



Nevşehir Bilim ve Teknoloji Dergisi

Araştırma Makalesi (Research Article)

Makale Doi: **10.17100/nevbiltek.1259668**

Geliş Tarihi:03/03/2023

Kabul Tarihi:30/12/2023



Beypazarı İlçesinin Papilionoidea ve Hesperioidea (Lepidoptera) Fauna Bilgisine Katkılar (Türkiye)

Kağan BOZKURT ¹, Selma SEVEN ÇALIŞKAN ²

¹ *Gazi Üniversitesi, Fen Fakültesi, Biyoloji Bölümü, Ankara*

ORCID ID: 0000-0001-8027-0913

² *Gazi Üniversitesi, Fen Fakültesi, Biyoloji Bölümü, Ankara*

ORCID ID: 0000-0003-4406-6768

Öz

Polinasyonda etkin gruplar arasında yer alan kelebekler, habitat kayıplarından en fazla etkilenen böcek gruplarının başında gelmektedir. Böcek takımları arasında en fazla çalışılan gruplardan biri olmasına rağmen Beypazarı'nın kelebekleri hala tam olarak bilinmemektedir. Çalışma alanı olarak seçilen Beypazarı ilçesi, karışık orman, çalılık, bozkır ve ruderal olmak üzere farklı habitat tiplerine sahiptir. Bu çalışmada bölgedeki kelebek türlerinin, özellikle nadir ve kritik türlerin dağılımlarını ayrıntılı bir şekilde incelenmesi amaçlanmış ve makalede 2016-2017 yılları arasında Beypazarı ilçesine yapılan arazi çalışmalarının sonuçları özetlenmiştir. Kelebek örnekleri 33 istasyondan toplanmıştır. Toplanan örneklerin teşhis çalışmaları sonucunda 6 familyaya ait 81 tür tespit edilmiştir. Türlerin familyalara göre dağılımı; Nymphalidae (13), Hesperidae (10), Lycaenidae (24), Papilionidae (3), Pieridae (16), Satyridae (15) olarak belirlenmiştir. 55 tür Beypazarı faunası için yeni kayıttır. Çalışma alanında tespit edilen *Polyommatus cornelius* Türkiye için endemiktir. 80 tür LC (Least Concern) bir tür NT (Near Threatened) kategorisindedir. Bölgede çalı vejetasyonu kelebek çeşitliliği açısından 56 tür ile ilk sırada yer alırken, karışık orman 38 tür ile ikinci sırada yer almaktadır.

Anahtar Kelimeler: Kelebek; dağılım; habitat; tehlike kategorileri; Ankara.

Contribution to the Knowledge on Papilionoidea and Hesperioidea (Lepidoptera) Fauna of Beypazarı District (Türkiye)

Abstract

Butterflies, which are among the active groups in pollination, are one of the insect groups that are most affected by habitat loss. Although it is one of the most studied groups among insect orders, the butterflies of Beypazarı are still not fully known. Beypazarı district, chosen as the study area, has different habitat types such as mixed forest, bush, steppe and

Sorumlu yazar e-mail: selma@gazi.edu.tr

ruderal. In this study, it was aimed to examine the distribution of butterfly species in the region, especially rare and critical species in detail, and the results of the field studies conducted in Beypazarı district between 2016-2017 were summarized in the article. Butterfly samples were collected from 33 stations. As a result of the identification studies of the collected specimens, 81 species belonging to 6 families were identified. Distribution of species according to families are: Nymphalidae (13), Hesperidae (10), Lycaenidae (24), Papilionidae (3), Pieridae (16), Satyridae (15). 53 species are new records for the Beypazarı fauna. *Polyommatus cornelius* detected in the study area is endemic to Türkiye. 80 types of LC (Least Concern) are in the category of one type of NT (Near Threatened). While the shrub vegetation in the region is in the first place with 56 species in terms of butterfly diversity, mixed forest is in the second place with 38.

Keywords: Butterfly; distribution; habitat; threat categories; Ankara.

1. Introduction

Beypazarı district, which is connected to Ankara province, is located in the Upper Sakarya section of the Central Anatolian region, and some of it is located in the Western Black Sea. Known as a historical life center, Beypazarı's first name was named "Lagania (Rock Peak Country)" coming from the high cliffs in this valley. It is believed that the Luwians, Hittites and Phrygians used the region as their living space. Teke Mountain National Park, İnözü Valley (Natural protected area) [1] and Kirmir Valley (Important Natural Area) [2] are located within the borders of Beypazarı. In addition, 176. 68 Ha. The area was declared as Butterfly Valley Nature Park on 01.04.2016 [3]. Despite this richness, the butterfly fauna of Beypazarı is one of the least researched regions in the Ankara province.

The mixed forest vegetation in Beypazarı is represented by *Pinus nigra* (larch pine), *Pinus brutia* (red pine) and *Quercus pubescens* (hairy oak). Shrub vegetation was formed as a result of the destruction of natural forests by various human activities over time. Steppe is the type of vegetation that dominates the region. It is possible to encounter this vegetation type at all altitudes. Riparian vegetation is seen around the streams in the region and is represented by herbaceous taxa such as *Centaurium erythraea*, *Epilobium hirsutum*, *Mentha longifolia* and *Senecio aquaticus* under the tree formations of *Salix alba*, *Alnus glutinosa* [4].

The emergence of studies on the protection of species in recent years has brought the priority of issues related to the identification and follow-up of rare species. In the order Lepidoptera, many countries produce lists of threatened species [5,6,7,8]. The study of Turkey's butterflies begins with Cramer (1777) in the 18th century. In the following years, studies continued increasingly. The number of known species now is 416 [9 and 10]. Although there are many lepidopter studies on Ankara and its surroundings [11-47], the number of studies in Beypazarı is limited. The first faunal studies of Lepidoptera in Beypazarı were started with Wagener [48] and Reissinger [49]. Koçak [50], was determined a total of 40 species belonging to 37 genera from Papilionoidea and Hesperioidea superfamilies in Beypazarı in his research on the ecology of Lepidoptera in the Beypazarı-Kızılcahamam region. Later, with the study published by Koçak and Kemal [9], the list of species was updated and it was stated that there are a total of 41 species belonging to 27 genera from the Papilionoidea and Hesperioidea superfamilies in Beypazarı.

Although Turkish butterflies are one of the most well-studied groups from past to present, there are still data gaps in some species. In addition, it is seen that climate change and habitat loss cause serious declines in the populations of species. For this reason, the butterfly fauna of Beypazarı was studied in detail, and the distribution of the species with their habitat preferences were investigated in this study.

2. Material ve Method

In the study, 792 samples were collected from 33 different stations in Ankara's Beypazarı district between April-September 2016-2019 were examined (Table 1). Samples were collected with the aid of butterfly net during daylight hours. The samples brought to the laboratory environment in triangular envelopes were softened in softening cups, pinned with standard insect needles, and left to dry by stretching on spreading boards. The dried samples were removed from the spreading boards and placed in the collection boxes together with the label information. The classified samples were identified by comparing them with the relevant literature and museum samples. The literature used to identification of species: Hesselbart et al. [51]; Tshikolovets, V. [52]; Bozano and Weidenhoffer [53]; Sbondoni et al. [54]. Karaçetin and Welch [55] are used for IUCN categories. The identified species are given in the results table with their families and new records for Beypazarı are marked with (*) symbol (Table 2). Collection areas are shown in Figure 1. Google Earth Pro program was used for mapping. Koçak and Kemal [9] have been used for naming the taxa.

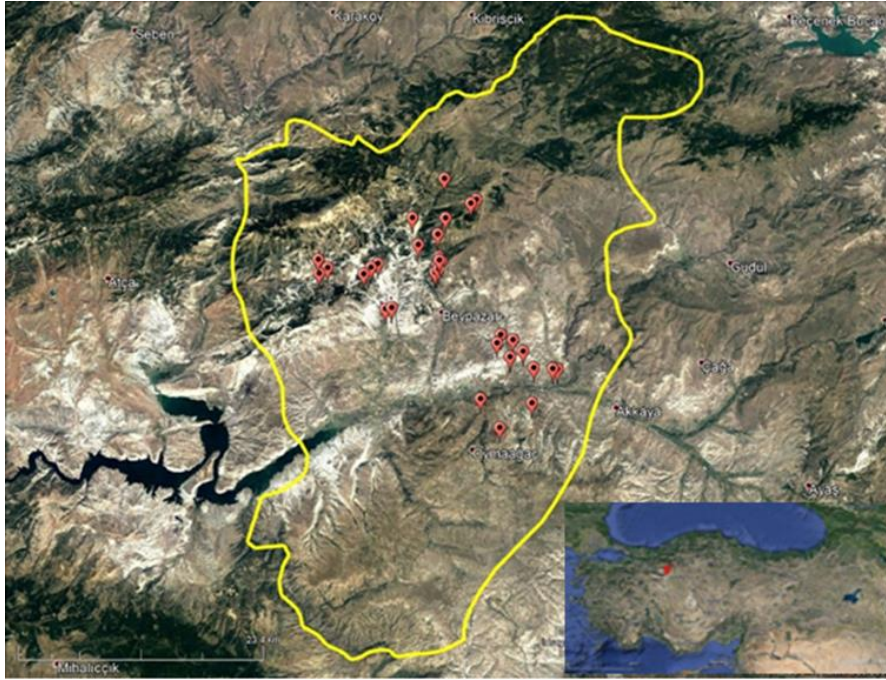


Figure 1. The study area and collection stations

2.1 Habitat types collected

1. Mixed forest vegetation: *Pinus nigra* and *Quercus* sp. dominates.
2. Shrub vegetation: Forest clearings have been replaced by bushes in places. In these habitats, mainly *Pictacia* sp., *Colutea* sp., *Berberis* sp., *Paliurus spina-christi*, *Rhamnus* sp., *Rosa* sp. and *Rubus* sp., *Urtica* sp., *Jasmin* sp. are spreading.
3. Step vegetation: It is common in the study area. Marly soil is dominant in some areas. Plants: *Marrubium* sp., *Salvia* sp., *Allium* sp., *Reseda* sp., *Cirsium* sp., *Gallium* sp. *Anthemis* sp. *Astragalus* sp., *Acanthalimon* sp., *Coronilla* sp., *Eryngium* sp., *Helianthemum* sp., *Euphorbia* sp., *Festuca* sp., *Onobrychis* sp., *Scabiosa* sp., *Phlomis* sp., *Teucrium* sp., *Thymus* sp.
4. Ruderal area: Destroyed road edges and field edges with abundant rubble piles are evaluated in this habitat type. Common plants; *Anchusa* sp., *Sisymbrium* sp., *Cardaria draba*, *Carduus* sp., *Cichorium* sp., *Senecio* sp.

Table 1: Numbers and full names of collecting stations

No	Stations	Coordinate	Altitude	Date	Stations	Coordinate	Altitude	Date
1.	Kelebekler Vadisi Tabiat Parkı	40°11'42.57"N/ 31°54'56.78"E	784m	15.06.2017	18. Bağözü Köyü güneyi	40° 9'25.92"N/ 31°51'35.13"E	702m	08.07.2017
2.	Kelebekler Vadisi Tabiat Parkı	40°11'54.04"N/ 31°55'03.00"E	806m	17.05.2017	19. Bağözü Köyü batısı	40°11'19.94"N/ 31°50'02.08"E	1018m	15.06.2017
3.	Kelebekler Vadisi Tabiat Parkı	40°11'35.56"N/ 31°54'53.45"E	775m	19.04.2017	20. Teke Dağı Milli Parkı	40°14'54.97"N/ 31°57'17.58"E	1473m	29.07.2017
4.	Kelebekler Vadisi Tabiat Parkı	40°11'39.62"N/ 31°54'55.38"E	778m	08.07.2017	21. Teke Dağı Milli Parkı	40°15'0.94"N/ 31°57'30.09"E	1490m	05.08.2017
5.	Kelebekler Vadisi Tabiat Parkı	40°11'47.98"N/ 31°54'58.80"E	798m	28.04.2017	22. Teke Dağı Milli Parkı	40°15'8.58"N/ 31°57'32.27"E	1522m	16.09.2017
6.	Kelebekler Vadisi Tabiat Parkı	40°11'59.37"N/ 31°55'04.29"E	826m	06.07.2019	23. Ankara-Beypazarı yolu	40° 7'22.96"N/ 32° 0'19.78"E	576m	08.04.2016
7.	Kozalan Köyü	40°14'8.26"N/ 31°55'30.67"E	1310m	08.07.2017	24. Ankara-Beypazarı yolu	40°8'3.99"N/ 31°59'20.98"E	590m	08.04.2016
8.	Kozalan yolu	40°13'19.99"N/ 31°54'56.98"E	1118m	08.07.2017	25. Ankara-Beypazarı yolu	40°6'26.37"N/ 32°1'25.71"E	536m	19.04.2017
9.	Hırkatepe Köyü doğusu	40°11'18.68"N/ 31°46'58.23"E	1038m	15.06.2017	26. Ankara-Beypazarı yolu	40°7'16.99"N/ 32°0'43.03"E	585m	19.04.2017
10.	Hırkatepe Köyü doğusu	40°11'21.97"N/ 31°46'58.52"E	1030m	15.06.2017	27. Beypazarı-Ankara yolu	40°08'8.76"N/ 31°59'11.78"E	613m	06.07.2019
11.	Hırkatepe Köyü doğusu	40°12'0.74"N/ 31°46'55.75"E	910m	15.06.2017	28. Beypazarı-Karaşar yolu	40°12'46.68"N/ 31°53'37.43"E	830m	06.07.2019
12.	Dikmen Köyü yolu	40°4'37.71"N/ 32°1'17.55"E	747m	28.04.2017	29. Acısu yolu	40° 7'53.54"N/ 31°59'58.23"E	556m	08.07.2017
13.	Dikmen-Oymaağaç arası	40°3'22.02"N/ 31°59'10.30"E	975m	28.04.2017	30. Boyalı yolu	40°14'9.47"N/ 31°53'13.38"E	920m	06.07.2019
14.	Dibecik Köyü doğusu	40°6'22.04"N/ 32° 2'46.29"E	527m	19.04.2017	31. Dibecik Köyü doğusu	40°6'22.04"N/ 32° 2'46.29"E	527m	19.04.2017
15.	Oymaağaç Köyü kuzeyi	40°4'48.93"N/ 31°57'50.72"E	717m	28.04.2017	32. Bağözü Köyü kuzeyi	40°11'42.57"N/ 31°50'48.34"E	932m	08.07.2017
16.	Yiğirler Köyü	40°16'14.54"N/ 31°55'22.49"E	1190m	28.04.2017	33. Bağözü Köyü güneyi	40° 9'25.92"N/ 31°51'35.13"E	702m	15.06.2017
17.	Bağözü Köyü kuzeyi	40°11'42.57"N/ 31°50'48.34"E	932m	15.06.2017				

3. Result and Discussion

A total of 41 species belonging to 27 genera from Papilionoidea and Hesperioidea superfamilies are known in Beypazarı [48, 49, 50, 54]. As a result of this study, 81 species were identified, 55 taxa are new records for Beypazarı butterfly fauna (Table 2). With this study, the number of Beypazarı butterflies increased to 96.

Table 2. Species list, their natural habitat types, collection stations, and threat category with number species (LC: Least Concern, NT: Near Threatened, SC: Schrub, MF: Mixed forest, SP: Steppe, RU: Ruderal)

Family	Taxon	Collecting station	Number species	IUCN	SC	MF	SP	RU
Hesperidae	<i>Carcharodus lavatherae</i> (Esper, [1783])*	1	1♀	LC	+	-	-	-
	<i>Carcharodus orientalis</i> Reverdin, 1913*	1, 2	2♀, 1♂	LC	+	-	-	-
	<i>Carcharodus alceae</i> (Esper, [1780]) *	3, 5	2♀, 1♂	LC	+	-	-	-
	<i>Erynnis tages</i> (Linnaeus, 1758)	2, 3, 5	1♀, 3♂	LC	+	-	-	-
	<i>Muschampia tessellum</i> (Hübner, [1802]) *	1	2♂	LC	+	-	-	-
	<i>Pyrgus armoricanus</i> (Oberthür, 1910) *	2, 3, 5, 7	2♀, 2♂	LC	+	-	-	+
	<i>Pyrgus malvae</i> (Linnaeus, 1758) *	2, 3	1♀, 1♂	LC	+	-	-	-
	<i>Spialia orbifer</i> (Hübner, [1823]) *	9	1♂	LC	-	+	-	-
	<i>Thymelicus lineolus</i> (Ochsenheimer, 1808) *	11	1♂	LC	-	-	-	+

	<i>Thymelicus sylvestris</i> (Poda, 1761)	1	1♂	LC	+	-	-	-
Papilionidae	<i>Archon apollinus</i> (Herbst, 1798)	13, 16	4♀, 3♂	LC	-	-	+	+
	<i>Iphiclides podalirius</i> (Linnaeus, 1758) *	3	1♀, 1♂	LC	+	-	-	-
	<i>Papilio machaon</i> (Linnaeus, 1758)*	15	3♂	LC	-	-	+	-
Pieridae	<i>Anthocharis cardamines</i> (Linnaeus, 1758) *	2, 3, 5	2♀, 8♂	LC	+	-	-	-
	<i>Anthocharis grueneri</i> (Herrich-Schäffer, [1851])*	3, 5	4♂	LC	+	-	-	-
	<i>Aporia crataegi</i> (Linnaeus, 1758) *	1, 8, 10	4♂	LC	+	+	-	-
	<i>Colias crocea</i> (Fourcroy, 1785)	3, 5, 6, 8, 15, 17, 20, 21, 22, 23, 30, 31, 32	8♀, 17♂	LC	+	+	+	+
	<i>Colias alfacariensis</i> (Ribbe, 1905) *	3, 5, 6, 9, 11, 15, 22, 28	1♀, 13♂	LC	+	+	+	+
	<i>Euchloe ausonia</i> (Hübner, [1804]) *	3, 13, 15, 23	5♀, 8♂	LC	+	-	+	+
	<i>Gonepteryx rhamni</i> (Linnaeus, 1758) *	1, 3, 31	3♀, 3♂	LC	+	-	-	+
	<i>Gonepteryx farinosa</i> (Zeller, 1847) *	3	1♀, 1♂	LC	+	-	-	-
	<i>Leptidea duponcheli</i> (Staudinger, 1871) *	3, 5	2♀, 4♂	LC	+	-	-	-
	<i>Leptidea sinapis</i> (Linnaeus, 1758) *	3, 5, 6, 20	5♀, 2♂	LC	+	+	-	-
	<i>Pieris manni</i> (Mayer, 1851)*	1, 4	2♀, 1♂	LC	+	-	-	-
	<i>Pieris pseudorapae</i> Verity, 1908) *	1, 3, 6, 14	10♀, 14♂	LC	+	-	-	+
	<i>Pieris rapae</i> (Linnaeus, 1758) *	1, 3, 4, 5, 6, 7, 9, 11, 13, 14, 15	14♀, 12♂	LC	+	+	+	+
	<i>Pieris brassicae</i> (Linnaeus, 1758) *	1, 3, 6, 9, 10, 14, 18, 20, 21, 24	7♀, 14♂	LC	+	+	+	+
	<i>Pontia edusa</i> (Fabricius, 1777)	4, 6, 8, 11, 12, 13, 18, 23, 27, 27, 28, 29, 30, 32, 33	27♀, 39♂	LC	+	+	+	+
<i>Zegris eupheme</i> (Esper, [1804]) *	12, 13, 15, 26,	4♂	NT	-	-	+	+	
Lycaenidae	<i>Callophrys rubi</i> (Linnaeus, 1758) *	2, 3, 9	4♀, 3♂	LC	+	+	-	-
	<i>Chilades trochylus</i> (Freyer, [1843]) *	5	1♀	LC	+	-	-	-
	<i>Cupido osiris</i> (Meigen, [1829]) *	1, 2, 4, 6, 11, 17, 19, 33	11♀, 18♂	LC	+	+	+	+
	<i>Glaucopsyche lessei</i> Bernardi, 1964)*	1, 2, 17	5♀, 6♂	LC	+	-	-	-
	<i>Glaucopsyche alexis</i> (Poda, 1761) *	1, 2, 3, 5, 9, 12	1♀, 24♂	LC	+	+	+	-
	<i>Lycaena virgaureae</i> (Linnaeus, 1758)	20	4♂	LC	-	+	-	-
	<i>Lycaena tityrus</i> (Poda, 1761)	13, 20, 28	8♀, 6♂	LC	-	+	+	-
	<i>Lycaena phlaeas</i> (Linnaeus, 1761)	7, 13, 20, 22	4♀, 5♂	LC	-	+	+	+
	<i>Lycaena kefersteinii</i> (Gerhard, [1850]) *	9	1♂	LC	-	+	-	-
	<i>Plebejus modicus</i> (Verity, 1935)*	1, 2, 9, 13	2♀, 4♂	LC	+	+	+	-
	<i>Polyommatus anteros</i> (Freyer, [1838]) *	2	2♀, 6♂	LC	+	-	-	-
	<i>Polyommatus agestis</i> ([Denis & Schiffermüller], 1775)	2, 4, 5, 9, 17, 20	18♀, 6♂	LC	+	+	+	-
	<i>Polyommatus bellis</i> (Freyer, [1842])	17	1♂	LC	+	-	-	-
	<i>Polyommatus bellargus</i> (Rottemburg, 1775) *	2	1♂	LC	+	-	-	-
<i>Polyommatus daphnis</i> ([Denis & Schiffermüller], 1775)	8, 20	1♀, 1♂	LC	-	+	-	-	

	<i>Polyommatus amandus</i> (Schneider, 1792) *	1	1♂	LC	+	-	-	-
	<i>Polyommatus cornelius</i> (Freyer, [1850]) *	8	2♀	LC	-	+	-	-
	<i>Polyommatus thersites</i> (Canterer, [1835])	2, 3, 20, 22	5♀, 9♂	LC	+	+	-	-
	<i>Polyommatus icarus</i> (Rottemburg, 1775) *	1, 2, 4, 5, 6, 8, 9, 11, 17, 18, 20, 21, 22, 27, 28, 30, 32	50♀, 82♂	LC	+	+	+	+
	<i>Pseudophilotes vicrama</i> (Moore, 1865) *	3	1♂	LC	+	-	-	-
	<i>Satyrrium ilicis</i> (Esper, [1779]) *	9, 11	2♂	LC	-	+	-	+
	<i>Satyrrium spini</i> (Fabricius, 1787) *	1, 33	5♀, 3♂	LC	+	-	+	-
	<i>Tomares nogelii</i> (Freyer, [1851])	2	3♀, 4♂	LC	+	-	-	-
	<i>Turanana endymion</i> (Freyer, [1850]) *	27	1♀	LC	-	-	+	-
Nymphalidae	<i>Libythea celtis</i> (Laicharting, 1782) *	3	1♀	LC	+	-	-	-
	<i>Argynnis pandora</i> ([Denis & Schiffermüller], 1775) *	1, 22	2♀, 1♂	LC	+	+	-	-
	<i>Argynnis aglaja</i> (Linnaeus, 1758) *	20	1♂	LC	-	+	-	-
	<i>Inachis io</i> (Linnaeus, 1758) *	1, 3, 14	2♀, 1♂	LC	+	-	+	-
	<i>Issoria lathonia</i> (Linnaeus, 1758) *	2, 5, 8, 9, 13, 20, 21, 22, 23, 24	6♀, 9♂	LC	+	+	+	+
	<i>Limenitis reducta</i> (Staudinger, 1901) *	10	6♂	LC	-	+	-	-
	<i>Melitaea phoebe</i> (Goeze, 1779) *	11	1♀, 2♂	LC	+	-	-	-
	<i>Melitaea didyma</i> (Esper, [1779]) *	1, 2, 8, 9,	6♀, 4♂	LC	+	+	-	-
	<i>Melitaea syriaca</i> Rebel, 1905*	2, 33	5♀, 2♂	LC	+	-	+	-
	<i>Nymphalis polychloros</i> (Linnaeus, 1758) *	3	1♀	LC	+	-	-	-
	<i>Polygonia egea</i> (Cramer, [1775])	1, 3, 5	3♀	LC	+	-	-	-
	<i>Vanessa cardui</i> (Linnaeus, 1758)	9, 23, 24, 27, 28	11♀	LC	-	+	-	+
	<i>Vanessa atalanta</i> (Linnaeus, 1758) *	5	1♀	LC	+	-	-	-
	Satyridae	<i>Arethusana arethusa</i> ([Denis & Schiffermüller], 1775)	20, 21	2♀, 2♂	LC	-	+	-
<i>Brintesia circe</i> (Fabricius, 1775)		7, 8, 20, 21	9♀, 7♂	LC	-	+	-	+
<i>Chazara briseis</i> (Linnaeus, 1764)		6, 20, 21, 27, 29, 30,	6♀, 2♂	LC	-	-	-	+
<i>Coenonympha leander</i> (Fabricius, 1787) *		2	14♀, 20♂	LC	+	-	-	-
<i>Coenonympha pamphilus</i> (Linnaeus, 1758)		2, 3, 4, 6, 7, 11, 12, 13, 14, 15, 20, 21	8♀, 21♂	LC	+	+	+	+
<i>Esperarge clymene</i> (Fabricius, 1787)		20	1♀	LC	-	+	-	-
<i>Hipparchia aristaeus</i> (Bonelli, 1826)		8, 9, 33	1♀, 3♂	LC	-	+	+	-
<i>Hipparchia syriaca</i> (Staudinger, 1871) *		20	5♀, 8♂	LC	-	+	-	-
<i>Hyponephele zuvandica</i> (Samodurov & Koroljev, 1996)		20	1♀	LC	-	+	-	-
<i>Kirinia roxelana</i> (Cramer, [1777]) *		20	1♀, 2♂	LC	-	+	-	-
<i>Lasiommata megera</i> (Linnaeus, 1767) *		6		LC	+	-	-	-
<i>Maniola jurtina</i> (Linnaeus, 1758)		1, 8, 11	4♂	LC	+	+	-	+
<i>Melanargia larissa</i> (Geyer, [1828])		6, 7, 8, 20,	12♀, 8♂	LC	+	+	-	+
<i>Proterebia afra</i> (Fabricius, 1787) *		5, 12, 13, 15,	5♀, 2♂	LC	+	-	+	-

<i>Pseudochazara mniszechii</i> (Herrich-Schäffer, [1851])	30	1♀, 1♂	LC	-	-	-	+
--	----	--------	----	---	---	---	---

In this study, a total 51 genera and 81 species to belonging to 2 superfamily and 6 families were determined (13 species belonging to 9 genera from the Nymphalidae, a total of 10 species belonging to 6 genera from the Hesperidae, a total of 24 species belonging to 11 genera from the Lycaenidae, a total of 3 species belonging to 3 genera from the Papilionidae, a total of 16 species belonging to 9 genera from the Pieridae, a total of 15 species belonging to 13 genera from the Satyridae). Considering the percentage distribution of families, Lycaenidae takes the first place with a rate of 30%. When compared with the number of species of butterfly families in Türkiye, this result is consistent with the literature data (Figure 2).

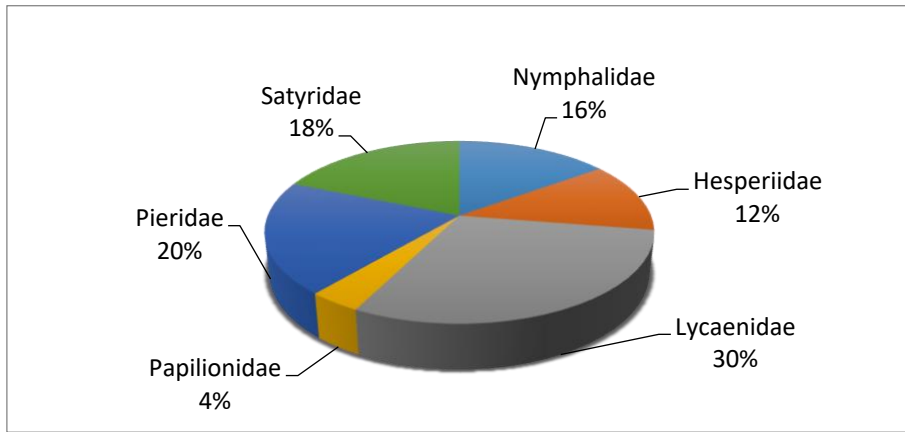


Figure 2. Percentage of families to which species from research area belong

The months with the highest number of individuals are April and July, and the months of May and June follow each other with close numbers. The number of species decreased in August (Figure 3).

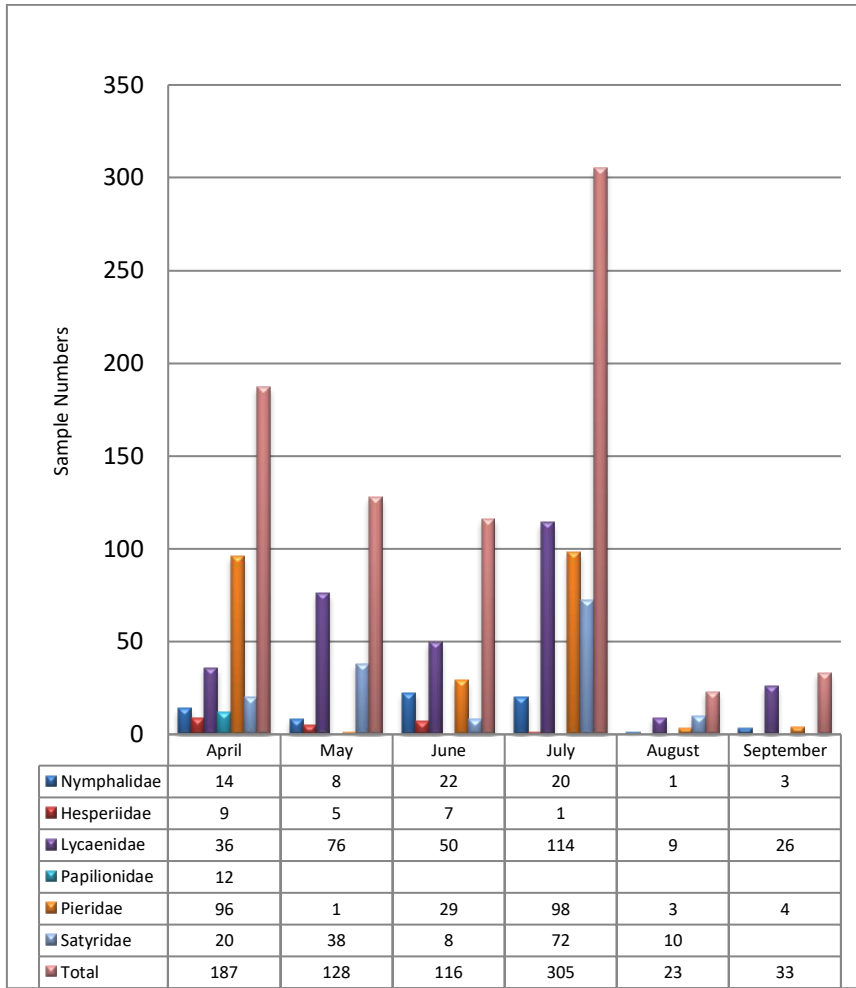


Figure 3. Distribution of the sample numbers of the detected families by months

While this is an expected outcome, the significant decrease in the number is not considered a normal case, and it is believed that the result of this decrease is the insufficiency of the field studies conducted in August. Weather conditions during the field studies also affect the number of individuals.

Of 792 samples collected from 33 localities, 68 belong to Nymphalidae, 22 belong to Hesperiidae, 311 belong to Lycaenidae, 12 belong to Papilionidae, 231 belong to Pieridae, 148 belong to Satyridae (Table 3).

Table 3. Male, female, and total numbers of specimens belonging to the families identified

Family	Male	Female	Total
Nymphalidae	27	41	68
Hesperiidae	13	9	22
Lycaenidae	188	123	311
Papilionidae	7	5	12
Pieridae	146	85	231
Satyridae	81	67	148

In the study, it is seen that the diversity of butterfly species of the shrub vegetation is in the first place with 56 species (Figure 4). Mixed forest ranks second with 38 species.

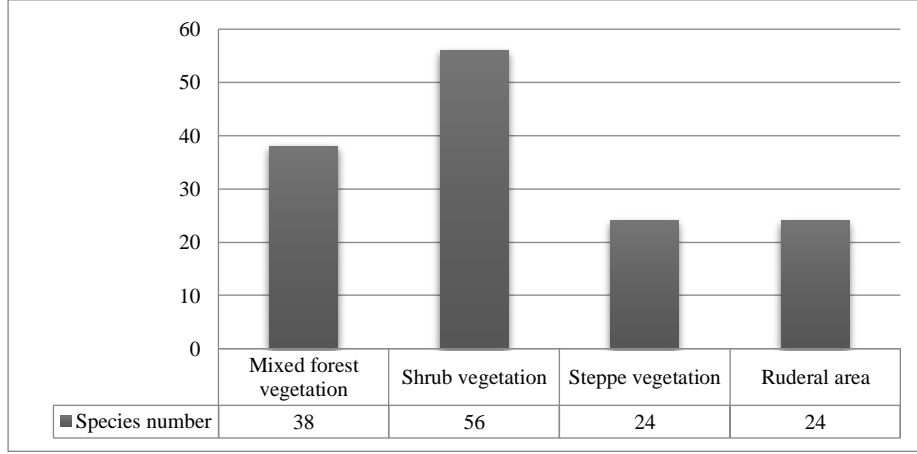


Figure 4. Habitat types and species numbers

4. Conclusion

Çimen [4] states in his study that steppe habitats are dominant in Beypazarı. The data in our study show that although steppe vegetation covers a large part of the study area, it does not adequately support butterfly diversity. Species diversity is higher in valleys with shrub vegetation, which provide sheltered areas for butterflies unlike steppe vegetation.

Polyommatus icarus has the highest population density in the area. This species is followed by *Coenonympha leander* and *Pontia edusa*, respectively. When the number of localities is evaluated, *P. icarus* is found in 18 localities; *Pontia edusa* in 15 localities; *Colias crocea* in 13 localities, *Coenonympha pamphilus* in 12 localities; *Pieris rapae* was detected in 11 localities. When these numbers are interpreted together, *P. icarus* was the most common species in the study area. Indeed, this species is a cosmopolitan species. *Coenonympha leander*, known only from Kalecik and Kızılcahamam [9] districts in Ankara, was detected although from a single locality in Beypazarı, and it ranks second in population density in the area with 34 individuals.

Polyommatus cornelius detected in the study area is endemic to Turkey. 80 species are LC, one species is in the NT category. *Zegris eupheme*, which is in the NT category, was detected with one individual in 4 different localities in Beypazarı. The habitat of this species, whose habitat preference is steppe, is the dominant vegetation in Beypazarı. Despite this, the fact that the population is represented by an individual reveals the necessity of urgent conservation studies for the species in the area

5. References

- [1]. Ankara Valiliği, Çevre, Şehircilik ve İklim Değişikliği İl Müdürlüğü, “İlimiz Beypazarı İlçesi İnözü Vadisi Doğal Sit Alanının Statüsünün Nitelikli Doğal Koruma Alanı Olarak Tescili” <https://ankara.csb.gov.tr/ilimiz-beypazarı-ilçesi-inozu-vadisi-dogal-sit-alaninin-statusunun-nitelikli-dogal-koruma-alani-olarak-tescili-duyuru-411349>, Data accessed March 2, 2023.
- [2]. Eken, G., Bozdoğan M., İsfendiyaroğlu S., Kılıç D.T. & Lise Y. (eds.) “Türkiye’nin Önemli Doğa Alanları (Key Biodiversity Areas of Turkey)” Ankara, Türkiye, Doğa Derneği, 2006
- [3]. T.R. Tarım ve Orman Bakanlığı, 9.Bölge Müdürlüğü, “Ankara - Kelebekler Vadisi Tabiat Parkı”, [https://bolge9.tarimorman.gov.tr/Menu/68/Ankara-Kelebekler-Vadisi-Tabiat Parki](https://bolge9.tarimorman.gov.tr/Menu/68/Ankara-Kelebekler-Vadisi-Tabiat-Parki), Data accessed March 2, 2023.

- [4]. Çimen, A. Ö., “Keltepe ve Sığır Yatağı Tepeleri ile (Beypazarı) çevresinin florası, Yüksek Lisans Tezi”, Gazi Üniversitesi Fen Bilimleri Enstitüsü, Ankara, 1-163, 2018
- [5]. Van Swaay, C.A.M. and Warren, M.S., “Red Data book of European butterflies (Rhopalocera)”. Nature and Environment, No. 99, Council of Europe Publishing, Strasbourg, 1999
- [6]. Van Swaay, C.A.M., Cuttelod, A., Collins, S., Maes, D., López Manguira, M., Šašic, M., Settele, J., Verovnik, R., Verstrael, T., Warren, M., Wiemers, M. ve Wynhoff, I., “European red list of butterflies. Luxembourg: Office for Official Publications of the European Communities, 2010
- [7]. Koçak A.Ö. & Seven, S., “A tentative list of the threatened butterflies in Turkey. Centre for Entomological Studies Misc.Pap., cilt.52, ss.3-8, 1998
- [8]. Verovnik, R., Wiemers, M., Balletto, E., Coutsis, J., Karsholt, O., Kudrna, O., Lopez Manguira, M., Šašic, M., van Nieukerken, E.J. and Wahlberg, N., “Revised list of European Butterflies. Taxonomy Commission of Butterfly Conservation Europe” 2010
- [9]. Koçak, A.Ö. ve Kemal, M., “A synonymous and distributional list of the species of the Lepidoptera of Turkey” Centre for Entomological Studies Memoirs 8: 1-487, 2018
- [10]. Çalışkan Seven S. & Hasbenli A., “The first record of endangered *Lycaena helle* ([Denis & Schiffermüller], 1775) for Turkey (Lepidoptera: Lycaenidae)”. Shilap-Revista De Lepidopterologia, Cilt.50, sa.197, ss.51-55, 2022
- [11]. Lederer, J., “Excursion lepidopterologique en Anatolie” Annales de la Société Entomologique de Belgique 9: 49-81, 1865
- [12]. Rebel, H., “Neue Lepidopteren aus Ankara” Z.öst. EntVer. 18: 23-24, 1933a
- [13]. Rebel, H., “Lepidopteren aus der Umgebung Ankaras. 1.Teil” Die Annalen des Naturhistorischen Museums in Wien, 47: 1-13, 1Pl., 2 figs., 1933b
- [14]. Rebel, H., “Lepidopteren aus der Umgebung Ankaras. 2.Teil” Die Annalen des Naturhistorischen Museums in Wien. 46: 1-13, 1Pl., 2 figs., 1936
- [15]. Rebel, H., “Description de trois espèces nouvelles de Microlépidoptères d’Ankara” Mitteilungen der Schweizerischen Entomologischen Gesellschaft, 16: 442-444, 1937
- [16]. Schurian, K.G. und Hofmann, P., “Entomologische Aufsammlungen und Beobachtungen bei Kızılcahamam (Türkei)” Nachrichten Entomologische Vereins Apollo N. F., 3 (4), 111-127, 1983
- [17]. Schurian, K.G., Hofmann, P.J. und Reif, A., “Ergänzungen zur Tagfalterfauna von Kizilcahamam (Türkei)” Nachrichten Entomologische Vereins Apollo N.F., 12 (1), 57- 67, 1991
- [18]. Battenfeld, P., 1978. Sammelergebnisse von Ankara. Nachrichten Entomologische Vereins Apollo N.F., 3:44-47.
- [19]. Koçak, A.Ö., “Ayaş Dağları Lepidopterleri Hakkında” Centre for Entomological Studies, Priamus 4 (1/2): 66-77, 1986
- [20]. Koçak, A.Ö., “On the Lepidoptera of Ayaş District (C.Anatolia)” Centre for Entomological Studies, Priamus 4 (4): 150-161, 1989
- [21]. Koçak, A.Ö., “Kızılcahamam Lepidoptera faunasına katkılar-I” Centre for Entomological Studies, Miscellaneous Papers 8: 1-4, 1990a
- [22]. Koçak, A.Ö., “Additional notes to the Lepidoptera fauna of Işık Dağı (N.Turkey): filo. Pap., 5, 4-8. Kızılcahamam (Prov. Ankara, Türkiye)” Centre for Entomological Studies, Priamus 6 (3/4): 97-113, 1990b
- [23]. Koçak, A.Ö., “An annotated list of the Lepidoptera collected from Işık Dağı (N. Turkey) in 1988” Centre for Entomological Studies, Miscellaneous Papers 3, 1-7, 1990c
- [24]. Koçak, A.Ö., “Additional faunistical and ecological notes to the Lepidoptera of Ayaş district (Central Turkey)” Centre for Entomological Studies, Miscellaneous Papers 4: 3-7, 1990d
- [25]. Koçak, A.Ö., “Über Lepidopterenfauna von Kızılcahamam mit taxonomischen Notizen (Lepidoptera)” Centre for Entomological Studies, Miscellaneous Papers 9: 1- 10, 3 figs., 1991
- [26]. Koçak,A.Ö., “M. ve W. Glaser tarafından Kızılcahamam'dan toplanan Lepidopterlerin listesi-I” Centre for Entomological Studies, Miscellaneous Papers 14: 6-8; 15: 1-8, 1992
- [27]. Koçak A. Ö., Seven S., “*Anthocharis cardamines* (Linnaeus) türünün erken gelişme safhaları üzerine bir çalışma (Lepidoptera, Pieridae)” Centre For Entomological Studies Miscellaneous Papers, Cilt.8, Ss.5-7, 1990
- [28]. Koçak, A.Ö. ve Seven, S., “*Euchloe ausonia* türünün erken gelişme safhaları üzerine bir çalışma (Lepidoptera, Pieridae)” Centre for Entomological Studies, Miscellaneous Papers 8: 5-7, 1990b
- [29]. Koçak A. Ö., Seven S., “Faunistisch-ökologische Notizen über Tagfalterfauna von Kızılcahamam (Prov.Ankara, Türkiye) (Lepidoptera)” Centre for Entomological Studies Priamus, cilt.5, sa.4, ss.105-122, 1991

- [30]. Koçak A. Ö., Seven S., “Lepidopterlerin erken gelişme safhaları ve beslenme biyolojisine katkılar-I” Centre for Entomological Studies Priamus, cilt.5, sa.4, ss.149-156, 1991
- [31]. Koçak A. Ö., Seven S., “Über die Tagfalterfauna des Gebirges Hodulca bei Kızılcahamam (Prov.Ankara,Türkei)” Centre For Entomological Studies, Priamus, cilt.6, ss.97-113, 1993
- [32]. Koçak, A.Ö. ve Seven, S., “Anadolunun diurnal Lepidoptera birlikleri ve ekolojisi” Centre for Entomological Studies Priamus 8(3/4): 53-162, 1996
- [33]. Koçak A. Ö., Seven S., “On the Papilionoidea and Hesperioidea fauna of the Mount Karyağdı Turkey (Lepidoptera)” Centre For Entomological Studies Miscellaneous Papers, cilt.53, sa.54, ss.1-12, 1998.
- [34]. Koçak, A.Ö. Seven S. & Kemal, M., “Tomares (nogelii) dobrogensis ssp.uighurica (ssp.n.) [in] Koçak, A., Enkhere vilayetindeki kepineklirining sinonumik tizimliği (Lepidoptera)” Centre for Entomological Studies Ankara, Miscellaneous Papers, cilt.67, sa.69, ss.14, 2000
- [35]. Koçak, A.Ö. ve Kemal, M., “Lepidoptera coğrafyası üzerine araştırmalar 1. Ankara vilayeti kelebeklerinin zoocoğrafik analizi” Centre for Entomological Studies, Priamus 10 (3/4): 105-111, 2001
- [36]. Koçak, A.Ö. ve Kemal, M., “Synonymical and distributional list of the species of Ankara Province (Central Turkey) (Lepidoptera)” Centre for Entomological Studies, Priamus 12 (1): 1-32, 2007
- [37]. Seven [Çalışkan] S., “The ecology and fauna of diurnal Lepidoptera for Kızılcahamam Kocaçay Valley” Centre for Entomological Studies Priamus , cilt.7, sa.1, ss.3-62, 1994
- [38]. Seven [Çalışkan] S., “Kuzey Anadolu’dan bir Melitaea cinxia formu hakkında” Centre for Entomological Studies, Miscellaneous Papers 26: 6–8, 1996
- [39]. Seven [Çalışkan] S., “Kırkkale Lepidoptera faunası ekolojisi ve taksonomisi üzerine araştırmalar” Centre for Entomological Studies, Priamus 10 (1/2): 1-101, 2000
- [40]. Seven [Çalışkan] S., “Contribution to the knowledge on Papilionoidea and Hesperioidea (Lepidoptera) Fauna of İdris Mountain (Turkey)” Acta Entomologica Slovenica 13(2): 127-144, 2005
- [41]. Seven [Çalışkan] S., “Preliminary Work on Rhopalocera and Heterocera Fauna of Çubuk Districts Ankara Province North Turkey” Gazi University Journal of Science, cilt.27, sa.3, ss.891-895, 2014
- [42]. Seven [Çalışkan] S., “Comparative Analysis of Habitat Preferences of the Diurnal Lepidoptera of Tuz Lake, Turkey” Acta Zoologica Bulgarica, Cilt.69, Sa.1, Ss.49-54, 2017
- [43]. Seven [Çalışkan] S., Koçak M. K., “Additions to the local faunas of the diurnal Lepidoptera in the Province of Ankara (North Turkey)” Centre for Entomological Studies, Miscellaneous Papers cilt.62, ss.1-7, 2000a.
- [44]. Seven [Çalışkan] S., Koçak M. K., “Additions to the diurnal lepidoptera fauna of the districts Çubuk and Kalecik (Ankara Prov. North Turkey)” Centre for Entomological Studies, Miscellaneous Papers, cilt. 63, ss.1-5, 2000b
- [45]. Seven [Çalışkan] S., Hüseyinoğlu Y., Kemal Koçak M., Özdemir M., “Recent collections of the diurnal Lepidoptera of the Soğuksu N.P. Işık Dağı (Kızılcahamam, Ankara Prov., N.Turkey)” Centre for Entomological Studies Ankara, Miscellaneous Papers, cilt. 64, ss.1-6, 2000
- [46]. Seven [Çalışkan] S., Bakowski M., “The contributions for Lepidoptera Fauna of Soğuksu National Park, (Ankara)” Centre for Entomological Studies, Priamus , cilt.7, sa.4, ss.156-170, 1996
- [47]. Torun, Ö. and Çalışkan, S. S., “Caterpillar (Lepidoptera) communities on oak (Quercus pubescens) in Ankara Province (Turkey)”, Turkish Journal of Entomology, 40 (3): 281-290, 2016
- [48]. Wagener, S., “Zwei neue Melanargia-Formen aus Anatolien (Lepidoptera: Satyridae)”, Atalanta 14(4): 247-299, 8 Taf., 4 Tab., 1983
- [49]. Reissinger, E.J. “Die geographisch-subspezifische Gliederung von Colias alfacariensis Ribbe, 1905 unter Berücksichtigung der Migrations-verhältnisse (Lepidoptera, Pieridae)”, Neue entomologische Nachrichten 26:5-351, Pls, 1989
- [50]. Koçak,A.Ö., “Über die Schmetterlinge von Beypazarı (Prov. Ankara, Türkei). Centre for Entomological Studies Priamus” 6 (3/4): 113-131, 1993
- [51]. Hesselbarth, G., Van Oorschot, H. und Wagener, S., “Die Tagfalter der Türkei unter Berücksichtigung der angrenzenden Länder”, Vol. 1+2: 1354 pp, Vol. 3: 847 pp., 1995
- [52]. Tshikolovets, V. V., “Butterflies of Europe and Mediterranean area. Czech Republic: Tshikolovets Publications”, 544 pp., 2011
- [53]. Bozano, G.C., Weidenhoffer, Z., “Guide to the Butterflies of the Palearctic Region: Lycaenidae 3: Theclineae, tribes Tomarini, Aphnaeini and Theclini (partim)”, Omnes Artes, 97pp., 2007
- [54]. Sbordoni, V.; Cesaroni, D.; Coutsis, J.G. “[Edt. Bozano, G.C.], Guide to the Butterflies of the Palearctic Region: Satyrinae 5: Tribe Satyrini. Satyrus, Minois, Hipparchia”, Omnes Artes, 134pp., 2018

- [55]. Karaçetin, E. ve Welch, H. J., “Türkiyedeki kelebeklerin kırmızı kitabı”, Doğa Koruma Merkezi, Ankara, Türkiye, 124 s. 2011