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## Identification of Butterfly (Lepidoptera; Rhopalocera) Fauna of Gökçeada and Bozcaada, Turkey

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**Abstract:** This study was carried out to determine the butterflies of Gökçeada and Bozcaada in Turkey. As a result, a total of 61 Lepidoptera species in the two islands was recorded. Of these, species 45 were found in Gökçeada and 16 species were found in Bozcaada. Additionally, it was appeared that 13 species for Gökçeada and all of the 16 species for Bozcaada were the first records.

**Key words:** Lepidoptera, butterfly, rhopalocera, Aegean Islands, Gökçeada, Bozcaada, Turkey

### INTRODUCTION

The island populations have often been the focus of many studies, because they have interesting biogeography due to their diverse faunal and floral properties. Particularly, some islands may have very distinguished species, if they are disconnected from the mainland at significant distance for a long period of time.

Gökçeada was geologically formed at the end of the Tersiyer and is recognised as has previously been a part of southern Thrace. It is the largest island of Turkey, because it is consisted of a 285.5 km<sup>2</sup> area. The island is located at about 20 km distance from the Kabatepe of Gallipoli peninsula. It has a Mediterranean climate. The island is mainly mountainous which corresponds 77 area and 12% area involves more or less rough slopes. The remaining 11% of the island is lowland. The Doruk Tepe which 675 m is the highest point in the area<sup>[1]</sup>. Bozcaada is recognised as previous part of Biga peninsula and has a 36.03 km<sup>2</sup> area. The island is located at 5.47 km. from Ezine (Odunluk İskeleyi) of the Anatolian mainland. Bozcaada has a typical Mediterranean climate. Since it is located at the mouth of the Çanakkale Strait, it is exposed to strong northern winds. Vegetation is primarily maquis, but the pine forest is found in the southwestern part<sup>[2]</sup>.

The information dealing with the Lepidoptera fauna of Gökçeada and Bozcaada is very limited. The study of Kılıç<sup>[3]</sup> which gives 32 species of Lepidoptera. However, the butterflies in the other Aegean islands have been surveyed in detail. In this respect, the species numbers in the islands are: Kos 45, Samos 64, Limnos 30, Hios 49,

Rodos 47, Lesbos 64 and Thasos 75<sup>[4-6]</sup>. Although, the numbers dealing with Thasos are debated, 75 species are generally recognised<sup>[7]</sup>. Along with those previous records dealing with the Aegean Islands; the number of the species was expected to increase with our study in Gökçeada and Bozcaada.

There are also other studies regarding the insect fauna of Gökçeada and Bozcaada. For example, Aras and Aktaş<sup>[8,9]</sup> determined 35 ant species from Gökçeada and 26 ant species from Bozcaada. Özşaraç (2001) has given 44 Heteroptera species from Gökçeada in which 34 have been recorded as new for the island. Özşaraç and Kiyak<sup>[11]</sup> also found 38 Heteroptera species in Bozcaada claiming the 36 are new records.

### MATERIALS AND METHODS

The study area included eleven localities in Gökçeada and six localities in Bozcaada (Fig. 1 and 2). The adult butterflies were collected mainly from herbaceous plants in different habitats such as open habitats, roadsides, agricultural fields, meadows vineyards and pine forest where they were active between April and October in 1998 and 1999. The samplings were performed using a standart sweeping net. The materials were examined in the laboratory under a binocular stereomicroscope. The methods of Fernandez-Rubio<sup>[12]</sup> were applied in the analyses. The identification of the species was performed according to Hesselbarth *et al.*<sup>[13]</sup>. The comparisons were made using the museum materials of Biology Department at Trakya University.

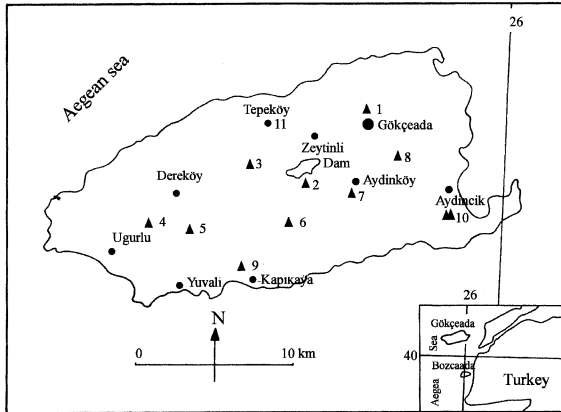


Fig. 1: The map of Gökçeada showing eleven sampling sites (triangles). Key; 1: Agricultural management office, 2: Dam, 3: Zeytinli-Dereköy, 4: Uğurlu-Dereköy, 5: Yuvalı-Dereköy, 6: Baraj-Kapıkaya, 7: Aydıncık, 8: Gökçeada-Aydıncık, 9: Kapıkaya, 10: Aydıncık, 11: Tepeköy

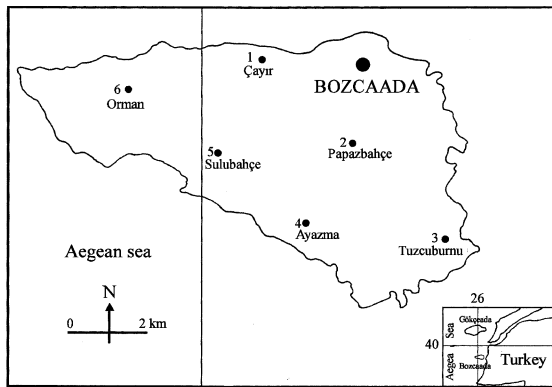


Fig. 2: The map of Bozcaada showing six sampling sites. 1: Meadow, 2: Papazbahçe; 3: Tuzcuburnu, 4: Ayazma, 5: Sulubahçe, 6: Forest

## RESULTS AND DISCUSSION

In the present study, A total of 61 butterfly species belonging to Papilionoidea and Hesperioidea were determined in the two islands. Of these, 45 species were found in Gökçeada, but only 16 species were found in Bozcaada. Thus, 13 butterflies for Gökçeada and all of the 16 species for Bozcaada appeared to be the first records. At the end of the present section, the two lists covering the species that found in the two islands and their brief taxonomical properties are given. The species recorded by Kılıç<sup>[3]</sup> are included in the lists for the evaluations.

Accordingly, during the course of the study, in the eleven localities in Gökçeada 45 species belonging to

31 genera and 6 families (Papilionidae, Pieridae, Nymphalidae, Satyridae, Lycaenidae, Hesperidae) were determined. Above all, 13 species-*Danaus chrysippus*, *Polygonia c-album*, *Nymphalis antiopa*, *Nymphalis polychloros*, *Euchloe ausonia*, *Anthocharis cardamines*, *Hipparchia fatua*, *Kirinia roxelana*, *Quercusia quercus*, *Lampides boeticus*, *Spialia orbifer*, *Carcharodus orientalis*, *Thymelicus acteon* — appeared to be the first records for Gökçeada Lepidoptera fauna. Thus, the number of butterflies in Gökçeada increased from 32 to 45.

In the study performed in six localities in Bozcaada, 16 species belonging to 13 genera and 5 families (Pieridae, Nymphalidae, Satyridae, Lycaenidae, Hesperidae). All of these species determined for the first records for the Bozcaada Lepidoptera fauna.

It has been known that the homeland of the migratory butterfly *Danaus chrysippus* (Linnaeus, 1758) that found in Gökçeada is Africa. This species migrates to southern Europe via north western Africa. The species has also been recorded from seven different localities form Anatolia these localities are İzmir<sup>[14,15]</sup>, İçel<sup>[16]</sup>, Maraş<sup>[17]</sup>, Elazığ<sup>[18]</sup>, Adana<sup>[19]</sup>, Antalya<sup>[20]</sup>, Muğla<sup>[13,21]</sup>. Since 1991, this species has been rarely found on the Mediterranean coast. Besides, in the Midland Anatolia it is found only in Elazığ region in the Euphrates Valley<sup>[13]</sup>. The presence of *D. chrysippus* in Gökçeada may be due to it is migratory status. Because, it prefers dry and open habitats to stay during its journey to southern countries. Since it was found in Gökçeada during the present study, the distribution map of this species now enlarged toward the north.

The species that have been recorded in previous studies from northern Aegean Islands-*L. hippothoe* (Linnaeus, 1758), *Satyrrium ledereri* (Boisduval, 1848), *Hipparchia mersina* (Staudinger, 1871), *H. pellucida* (Stauder, 1923), *Maniola chia* Thomson, 1987, *M. megala* (Oberthür, 1908), *M. telmessia*<sup>[14]</sup>, *Pseudochazara anthela anthela* (Hübner, 1824), *Ypthima xasterope* (Klug, 1832) and *Pelopidas thrax* (Hübner, 1821)- have not been found in Greece.

If the distribution of the species occurs in northern Aegean Islands regarded, it appears that 97 of the recorded species are also found in Anatolia. *Maniola chia* Thomson, 1987 which has been recorded from Inussa (Koyun adası) ve Chios (Sakız adası) is endemic for these tow islands. Therefore it is not expected that this species occur in Anatolia. Gökçeada and Bozcaada are the two islands close to the midland. Along with the transport via the man and long-fly ability of particular species may be some of the reasons of species similarity between the two islands and Anatolia dealing with the fauna. In conclusion, the future studies in the other Mediterranean

places may reveal interesting results regarding the Lepidoptera fauna.

The lists of Lepidoptera species determined during the present study in Gökçeada (The list 1) and Bozcaada (The list 2). Key; K: Kılıç, O-A: Okyar and Aktaş. The asterisk (\*) indicates the species that are for the first records.

#### The list 1 for the Gökçeada species

##### Papilionidae

*Iphiclides podalirius* (Linnaeus, 1758). K, O-A

*Papilio machaon* (Linnaeus, 1758). K, O-A

##### Pieridae

*Gonepteryx cleopatra* (Linnaeus, 1767). K, O-A

*Pieris brassicae* (Linnaeus, 1758). K, O-A

*Pieris rapae* (Linnaeus, 1758). K, O-A

*Colias crocea* (Fourcroy, 1785). K, O-A

*Pontia daplidice* (Linnaeus, 1758). K, O-A

*Aporia crataegi* (Linnaeus, 1758). K, O-A

*Euchloe ausonia* (Hübner, 1804)\*.

*Anthocharis cardamines* (Linnaeus, 1758)\*.

##### Nymphalidae

*Danaus chrysippus* (Linnaeus, 1758)\*.

*Pandoriana pandora* ([Denis-Schifferrmüller], 1775). K, O-A

*Limenitis reducta* Staudinger, 1901. K, O-A

*Cynthia cardui* (Linnaeus, 1758). K, O-A

*Vanessa atalanta* (Linnaeus, 1758). K, O-A

*Nymphalis antiopa* (Linnaeus, 1758)\*.

*Nymphalis polychloros* (Linnaeus, 1758)\*.

*Polygonia c-album* (Linnaeus, 1758)\*.

*Polygonia egea* (Cramer, 1775). K, O-A

*Melitea didyma* (Esper, [1779]). K, O-A

*Melitea trivia* (Denis-Schifferrmüller, 1775). K, O-A

##### Satyridae

*Maniola jurtina* (Linnaeus, 1758). K, O-A

*Hyponephele lupina* (Costa, [1836]). K, O-A

*Lasiommata megera* (Linnaeus, 1767). K, O-A

*Lasiommata maera* (Linnaeus, 1758). K, O-A

*Melanargia larissa* (Geyer, [1828]). K, O-A

*Coenonympha pamphilus* (Linnaeus, 1758). K, O-A

*Hipparchia fatua* (Freyer, 1844)\*.

*Hipparchia statilinus* (Hufnagel, 1766). K, O-A

*Kirinia roxelana* (Cramer, [1777])\*.

##### Lycaenidae

*Polyommatus icarus* (Rottemburg, 1775). K, O-A

*Polyommatus admetus* (Esper, 1783). K, O-A

*Plebejus agestis* (Denis-Schifferrmüller, 1775). K, O-A

*Satyrus ilicis* (Esper, 1779). K, O-A

*Callophrys rubi* (Linnaeus, 1758). K, O-A

*Leptotes pirithous* (Linnaeus, 1767). K, O-A

*Celastrina argiolus* (Linnaeus, 1758). K, O-A

*Quercusia quercus* (Linnaeus, 1758)\*.

*Lampides boeticus* (Linnaeus, 1767)\*.

*Lycaena phlaeas* (Linnaeus, 1761). K, O-A

##### Hesperiidae

*Spialia orbifer* (Hübner, [1823])\*.

*Carcharodus orientalis* Reverdin, 1913\*.

*C. alcea* (Esper, [1780]). K, O-A

*Thymelicus acteon* (Rottemburg, 1775)\*.

*T. sylvestris* (Rottemburg, 1775). K, O-A

#### The list 2 for Bozcaada species

##### Pieridae

*Artogeia rapae* (Linnaeus, 1758)\*.

*A. napi* (Linnaeus, 1758)\*.

*Pontia daplidice* (Linnaeus, 1758)\*.

*Pieris brassicae* (Linnaeus, 1758)\*.

*Euchloe ausonia* (Hübner, 1804)\*.

##### Nymphalidae

*Polygonia egea* (Cramer, 1775)\*.

##### Satyridae

*Maniola jurtina* (Linnaeus, 1758)\*.

*Hipparchia fatua* (Freyer, 1844)\*.

*Coenonympha pamphilus* (Linnaeus, 1758)\*.

##### Lycaenidae

*Lycaena phlaeas* (Linnaeus, 1761)\*.

*Polyommatus agestis* ([Denis-Schifferrmüller], 1775)\*.

*Celastrina argiolus* (Linnaeus, 1758)\*.

*Polyommatus icarus* (Rottemburg, 1775)\*.

*P. admetus* (Esper, 1783)\*.

##### Hesperiidae

*Thymelicus acteon* (Rottemburg, 1775)\*.

*Carcharodes alcea* (Esper, [1780])\*.

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