolu, Düzce, Edirne, İstanbul, Kırklareli, Trabzon (Okyar and Mironov 2008, Koçak and Kemal 2009).

*Idaea camparia* (Herrich-Schaffer [1852])

Material Examined: Perşembe: Çaytepe, 300 m 22.VIII.1997 1 ♂ (Genital slide number: GP0012).

Distribution in Turkey: Adana, Amasya, Antalya, Bursa, Çanakkale, Edirne, Hakkari, İçel, İstanbul, İzmir, Manisa, Kahramanmaraş, Tekirdağ (Okyar and Mironov 2008, Koçak and Kemal 2009).

*Idaea degeneraria* (Hübner, [1799])

Material Examined: Perşembe: Çaytepe, 200 m 01.VI.1995 1 ♂; 200 m 03.VIII.1996 1 ♂; 200 m 07.VIII.1996 2 ♂♂; 200 m 14.VIII.1996 1 ♀ 4 ♂♂; 200 m 15.VIII.1996 1 ♀ 5 ♂♂; 200 m 25.VIII.1996 2 ♂♂; 300 m 04.VI.1995 1 ♂; 300 m 20.VIII.1998 1 ♂; 230 m 20.V.2007 2 ♀♀.

Distribution in Turkey: Adana, Amasya, Ankara, Antalya, Bartın, Bolu, Bursa, Çanakkale, Edirne, Hatay, İçel, İstanbul, Kahramanmaraş, Kırıkkale, Kırklareli, Konya, Ordu, Osmaniye, Siirt, Sivas, Tekirdağ, Tokat, Trabzon, Van (Doğanlar 2003, Okyar and Mironov 2008, Koçak and Kemal 2009, Topper Kaygın et al. 2009, Kemal and Seven 2012).

*Idaea dilutaria* (Hübner, [1799])

Material Examined: Perşembe: Çaytepe, 200 m 08.VII.1996 1 ♂ (Genital slide number: GP4510).

Distribution in Turkey: Amasya, Ardahan, Bolu, Bursa, Edirne, İstanbul, Kırklareli, Rize, Zonguldak (Koçak and Kemal 2009, Okyar 2010a, 2012).

*Idaea dimidiata* (Hufnagel, 1767)

Material Examined: Perşembe: Çaytepe, 200 m 08.VII.1996 1 ♀; 200 m 07.VIII.1996 1 ♀; 200 m 11.VIII.1996 3 ♂♂; 200 m 15.VIII.1996 1 ♀; 200 m 16.VIII.1996 1 ♀; 200 m 25.VIII.1996 1 ♂ 300 m 20.VII.1997 1 ♂; 300 m 15.VIII.1997 3 ♀♀ (Genital slide number: GP4565).

Distribution in Turkey: Adana, Amasya, Ardahan, Bolu, Bursa, Düzce, Hatay, İstanbul, Kırklareli, Manisa, Muğla, Kahramanmaraş, Zonguldak (Koçak and Kemal 2009, Okyar 2012).

*Idaea filicata* (Hübner, [1799])

Material Examined: Perşembe: Çaytepe, 200 m 11.VIII.1996 1 ♀; 200 m 15.VIII.1996 1 ♀; 300 m 22.VIII.1997 1 ♂.

Distribution in Turkey: Adana, Amasya, Bolu, Bursa, Çanakkale, Edirne, İçel, İstanbul, Kırıkkale, Konya, Manisa, Kahramanmaraş, Muğla, Osmaniye, Siirt, Sivas, Tekirdağ, Tokat, Trabzon, Van (Doğanlar 2003, Koçak and Kemal 2009).

*Idaea moniliata* ([Denis and Schiffermüller ], 1775)

Material Examined: Perşembe: Çaytepe, 300 m 20.VII.1997 2 ♂♂.

Distribution in Turkey: Adana, Amasya, Ankara, Bitlis, Bolu, Bursa, Çanakkale, Düzce, Edirne, Hatay, İçel, İstanbul, Kastamonu, Kırklareli, Konya, Rize, Tokat, Zonguldak (Doğanlar 2003, Okyar and Mironov 2008, Koçak and Kemal 2009, Okyar 2010a, 2012).

*Idaea muricata* (Hufnagel, 1767)

Material Examined: Perşembe: Çaytepe, 150 m 15.VII.1995 1 ♀.

Distribution in Turkey: Kırklareli, Rize (Okyar and Mironov 2008).

*Idaea ochrata* (Scopoli, 1763)

Material Examined: Perşembe: Çaytepe, 200 m 10.VII.1996 1 ♂.

Distribution in Turkey: Amasya, Bolu, Bursa, Çanakkale, Düzce, Edirne, Iğdır, İstanbul, Kırklareli, Kahramanmaraş, Karabük, Kastamonu, Tekirdağ, Van, Zonguldak (Okyar and Mironov 2008, Koçak and Kemal 2009, Okyar 2012)

*Idaea politaria* (Hübner, [1799])

Material Examined: Perşembe: Çaytepe, 200 m 04.VII.1996 2 ♀♀; 200 m 08.VII.1996 1 ♀; 200 m 10.VII.1996 2 ♀♀; 250 m 30.IV.1996 1 ♂; 300 m 20.VII.1997 1 ♀ 1 ♂.

Distribution in Turkey: Adana, Amasya, Antalya, Bolu, Bursa, Düzce, Edirne, Hatay, İçel, İstanbul, Kastamonu, Kırklareli, Manisa (Koçak and Kemal 2009, Okyar 2012).

*Idaea rusticata* ([Denis and Schiffermüller], 1775)

Material Examined: Perşembe: Çaytepe, 200 m 04.VII.1996 1 ♀; 300 m 20.VII.1997 1 ♀ (Genital slide number: GP4529).

Distribution in Turkey: Amasya, Ankara, Ardahan, Bitlis, Bolu, Bursa, Çanakkale, Edirne, İstanbul, Kayseri, Kırklareli, Konya, Sivas (Okyar and Mironov 2008, Koçak and Kemal 2009).

*Idaea straminata* (Borkhausen, 1794)

Material Examined: Perşembe: Çaytepe 300 m 15.VIII.1999 1 ♂; 200 m 07.VIII.1996 1 ♀; 300 m 20.VIII.1998 2 ♀♀ 1 ♂; 230 m 20.V.2007. 1 ♂ (Genital slide number: GP4559, GP4512, GP4561, GP4593).

Distribution in Turkey: Amasya, Bursa, Düzce, Kars, Konya, Rize (Koçak and Kemal 2009, Okyar 2010a)

*Idaea subsericeata* (Haworth, [1809])

Material Examined: Perşembe: Çaytepe, 200 m 25.VII.1996 1 ♀; 200 m 03.VIII.1996 1 ♀; 200 m 07.VIII.1996 1 ♀; 230 m 20.VIII.2008 2 ♀♀ (Genital slide number: GP4514, GP4511, GP4594).

Distribution in Turkey: Adana, Amasya, Antalya, Bolu, Bursa, Düzce, Çanakkale, Edirne, Hatay, İçel, İstanbul, Kahramanmaraş, Tekirdağ (Koçak and Kemal 2009, Okyar 2012).

*Idaea trigeminata* (Haworth, [1809])

Material Examined: Perşembe: Çaytepe, 250 m 27.VI.1995 1 ♂; 250 m 30.IV.1996 1 ♂; 300 m 20.VII.1997 1 ♂ (Genital slide number: GP4530).

Distribution in Turkey: Adana, Amasya, Antalya, Bolu, Bursa, Çanakkale, Düzce, Hatay, İçel, İstanbul, Kahramanmaraş, Karabük, Trabzon. Van, Zonguldak (Koçak and Kemal 2009, Okyar 2012).

*Rhodometra sacraria* (Linnaeus, 1767)

Material Examined: Perşembe: Çaytepe, 100 m 30.VIII.1994 1 ♂.

Distribution in Turkey: Adana, Amasya, Ankara, Antalya, Aydın, Bursa, Çanakkale, Edirne, Gaziantep, İçel, İstanbul, Konya, Kahramanmaraş, Manisa, Muğla, Niğde, Sivas, Tekirdağ, Şanlıurfa, Van (Koçak and Kemal 2009).

*Rhodostrophia vibicaria* (Clerck, 1759)

Material Examined: Çambaşı, 1800 m 03.VIII.1995 1 ♂ (Genital slide number: GP4534).

Distribution in Turkey: Amasya, Ardahan, Bayburt, Bitlis, Bolu, Çanakkale, Edirne, Gümüşhane, Iğdır, İstanbul, Kastamonu, Kayseri, Kırklareli, Konya, Ordu, Siirt, Sinop, Tekirdağ, Tokat, Trabzon, Van, Bayburt, Iğdır (Okyar and Aktaş 1999, Koçak and Kemal 2009, Kemal and Seven 2012, Okyar 2012).

*Scopula marginepunctata* (Goeze, 1781)

Material Examined: Perşembe: Çaytepe, 200 m 10.VII.1996 1 ♂ (Genital slide number: GP0012).

Distribution in Turkey: Adana, Amasya, Bolu, Bursa, Çanakkale, Düzce, Edirne, Erzincan, İstanbul, İzmir, Kayseri, Kırıkkale, Kırklareli, Konya, Kahramanmaraş, Osmaniye, Siirt, Sivas, Tekirdağ, Tokat, Trabzon, Van, Iğdır (Koçak and Kemal 2009, Kemal and Seven 2012).

*Scopula nigropunctata* (Hufnagel, 1767)

Material Examined: Perşembe: Çaytepe, 200 m 10.VIII.1994 1 ♂; 200 m 04.VII.1996 3 ♀♀; 200 m 08.VII.1996 4 ♀♀ 1 ♂; 200 m 10.VII.1996 3 ♀♀ 2 ♂♂; 200 m 14.VIII.1996 2 ♀♀ 1 ♂; 200 m 15.VIII.1996 4 ♀♀ 3 ♂♂; 200 m 16.VIII.1996 2 ♂♂; 200 m 24.VIII.1996 1 ♂; 200 m 25.VIII.1996 4 ♀♀ 3 ♂♂; 250 m 30.IV.1996 1 ♀ 1 ♂; 300 m 20.VII.1997 5 ♂♂; 300 m 15.VIII.1997 3 ♀♀; 300 m 22.VIII.1997 2 ♀♀ 1 ♂ (Genital slide number: GP4513, GP0019).

Distribution in Turkey: Ankara, Bolu, Düzce, Edirne, İstanbul, Kastamonu, Kırklareli, Sakarya (Koçak and Kemal 2009, Okyar 2012).

*Scopula ornata* (Scopoli, 1763)

Material Examined: Perşembe: Çaytepe, 200 m 25.VII.1996 2 ♂♂; 200 m 12.VIII.1996 1 ♀; 300 m 22.VIII.1997 1 ♂.

Distribution in Turkey: Adana, Amasya, Ankara, Antalya, Aydın, Bilecik, Bolu, Bursa, Çanakkale, Çankırı, Düzce, Edirne, Gümüşhane, Iğdır İstanbul, Kırklareli, Ordu, Tekirdağ, Trabzon, Van, Yalova (Doğanlar 2003, Koçak and Kemal 2009).

*Scopula rubiginata* (Hufnagel, 1767)

Material Examined: Perşembe: Çaytepe, 150 m 28.VIII.1996 1 ♂; 200 m 15.VIII.1996 1 ♂.

Distribution in Turkey: Amasya, Ankara, Antalya, Ardahan, Artvin, Bartın, Bitlis, Bolu, Bursa, Düzce, Erzincan, İstanbul, Kastamonu, Kırklareli, Konya, Malatya, Sivas, Tekirdağ (Koçak and Kemal 2009, Toper Kaygın et al. 2009, Göktürk 2011, Okyar 2012).

*Timandra comae* (Schmidt, 1931)

Material Examined: Perşembe: Çaytepe, 200 m 25.VIII.1996 1 ♀ (Genital slide number: GP4528).

Distribution in Turkey: Adana, Amasya, Artvin, Bartın, Bursa, Edirne, İçel, İstanbul, Kırklareli, Konya, Ordu, Rize, Samsun, Sivas, Tekirdağ (Koçak and Kemal 2009, Okyar 2012).

#### **Lerentiinae Duponchel, 1845**

*Aplocera fraudulentata* (Herrich-Schäffer, 1861)

Material Examined: Perşembe: Çaytepe, 100 m 15.VII.1994 2 ♀♀; 200 m 07.VIII.1996 1 ♀ 1 ♂; 200 m 14.VIII.1996 1 ♀; 200 m 15.VIII.1996 2 ♀♀; Ortatepe, 800 m 25.VII.1997 1 ♀ (Genital slide number: GP4521).

Distribution in Turkey: Bolu, Bursa, İstanbul, Zonguldak (Okyar and Mironov 2008, Koçak and Kemal 2009).

*Camptogramma bilineata* (Linnaeus, 1758)

Material Examined: Perşembe: Çaytepe, 200m 17.VII.1994 1 ♀; 200 m 04.VII.1996 1 ♀; 200 m 24.VIII.1996 1 ♀ 1 ♂; 250 m 02.V.1996 1 ♀; 300 m 20.VII.1997 1 ♀ 1 ♂; 300 m 15.VIII.1997 1 ♀ (Genital slide number: GP0022).

Distribution in Turkey: Adana, Amasya, Ankara, Balıkesir, Bitlis, Bolu, Bursa, Çanakkale, Çankırı, Edirne, Elazığ, Giresun, Hatay, İçel, İstanbul, İzmir, Kahramanmaraş, Kars, Kayseri, Kırklareli, Konya, Malatya, Manisa, Muğla, Ordu, Osmaniye, Siirt, Sinop, Şırnak, Tekirdağ, Tokat, Van (Doğanlar 2003, Koçak and Kemal 2009).

*Chloroclystis v-ata* (Haworth, [1809])

Material Examined: Perşembe: Çaytepe, 200 m 17.VII.1996 1 ♀; 200 m 25.VII.1996 2 ♀♀ 1 ♂; 300 m 20.VII.1997 1 ♀; 300 m 05.VIII.1997 1 ♀; 300 m 15.VIII.1997 2 ♀♀; 230 m 20.V.2007 3 ♀♀ 1 ♂ (Genital slide number: GP4541).

Distribution in Turkey: Rize (Okyar 2010a).

*Dysstroma citrata* (Linnaeus, 1761)

Material Examined: Çambaşı, 1600 m 12.VIII.1994, 1 ♂ (Genital slide number: GP4517).

Distribution in Turkey: Rize (Okyar 2010a).

*Ecliptopera silaceata* ([Denis and Schiffermüller], 1775)

Material Examined: Perşembe: Çaytepe, 100 m 10.VIII.1994 1 ♂; 200 m 10.VIII.1994 1 ♂; 300 m 22.VIII.1997 2 ♀.

Distribution in Turkey: Bolu, Rize, Trabzon (Koçak and Kemal 2009).

*Epirrhoe alternata* (Müller, 1764)

Material Examined: Perşembe: Çaytepe, 200 m 08.VII.1994 1 ♂; 200 m 04.VII.1996 1 ♂; 200 m 08.VII.1996 1 ♂; 200 m 10.VII.1996 1 ♂; 200 m 17.VII.1996 1 ♀; 300 m 20.VII.1997 1 ♀ 2 ♂♂; Ortatepe, 800 m 25.VII.1997 1 ♂ (Genital slide number: GP4525, GP0014).

Distribution in Turkey: Ardahan, Bilecik, Bolu, Bursa, Düzce, Rize, Trabzon, Kırıkkale (Koçak and Kemal 2009).



*Euphyia biangulata* (Haworth, [1809])

Material Examined: Perşembe: Çaytepe, 200 m 17.VII.1996 1 ♂ (Genital slide number: GP0031).

Distribution in Turkey: Ardahan, Bolu, İstanbul, Tokat (Koçak and Kemal 2009).

*Eupithecia centaureata* ([Denis and Schiffermüller], 1775)

Material Examined: Perşembe: Çaytepe, 100 m 15.VII.1994 1 ♀; 200 m 17.VII.1996 1 ♀ 1 ♂; 250 m 09.VII.1995 1 ♀; 300 m 20.VII.1997 1 ♀ 1 ♂.

Distribution in Turkey: Adana, Amasya, Ankara, Bolu, Bursa, Çanakkale, Çorum, Edirne, İstanbul, Kahramanmaraş, Kırıkkale, Konya, Siirt, Sivas, Tekirdağ, Van (Doğanlar 2003, Okyar and Mironov 2008, Koçak and Kemal 2009, Okyar 2012).

*Eupithecia haworthiata* Doubleday, 1856

Material Examined: Perşembe: Çaytepe, 230 m 20.V.2007 1 ♀ 1 ♂ (Genital slide number: GP4591, GP4592).

Distribution in Turkey: From Thrace, west and middle Black Sea Region to Trabzon (Mirinow 2003).

*Eupithecia pusillata* ([Denis and Schiffermüller], 1775)

Material Examined: Perşembe: Çaytepe, 300 m 10.IV.1998 2 ♀♀ (Genital slide number: GP0013).

Distribution in Turkey: Trabzon (Koçak and Kemal 2009).

*Eupithecia semigraphata* Bruand, [1847]

Material Examined: Perşembe: Çaytepe, 300 m 20.VIII.1998 1 ♀ 1 ♂ (Genital slide number: GP4566).

Distribution in Turkey: Amasya, Ankara, Hakkari, İstanbul, Konya, Kahramanmaraş (Okyar and Mironov 2008, Koçak and Kemal 2009).

*Gymnoscelis rufifasciata* Haworth, [1809]

Material Examined: Perşembe: Çaytepe, 200 m 25.VII.1996 1 ♀; 200 m 03.VIII.1996 1 ♀; 300 m 05.VIII.1997 3 ♀♀; Ortatepe, 800 m 25.07.1997 3 ♂♂.

Distribution in Turkey: Adana, Amasya, Bolu, Bursa, Çanakkale, Edirne, Düzce, Hatay, Iğdır İstanbul, İzmir, Kırıkkale, Konya, Mardin, Muğla, Osmaniye, Siirt (Doğanlar 2003, Koçak and Kemal 2009, Kemal and Seven 2012).

*Lythria cruentaria* (Hufnagel, 1767)

Material Examined: Çambaşı, 1700 m 06.VII.1995 1 ♀ 1 ♂; 2000 m 06.VII.1995 1 ♂; 2300 m 24.VII.1995 2 ♂♂ (Genital slide number: GP4545, GP4542).

Distribution in Turkey: Afyon, Ankara, Bitlis, Bursa, Edirne, İstanbul, Kayseri, Kırıkkale, Kocaeli, Konya, Tokat, Van (Koçak and Kemal 2009).

*Melanthia procellata* ([Denis and Schiffermüller], 1775)

Material Examined: Perşembe: Çaytepe, 100 m 11.VIII.1994 1 ♀ 2 ♂♂; 100 m 15.VIII.1994 1 ♂; 150 m 02.VIII.1995 1 ♀; 200 m 29.IV.1996 1 ♀; 200 m 17.VII.1996 1 ♀; 200 m 03.VIII.1996 1 ♀; 200 m 07.VIII.1996 5 ♀♀ 1 ♂; 200 m

11.VIII.1996 1 ♂; 200 m 14.VIII.1996 1 ♀; 200 m 15.VIII.1996 2 ♂♂; 300 m 04.VI.1995 1 ♂.

Distribution in Turkey: Bolu, Düzce, Edirne, İstanbul, Kırklareli, Sinop, Trabzon (Koçak and Kemal 2009).

*Operiphthera brumata* (Linnaeus, 1758)

Material Examined: Perşembe: Çaytepe, 200 m 10.II.1999 1 ♀ 1 ♂ (Genital slide number: GP4535).

Distribution in Turkey: Bolu, Çanakkale, Edirne, İstanbul, Kırklareli (Koçak and Kemal 2009).

*Pasiphila rectangulata* (Linnaeus, 1758)

Material Examined: Perşembe: Çaytepe, 100 m 26.V.1995 1 ♀ (Genital slide number: GP4523).

Distribution in Turkey: Bolu, Edirne, Trabzon, Van, Kırkkale, Iğdır (Koçak and Kemal 2009).

*Perizoma gigas* Wiltshire, 1976

Material Examined: Çambaşı, 1700 m 06.VII.1995 1 ♀ (Genital slide number: Gp4536).

Distribution in Turkey: Rize, Trabzon (Koçak and Kemal 2009).

*Xanthorhoe biriviata* (Borkhausen, 1794)

Material Examined: Yokuşdibi, 1000 m 26.V.1995 1 ♂ (Genital slide number: GP4526).

Distribution in Turkey: İstanbul, North-eastern Turkey (Okyar and Mironov 2008, Hausmann and Viidalepp 2012)

*Xanthorhoe designata* (Hufnagel, 1767)

Material Examined: Yokuşdibi, 1000 m 26.V.1995 1 ♂; Perşembe: Çaytepe, 300 m 10.IV.1998 1 ♀; Ortatepe, 500 m 25.VIII.1997 6 ♂♂ (Genital slide number: GP4563, GP4527).

Distribution in Turkey: Ankara, Bolu, Düzce, Rize, Trabzon (Özdemir 2007, Koçak and Kemal 2009).

*Xanthorhoe ferrugata* (Clerck, 1759)

Material Examined: Perşembe: Çaytepe, 200 m 04.VII.1996 4 ♀♀; 200 m 17.VII.1996 3 ♀♀ 1 ♂; 200 m 16.VIII.1996 1 ♂; 250 m 01.VII.1995 1 ♀; 250 m 30.IV.1996 2 ♂♂; 300 m 20.VII.1997 1 ♀ 1 ♂ (Genital slide number: GP4537, GP4538).

Distribution in Turkey: Bursa, Bolu, Düzce, Kırklareli, Trabzon, Zonguldak (Özdemir 2007, Koçak and Kemal 2009, Okyar 2012).

*Xanthorhoe fluctuata* (Linnaeus, 1758)

Material Examined: Perşembe: Çaytepe, 100 m 15.VIII.1994 1 ♀; 200 m 17.VII.1994 1 ♀; 200 m 20.IV.1997 5 ♂♂; 300 m 15.VIII.1997 1 ♀ (Genital slide number: GP0011, GP4524)

Distribution in Turkey: Adana, Amasya, Ankara, Bolu, Bursa, Çanakkale, Edirne, Hatay, İçel, İstanbul, Kırklareli, Konya, Kahramanmaraş, Muğla, Niğde, Sivas, Van (Doğanlar 2003, Koçak and Kemal 2009).

### **Ennominae Duponchel, [1845]**

*Agriopis marginaria* (Brokhausen, 1794)

Material Examined: Perşembe: Çaytepe, 100 m 15.VII.1994 1 ♂; 200 m 17.VII.1994 1 ♂; 100 m 10.VIII.1994 1 ♂; 200 m 17.VII.1996 1 ♂; 150 m 28.VIII.1996 1 ♂; 300 m 20.VII.1997 1 ♂; 200 m 10.II.1999 2 ♂♂; 300 m 15.VIII.1999 1 ♂ (Genital slide number: GP4552).

Distribution in Turkey: Ankara, Düzce, Edirne, İstanbul, Kırklareli (Koçak 1991, Özdemir 2007, Okyar and Mironov 2008).

*Apeira syringaria* (Linnaeus, 1758)

Material Examined: Perşembe: Çaytepe, 300 m 20.VIII.1998 1 ♀.

Distribution in Turkey: Bolu, İstanbul, Kırklareli, Sinop (Koçak and Kemal, 2009).

*Ascotis selenaria* ([Denis and Schiffermüller], 1775)

Material Examined: Perşembe: Çaytepe, 100 m 15.VII.1994 1 ♂; 200 m 17.VII.1994 1 ♂; 100 m 10.VIII.1994 1 ♂; 200 m 17.VII.1996 1 ♂; 150 m 28.VIII.1996 1 ♂; 300 m 20.VII.1997 1 ♂; 300 m 15.VIII.1999 1 ♂.

Distribution in Turkey: Adana, Amasya, Balıkesir, Bolu, Bursa, Çanakkale, Düzce, Edirne, Hatay, İçel, İstanbul, Manisa, Kahramanmaraş, Ordu, Sinop (Doğanlar 2003, Koçak and Kemal 2009).

*Biston betularius* (Linnaeus, 1758)

Material Examined: Perşembe: Çaytepe, 100 m 10.VIII.1994 1 ♂; 200 m 10.VIII.1994 1 ♂; 100 m 11.VIII.1994 1 ♂; 250 m 01.VII.1995 1 ♂; 200 m 15.VIII.1996 1 ♂; 300 m 15.VIII.1999 1 ♂; Ortatepe, 800 m 25.07.1997 1 ♂.

Distribution in Turkey: Artvin, Bolu, Çankırı, Çorum, Düzce, Rize, Sinop, Trabzon (Özdemir 2007, Koçak and Kemal 2009, Okyar 2010a, 2012).

*Cabera pusaria* (Linnaeus, 1758)

Material Examined: Perşembe: Çaytepe, 200 m 08.VII.1994 1 ♀; 100 m 15.VIII.1994 1 ♀; 200 m 11.VIII.1996 1 ♀; 200 m 25.VIII.1996 1 ♂; 150 m 28.VIII.1996 2 ♀♀; 300 m 20.VII.1997 1 ♀; 300 m 22.VIII.1997 1 ♀; Kovanlı, 200 m 29.VIII.1994 1 ♂ (Genital slide number: GP0029).

Distribution in Turkey: Bolu, Düzce İstanbul, Kastamonu, Kırklareli, Ordu, Tokat, Trabzon, Zonguldak (Koçak and Kemal 2009, Okyar 2012).

*Campaea margaritata* (Linnaeus, 1767)

Material Examined: Perşembe: Çaytepe, 200 m 09.VII.1994 1 ♀♀; 300 m 20.VIII.1998 1 ♀.

Distribution in Turkey: Amasya, Ankara, Ardahan, Artvin, Bolu, Bursa, Düzce, İstanbul, Kastamonu, Kırklareli Osmaniye, Sinop, Trabzon, Van, (Koçak and Kemal 2009, Okyar 2012).

*Charissa onustaria* (Herrich-Schäffer, [1852])

Material Examined: Perşembe: Çaytepe, 100 m 10.VIII.1994 1 ♀; 200 m 20.VII.1996 1 ♂; 10.VIII.1996 1 ♂; 11.VIII.1996 1 ♂; 15.VIII.1996 1 ♀; 300 m 22.VIII.1997 1 ♂ (Genital slide number: GP4547).

Distribution in Turkey: Amasya, Bolu, Bursa, Hatay, İçel, Kahramanmaraş, Trabzon, Zonguldak (Koçak and Kemal 2009).

*Colotois pennaria* (Linnaeus, 1761)

Material Examined: Perşembe: Çaytepe, 200 m 10.II.1999 2 ♂♂ (Genital slide number: GP4564).

Distribution in Turkey: Adana, Amasya, Ankara, Ardahan, Bitlis, Edirne, İçel, İstanbul, Kırklareli (Doğanlar 2003, Okyar and Mironov 2008, Koçak and Kemal 2009).

*Ectropis crepuscularia* (Denis and Schiffermuller 1775)

Material Examined: Perşembe: Çaytepe, 200 m 11.VIII.1996 1 ♀, 6 ♂♂; 200 m 15.VIII.1996 3 ♂♂; 200 m 25.VIII.1996 2 ♂♂; 300 m 20.VII.1997 1 ♂; 300 m 05.VIII.1997 1 ♂; 300 m 15.VIII.1997 3 ♀♀; 300 m 20.VIII.1998 1 ♀, 3 ♂♂; Ortatepe, 800 m 25.VII.1997 2 ♀♀, 1 ♂ (Genital slide number: GP0021).

Distribution in Turkey: Bursa, Düzce (Koçak and Kemal 2009).

*Ematurga atomaria* (Linnaeus, 1758)

Material Examined: Perşembe: Çaytepe, 200 m 27.VII.1994 1 ♂; 100 m 25.V.1995 1 ♂; 250 m 09.VII.1995 1 ♂; 200 m 17.VII.1996 1 ♂; 200 m 07.VIII.1996 1 ♂; 200 m 12.VIII.1996 1 ♀; 300 m 15.VIII.1997 1 ♀; 200 m 10.II.1999 1 ♀; Kovanlı, 200 m 29.VIII.1994 1 ♀, 1 ♂; Çambaşı, 1700 m 27.V.1995 2 ♂♂; 1700 m 24.VII.1995 1 ♂ (Genital slide number: GP4546).

Distribution in Turkey: Amasya, Ankara, Bartın, Bilecik, Bitlis, Bolu, Bursa, Çanakkale, Düzce, Edirne, İçel, İstanbul, Kastamonu, Kırklareli, Kocaeli, Manisa, Ordu, Sakarya, Samsun, Sinop, Sivas, Tokat, Zonguldak (Okyar and Mironov 2008, Koçak and Kemal 2009, Toper Kaygın et al. 2009).

*Gnophos obfuscata* ([Denis and Schiffermüller], 1775)

Material Examined: Çambaşı plateau, 1600 m 12.VIII.1994 1 ♀; 1700 m 24.VII.1996 1 ♀ (Genital slide number: GP4548).

Distribution in Turkey: İstanbul (Koçak and Kemal 2009)

*Hypomecis punctinalis* (Scopoli, 1763)

Material Examined: Perşembe: Çaytepe, 200 m 06.VII.1994 3 ♂♂; 200 m 08.VII.1994 4 ♂♂; 100 m 15.VII.1994 2 ♂♂; 250 m 01.VII.1995 3 ♂♂; 250 m 15.VII.1995 1 ♂; 100 m 18.VIII.1995 1 ♂; 200 m 04.VII.1996 1 ♀, 3 ♂♂; 200 m 17.VII.1996 1 ♂; 200 m 07.VIII.1996 1 ♂; 200 m 12.VIII.1996 1 ♂; 200 m 14.VIII.1996 1 ♀; 200 m 15.VIII.1996 1 ♀, 1 ♂; 300 m 20.VII.1997 7 ♂♂; 300 m 15.VIII.1997 1 ♂ (Genital slide number: GP0008).

Distribution in Turkey: Amasya, Bolu, Bursa, Düzce, Hatay, Kırklareli, Ordu, Osmaniye, Sinop, Trabzon (Doğanlar 2003, Koçak and Kemal 2009).

*Hypomecis roboraria* ([Denis and Schiffermüller], 1775)

Material Examined: Perşembe: Çaytepe, 200 m 11.VIII.1996 1 ♂ (Genital slide number: GP0026).

Distribution in Turkey: Artvin, Bolu, Düzce (Koçak and Kemal 2009).

*Lomographa tenerata* ([Denis and Schiffermüller], 1775)

Material Examined: Perşembe: Çaytepe, 200 m 10.V.1994 1 ♂; 100 m 10.VIII.1994 1 ♂; 200 m 10.VIII.1994 1 ♂; 100 m 11.VIII.1994 1 ♀ 1 ♂; 200 m 14.VIII.1996 2 ♀♀; 200 m 15.VIII.1996 1 ♀; 300 m 22.VIII.1997 1 ♀.

Distribution in Turkey: Düzce, Tokat (Koçak and Kemal 2009).

*Lycia hirtaria* (Linnaeus, 1761)

Material Examined: Perşembe: Çaytepe, 250 m 30.IV.1996 1 ♂; 200 m 20.IV.1997 1 ♂; 300 m 10.IV.1998 1 ♂ (Genital slide number: GP0007).

Distribution in Turkey: Amasya, Ankara, Bursa, Edirne (Kansu 1961, Koçak and Kemal 2009, Okyar 2010b).

*Opisthograptis luteolata* (Linnaeus, 1758)

Material Examined: Perşembe: Ortatepe, 800 m 25.VII.1997 1 ♂; Perşembe: Çaytepe, 230 m 20.V.2007 1 ♂.

Distribution in Turkey: Amasya, Ankara, Artvin, Bolu, Bursa, Düzce, Çanakkale, Çankırı, İstanbul, Kastamonu, Kırklareli, Kocaeli, Manisa, Ordu, Rize, Sinop, Trabzon, Van (Koçak and Kemal 2009, Okyar 2010a, 2012, Beşkardeş 2012).

*Ourapteryx persica* (Ménétriés, 1832)

Material Examined: Perşembe: Çaytepe, 250 m 1 ♂; 250 m 15.VII.1995 1 ♂; 200 m 04.VII.1996 1 ♀; 200 m 17.VII.1996 1 ♂; Ortatepe, 800 m 25.VII.1997 1 ♀ (Genital slide number: GP4554).

Distribution in Turkey: Amasya, Ardahan, Artvin, Erzincan, Eskişehir, Rize, Trabzon (Koçak and Kemal 2009).

*Parectropis similaria* (Hufnagel, 1767)

Material Examined: Perşembe: Çaytepe, 250 m 01.VII.1995 1 ♂; 200 m 04.VII.1996 1 ♂ (Genital slide number: GP0030).

Distribution in Turkey: Bolu, Düzce, Zonguldak (Koçak and Kemal 2009, Okyar 2012)

*Peribatodes rhomboidaria* (Goeze, 1781)

Material Examined: Perşembe: Çaytepe, 200 m 08.VII.1994 1 ♂; 200 m 17.VII.1994 1 ♀; 100 m 15.VIII.1994 1 ♀; 100 m 30.VIII.1994 1 ♀; 150 m 14.VII.1995 1 ♀; 100 m 18.VIII.1995 1 ♀, 1 ♂; 200 m 11.VIII.1996 1 ♀; 200 m 14.VIII.1996 1 ♀; 200 m 15.VIII.1996 1 ♀, 1 ♂; 300 m 22.VIII.1997 1 ♂; 300 m 20.VIII.1998 2 ♀♀, 1 ♂ (Genital slide number: GP0025, GP0009).

Distribution in Turkey: Adana, Amasya, Artvin, Bolu, Burdur, Bursa, Çanakkale, Düzce, Edirne, Hatay, İçel, İstanbul, Kars, Konya, Kahramanmaraş, Kastamonu, Kocaeli, Manisa, Muğla, Ordu, Osmaniye, Rize, Sinop, Tekirdağ, Tokat, Trabzon,

Van (Doğanlar 2003, Koçak and Kemal 2009, Göktürk 2011, Okyar 2010a, 2012, Beşkardeş 2012).

*Petrophora chlorosata* (Scopoli, 1763)

Material Examined: Yokuşdibi, 1000 m 26.V.1995 1 ♀, 1 ♂ (Genital slide number: GP4533).

Distribution in Turkey: Amasya, Düzce, İstanbul Kırklareli, Ordu, Rize, Sinop, Trabzon (Okyar and Mironov 2008, Koçak and Kemal 2009, Okyar 2010a).

*Plagodis dolabraria* (Linnaeus, 1767)

Material Examined: Perşembe: Çaytepe, 200 m 11.VII.1994 1 ♂; 200 m 04.VII.1996 3 ♂♂; 200 m 10.VII.1996 2 ♂♂.

Distribution in Turkey: Bolu, Düzce (Özdemir 2007)

*Selenia dentaria* (Fabricius, 1775)

Material Examined: Perşembe: Çaytepe, 200 m 08.VII.1994 1 ♀.

Distribution in Turkey: Artvin, Bolu, Düzce (Koçak and Kemal 2009).

*Selenia lunularia* (Hübner, 1788)

Material Examined: Perşembe: Çaytepe, 200 m 09.VII.1994 1 ♀; 100 m 11.VII.1994 1 ♀; 200 m 11.VII.1994 1 ♀; 200 m 04.VII.1996 1 ♀; 200 m 20.IV.1997 1 ♂; 300 m 20.VII.1997 1 ♀.

Distribution in Turkey: Adana, Amasya, Ardahan, Bitlis, Bolu, Çanakkale, Düzce, İstanbul, Kocaeli, Osmaniye, Rize, Sinop, Trabzon, Van (Doğanlar 2003, Koçak and Kemal 2009, Okyar 2010a, Beşkardeş 2012).

*Synopsia sociaria* (Hübner, [1799])

Material Examined: Perşembe: Çaytepe, 200 m 12.VIII.1996 1 ♂.

Distribution in Turkey: Bolu, Bursa, Çanakkale, Edirne, Erzurum, İçel, İstanbul, Konya, Van (Okyar and Mironov 2008, Koçak and Kemal 2009).

*Tephрина arenacearia* ([Denis and Schiffermüller], 1775)

Material Examined: Perşembe: Çaytepe, 150 m 27.VII.1995 1 ♂; 200 m 17.VII.1996 1 ♂ (Genital slide number: GP4540, GP0034).

Distribution in Turkey: Bursa, Edirne, Kars, Kırklareli (Koçak and Seven 1991, Koçak and Kemal 2009).

## DISCUSSION

In this study totally 79 geometrid species were determined, five of them belonging to subfamilies of Geometrinae, 26 Sterrhinae, 21 Larentiinae and 25 Ennominae. Before there were 21 geometrid species known from Ordu province (Can 2008, Koçak and Kemal 2009). Thirteen of them were obtained in this study also. However eight species of them (*Ascotis selenaria* ([Denis and Schiffermüller], 1775), *Cepphis advenaria* (Hübner [1799]), *Cyclophora linearia* (Hübner, [1799]), *Hydriomena coerulea* (Fabricius, 1777), *Lythria purpuraria* (Linnaeus, 1758), *Perconia strigillaria* (Hübner, 1787), *Rheumaptera hastata* (Linnaeus, 1758) and

*Trichodezia haberhaueri* (Lederer, 1864)) could not be recorded. Adding with this total species number of Geometridae fauna of Ordu province was increased from 21 to 85.

*Perizoma gigas* Wiltshire, 1976 is an endemic species for Turkey. This species was described firstly from Trabzon province and the type specimens collected at 1500m altitude in June. Koçak and Kemal (2009) presented the distribution of this species as Trabzon and Rize. In this study *P. gigas* collected from Ordu where western side of type location at 1700m altitude in early July. *Dysstroma citrata* (Linnaeus, 1761) were recorded first time from Turkey in Ayder plateau (in Rize province) by Okyar (2010a). Second record of this species was from Ordu with this study, so the distribution of *D. citrata* was expanded thought western side. Knowledge about distributions in Turkey of *Chloroclystis v-ata* (Haworth, [1809]), *Eupithecia pusillata* ([Denis and Schiffermüller], 1775) and *Gnophos obfuscata* ([Denis and Schiffermüller], 1775) are limited. New locations were added to their distributions with the present study.

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