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Contributions to the Knowledge of Papilionoidea (Lepidoptera: Rhopalocera) Fauna from Northern Cyprus

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Abstract: The local distribution of the superfamily Papilionoidea was investigated in Northern Cyprus. As a result of this study, a total of 45 species belonging to families Papilionidae, Pieridae, Lycaenidae, Satyridae and Nymphalidae was identified; out of which 19 species are new records for the study area. The Nymphalidae had the greatest number of species following by Pieridae, Satyridae, Lycaenidae and Papilionidae. The most abundant species in the study area were *Pieris brassicae* (L.) (19% of the catches), *Polyommatus icarus* (Rott.) (11%), *Euchloe ausonia* (Hbn.) (5%) and *Pararge aegeria* (L.) (5%).

Key words: Papilionoidea, northern cyprus, distribution

INTRODUCTION

Cyprus (35°00'N, 33°00'E) has an area of 9251 km² in Northeastern Mediterranean Sea. It is situated at the junction of Europe, Asia and Africa which makes its fauna and flora an interesting blend of familiar European and less known Asian and African species (Parker, 1983; Özden, 2003).

The superfamily Papilionoidea contains all the butterflies except for the skippers, which are classified in superfamily Hesperioidea (Anonymous, 2006). Butterflies are considered as being the best group of insects for examining the patterns and the distribution of terrestrial biotic diversity (Robbins and Opler, 1997; Boriani *et al.*, 2005).

The Papilionoidea are medium to large, occasionally small lepidopterans. They are among the most specialized Lepidoptera in terms of behavior and ecology. Perhaps more than any other insects, butterflies display aposematic or warning coloration and engage in mimicry relationships (Daly *et al.*, 1998).

The superfamily Papilionoidea consists of five families that include Nymphalidae, Lycaenidae, Papilionidae, Pieridae and Satyridae. The largest families of the Papilionoidea are Lycaenidae and Nymphalidae (Daly *et al.*, 1998).

Studies on the Lepidopteran species of Cyprus have been conducted by several researchers, such as Turner

(1920), Rebel (1939), Hackman (1954), Georghiou (1977), John (2000), Makris (2002) and Özden (2003). The purpose of this study was to contribute to the diversity and abundance of Papilionoidea fauna throughout Northern Cyprus.

MATERIALS AND METHODS

This study was carried out in the capital city Lefkoşa and 4 major towns of Northern Cyprus (Gazimagosa, Gime, Güzelyurt, İskele) between 2000 and 2004 (Fig. 1). Sweepnets and hand-picking were used to collect specimens resting or feeding on plants, flying around and nectaring on flowers. The captured specimens were killed in killing jars with ethyl acetate and separately kept in rectangular envelopes. The captured specimens inside envelopes were then brought back to the laboratory for preparation and identification. Some specimens, collected in the larval stage, were reared to adults on their host plants in the laboratory conditions.

Identifications were conducted by comparison of collected specimens with specimens in the Collection Room of the Department of Forest Entomology and Protection, Faculty of Forestry, İstanbul University, Turkey. Some references, notably Spuler (1910) and Hesselbarth *et al.* (1995) were used as well. The identified specimens were deposited in the collection room of the department mentioned above.



Fig. 1: Collection sites in Northern Cyprus

Table 1: List of The Papilionoidea specimens collected from Northern Cyprus in the period of 2002-2004

Family	Genus species	Locality	Collection date	Stage (No. of specimens)	
Papilionidae	<i>Allancastria cerisyi</i> (Godart, [1824])	Zümrütköy V. (Güzelyurt T.)	27.06.2002	Adult (1)	
	<i>Allancastria cerisyi</i> (Godart, [1824])	Zümrütköy V. (Güzelyurt T.)	29.06.2002	Adult (2)	
	<i>Iphiclides podalirius</i> (Linnaeus, 1758)	Karaağaç V. (Girne T.)		Adult (2)	
	<i>Papilio machaon</i> Linnaeus, 1758	Lefke R. (Güzelyurt T.)	27.04.2003	Larvae	
	<i>Papilio machaon</i> Linnaeus, 1758	Güzelyurt T.	18.05.2003	Adult (2)	
	<i>Zerynthia polyxena</i> ([Denis and Schiffermüller], 1775)	Turunçlu V. (Gazimagosa T.)	02.05.2003	Adult (3)	
	Pieridae	<i>Anthocharis cardamine s</i> (Linnaeus, 1758)	Yedidalga V. (Güzelyurt T.)	13.05.2003	Adult (1)
		<i>Anthocharis cardamine s</i> (Linnaeus, 1758)	Doğancı V. (Güzelyurt T.)	07.06.2004	Adult (1)
		<i>Aporia crataegi</i> (Linnaeus, 1758)	Çatalköy V. (Girne T.)	28.05.2004	Adult (4)
		<i>Aporia crataegi</i> (Linnaeus, 1758)	Arapköy V. (Girne T.)	30.05.2004	Larvae
<i>Colias crocea</i> (Fourcroy, 1785)		Haspolat R. (Lefkoşa T.)	27.05.2003	Larvae	
<i>Euchloe ausonia</i> (Hübner, [1804])		Çatalköy V. (Girne T.)	28.05.2004	Adult (2)	
<i>Euchloe ausonia</i> (Hübner, [1804])		Çatalköy V. (Girne T.)	29.05.2004	Adult (5)	
<i>Gonepteryx cleopatra</i> (Linnaeus, 1758)		Yedidalga V. (Güzelyurt T.)	21.08.2002	Adult (4)	
<i>Leptidea sinapis</i> (Linnaeus, 1758)		Lefke R. (Güzelyurt T.)	02.07.2002	Adult (3)	
<i>Leptidea sinapis</i> (Linnaeus, 1758)		Kantara Castle (Gazimagosa T.)	08.07.2003	Adult (1)	
<i>Pieris brassicae</i> (Linnaeus, 1758)		Geçitköy V. (Girne T.)	22.07.2000	Adult (8)	
<i>Pieris brassicae</i> (Linnaeus, 1758)		Güzelyurt Forest Nursery (Güzelyurt T.)	09.03.2001	Adult (5)	
<i>Pieris brassicae</i> (Linnaeus, 1758)		Haspolat R. (Lefkoşa T.)	10.04.2001	Adult (1)	
<i>Pieris brassicae</i> (Linnaeus, 1758)		Alevkaya R. (Girne T.)	12.05.2001	Adult (2)	
<i>Pieris brassicae</i> (Linnaeus, 1758)		Kantara Castle (Gazimagosa T.)	15.08.2001	Adult (1)	
<i>Pieris brassicae</i> (Linnaeus, 1758)		Lapta V. (Girne T.)	23.10.2001	Adult (3)	
<i>Pieris brassicae</i> (Linnaeus, 1758)		Lefkoşa T.	12.03.2002	Larvae	
<i>Pieris brassicae</i> (Linnaeus, 1758)		Boğaz R. (Girne T.)	14.04.2002	Adult (2)	
<i>Pieris brassicae</i> (Linnaeus, 1758)		Kumyalı V. (İskele T.)	17.04.2002	Adult (1)	
<i>Pieris brassicae</i> (Linnaeus, 1758)		Gönyeli V. (Lefkoşa T.)	24.06.2003	Adult (1)	
<i>Pieris brassicae</i> (Linnaeus, 1758)	Marves Sices R. (Güzelyurt T.)	12.08.2003	Adult (1)		

Table 1: Continued

Family	Genus species	Locality	Collection date	Stage (No. of specimens)	
Lycaenidae	<i>Pieris napi</i> (Linnaeus, 1758)	Demirhan V. (Lefkoşa T.)	28.05.2003	Adult (2)	
	<i>Pieris rapae</i> (Linnaeus, 1758)	Pınarbaşı V. (Gürne T.)	17.08.2002	Larvae	
	<i>Pontia edusa</i> (Fabricius, 1777)	Çatakköy V. (Gürne T.)	01.05.2004	Adult (1)	
	<i>Pontia edusa</i> (Fabricius, 1777)	Geçitköy V. (Gürne T.)	01.05.2004	Adult (1)	
	<i>Aricia agestis</i> [(Denis and Schiffermüller), 1775]	Lapta V. (Gürne T.)	03.05.2003	Adult (1)	
	<i>Aricia agestis</i> [(Denis and Schiffermüller), 1775]	Lapta V. (Gürne T.)	05.05.2003	Adult (1)	
	<i>Callophrys rubi</i> (Linnaeus, 1758)	Kumyalı V. (İskele T.)	22.06.2003	Adult (1)	
	<i>Celastrina argiolus</i> (Linnaeus, 1758)	Güzelyurt T.	01.06.2004	Adult (1)	
	<i>Celastrina argiolus</i> (Linnaeus, 1758)	Yedilkırmak V. (Güzelyurt T.)	02.06.2004	Adult (1)	
	<i>Lampides boeticus</i> (Linnaeus, 1767)	Gürne T.	11.09.2003	Pupae	
	<i>Lampides boeticus</i> (Linnaeus, 1767)	Çamlıbel V. (Gürne T.)	13.10.2003	Adult (3)	
	<i>Lycaena phlaeas</i> (Linnaeus, 1761)	Değirmenlik V. (Lefkoşa T.)	13.05.2002	Adult (2)	
	<i>Lycaena phlaeas</i> (Linnaeus, 1761)	Kaleburnu V. (İskele T.)	07.06.2002	Adult (2)	
	<i>Neozephyrus quercus</i> (Linnaeus, 1758)	Çatakköy V. (Gürne T.)	07.08.2004	Adult (1)	
	<i>Neozephyrus quercus</i> (Linnaeus, 1758)	Çatakköy V. (Gürne T.)	19.08.2004	Adult (1)	
	<i>Polyommatus icarus</i> (Rottemburg, 1775)	Yılmazköy V. (Lefkoşa T.)	16.03.2000	Adult (1)	
	<i>Polyommatus icarus</i> (Rottemburg, 1775)	Dağyolu V. (Gürne T.)	06.09.2000	Adult (2)	
	<i>Polyommatus icarus</i> (Rottemburg, 1775)	Kanlıköy V. (Lefkoşa T.)	23.04.2001	Adult (4)	
	<i>Polyommatus icarus</i> (Rottemburg, 1775)	Hacıbayram Pınarı R. (Gürne T.)	30.06.2001	Adult (3)	
	<i>Polyommatus icarus</i> (Rottemburg, 1775)	Kantara R. (Gazimagosa T.)	05.05.2002	Adult (2)	
	<i>Polyommatus icarus</i> (Rottemburg, 1775)	Akatu Boğazı R. (Gürne T.)	02.07.2002	Adult (1)	
	<i>Polyommatus icarus</i> (Rottemburg, 1775)	Akatu Boğazı R. (Gürne T.)	04.07.2002	Adult (1)	
	<i>Polyommatus icarus</i> (Rottemburg, 1775)	Kaynakköy V. (Lefkoşa T.)	11.10.2002	Adult (1)	
	Satyridae	<i>Satyrium ilicis</i> (Esper, [1779])	Pınarbaşı V. (Gürne T.)	21.06.2003	Adult (1)
		<i>Coenonympha arcania</i> (Linnaeus, 1761)	Değirmenlik V. and Minareliköy V. (Lefkoşa T.)	22.06.2002	Adult (1)
		<i>Coenonympha pamphilus</i> (Linnaeus, 1758)	Cihangir V. (Lefkoşa T.)	12.05.2002	Adult (1)
		<i>Coenonympha pamphilus</i> (Linnaeus, 1758)	Değirmenlik V. and Minareliköy V. (Lefkoşa T.)	13.05.2002	Adult (1)
<i>Hipparchia syriaca</i> (Staudinger, 1871)		Kaplıca V. (İskele T.)	30.06.2002	Adult (1)	
<i>Kirinia roxelana</i> (Cramer, [1777])		Beyköy V. (Lefkoşa T.)	03.04.2002	Larvae	
<i>Lasiommata megera</i> (Linnaeus, 1767)		Kalavaç V. (Lefkoşa T.)	20.05.2003	Larvae	
<i>Maniola jurtina</i> (Linnaeus, 1758)		Akova V. (Gazimagosa T.)	15.06.2001	Adult (2)	
<i>Melanargia galathea</i> (Linnaeus, 1758)		Kumyalı V. (İskele T.)	11.07.2001	Adult (1)	
<i>Pararge aegeria</i> (Linnaeus, 1758)		Zümrütköy V. (Güzelyurt T.)	27.08.2001	Adult (3)	
<i>Pararge aegeria</i> (Linnaeus, 1758)	Serdarlı V. and Turunçlu V. (Gazimagosa T.)	12.09.2001	Adult (3)		

Table 1: Continued

Family	Genus species	Locality	Collection date	Stage (No. of specimens)
Nymphalidae	<i>Pseudochazara lydia</i> (Staudinger, 1878)	Bahçeli V. (Girne T.)	11.09.2001	Adult (1)
	<i>Argynnis pandora</i> ([Denis and Schiffermüller], 1775)	Karaoğlanoğlu V. (Girne T.)	08.07.2002	Adult (1)
	<i>Argynnis paphia</i> (Linnaeus, 1758)	Beşparmak Mountains (Girne T.)	08.07.2002	Adult (1)
	<i>Brenthis daphne</i> (Bergstrasser, 1780)	Ozanköy V. (Girne T.)	18.06.2001	Adult (1)
	<i>Charaxes jasius</i> (Linnaeus, 1767)	Çatalköy V. (Girne T.)	12.08.2004	Adult (3)
	<i>Inachis io</i> (Linnaeus, 1758)	Bahçeli V. and Karaağaç V. (Girne T.)	01.09.2003	Adult (4)
	<i>Issoria lathonia</i> (Linnaeus, 1758)	Ozanköy V. (Girne T.)	09.06.2002	Adult (2)
	<i>Issoria lathonia</i> (Linnaeus, 1758)	Çatalköy V. (Girne T.)	04.08.2002	Adult (3)
	<i>Limenitis reducta</i> Staudinger, 1901	Boğaztepe V. (Gazimagosa T.)	23.05.2000	Adult (2)
	<i>Limenitis reducta</i> Staudinger, 1901	Büyükkonuk V. (İskele T.)	24.05.2003	Adult (1)
	<i>Melitaea didyma</i> (Esper, 1779)	Vadili V. (Gazimagosa T.)	14.05.2001	Adult (1)
	<i>Melitaea trivialis</i> ([Denis and Schiffermüller], 1775)	Geçitkale V. (Gazimagosa T.)	02.08.2002	Adult (1)
	<i>Nymphalis polychloros</i> (Linnaeus, 1758)	Beşparmak Mountains (Girne T.)	13.05.2001	Adult (1)
	<i>Polygonia c-album</i> (Linnaeus, 1758)	Çamlıbel V. (Girne T.)	11.07.2001	Adult (1)
	<i>Speyeria aglaja</i> (Linnaeus, 1758)	İskele T.	21.07.2002	Adult (2)
	<i>Vanessa atalanta</i> (Linnaeus, 1758)	Lefkoşa T.	10.09.2001	Larvae
	<i>Vanessa cardui</i> (Linnaeus, 1758)	Minareliköy V. (Lefkoşa T.)	12.07.2002	Adult (5)
	<i>Vanessa cardui</i> (Linnaeus, 1758)	Değirmenlik V. (Lefkoşa T.)	21.07.2004	Larvae

Abbreviations: D: District, V: Village, R: Region, T: Town, C: Capital city

RESULTS

A total of 45 species, belonging to five families, were recorded in the study area (Table 1). The list of the superfamily Papilionoidea of Northern Cyprus given below is based mainly on the generic classification taken from Forster and Wohlfahrt (1955), Schwenke (1978), Hesselbarth *et al.* (1995) and Koçak and Seven (2001). Species under families are arranged in alphabetical order.

The most represented families were Nymphalidae (14 species) and Pieridae (10 species) following by Satyridae (9 species), Lycaenidae (8 species) and Papilionidae (4 species) (Fig. 2).

Nineteen Papilionoidea species captured are new records for Cyprus Island. The new records are *Iphiclides podalirius*, *Zerynthia polyxena*, *Leptidea sinapis*, *Pieris napi*, *Callophrys rubi*, *Satyrium ilicis*, *Coenonympha arcania*, *Coenonympha pamphilus*, *Maniola jurtina*, *Melanargia galathea*, *Pseudochazara lydia*, *Argynnis paphia*, *Brenthis daphne*, *Inachis io*, *Issoria lathonia*, *Melitaea didyma*, *Melitaea trivialis*, *Polygonia c-album* and *Speyeria aglaja*.

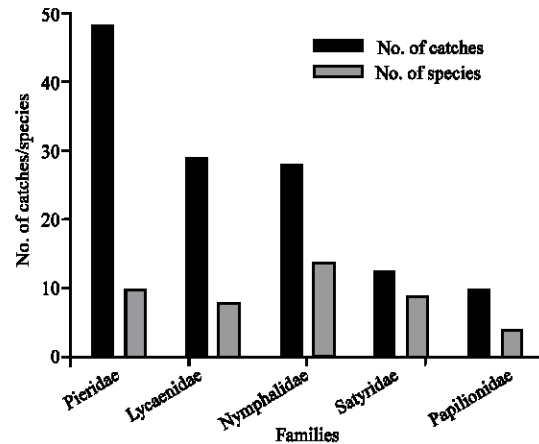


Fig. 2: Comparison of numbers of catches and species of the Papilionoidea collected in Northern Cyprus

DISCUSSION

Forty-nine butterfly species, excluding the family Hesperidae, are known to distribute throughout Cyprus

(Makris, 2002). In this study, 19 species were captured as new records for Cyprus.

As the sweepnet collections did not systematically sample the Papilionoidea fauna, it is not possible to make direct comparison of relative abundance by species. Some species of the Papilionoidea fauna were however noticeably abundant in the study area, such as *Pieris brassicae* (L.) (19% of the catches), *Polyommatus icarus* (Rott.) (11%), *Euchloe ausonia* (Hbn.) (5%) and *Pararge aegeria* (L.) (5%). It has been observed that *Polyommatus icarus* (Rott.) was available in Italy constitution 23% of the catches conducted by Boriani *et al.* (2005).

The aim of this study was to investigate the Papilionoidea community of Northern Cyprus. Although 45 specimens were recorded in the study area, probably a large portion of the fauna remains unsampled. For this reason, further investigations are needed to make new contributions to the knowledge of the superfamily Papilionoidea.

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