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Interrelation Between Some Butterflies and Plant Associations (Turkey)

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Abstract: The butterfly fauna in Ordu province (N-Turkey) was determined in this study. Their relations with the phytosociological associations found in the zone were evaluated and the Lepidoptera taxa in these units were presented. The numbers of determined taxa in each plant association are Castanea-Carpinus-Corylus (23), *Fagus orientalis*, *Carpinus betulus* and *Picea orientalis* Mixed Forest Zone (23), Subalpine Zone (*Rhododendron luteum-Vaccinium myrtillus*) (25), Lower Alpine Zone (*Festuca lazistanica* ssp. *giresunica*) (20), Mid-alpine Zone (*Festuca lazistanica* ssp. *giresunica*) (13). Fifteen taxa are new for Ordu province.

Key words: Butterflies, plant associations, interrelation, Turkey

INTRODUCTION

Ordu lies in Eastern Black Sea region in the north of Turkey. This territory takes place in the North Anatolian orogenic belt. A great part of it is covered with volcanic and sedimentary series, which belong to the Upper Cretaceous (Atalay *et al.*, 1985). This territory is generally exposed to the Oceanic climate because it is on the north slopes of the East Black Sea Mountains. On the other hand, on the south slopes, the effects of mid-dry climate and cold transition period are seen (Quezel *et al.*, 1980).

Diurnal Lepidoptera have previously been known as two species from the vicinity of Ordu; *Pararge aegeria* (*Satyridae*) and *Lycaena dispar* (*Lycaenidae*) (Rebel, 1908); from Gököy and Perşembe *Gonepteryx rhamni* ssp. *miljanovski* (*Pieridae*) (Freina, 1983). Higgins (1966) has mentioned all provinces where these species have been determined in connection with his list about the butterflies of Turkey, not giving any kind of record about Ordu. Hesselbarth *et al.* (1995) have increased this number by 59. The number of the species in this region has reached to 74 with our study. Koçak and Seven (1994) includes all references on the butterflies fauna of Ordu province.

As a result of a phytosociological study in the region, Kılınç and Karakaya (1992) defined the herbal communities in Çambaşı high-plateau and it's around as follows;

Rhododendro-Vaccinetum myrtilli (*Rhododendron luteum-Vaccinium myrtillus* community): This community is generally widespread between 1550-1800 m in the

research area; *Thymetum jankaei* (*Thymus praecox* subsp. *jankaei* community): This community is generally widespread between 1500-2000 m in the southern slopes in the research area; *Festucetum giresunicae* (*Festuca lazistanica*-subsp. *giresunica* community): This community is generally widespread between 1800-2600 m in the research field.

The aim of this study is to determine which plant units the butterflies prefer in their habitat and by this way to reveal which phytosociological plant associations are richer for butterfly fauna. For this reason, on land of the Çambaşı plateau of Ordu province in 1994 and 1995 between May and August, 364 samples of diurnal Lepidoptera have been collected and examined.

MATERIALS AND METHODS

The material for examining has been collected from Ordu (Çambaşı yaylası, Yokuşdibi), Perşembe (Çaytepe), Mesudiye (Güzele, Güvenli) with a trap by day and has been killed in the jars with ethyl acetate. All the data about the collection process and the properties of the habitat where the species are collected have been recorded as well as the dominant plant species and the samples have been put into triangular envelopes. After that, they have been prepared in accordance with the methods of museum material by being softened in the pots for softening in the laboratory and their locality labels have been pinned. For the classification and nomenclature of taxa, Hesselbarth *et al.* (1995) have been followed. Natural areas where the butterflies were

collected are divided into five groups and evaluated. The localities, vertical distributions, host plants and plant associations of the examined taxa are given in Table 1. Larval food plants are given according to Hesselbarth *et al.* (1995) and Koch (1991). First records for Ordu province are shown with * asteriks sign.

RESULTS AND DISCUSSION

Vegetation of the region: Lower mountain zone (0-500 m) is covered by degraded *Castanea sativa*-*Carpinus orientalis* Forest. Among them, *Corylus avellana* plantations are seen frequently. Between the elevations 500 and 1500 m, remarkable plant formations are the remnant forests of *Fagus orientalis*, *Carpinus betulus* and *Picea orientalis* together with sporadic *Rhododendron*, *Ulmus* and *Alnus glutinosa*.

This region covers the Çambaşı high-plateau forest border and subalpine and alpine meadows lying in the upper part of the forest border. Upper border of the forest generally ends in 1550 m in the region, however, it is understood that the forest border is going up to 1700-1800 m even to 1900 m as a result of the topographical structure of the many parts in the region. Depending on the height in the studying area, subalpine, alpine, lower alpine and mid-alpine regions can be distinguished.

Subalpine region (1550-1800 m): These are generally composed of distorted forest, shrubs and meadows. This region is characterized by the small forest communities, formed with *Picea orientalis* and *Pinus sylvestris* and shrubs named particularly *Rhododendrum luteum*, *Daphne pontica* and *Vaccinium myrtillus*. There are wide area of meadows among these local forests and shrubs. Particularly *Thymus praecox* subsp. *jankae*, *Brachypodium pinnatum*, *Carlina vulgaris*, *Astragalus fragrans* and *Deschampsia flexuosa* are the characteristics of the region.

Lower alpine region (1800-2000 m): *Rhododendron luteum* are seen in this region, even which can intensively be encountered in the northern slopes. *Vaccinium myrtillus* is generally widespread both in open areas and among *Rhododendron luteum* community. Some perennial herbs dominant on the Subalpine region have also the same situation in this region, in addition to this, some species such as *Veratrum album*, *Oxalis acetosella*, *Pedicularis condensata* and *Lilium ciliatum* are the characteristics of the region.

Mid-alpine region (2000-2600 m): The characteristic vegetation of this region is alpine meadows. Particularly *Festuca lazistanica* subsp. *giresunica*, *Ballerdiachloa polycroa*, *Bunium microcarpum* subsp. *bourgei*, *Campanula tridentata* and *Minuartia recurva* subsp. *oreina* can be counted as characteristics of the region.

Due to the fact that the field covered by alpine and subalpine meadows, possessing a number of different sized hills is utilized as a high-plateau at summers. There is a great biotical effect on the flora and vegetation in the region. Overgrazing in the region has caused a corruption in the natural balance. Human oriented destroying of the forests distorted the vegetation as one of the important biotical effects.

In addition to these; *Festuca lazistanica* subsp. *giresunica* mixed with *Alchemilla mollis*, *Epibolium gemmascens*, *Saxifraga moschata*, *Caltha polypetala* and *Carex pallescens* subsp. *chalcodeta* are widespread in the damp meadows and in the edges of the mountain streams. *Vaccinium myrtillus* has a wide distribution in the entire research area.

The butterfly species recorded in the studied area is listed in Table 1. Localities with their altitudes, classified natural areas and the number of the specimens used are also given in the Table 1.

As a result of the collection studies realized in Çambaşı high-plateau, it is understood that most of the butterfly species in subalpine and alpine zones prefer the places as their habitat, where *Rhododendro-Vaccinetum myrtilli* association. The reason of the preference of the butterflies is probably the presence of their larval foodplants within this plant formation.

As to the *Rhododendro-Vaccinetum myrtilli* community at Çambaşı, the following butterflies preferred this plant formation: *Zerynthia caucasica*, *Pieris brassicae*, *P. bryoniae*, *P. pseudorapae*, *P. rapae*, *Colias crocea*, *Gonepteryx rhanni*, *Vanessaa cardui*, *Vanessa atalanta*, *Inachis io*, *Aglais urticae*, *Argynnis paphia*, *Argynnis aglaia*, *Boloria caucasica*, *Boloria euphrosyne*, *Issoria lathonia*, *Erebia aethiops*, *Erebia ottomana*, *Maniola jurtina*, *Coenonympha pamphilus*, *Lycaena phlaeas* and *Polyommatus icarus*.

The species recorded in the studied area are listed according to the families, in the column under the title Taxon. Collecting localities and their elevations are given in the columns Locality and Altitude, respectively. The species are classified into five groups (A, B, C, D, E) under the Natural Areas. A: Roadside and openings in the degraded *Castanea*-*Carpinus*-*Corylus* forest (0-500 m). B: Damp meadows, streamside in the Mixed Forest

Table 1: The butterfly species distribution according to the natural ares

Taxon	Locality	Altitude	Larval food plants	Natural areas					N
				A	B	C	D	E	
<i>Papilionidae</i> Latreille, 1802									
<i>Iphiclides podalirius</i> (Linnaeus, 1758)	Çaytepe	0200 m	<i>Amygdalus, Malus, Prunus, Pyrus, Cotoneaster, Crataegus, Sorbus</i>						2
<i>Zermythia caucasica</i> (Lederer, 1864)	Yokusdibi	1000 m	<i>Aristolochia</i> spp.						1
<i>PIERIDAE</i> Duponchel, 1835									
<i>Pieris brassicae</i> (Lederer, 1758)	Çambasi	1600-2000 m	<i>Alliaria, Arabis, Barbarea, Brassica, Descurainia, Sophia, Diplotaxis, Hesperis, Isatis, Lepidium, Peltaria, Raphanus, Rorippa, Sinapis, Sisymbrium</i>						9
<i>Pieris bryoniae</i> (Hübner, 1803)	Yokusdibi, Çambasi	1000-1800 m	<i>Biscutella laevigata, Thlaspi montanum, Cardamine</i> spp.						5
<i>Pieris pseudorapae</i> Verity, 1908	Çaytepe, Çambasi	0100-2100 m	<i>Alliaria, Arabis, Barbarea, Descurainia, Diplotaxis, Hesperis, Iberis, Isatis, Lepidium, Peltaria, Raphanus, Rorippa, Sinapis, Sisymbrium, Thlaspi, Capparis, Reseda</i>						6
<i>Pieris rapae</i> (Linnaeus, 1758)	Çaytepe, Yokusdibi, Çambasi	0100-2000 m							14
<i>Pontia edusa</i> (Linnaeus, 1758)	Güvenli, Çambasi	1300-1800 m	<i>Reseda, Sinapis, Raphanus, Descurainia, Thlaspi, Berteroa, Sisymbrium, Alyssum, Arabis, Diplotaxis</i>						2
<i>Colias crocea</i> (Fourcroy, 1785)	Çaytepe, Yokusdibi, Güvenli, Çambasi	0100-2100 m	<i>Medicago, Trifolium, Coronilla, Onobrychis, Hippocrepis</i>						32
<i>Gonepteryx rhamni</i> (Linnaeus, 1758)	Çaytepe, Çambasi	0200-2100 m	<i>Rhamnaceae (Rhamnus cartharticus), Frangula alnus</i>						12
<i>LIBYTHEIDAE</i> Boisduval, 1833									
<i>Libythea celtis</i> * (Laicharting, 1782)	Güvenli	1300 m	<i>Celtis</i> sp.						1
<i>NYMPHALIDAE</i> Swainson, 1827									
<i>Vanessa cardui</i> (Linnaeus, 1758)	Çaytepe, Yokusdibi, Çambasi	0200-1800 m	<i>Polyphag</i>						9
<i>Vanessa atalanta</i> (Linnaeus, 1758)	Çaytepe, Yokusdibi	0200-1000 m	<i>Sambucus ebulus, Malva sylvestris</i>						12
<i>Inachis io</i> (Linnaeus, 1758)	Çaytepe, Çambasi	0100-2100 m	<i>Urtica dioica</i>						8
<i>Aglais urticae</i> (Linnaeus, 1758)	Çaytepe, Çambasi	0200-2100 m	<i>Urtica dioica</i>						11
<i>Polygonia c-album</i> (Linnaeus, 1758)	Çaytepe	0200 m	<i>Urtica, Salix, Humulus lupulus</i>						6
<i>Argynnis paphia</i> * (Linnaeus, 1758)	Çaytepe	0200 m	<i>Viola</i> spp.						4
<i>Argynnis pandora</i> (Denis and Schiffermüller, 1775)	Güvenli, Çambasi	1300-1600 m	<i>Viola</i> spp.						2
<i>Argynnis aglaja</i> * (Linnaeus, 1758)	Çambasi	1800-2100 m	<i>Polygonum, Viola</i>						19
<i>Boloria caucasica</i> * (Lederer, 1852)	Çambasi	1600-2100 m	<i>Viola altaica</i> ssp. <i>Oreades</i>						21
<i>Boloria euphrosyne</i> (Linnaeus, 1758)	Yokusdibi, Çambasi	1000-1800 m							8

Table 1: Continued

<i>Issoria lathonia</i> (Linnaeus, 1758)	Çambasi	1700-2000 m	<i>Viola</i> spp.								7
<i>Melitaea didyma</i> * (Esper, 1779)	Çaytepe	0100-0200 m	<i>Plantago, Centaurea, Veronica, Verbascum, Rhinanthus, Stachys</i>								7
SATYRIDAE											
Boisduval, 1833											
<i>Hipparchia syriaca</i> * (Staudinger, 1871)	Güzele	0900 m	<i>Graminae (Festuca, Agrostis, Brachypodium)</i>								1
<i>Hipparchia stalinus</i> * (Hufnagel, 1766)	Güzele, Güvenli	0900-1300 m	<i>Graminae (Poa annua)</i>								2
<i>Erebia aethiops</i> * (Esper, 1777)	Çambasi	1600-2100 m	<i>Bromus, Festuca, Poa, Dactylis, Brachypodium, Briza</i>								27
<i>Erebia ottomana</i> * (Herrich-Schäffer, 1847)	Çambasi	1800-2000 m	<i>Bromus, Festuca, Poa, Dactylis, Brachypodium, Briza</i>								9
<i>Maniola jurtina</i> (Linnaeus, 1758)	Çaytepe	0100-0300 m	<i>Graminae (Poa spp.)</i>								12
<i>Coenonympha pamphilus</i> (Linnaeus, 1758)	Çaytepe, Yokusdibi, Çambasi	0100-1800 m	<i>Poa, Anthoxanthum, Cynosurus, Festuca, Nardus</i>								28
<i>Pararge aegeria</i> (Linnaeus, 1758)	Çaytepe	0200 m	<i>Poa, Brachypodium</i>								4
<i>Lasiommata maera</i> * (Linnaeus, 1758)	Çambasi	1800-2300 m	<i>Festuca, Bromus, Dactylis, Deschampsia, Poa</i>								7
<i>Lasiommata megera</i> * (Linnaeus, 1767)	Çaytepe	0150 m	<i>Festuca, Bromus, Dactylis, Deschampsia, Poa</i>								2
LYCAENIDAE Leach, 1815											
<i>Favonius quercus</i> * (Linnaeus, 1758)	Güvenli	1400 m	<i>Quercus</i> spp.								4
<i>Lycæna phlaeas</i> (Linnaeus, 1761)	Çaytepe, Çambasi	0100-1900 m	<i>Polyphag</i>								5
<i>Lycæna candens</i> * (Herrich-Schäffer, 1845)	Çambasi	1800 m	<i>Rumex acetosella</i>								4
<i>Celastrina argiolus</i> (Linnaeus, 1758)	Çaytepe	0150 m	<i>Polyphag</i>								1
<i>Cupido minimus</i> * (Fuessly, 1775)	Çaytepe	0200 m	<i>Anthyllis vulneraria, Astragalus cicer, A. penduliflorus</i>								1
<i>Cupido argiades</i> * (Pallas, 1771)	Çaytepe	0200 m	<i>Trifolium pratense, Medicago Sativa, M. lupulina, Viciasativa, V. cracca, Lotus corniculatus</i>								1
<i>Lampides boeticus</i> (Linnaeus, 1767)	Çaytepe, Çambasi	0100-2300 m	<i>Pisum, Phaseolus, Cicer, Medicago, Colutea, Astragalus, Capparis</i>								5
<i>Plebeius argus</i> (Linnaeus, 1758)	Güzele, Güvenli	0900-1300 m	<i>Leguminosae</i> spp.								2
<i>Polyommatus admetus</i> * (Esper, 1783)	Güvenli	1400 m	<i>Onobrychis</i> spp.								1
<i>Polyommatus icarus</i> (Rottemburg, 1775)	Çaytepe, Çambasi	0100-2100 m	<i>Polyphag</i>								32
HESPERIIDAE											
Latreille, 1809											
<i>Ochlodes venatus</i> * (Bremer and Grey, 1852)	Çaytepe	0200-0300 m	<i>Festuca, Calamagrostis, Molinia, Dactylis, Poa</i>								3
<i>Pyrgus alveus</i> * (Hübner, 1803)	Çambasi	1600-2100 m	<i>Helianthemum nummularium</i>								13
<i>Pyrgus malvae</i> * (Linnaeus, 1758)	Çambasi	1800 m	<i>Potentilla, Fragaria, Agrimonia, Rubus</i>								2
Total number				23	23	25	20	13			364

Zone (1000-1550 m). C: Subalpine Zone (1550-1800 m). *Rhododendron luteum-Vaccinium myrtillus* Kılınç and Karakaya (1992) association belongs to this zone. *Thymus praecox* subsp. *jankae* Kılınç and Karakaya (1992) association is partly represented in the southern slopes. D: Lower Alpine Zone (1800-2000 m). *Festuca lazistanica* ssp. *giresunica* Kılınç and Karakaya (1992) is well represented in this zone. E: Mid-alpine Zone (2000-2600 m). *Festuca lazistanica* ssp. *giresunica* Kılınç and Karakaya (1992) is well represented in this zone N. Number of the specimens collected.

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