

Full Length Research Paper

## A faunistic and ecological study on Papilionoidea and Hesperioidea (Lepidoptera) of Sultandağları Mountains (Afyonkarahisar/Turkey)

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In this study, the fauna of Papilionoidea and Hesperioidea (Lepidoptera) from Sultandağları Mountains, Afyonkarahisar province, in Turkey were investigated. Field collections were conducted between March and August from 1997 to 2001. Individuals were collected from 110 field surveys. The specimens belonged to 131 species in seven families, including Papilionidae (6 species), Pieridae (17), Libytheidae (1), Argynnididae (21), Satyridae (24), Lycaenidae (45), and Hesperidae (17). *Tomares nesimachus* (Oberthür, 1893) was identified for the first time in Afyonkarahisar and fourteen of the 131 species were new records for the Lepidoptera fauna of Sultandağları Mountains.

**Key words:** Butterfly, fauna, Sultandağı, Çay, Sultandağları, biodiversity, Turkey.

### INTRODUCTION

Today, certain species from Lepidoptera have partially become extinct or are under the risk of extinction due to the factors like environmental pollution in industrial countries, destruction of biotopes, effects of pesticides and the fact that some species have been collected for commercial purposes. Within the context of preserving biodiversity every country has to take the required conservation measures.

This study was conducted to contribute to identification of Sultandağları's diurnal Lepidoptera fauna, to define habitats of the species, to shed light on zoogeographic aspect of the fauna and finally to explore Afyonkarahisar province's biological richness.

The literature relating to Sultandağları's Lepidoptera fauna was reviewed from Koçak and Seven (1994). 30 scientific publications in total relating to the subject were reviewed. These faunistic studies include those conducted by Pfeiffer (1926-1927), Wagner (1929), and

Schwingenschuss (1938, 1939) in Sultandağları. Belter (1935) described a new subspecies from *Brenthis daphne* species collected in the region. Verity (1934-1936, 1935, 1936-1937, 1937-1938) recognized and named a couple of geographic variations from the species taking place in certain Satyridae and Lycaenidae families, which had been collected previously in Sultandağları, in his various articles. Lattin (1950) observed some butterfly species collected by Kosswig from various regions of Anatolia including Sultandağları and revised certain species, especially the species of *Agrodiaetus*, based on the material collected by Forster (1936, 1956, 1960, 1960-1961) and other various researchers and held in Munich Zoology Museum. In the study, various species and subspecies of *Agrodiaetus* living around Sultandağları and Akşehir were identified. Schurian and Rose (1991) identified a new subspecies from *Lycaenidae* species collected from Sultandağları.

**Table 1.** Locations and dates of collections of butterflies in Sultandağı, Afyonkarahisar, Turkey. Locality Altitude Collection Date.

1: Yakasenek, Manastır 1400 m. 13.07.1997
2: Yakasenek, Manastır 1450 m. 16.05.1999
3: Yakasenek, Manastır 1450 m. 22.05.1999
4: Yakasenek, Manastır 1500 m. 24.06.2000
5: Yakasenek, Gelincikana 1750 m. 13.07.1997
6: Yakasenek, Gelincikana 1750 m. 17.07.1997
7: Yakasenek, Gelincikana 1700 m. 12.07.1998
8: Yakasenek, Gelincikana 1800 m. 12.07.1998
9: Yakasenek, Gelincikana 1750 m. 24.06.2000
10: Yakasenek, Gelincikana 1750 m. 24.06.2001
11: Yakasenek, Gelincikana 1860 m. 02.07.2000
12: Yakasenek, Gelincikana 1850 m. 14.07.2000
13: Yakasenek, Gelincikana 1900 m. 23.07.2000
14: Yakasenek, 1100-1200 m. 22.05.1999
15: Yakasenek 1300 m. 04.07.1998
16: Yakasenek 1100-1250 m. 16.05.1999
17: Yakasenek 1200 m. 14.04.2000
18: Yakasenek, Sarıpınar 1900 m. 23.07.2000
19: Yakasenek, Sütülpınar 1500 m. 19.05.2000
20: Yakasenek, Sütülpınar 1500 m. 24.06.2000
21: Yakasenek, Sütülpınar 1400 m. 14.07.2000
22: Yakasenek, Sütülpınar 1600 m. 23.07.2000
23: Yakasenek, Sütülpınar 1450 m. 19.08.2000
24: Yalama Hill 1400 m. 04.07.1998
25: Yalama Hill 1750 m. 04.07.1998
26: Yalama Hill 1200 m. 16.05.1999
27: Yalama Hill 1200 m. 30.05.1999
28: Yalama Hill 1300 m. 30.05.1999
29: Yalama Hill 1500 m. 30.05.1999
30: Yalama Hill 1200 m. 16.08.1999
31: Yalama Hill 1250 m. 19.05.2000
32: Yalama Hill 1200 m. 17.06.2000
33: Yalama Hill 1400 m. 17.06.2000
34: Yalama Hill 1500 m. 17.06.2000
35: Yalama Hill 1200 m. 02.07.2000
36: Yalama Hill, Borazan 1700 m. 12.07.1998
37: Yalama Hill, fire tower 1500 m. 11.07.1998
38: Yalama Hill, fire tower 1680 m. 30.05.1999
39: Yalama Hill, fire tower 1680 m. 11.07.1999
40: Yalama Hill, fire tower 1700 m. 17.06.2000
41: Yalama Hill, fire tower 1750 m. 02.07.2000
42: Dereçine S. 1200 m. 20.06.1998
43: Dereçine S. 1400 m. 20.06.1998
44: Dereçine S. 1300 m. 05.07.1998

Hesselbarth et al. (1995) reported the species identified in Sultandağları in their books on butterflies in Turkey.

**Table 1 Contd.**

45: Dereçine S. 1500 m. 05.07.1998
46: Dereçine S. 1200 m. 15.05.1999
47: Dereçine S. 1400 m. 15.05.1999
48: Dereçine, 1100 m. 18.05.1999
49: Dereçine, 1290 m. 15.05.1999
50: Dereçine, 1280 m. 13.05.2000
51: Dereçine, 1290 m. 15.05.2000
52: Dereçine, 1280 m. 28.05.2000
53: Dereçine, Okkaya 1700 m. 08.07.2000
54: Dereçine, Okkaya 1800 m. 15.07.2000
55: Dereçine, Okkaya 1900 m. 28.07.2001
56: Kırca Village S. 1200 m. 30.05.1998
57: Kırca Village S. 1200 m. 30.05.1999
58: Dort Valley 1050-1100 m. 19.05.1999
59: Dort Valley 1100 m. 29.05.1999
60: Dort Valley 1200 m. 29.04.2000
61: Dort Valley 1150 m. 28.05.2000
62: Dort Valley 1200 m. 28.05.2000
63: Dort Valley 1200 m. 10.06.2000
64: Dort Valley 1100 m. 08.07.2000
65: Dort Valley 1200 m. 14.07.2000
66: Dort Valley 1300 m. 14.07.2000
67: Dort Valley 1100 m. 05.08.2000
68: Dort Valley, 1200 m. 19.05.1999
69: Dort Valley, 1250 m. 29.05.1999
70: Dort Valley, 1300 m. 29.08.1999
71: Dort Valley, 1280 m. 28.05.2000
72: Dort Valley, 1300 m. 10.06.2000
73: Deresine Valley 1300 m. 05.08.2000
74: Deresine Valley 1400 m. 19.08.2000

Carbonell (1998) identified *Agrodiaetus cilicius* species as a result of his study conducted in Toros Mountains and reported that its invasion reaches up to Sultandağları.

## MATERIALS AND METHODS

Sultandağları is an extension of Toros Mountains toward Central Anatolia in the direction of NW-SE. Average altitude of Sultandağları rising like a wall from the plain surface with an average altitude of 970 to 980m is around 2000 m and the altitude decreases gradually from NW toward SE until 1700 m around Doğanhisar. Certain high peaks on the mountain and their altitudes, from NW toward SE, are: Sultandede Peak 2311 m, Mezarlık Peak 2274 m, Toprak Peak 2519 m, Gelincikana Peak 2610 m, Çiğirgan Peak 2308 m, Demirlik Peak 2020 m, Mercansivri Peak 2276 m, Gedik Peak 2181 m, Taşpınar Plateau 2300 m, Başyurt Peak 2424 m, Batman Peak 1993 m, Tekke Mount 2169 m. As understood according to these altitudes, the mountain's altitude relative to the plain surface sometimes reaches 1000 to 1100 m (Atalay, 1977). Sultandağları has a climatic typology called "Central Anatolian

**Table 2.** Locations and dates of collections of butterflies in Çay, Afyonkarahisar, Turkey. No Locality Altitude Collection Date

75: Çay Valley 1100 m. 01.06.1998
76: Çay Valley 1100 m. 11.06.1998
77: Çay Valley 1100 m. 05.07.1998
78: Çay Valley 1200 m. 05.07.1998
79: Çay Valley 1050 m. 09.04.1999
80: Çay Valley 1200 m. 14.04.2000
81: Çay Valley 1250 m. 15.04.2000
82: Çay Valley, Hacıpınar 1300 m. 06.05.1999
83: Çay Valley, Hacıpınar 1200 m. 20.04.2000
84: Çay Valley, Hacıpınar 1300 m. 11.06.2000
85: Çay Valley, Hacıpınar 1200 m. 29.07.2000
86: Çay Valley, Kireçlik 1400 m. 05.07.1998
87: Çay Valley, Kireçlik 1300 m. 18.05.1999
88: Çay Valley, Kireçlik 1300 m. 15.04.2000
89: Çay Valley, Kireçlik 1400 m. 13.05.2000
90: Nişankaya Location 1200 m. 04.07.1998
91: Karamık 1050 m. 20.07.1998
92: Kirazlıyayla 1400 m. 01.08.1998
93: Kirazlıyayla 1400 m. 03.07.1999
94: Kireçlik Hill 1700 m. 28.07.1998
95: Gökseki Hill 1900 m. 22.07.2000
96: Akkaya Hill 1800 m. 27.07.1999
97: Mezarlık Hill 1900 m. 09.08.1999
98: Sarıyayla Hill 1200 m. 18.05.1999
99: Sarıyayla Hill 1600 m. 17.07.1999
100: Boncuklu, Gökgedik 1900 m. 19.08.1998
101: Boncuklu, Gökgedik 1900 m. 09.08.1999
102: Boncuklu Hill 1850 m. 18.07.1998
103: Boncuklu Hill 1850 m. 01.08.1998
104: Boncuklu Hill 1700 m. 01.06.1999
105: Boncuklu Hill 1700 m. 10.07.1999
106: Boncuklu Hill 1700 m. 09.08.1999
107: Boncuklu Hill 1700 m. 22.07.2000
108: Boncuklu Hill 1800 m. 29.07.2000
109: Gölgecikaya 1600 m. 14.08.1998
110: Karıncaova 1250 m. 03.07.1999

Steppe Climate". However, local climatic variations exist between the basins of Sultandağları-Akşehir-Eber and especially, in northern and northwestern parts of Sultandağları. Thus, dry steppe climatic characteristics are prevalent in the said areas (Atalay, 1977).

This study was conducted from 1997 to 2001 in Sultandağları, Afyonkarahisar, Turkey, to identify its butterfly fauna. 110 field surveys were carried out between March to August in different habitat types and ranging in altitude from 1050 to 1900 m (Tables 1 and 2).

Specimens were collected using a sweep net and killed in killing jars with ethyl acetate. Each specimen was put into a labeled envelope and brought to the laboratory to be spread and dried. Identifications were based on the studies of Hesselbarth et al. (1995), Hofmann and Marktanner (1995), Tolman and Lewington (1997), and the author's reference collections. The specimens collected from the study area were taken from different stations during 110 field studies. These stations (Material Examined, Locality No) are chronologically listed in Tables 1 and 2 (Sultandağları and Çay).

## RESULTS AND DISCUSSION

A total of 131 species belonging to seven families and two super families of Rhopalocera were identified. The highest number of species belongs to Lycaenidae (45, 30.4%), followed by Satyridae (24, 18.2%), Argynnididae (21, 16%), Pieridae (17, 13%), Hesperidae (17, 13%), Papilionidae (6, 4.6%) and Libytheidae (1, 0.8%). The list of species, according to Koçak and Kemal (2009), and the localities from which they were collected in Sultandağları are in Table 3.

Sultandağları Mountains has a rich flora and fauna. The different ecosystems provide multiple habitat types for animals and plants, which may increase diversity. For more thorough sampling, butterflies in Sultandağları were collected at 110 sites in different vegetation types, including agricultural fields and in forests, at altitudes ranging from 1050 to 1900 m and at different times. All these characteristics (locality, vegetation type, altitude, and date) affect biological distributions, especially of the butterflies in this study.

In this study, the Papilionoidea and Hesperioidea faunas in Sultandağları were comprehensively evaluated, compared with previous reports, and updated based on taxonomic and nomenclatural changes in recent years. A total of 131 species belonging to seven families of Lepidoptera were identified. These families and number of species are: Papilionidae (6); Pieridae (17); Libytheidae (1); Argynnididae (16); Satyridae (24); Lycaenidae (45) and Hesperidae (17). Among these, *Tomares nesimachus* (Oberthür, 1893), is identified for the first time in Sultandağları Mountains for fauna of the Afyonkarahisar during this study. 117 species were previously known from Sultandağları, and the remaining 14 species (indicated with asterisks in Table 2) were new records for the region. In addition, *Archon apollinus* was also recorded by the author in Central Afyonkarahisar on 31 March 2001.

The larvae of some of the species identified in this study can cause economic damage to plants. Among these species *Zerynthia deyrollei*, *Anthocharis cardamines*, *Euchloe ausonia*, *Pieris brassicae*, *Pieris rapae*, *Pontia edusa*, *Melanargia larissa*, *Vanessa cardui*, *Polyommatus agestis*, and *Polyommatus icarus* have been mostly observed in agricultural areas. *P. brassicae* and *P. rapae* feed on cultivated Brassicaceae and are common pests on *Brassica oleracea* as well as *Capparis spinosa* (Capparaceae); *V. cardui* and *P. icarus* are widespread on Fabaceae, including *Lotus*, *Trifolium*, *Astragalus*, and *Medicago*; *Lampides boeticus* feeds on *Prunus armeniaca* and *Pisum sativum* (Rosaceae); *Iphiclides podalirius* feeds on cultivated species such as *Prunus spinosa*, *P. armeniaca*, and *P. avium*; and *Leptidea sinapis* feeds on *Lotus corniculatus* in Sultandağları.

Most of the species were caught in meadows and prairies because of the variety of plants and abundance

**Table 3.** Systematic list of butterfly species collected in Sultandağları, Afyonkarahisar, Turkey. Localities are as in Tables 1 and 2.

<b>Superfamily: PAPILONOIDEA Latreille, (1802) (6 Families)</b>	
<b>Family: PAPILIONIDAE Latreille, (1802) (6 species):</b>	
<i>Iphiclides podalirius</i> (Linnaeus, 1758)	87, 68, 14, 69, 57, 51, 19, 71, 72, 84, 33, 40, 41, 21, 85, 73, 74
<i>Papilio (Alexanoria) alexanor</i> (Esper, 1800)	24, 33, 41, 21, 65
<i>Papilio machaon</i> (Linnaeus, 1758)	1, 102, 98, 39, 99, 30, 19, 40, 41, 53, 65, 12, 95, 108, 73
<i>Parnassius apollo</i> (Linnaeus, 1758)	5, 12, 54, 22
* <i>Parnassius (Driopa) mnemosyne</i> (Linnaeus, 1758)	5, 26, 2, 48, 68, 14, 69, 38, 61, 71, 72, 63, 84, 33, 34, 40, 20, 9, 11
* <i>Zerynthia (Allancastris) deyrollei</i> (Oberthür, 1869)	26, 58, 31, 14, 71
<b>Family: PIERIDAE (Duponchel, 1835) (17 species):</b>	
<i>Anthocharis cardamines</i> (Linnaeus, 1758)	51, 47, 46, 2, 26, 48, 98, 87, 58, 68, 14, 80, 88, 60, 83, 89, 52, 19, 71, 3
* <i>Anthocharis gruneri</i> (Herrich-Schäffer, 1851)	79
<i>Aporia crataegi</i> (Linnaeus, 1758)	1, 6, 43, 25, 24, 77, 37, 7, 98, 14, 3, 69, 71, 72, 63, 84, 40, 32, 33, 34, 9, 20, 4, 11, 41, 53, 64, 65, 54
<i>Colias (Neocolias) aurorina</i> Herrich-Schäffer, [1850]	1, 37, 36, 7, 20, 4, 41, 21
<i>Colias (Eriocolias) crocea</i> (Fourcroy, 1785)	5, 1, 15, 24, 77, 45, 37, 7, 36, 26, 87, 68, 14, 3, 69, 59, 29, 99, 101, 60, 51, 47, 71, 72, 62, 63, 84, 32, 33, 40, 34, 9, 4, 41, 64, 12, 65, 54, 53, 95, 13, 22, 18, 108, 85, 73, 67, 74, 23
<i>Colias alfacariensis</i> (Ribber, 1905)	5, 1, 24, 25, 77, 44, 37, 7, 36, 92, 51, 26, 2, 87, 68, 3, 14, 69, 29, 99, 89, 31, 61, 62, 71, 63, 84, 20, 41, 11, 53, 64, 12, 66, 54, 95, 18, 22, 85, 67, 73, 74
<i>Euchloe ausonia</i> (Hübner, 1804)	26, 31
<i>Gonepteryx farinosa</i> (Zeller, 1847)	24, 37, 7, 36, 89, 53, 54, 74
<i>Gonepteryx rhamni</i> (Linnaeus, 1758)	43, 24, 37, 36, 46, 51, 26, 2, 48, 87, 58, 14, 3, 69, 99, 101, 17, 80, 83, 60, 50, 31, 71, 72, 63, 84, 35, 53, 18, 108, 85, 74
<i>Leptidea duponcheli</i> (Staudinger, 1871)	89, 40, 85

Table 3. Contd.

<i>Leptidea sinapis</i> (Linnaeus, 1758)	56, 45, 51, 46, 47, 2, 26, 16, 48, 87, 98, 58, 14, 3, 69, 88, 60, 50, 89, 31, 61, 71, 72, 63, 35, 21, 85, 73
<i>Pieris brassicae</i> (Linnaeus, 1758)	24, 46, 51, 47, 16, 2, 26, 87, 48, 68, 98, 58, 14, 84, 40, 9, 12, 54, 18, 85, 74, 23
<i>Pieris (Artogeia) ergane</i> (Geyer, 1828)	24, 51, 50, 54
<i>Pieris (Artogeia) rapae</i> (Linnaeus, 1758)	45, 103, 16, 48, 87, 58, 69, 80, 83, 60, 50, 89, 71, 54, 73
<i>Pieris (Artogeia) mannii</i> (Mayer, 1851)	54
<i>Pieris (Artogeia) pseudorapae</i> (Verity, 1908)	1, 24, 56, 92, 51, 46, 2, 16, 26, 48, 87, 98, 58, 68, 14, 106, 80, 89, 50, 31, 71, 34, 4, 64, 53, 54, 85, 18, 73, 67, 74
<i>Pontia edusa</i> (Fabricius, 1777)	24, 25, 56, 78, 45, 7, 92, 68, 69, 80, 88, 61, 63, 84, 33, 34, 9, 64, 53, 12, 65, 54, 22, 85, 67, 73, 74
<b>Family: LIBYTHEIDAE Boisduval, 1833 (1 species):</b>	
<i>Libythea celtis</i> (Laicharting, 1782)	17, 80
<b>Family: ARGYNNIDAE Duponchel, [1835] (21 species):</b>	
<i>Aglais urticae</i> (Linnaeus, 1758)	37, 58, 59, 38, 33, 18
<i>Argynnis (Speyeria) aglaja</i> (Linnaeus, 1758)	1, 5, 44, 45, 37, 7, 92, 95, 4, 35, 53, 65, 54, 22, 18, 13, 85, 108
<i>Argynnis (Fabriciana) niobe</i> (Linnaeus, 1758)	25, 44, 45, 69, 29, 27, 84, 9, 54, 18, 85
<i>Argynnis (Pandoriana) pandora</i> [Denis and Schiffermüller], 1775)	42, 24, 45, 37, 92, 69, 28, 41, 54, 18, 108, 23
* <i>Boloria (Clossiana) euphrosyne</i> (Linnaeus, 1758)	93
<i>Brenthis daphne</i> (Bergstasser, 1780)	24, 27, 93, 64, 74
* <i>Brenthis hecate</i> (Denis and Schiffermüller, 1775)	110
<i>Issoria lathonia</i> (Linnaeus, 1758)	24, 45, 37, 36, 7, 92, 103, 46, 51, 47, 26, 2, 48, 2, 98, 58, 68, 87, 48, 14, 3, 69, 38, 29, 106, 80, 88, 31, 71, 72, 84, 34, 9, 41, 53, 21, 54, 18, 73
<i>Limenitis reducta</i> Staudinger, 1901	42, 24, 77, 45, 92, 16, 48, 87, 58, 14, 27, 69, 71, 72, 61, 63, 84, 34, 4, 35, 64, 53, 65, 85, 67, 73, 74
* <i>Melitaea (Mellicta) athalia</i> (Rottemburg, 1775)	5, 8, 110, 105, 9, 20, 4, 11, 53, 12, 108
<i>Melitaea cinxia</i> (Linnaeus, 1758)	56, 42, 37, 46, 47, 26, 16, 2, 58, 31, 14, 3, 29, 28, 71, 61, 63, 84, 32, 34, 20
<i>Melitaea (phoebe) punica</i> Oberthür, 1876	58, 69, 31, 62, 84, 72

Table 3. Contd.

<i>Melitaea (Didymaeformis) didyma</i> (Esper, 1779)	45, 5, 42, 77, 45, 37, 102, 59, 33, 9, 12
<i>Melitaea (Didymaeformis) fascelis</i> (Fabricius, 1787)	45, 5, 42, 77, 45, 37, 102, 59, 33, 9, 12
<i>Nymphalis antiopa</i> (Linnaeus, 1758)	99; 79; 82
<i>Nymphalis polychloros</i> (Linnaeus, 1758)	37; 48; 89
<i>Polygonia (Comma) c-album</i> (Linnaeus, 1758)	17; 89; 50
* <i>Polygonia (Comma) egea</i> (Cramer, 1775)	97; 80; 50
<i>Thaleropsis ionia</i> (Eversmann, 1851)	61
<i>Vanessa atalanta</i> (Linnaeus, 1758)	45, 37, 14, 3, 80, 50, 72, 4, 11, 53, 18, 10
<i>Vanessa cardui</i> (Linnaeus, 1758)	1, 42, 56, 24, 44, 45, 15, 25, 77, 37, 7, 92, 48, 17, 84, 40, 20, 4, 18
<b>Family: SATYRIDAE Boisduval, 1833 (24 species):</b>	
<i>Arethusana arethusia</i> (Denis and Schiffermüller, 1775)	94; 109
<i>Brintesia circe</i> (Fabricius, 1755)	1, 5, 24, 44, 45, 102, 64
<i>Chazara (Neochazara) anthe</i> (Hoffmannsegg, 1804)	15, 25, 97, 22
<i>Chazara briseis</i> (Linnaeus, 1764)	1, 45, 24, 15, 37, 7, 102, 99, 53, 12, 21, 54, 18, 13, 85, 74, 23
<i>Coenonympha leander</i> (Fabricius, 1787)	45, 37, 7, 82, 14, 3, 69, 62, 72, 84, 40, 9, 4, 11
<i>Coenonympha pamphilus</i> (Linnaeus, 1758)	92, 46, 49, 47, 26, 2, 16, 48, 98, 87, 48, 58, 68, 14, 3, 69, 59, 29, 31, 71, 61, 63, 84, 34, 32, 85, 73, 67, 74
<i>Hipparchia (Neohipparchia) fatua</i> (Freyer, 1844)	60, 72, 73, 74
<i>Hipparchia (Parahipparchia) aristaeus</i> (Bonelli, 1826)	45, 37, 7, 15, 109, 105, 28, 9, 12
* <i>Hipparchia (Neohipparchia) statilinus</i> (Hufnagel, 1766)	92; 109; 23
<i>Hipparchia syriaca</i> (Staudinger, 1871)	24, 1, 44, 45, 36, 36, 105, 34, 35, 64, 22, 74, 23
<i>Hyponephele lupina</i> (Costa, 1836)	5, 24, 45, 44, 109, 27, 99, 106, 54, 13
<i>Hyponephele lycaon</i> (Rottemburg, 1775)	92, 109, 99, 106, 35, 54, 22, 13, 18, 73, 74
<i>Kirinia roxelana</i> (Cramer, 1777)	24, 44, 45, 94, 99, 35, 21, 73, 74
* <i>Lasiommata maera</i> (Linnaeus, 1758)	56, 7, 109, 16, 2, 87, 48, 59, 38, 41, 74
* <i>Lasiommata megera</i> (Linnaeus, 1767)	46, 16, 26, 48, 58, 28, 38, 104, 99, 40, 41
<i>Maniola (Telmessiola) telmessia</i> (Zeller, 1847)	1, 76, 42, 24, 44, 45, 92, 14, 59, 28, 100, 63, 4, 35, 65, 85, 67
<i>Maniola jurtina</i> (Linnaeus, 1758)	1, 24, 14, 69, 59, 28, 93, 63, 33, 35, 64, 73, 67, 74
<i>Melanargia (Turcargia) larissa</i> (Geyer, 1828)	1, 5, 24, 15, 44, 45, 77, 37, 7, 36, 99, 101, 64, 21, 65, 54, 95, 22, 18, 85, 108, 73

Table 3. Contd.

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<i>Pseudochazara (Achazara) anthelea</i> (Hübner, 1824)	24, 25, 44, 45, 37, 7, 36, 35, 65
<i>Pseudochazara beroe</i> (Freyer, 1843)	96; 95
<i>Pseudochazara lydia</i> (Staudinger, 1878)	86, 99, 73, 74, 23
<i>Pseudochazara mamurra</i> (Herrich-Schäffer, 1846)	15
<i>Pseudochazara mniszechii</i> (Herrich-Schäffer, 1851)	24, 92, 99, 85, 73, 74
<i>Satyrus (Asatyris) ferulus</i> (Fabricius, 1793)	86, 77, 97, 95
<b>Family: LYCAENIDAE Stephenes, 1829 (45 species):</b>	
<i>Callophrys rubi</i> (Linnaeus, 1758)	82, 26, 16, 48, 68, 58, 60, 89, 31, 71, 62, 84
<i>Celastrina argiolus</i> (Linnaeus, 1758)	87, 80, 60, 89, 71, 63
<i>Cupido minimus</i> (Fuessly, 1775)	99, 70, 61, 62, 63
<i>Cupido osiris</i> (Meigen, 1829)	14, 27, 70, 71, 61, 63, 54
<i>Glaucopsyche alexis</i> (Poda, 1761)	58, 14, 69, 60, 31, 62, 63
<i>Glaucopsyche (Iolana) lessei</i> (Bernardi, 1964)	75, 42, 48, 58
<i>Lampides boeticu</i> (Linnaeus, 1767)	42, 24, 86, 69, 63, 35, 53, 21, 95, 85, 73, 67, 23, 74
<i>Lycaena (Alciphronia) alciphron</i> (Rottemburg, 1775)	90, 2, 26, 68, 58, 3, 53, 12, 54, 18, 90, 85, 73
<i>Lycaena (Heodes) virgaureae</i> (Linnaeus, 1758)	5, 109, 18
<i>Lycaena (Loweia) tityrus</i> (Poda, 1761)	82, 2, 48, 98, 58, 3, 99, 60, 61, 71, 62, 63, 84, 85, 73, 74
<i>Lycaena (Thersamonia) thersamon</i> (Esper, 1784)	56, 109, 84, 54, 73, 74
<i>Lycaena (Thersamonia) thetis</i> (Klug, 1834)	94, 106, 54, 95, 107, 18, 108
<i>Lycaena phlaeas</i> (Linnaeus, 1761)	94, 58, 93, 54, 74
<i>Plebejus (Kretania) carmon</i> (Gerhard, 1851)	98, 59, 28, 62, 61, 63, 84, 33, 4, 95
<i>Plebejus (Lycaeides) idas</i> (Linnaeus, 1761)	24, 9, 54, 95
<i>Plebejus (Plebejides) sephirus</i> (Frivaldzky, 1835)	42, 86, 36, 87, 48, 59, 20, 4, 13
<i>Plebejus argus</i> (Linnaeus, 1758)	5, 1, 68, 7, 72, 53, 12, 54, 95, 18, 13
<i>Polyommatus (Albulina) loewii</i> (Zeller, 1847)	45, 63, 84, 34, 4, 65

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Table 3. Contd.

<i>Polyommatus (Eumedonia) eumedon</i> (Esper, 1780)	99
<i>Polyommatus (Aricia) anteros</i> (Freyer, 1838)	51, 16, 48, 87, 58, 14, 59, 69, 29, 38, 61, 71, 63, 84, 4, 9, 85, 67, 74
<i>Polyommatus (Aricia) agestis</i> (Denis and Schiffermüller, 1775)	42, 51, 47, 26, 48, 87, 58, 68, 14, 59, 69, 110, 89, 31, 61, 62, 63, 84, 34, 4, 9, 35, 64, 53, 65, 85, 73, 74
* <i>Polyommatus (Aricia) artaxerxes</i> (Verity, 1936)	45, 51, 46, 16, 87, 69, 31, 73, 67
<i>Polyommatus (Agrodiaetus) actis</i> (Herrich-Schäffer, 1851)	25, 105, 106, 54, 95, 108
<i>Polyommatus (Admetusia) admetus</i> (Esper, 1783)	109, 35, 73
<i>Polyommatus (Admetusia) ripartii</i> (Freyer, 1830)	93, 105, 65, 21, 54, 95
<i>Polyommatus (Agrodiaetus) hopfferi</i> (Gerhard, 1851)	109, 35, 65, 22, 85, 108, 73, 23, 74
* <i>Polyommatus (Agrodiaetus) poseidon</i> (Herrich-Schäffer, 1851)	95
<i>Polyommatus (Agrodiaetus) wagneri</i> (Forster, 1956)	91
<i>Polyommatus (Agrodiaetus) iphigenia</i> (Herrich-Schäffer, 1847)	105, 53, 65, 95
<i>Polyommatus (Cyaniris) bellis</i> (Freyer, 1842)	2, 26, 87, 68, 58, 3, 69, 29, 38, 31, 62, 63, 84, 4, 20
<i>Polyommatus (Lysandra) bellargus</i> (Rottemburg, 1775)	56, 43, 44, 7, 47, 51, 26, 16, 68, 48, 87, 98, 14, 59, 69, 29, 27, 99, 101, 31, 61, 71, 62, 63, 84, 34, 4, 9, 20, 53, 73, 23, 74
<i>Polyommatus (Lysandra) ossmar</i> (Gerhard, 1851)	94, 69, 99, 54, 85, 73, 74
<i>Polyommatus (Meleageria) dophnis</i> (Denis and Schiffermüller, 1775)	45, 86, 109, 54, 85, 108, 73, 74
<i>Polyommatus (Plebicula) amandus</i> (Schneider, 1792)	82, 16, 58, 14, 69, 27, 61, 63, 72, 84, 64
<i>Polyommatus (Sublysandra) cornelius</i> (Freyer, 1850)	26; 62; 73
<i>Polyommatus (Thersitesia) thersites</i> (Canterer, 1835)	53, 64, 12, 65, 54, 18, 13, 85, 73, 67, 23, 74
<i>Polyommatus icarus</i> (Rottemburg, 1775)	5, 1, 25, 56, 15, 37, 36, 51, 46, 26, 16, 48, 87, 98, 68, 14, 3, 59, 69, 29, 38, 99, 101, 31, 61, 62, 71, 63, 84, 40, 33, 32, 34, 4, 20, 53, 64, 12, 65, 95, 22, 13, 18, 85, 73, 67, 23, 74
<i>Pseudophilotes vicrama</i> (Moore, 1865)	45, 46, 48, 58, 3, 99, 20, 21, 65, 67, 23
<i>Quercusia quercus</i> (Linnaeus, 1758)	1; 21
<i>Satyrium (Nordmannia) acaciae</i> (Fabricius, 1787)	86, 95
<i>Satyrium (Nordmannia) ilicis</i> (Esper, 1779)	90, 45, 36, 35, 85
<i>Satyrium (Strymonidia) spini</i> (Fabricius, 1787)	1, 24, 102, 35, 95
* <i>Tomares (nogelii) nesimachus</i> (Oberthür, 1893)	99
* <i>Tomares (nogelii) nogelii</i> (Freyer, 1851)	16; 62



Table 3. Contd.

<i>Turanana endymion</i> (Freyer, 1850)	99; 22; 108
<b>Superfamily: HESPERIOIDEA Latreille, 1809 (1 Family)</b>	
<b>Family: HESPERIIDAE Latreille, 1809 (17 species):</b>	
<i>Carcharodus (Lavatheria) lavatherae</i> (Esper, 1783)	90, 45, 53, 108, 23
<i>Carcharodus (Reverdinus) orientalis</i> (Reverdin, 1913)	51, 69, 93, 99, 106, 62, 61, 53, 12, 21, 54, 95, 18, 85, 108, 73, 74
<i>Carcharodus alceae</i> (Esper, 1780)	102, 69, 81, 89, 61, 64, 53, 12, 73, 74
<i>Erynnis (Hesperopegasus) marloyi</i> (Boisduval, 1834)	62, 40, 41
<i>Erynnis tages</i> (Linnaeus, 1758)	56, 51, 2, 26, 16, 48, 68, 58, 14, 3, 59, 69, 60, 31, 61, 71, 61, 62, 63, 72, 84, 34, 85, 73, 74
<i>Hesperia comma</i> (Linnaeus, 1758)	23; 54
<i>Muschampia nomas</i> (Lederer, 1855)	25, 37, 86, 36, 63, 53, 12, 54, 22
<i>Muschampia proteides</i> (Wagner, 1929)	44, 109, 110, 99, 106, 21, 54, 85, 73, 23, 74
<i>Ochlodes venatus</i> (Bremer and Grey, 1852)	5, 42, 24, 45, 99, 110, 72, 53
<i>Pyrgus armoricanus</i> (Oberthür, 1910)	42, 48, 29, 71, 63, 84, 34, 85, 73, 23
<i>Pyrgus cinarae</i> (Rambur, 1839)	37, 94, 59, 71, 84, 64, 65, 85, 73
<i>Pyrgus melotis</i> (Duponchel, 1834)	56, 47, 46, 2, 26, 16, 48, 68, 58, 14, 69, 29, 60, 31, 61, 71, 62, 63, 84, 40, 34, 34, 4, 74
<i>Pyrgus serratulae</i> (Rambur, 1839)	7, 68, 58, 14, 3, 69, 38, 29, 62, 61, 63, 84, 34, 34, 4, 9
<i>Pyrgus sidae</i> (Esper, 1784)	27, 63, 84, 32, 4, 20, 12
<i>Spialia (Neaspialia) orbifer</i> (Hübner, 1823)	42, 24, 44, 7, 26, 48, 58, 59, 49, 89, 31, 62, 61, 71, 63, 84, 32, 34, 4, 20, 35, 53, 54, 74
<i>Thymelicus lineolus</i> (Ochsenheimer, 1808)	5, 1, 24, 25, 44, 45, 37, 36, 7, 59, 110, 63, 32, 20, 64, 53, 12, 54, 22, 18, 85
<i>Thymelicus sylvestris</i> (Poda, 1761)	5, 1, 24, 45, 77, 44, 37, 37, 7, 36, 59, 99, 106, 84, 33, 4, 20, 35, 53, 64, 12, 21, 54, 22, 13, 85, 73

of flowers there. The greatest diversity of butterfly species was observed in spring and summer seasons, which provide the most food resources for butterfly larvae and adults and have adequate temperatures for development.

The most widespread species in the study area were: *I. podalirius*, *Papilio machaon*, *Parnassius mnemosyne*, *A. cardamines*, *Aporia crataegi*, *Colias crocea*, *E. ausonia*, *Gonepteryx rhamni*, *L. sinapis* *P. brassicae*, *P. rapae*, *P. pseudorapae*,

*P. edusa*, *Argynnis aglaja*, *A. pandora*, *Issoria lathonia*, *Limenitis reducta*, *Melitaea cinxia*, *V. cardui*, *Chazara briseis*, *Coenonympha leander*, *C. pamphilus*, *Hipparchia syriaca*, *Hyponephele lycaon*, *Lasiommata maera*, *L. megera*, *Maniol*

*telmessia*, *M. jurtina*, *M. larissa*, *Callophrys rubi*, *L. boeticus*, *Lycaena alciphron*, *L. tityrus*, *Polyommatus anteros*, *P. agestis*, *P. bellis*, *P. bellargus*, *P. thersites*, *P. icarus*, *Carcharodus lavatherae*, *C. alceae*, *Erynnis tages*, *Muschampia proteide*, *Pyrgus melotis*, *P. serratulae*, *Spialia orbifer*, *Thymelicus lineolus*, and *T. sylvestris*.

The Papilionoidea and Hesperioidea fauna of the Sultandağları Mountains was investigated in detail with this study and results of the studies conducted on the subject were also evaluated together. Furthermore; recent changes on Lepidoptera taxonomy and nomenclature were taken into consideration in this study and thus scientific names of fauna in this region were updated. 14 taxa of Papilionoidea and Hesperioidea in total have been identified until now from Sultandağları. Their distributions according to families are as: Papilionidae (1), Argynnidae (2), Satyridae (1), Lycaenidae (7) and Hesperidae (3). According to the recent taxonomic studies (Hesselbarth et al., 1995), only five names from the proposed taxons still remains valid today. Others are mentioned in the literature as just young synonym names. The list relating to these names is given below. The 14 valid taxa, which have been identified in Sultandağları are not endemic for the area covered in this study because they exist in other regions of Turkey and even in some neighbor countries. Papilionidae *Parnassius apollo anatolicus* Pagenstecher, 1912, today is accepted as junior synonym of *Parnassius apollo* (Linnaeus, 1758).

Argynnidae: *Mellicta athalia anatolica* Wagner, 1929, today is accepted as junior synonym of *Melitaea (Mellicta) athalia* (Rottemburg, 1775). *Brenthis daphne anatolica* Belter, 1935, today is accepted as junior synonym of *Brenthis daphne* (Bergstasser, 1780).

Satyridae: *Eumenis statilinus minutula* Verity, 1938, today is accepted as junior synonym of *Hipparchia (Neohipparchia) statilinus* (Hufnagel, 1766).

Lycaenidae: *Strymon lynceus* ssp. *anatolicus* Lattin, 1950, today is accepted as junior synonym of *Strymonidia spini* (Fabricius 1787). *Callophrys rubi* ssp. *herculeana* Pfeiffer, 1927, today is accepted as junior synonym of *C. rubi* (Linnaeus, 1758). *Cupido (Tiora) sebrus majuspunctata* Verity, 1934, today is accepted as *Cupido osiris* (Meigen, [1829]). *Plebejus sephyrus modica* Verity, 1935, today is accepted as junior synonym of *Plebejus (Plebejides) sephyrus* (Frivaldzky, 1835). *Lycaena argus* ssp. *sultana* Forster, 1936, today is accepted as junior synonym of *Plebejus argus* (Linnaeus, 1758). *Agrodiaetus admetus* ssp. *anatoliensis* Forster, 1960, today is accepted as *Polyommatus (Admetusia) admetus* (Esper, [1783]). *Agrodiaetus damone* ssp. *wagneri* Forster, 1956, today is accepted as *Polyommatus (Agrodiaetus) wagneri* (Forster, 1956).

Hesperidae: *Carcharodus orientalis* ssp. *centralanatolica* Pfeiffer, 1927, today is accepted as junior synonym of *Carcharodus (Reverdinus) orientalis* Reverdin, 1913.

*Hesperia proto proteides* Wagner, 1929, today is accepted as *Muschampia proteides* (Wagner, 1929). *Hesperia persica postranae* Pfeiffer, 1927, is accepted as junior synonym of *Pyrgus armoricanus* (Oberthür, 1910).

This study contributed to our knowledge of the lepidopteran fauna of Sultandağları in Afyonkarahisar province, Turkey. Scientific and taxonomic studies from this region are very limited in number. New studies of insect distributions should be carried out before agricultural and forest ecosystems are destroyed. In addition, the continuing illegal use of forests and incorrect land-use practices threaten to destroy biodiversity in the Aegean region. Therefore, detailed studies should be carried out as quickly and accurately as possible to evaluate the biological diversity in Turkey.

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