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Original article

Contributions to the knowledge of the vernal butterflies of East Mediterranean region in Turkey

Doğu Akdeniz Bölgesi (Türkiye) bahar kelebeklerinin bilgisine katkılar

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ABSTRACT

The present paper is a continuation of the previously published spring butterflies of the Eastern Mediterranean Region. The information of collection station of the previously listed species of 68 stations was included in this study. The stations were divided into 8 groups according to their vertical distribution. Habitat types at various altitudes have been defined. The communities of Lepidoptera detected in these habitats are given. The status of the *Pontia daplidice/edusa* species group in the region is discussed.

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INTRODUCTION

Biodiversity in Turkey is generally higher in plants and animals, not only in butterflies and moths but also in other insect species compared to European and the Near East countries (Wagener 2006). The Mediterranean Region is one of the richest regions of Turkey in terms of endemism. Çukurova valley, located in the Mediterranean region, has the most fertile agricultural soils in Turkey. This region also includes the Seyhan and Ceyhan deltas, which were declared as important natural areas (Eken et al. 2006). Intensive agricultural practices, animal husbandry, tourism, and urbanization pressure in the coastal areas of the region are some adverse impacts on butterfly diversity.

Although there are many studies on the butterflies in Turkey, the number of the studies containing spring butterflies is limited. Some of these contain information about the early developmental stages of spring species (Koçak 1982, Koçak

and Seven 1990, 1991, Torun and Seven 2016). Some studies on Turkey's spring butterflies as follows: Kemal and Seven 2008, Koçak 1993, Kemal and Koçak 2017a, 2017b, Kemal and Koçak 2018a, 2018b.

This article includes supplementary notes to the previous article on spring butterflies in the Eastern Mediterranean Region of Turkey (Seven and Bozacı 2020). In the study, information was given about the labels of butterfly collection stations. Collection stations were divided into 8 groups according to their vertical distribution and habitat definitions of them were recorded. In addition, some identified species were discussed.

MATERIALS AND METHODS

Butterfly species were collected in daylight within the borders of the Eastern Mediterranean region between April and June

2008. The species list is given by Seven and Bozacı (2020) and the stations are shown on Figure 1. The open addresses of the collection stations are presented in Table 1. Photographs of some species recorded from the area are shown in Table 2. The field research of this study was conducted within the scope of the Anatolian Cross Biodiversity Project of The Nature Conservation Center.

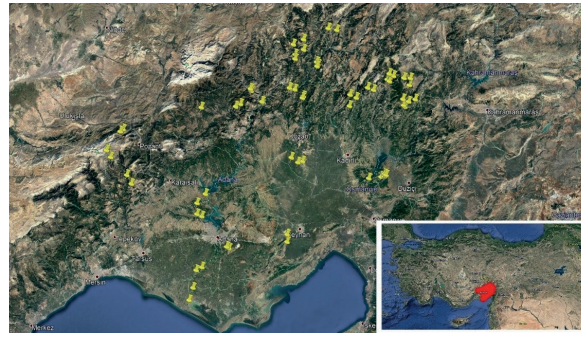


Figure 1. The stations collected butterfly species within the borders of the Eastern Mediterranean region (Seven & Bozacı, 2020)

Table 1. Numbers, full names, altitudes, dates, and coordinates of collecting stations

1. Adana,İnnaplı,0002m, 27.04.2008, 36S 0692570D, 4060939K	35. Adana,Yaylapınar,1068m,29.05.2008,36S 748996D,4197468K
2. Adana,Çavuşlu,0001m, 27.04.2008, 36S 0694466D, 4067412K	36. Adana,Yerebakan,0846m, 29.05.2008,36S 749207D,4192245K
3. Adana,Irmakbaşı,0002m, 27.04.2008,36S 0698865D, 4078187K	37. Adana,Değirmenuşağı,1373m, 29.05.2008,36S 744851D,4189564K
4. Adana,Karaahmetli,0003m, 27.04.2008, 36S 0695920D, 4076610K	38.Adana,Değirmenuşağı-Kayadibi,1516m, 29.05.2008, 36S 744848D,4187265K
5. Adana,Yukarıçiçekli,0007m, 27.04.2008, 36S 0711573D, 4089131K	39. Adana,Hıdıruşağı,0975m, 29.05.2008,36S 743776D,4194785K
6. Adana,Yukarıçiçekli,0016m, 27.04.2008, 36S 0712757D, 4088409K	40. Adana,Akkaya,0519m, 30.05.2008,36S 756105D,4186073K
7. Adana,Kabasakal, 0211m, 28.04.2008, 36S 0695681D, 4105747K	41. Adana,Cıvıklı,1112m, 30.05.2008,36S 761673D,4203496K
8. Adana,Kabasakal, 0089m, 28.04.2008, 36S 0698216D, 4104657K	42. Adana,Cumhurlu,0974m, 30.05.2008,37S 238864D,4202615K
9. Adana,Kaşoba,0124m, 28.04.2008, 36S 0695584D, 4111436K	43. Adana, Darılık, 1045m , 04.05.2008, 36S 0717102D,4163265K
10. Adana,Kırıklı,0078m, 28.04.2008, 36S 0699850D, 4116310K	44. Adana,Darılık,0690m, 04.05.2008, 36S 0714635D,4161954K
11. Adana,Ağaçpınar-İsalı,0051m, 29.04.2008, 36S 0742954D, 4092499K	45. Adana,Kökez-Kıçak,1017m, 04.05.2008, 36S 0696750D,4161015K
12. Adana,Çokçapınar,0125m, 29.04.2008, 36S 0742928D, 4096317K	46.Kahramanmaraş,1297m, 01.05.2008, 37S 0276016D,4176177K
13. Adana,Hamam,0072m, 29.04.2008, 36S 0749969D, 4134457K	47. Kahramanmaraş,1384m, 1.05.2008, 37S 0275310D,4172684K
14. Adana,Aslanlı-Hamam,0055m, 29.04.2008, 36S 0747637D, 4133812K	48.Kahramanmaraş,Torlar,1181m, 01.05.2008, 37S 0271974D,4162395K
15. Adana,Ufakıkören,0073m, 29.04.2008, 36S 0744124D, 4136272K	49. Kahramanmaraş, Yeniköy, Torlar, 1044m, 01.05.2008, 37S 0271760D,4165511K
16. Adana,Olukluçunur, 0431m, 30.04.2008, 37S 0260755D, 4127254K	50.Kahramanmaraş,Gökgedik,1029m,01.05.2008, 37S 0278092D,4165112K

17. Adana,Olukluçunur,0387m, 30.04.2008, 37S 0261452D, 4126656K	51. Kahramanmaraş,Kargaçayırı,1298m, 31.05.2008, 37S 275950D,4175989K
18. Adana,Olukluçunur-Karagedik, 0313m, 30.04.2008, 37S 0260540D, 4126014K	52. Kahramanmaraş,Kargaçayırı/ Kaleboynu,1445m, 31.05.2008, 37S 272648D,4176416K
19. Adana,Karagedik,0144m, 30.04.2008, 37S 0258860D, 4125779K	53. Kahramanmaraş,Gökgedik,0933m, 31.05.2008, 37S 274746D,4164152K
20. Adana,Karatepe,0286m, 30.04.2008, 37S 0252444D, 4125294K	54. Kahramanmaraş,Torlar,1132m,31.05.2008, 37S 272609D,4161559K
21. Mersin, Çukurbağ, 0960m, 24.05.2008, 36S 0661282D, 4120694K	55. Osmaniye,Yeşilyayla, 0785m, 02.05.2008, 37S 0243826D,4163082K
22. Adana,Horoz,1371m,25.05.2008, 36S 655205D, 4147528K	56. Osmaniye,Esenli,1321m, 02.05.2008, 37S 0247508D,4167150K
23. Adana,Horoz,1257m, 25.05.2008, 36S 656534D,4148726K	57. Osmaniye,Esenli,0833m, 02.05.2008, 37S 0244348D,4168848K
24. Adana,Akçatekir,1916m,26.05.2008, 36S 648464D,4137707K	58.Osmaniye,Çokak, 1180m,02.05.2008, 37S 0265079D 4178844K
25. Adana,Akçatekir,1610m, 26.05.2008, 36S 650482D,4134147K	59. Osmaniye,Akifiye, 1148m, 02.05.2008, 37S 0264985D, 4174973K
26. Adana,Kıçak, 1021m, 26.05.2008,36S 696771D,4161036K	60. Osmaniye,Akifiye, 1221m,01.06.2008, 37S 0267199D,4177670K
27. Adana,Köprücek,1216m, 27.05.2008, 36S 722510D,4170249K	61. Osmaniye,Akkaya, 0771m, 03.05.2008, 36S 0756341D,4183852K
28. Adana,Köprücek,1119m, 27.05.2008, 36S 722059D,4171256K	62. Osmaniye,Canbaz, 1157m, 01.06.2008, 37S 0263972D,4175930K
29. Adana,Gökgöz/Musafakı mah,0579m, 27.05.2008, 36S 728209D,4164760K	63. Osmaniye,Değirmendere/Kale, 1263m, 01.06.2008, 37S 0256591D,4170820K
30. Adana,Düzağaç,0781m, 28.05.2008, 36S 749578D,4168144K	64. Osmaniye,Maksutoğlu, 1240m, 01.06.2008, 37S 0253613D,4172075K
31.Adana,Kabaktepe,0856m, 28.05.2008, 36S 749147D,4167253K	65. Mersin, Çukurbağ, 1193m, 05.05.2008, 36S 0658909D,4125123K
32.Adana,Çelenuşağı,1131m,28.05.2008, 36S 742302D,4172274K	66.Mersin, Çukurbağ, 0942m, 05.05.2008, 36S 0661311D,4120469K
33.Adana,Çelenuşağı,1073m,28.05.2008, 36S 742556D,4171795K	67. Kayseri,Sarız,1557m, 02.06.2008, 37S 0280342D,4259301K
34. Adana,Yanalerik,0988m, 28.05.2008, 36S 745098D,4171513K	68. Adana,Akkaya,0615m, 30.05.2008, 36S 756765D,4184861K

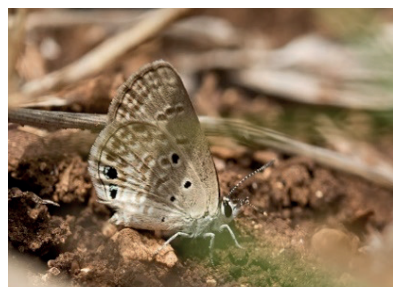
Table 2. Some vernal butterflies of the East Mediterranean Region



Aricia anteros



Glaucopsyche lessei



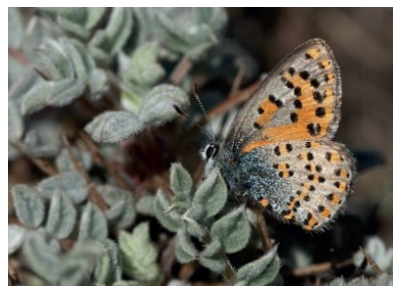
Chilades galba



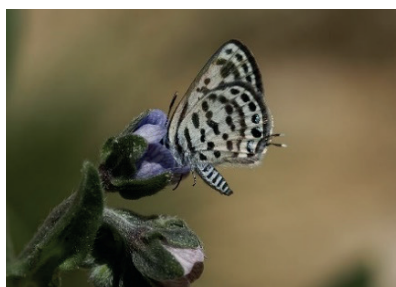
Polyommatus antiochenus



Zizeeria karsandra



Tomares nesimachus



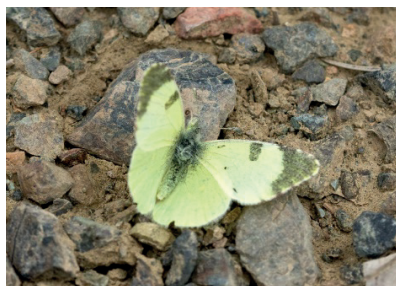
Tarucus balkanicus



Callophrys paulae



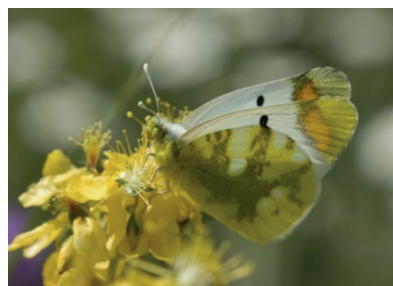
Zerynthia cerisy



Elphinstonia penia



Euchloe ausonia



Zegris eupheme



Polygonia egea



Thaleropis ionia



Ypthima asterope

RESULTS

The collection stations were divided into 8 groups according to their 250 m altitude ranges. The habitat definitions of the stations where the collection is made at the altitude ranges in question and the identified species are as follows.

A (0-250 m): Habitat types seen at between 0-250 m are mostly plantation areas (citrus groves, ruderal areas in the vicinity of the residential area, road edges with acacia and eucalyptus trees beside them) and natural areas (dried river beds and maquis areas where kermes oak and Ramhnus are densely seen).

Butterfly species: Pieridae: *Colias crocea* (Fourcroy, 1785), *Euchloe ausonia* (Hübner, [1804]), *Pieris rapae* (L., 1758), *P. brassicae* (L., 1758), *Pontia edusa* (Fabricius, 1777). Nymphalidae: *Melitaea fascelis* (Esper, 1783), *Polygonia egea* (Cramer, [1775]), *Vanessa cardui* (L., 1758), *V.atalanta* (L., 1758), Satyriinae: *Kirinia roxelana* (Cramer, [1777]), *Lasiommata megera* (L., 1767), *Maniola telmessia* (Zeller, 1847), *Ypthima asterope* (Klug, 1832), Lycaenidae: *Aricia agestis* ([D. and Sch.], 1775), *Chilades trochylus* (Freyer, [1843]), *C. galba* (Lederer, 1855), *Glauropsyche alexis* (Poda, 1761), *Lampides boeticus* (L., 1767), *Lycaena phlaeas* (L., 1761), *Plebejus sephirus* (Frivaldszky, 1835), *Polyommatus icarus* (Rottemburg, 1775), *Satyrium ilicis* (Esper, [1779]), *S. spini* ([D. and Sch.], 1775), *Tarucus balkanicus* (Freyer, [1844]), *Zizeeria karsandra* (Moore, 1865), Hesperidae: *Carcharodus orientalis* Reverdin, 1913, *C. alceae* (Esper, [1780]), *Gegenes pumilio* (Hoffmannsegg, 1804), *G. nostrodamus* (Fabricius, 1793), *Muschampia tessellum* (Hübner, [1802]), *Pyrgus melotis* (Duponchel, [1834]), *Pelopidas thrax* (Hübner, [1821]), *Spialia orbifer* (Hübner, 1823), *Thymelicus sylvestris* (Tutt, [1905]).

B (250-500 m): Types of habitat at their heights, mostly edges of pine plantation, open fields in the forest, Cistus dominated by olive trees, olive groves, roadside in forests, and areas with low vegetation due to maquis groves.

Butterfly species: Pieridae: *Colias crocea* (Fourcroy, 1785), *Euchloe ausonia* (Hübner, [1804]), *Pieris rapae* (L.,1758), *P. brassicae* (L.,1758). Nymphalidae: *Melitaea phoebe* ([D. and Sch.], 1775), *M. fascelis* (Esper, 1783), *Vanessa cardui* (L., 1758), *V. atalanta* (L., 1758), Satyriinae: *Lasiommata megera* (L., 1767), *Maniola telmessia* (Zeller, 1847), *Pararge aegeria* (L., 1758), *Ypthima asterope* (Klug, 1832), Lycaenidae: *Aricia agestis* ([D. and Sch.], 1775), *Glauropsyche lessei* (Bourgogne, 1954), *G. alexis* (Poda, 1761), *Lycaena phlaeas* (L., 1761), *Polyommatus icarus* (Rottemburg, 1775), Hesperidae: *Carcharodus alceae* (Esper, [1780]), *Gegenes pumilio* (Hoffmannsegg, 1804).

C (500-750 m): Heights at between 500-750 m, there are forest openings, kermes oak, dried river beds, and maquis groves dominated by Rhamnus.

Butterfly species: Pieridae: *Anthocharis cardamines* (L.,1758), *Colias crocea* (Fourcroy, 1785), *Euchloe ausonia* (Hübner, [1804]), *Euchloe (Elphinstonia) penia* (Freyer, 1851), *Pieris rapae* (L.,1758), *P. brassicae* (L.,1758), *Pontia edusa* (Fabricius, 1777), Nymphalidae: *Argynnis pandora* ([D. and Sch.], 1775), *Issoria lathonia* (L., 1758), *Limenitis reducta* Staudinger, 1901, *Melitaea phoebe* ([D. and Sch.], 1775), *M. telona* Fruhstorfer, 1908, *Vanessa cardui* (L., 1758), *V. atalanta* (L., 1758), Satyriinae: *Hipparchia mersina* (Staudinger, 1871), *Kirinia roxelana* (Cramer, [1777]), *Maniola telmessia* (Zeller, 1847), *Pararge aegeria* (L., 1758), Lycaenidae: *Aricia agestis* ([D. and Sch.], 1775), *Chilades trochylus* (Freyer, [1843]), *Glauropsyche alexis* (Poda, 1761), *Lampides boeticus* (L., 1767), *Lycaena phlaeas* (L., 1761), *Plebejus sephirus* (Frivaldszky, 1835), *Polyommatus icarus* (Rottemburg, 1775), *Rubrapterus bavius* (Eversmann, 1832), *Satyrium ilicis* (Esper, [1779]), *S. spini* ([D. and Sch.], 1775), Hesperidae: *Carcharodus alceae* (Esper, [1780]), *Muschampia tessellum* (Hübner, [1802]), *Pyrgus melotis* (Duponchel, [1834]), *P. armoricanus* (Oberthür, 1910), *Spialia orbifer* (Hübner, 1823), *Thymelicus sylvestris* (Tutt, [1905]).

D (750-1000 m): At these heights, there are fields where dryland farming (wheat) is practised and Riparian forest is dominated by poplar trees.

Butterfly species: Papilionidae: *Iphiclides podalirius* (L., 1758), *Papilio machaon* (L., 1758), *Zerynthia cerisy* (Godart, [1824]), Pieridae: *Anthocharis cardamines* (L.,1758), *Colias crocea* (Fourcroy, 1785), *Gonepteryx cleopatra* (L.,1767), *G. rhamni* (L.,1758), *Pieris napi* (L.,1758), *P. rapae* (L.,1758), *P. brassicae* (L.,1758), *Pontia edusa* (Fabricius, 1777), Nymphalidae: *Argynnis pandora* ([D. and Sch.], 1775), *Issoria lathonia* (L., 1758), *Limenitis reducta* Staudinger, 1901, *Melitaea phoebe* ([D. and Sch.], 1775), *M. telona* Fruhstorfer, 1908, *M. fascelis* (Esper, 1783), *Nymphalis polychloros* (L.,1758), *Vanessa cardui* (L., 1758), *V. atalanta* (L., 1758), Satyriinae: *Coenonympha pamphilus* (L.,1758), *Hipparchia mersina* (Staudinger, 1871), *Kirinia roxelana* (Cramer, [1777]), *Lasiommata maera* (L.,1758), *L. megera* (L., 1767), *Maniola telmessia* (Zeller, 1847), Lycaenidae: *Aricia agestis* ([D. and Sch.], 1775), *Lycaena phlaeas* (L., 1761), *Lampides boeticus* (L., 1767), *Polyommatus anteros* (Freyer, [1838]), *P. bellis* (Freyer, [1842]), *P. bellargus* (Rottemburg, 1775), *P. syriacus burak* Koçak, 1992, *P. amandus* (Schneider, 1792), *P. thersites* (Cantener, [1835]), *P. icarus* (Rottemburg, 1775), *Plebejus sephirus* (Frivaldszky, 1835), *Satyrium ilicis* (Esper, [1779]), *S. spini* ([D. and Sch.], 1775), *Tarucus balkanicus*

(Freyer, [1844]), Hesperidae: *Carcharodus orientalis* Reverdin, 1913, *C. alcaeae* (Esper, [1780]), *Gegenes pumilio* (Hoffmannsegg, 1804), *Muschampia nomas* (Lederer, 1855), *M. proto* (Ochsenheimer, 1808), *M. tessellum* (Hübner, [1802]), *Pyrgus armoricanus* (Oberthür, 1910), *P. melotis* (Duponchel, [1834]), *Spialia orbifer* (Hübner, 1823), *Thymelicus sylvestris* (Tutt, [1905]).

E (1000-1250 m): In the residential areas, there are gardens, non-deep short valleys, outdoor areas with well-developed vegetation, and non-cultivated fields.

Butterfly species: Papilionidae: *Archon apollinus* (Herbst, 1798), *Parnassius mnemosyne* (L., 1758), *Zerynthia cerisy* (Godart, [1824]), Pieridae: *Colias crocea* (Fourcroy, 1785), *C. alfariensis* Ribbe, 1905, *Euchloe ausonia* (Hübner, [1804]), *Leptidea sinapis* (L., 1758), *Pieris ergane* (Geyer, [1828]), *P. napi* (L., 1758), *P. rapae* (L., 1758), *P. brassicae* (L., 1758), *Pontia edusa* (Fabricius, 1777), Nymphalidae: *Argynnis pandora* ([D. and Sch.], 1775), *Issoria lathonia* (L., 1758), *Melitaea phoebe* ([D. and Sch.], 1775), *M. telona* Fruhstorfer, 1908, *M. didyma* (Esper, 1778), *M. fascelis* (Esper, 1783), *M. cinxia* (L., 1758), *M. collina* Lederer, 1861, *Polygonia egea* (Cramer, [1775]), *Thaleropsis ionia* (Eversmann, 1851), *Vanessa cardui* (L., 1758), *V. atalanta* (L., 1758), *Limnitis reducta* Staudinger, 1901, Satyrinae: *Coenonympha pamphilus* (L., 1758), *Hipparchia mersina* (Staudinger, 1871), *Lasiommata maera* (L., 1758), *Maniola telmessia* (Zeller, 1847), Lycaenidae: *Aricia agestis* ([D. and Sch.], 1775), *Callophrys danchenkoi* Zhdanko, 1998, *C. rubi* (L., 1758), *Glaucopteryx alexis* (Poda, 1761), *G. lessei* (Bourgogne, 1954), *Lampides boeticus* (L., 1767), *Lycaena tityrus* (Poda, 1761), *L. asabinus* (Gerhard, [1850]), *L. ochimus* (Herrich-Schäffer, [1851]), *L. phlaeas* (L., 1761), *Polyommatus anteros* (Freyer, [1838]), *P. antiochenus*, *P. bellis* (Freyer, [1842]), *P. bellargus* (Rottemburg, 1775), *P. coelestinus ponticus* (Courvoisier, 1911), *P. amandus* (Schneider, 1792), *P. cornelia* (Freyer, [1850]), *P. thersites* (Cantener, [1835]), *P. icarus* (Rottemburg, 1775), *Plebejus sephirus* (Fruvaldszky, 1835), *P. argus* (L., 1758), *Satyrrium spini* ([D. and Sch.], 1775), *Tomares nesimachus* (Oberthür, 1893), *T. nogelii* (Herrich-Schäffer, 1851), Hesperidae: *Carcharodus orientalis* Reverdin, 1913, *Erynnis tages* (L., 1758), *Pyrgus melotis* (Duponchel, [1834]), *P. armoricanus* (Oberthür, 1910), *Spialia orbifer* (Hübner, 1823), *Thymelicus sylvestris* (Tutt, [1905]), *T. acteon* (Rottemburg, 1775).

F (1250-1500 m): At these heights, the collection was mainly carried out in coniferous forests and forest openings, and stony rocky areas. In the spring season, overcast weather and rain negatively affected the species numbers. Hence, species seen were common and pioneer species.

Butterfly species: Papilionidae: *Iphiclides podalirius* (L., 1758), *Parnassius mnemosyne* (L., 1758), *Zerynthia cerisy* (Godart, [1824]), Pieridae: *Anthocharis cardamines* (L., 1758), *A. damone* Boisduval, 1836, *Colias crocea* (Fourcroy, 1785), *C. alfariensis* Ribbe, 1905, *Gonepteryx rhamni* (L., 1758), *Leptidea sinapis* (L., 1758), *Pieris ergane* (Geyer, [1828]), *P. krueperi*, *P. rapae* (L., 1758), *P. brassicae* (L., 1758), *Pontia edusa* (Fabricius, 1777), Nymphalidae: *Aglais urtica* (L., 1758), *Argynnis niobe* (L., 1758), *A. pandora* ([D. and Sch.], 1775), *Issoria lathonia* (L., 1758), *Libythea celtis* (Laicharting, 1782), *Melitaea telona* Fruhstorfer, 1908, *M. didyma* (Esper, 1778), *M. arduinna* (Esper, [1783]), *M. cinxia* (L., 1758), *Polygonia egea* (Cramer, [1775]), *Vanessa cardui* (L., 1758), *V. atalanta* (L., 1758), Satyrinae: *Coenonympha pamphilus* (L., 1758), *Lasiommata maera* (L., 1758), *Maniola telmessia* (Zeller, 1847), Lycaenidae: *Aricia agestis* ([D. and Sch.], 1775), *Callophrys rubi* (L., 1758), *Cupido minimus* (Fuesslin, 1775), *C. osiris* (Meigen, [1829]), *Glaucopteryx alexis* (Poda, 1761), *G. lessei* (Bourgogne, 1954), *Lampides boeticus* (L., 1767), *Lycaena alciphron* (Rottemburg, 1775), *L. tityrus* (Poda, 1761), *L. ochimus* (Herrich-Schäffer, [1851]), *L. thersamon* (Esper, [1784]), *L. phlaeas* (L., 1761), *Polyommatus anteros* (Freyer, [1838]), *P. bellis* (Freyer, [1842]), *P. bellargus* (Rottemburg, 1775), *P. cornelia* (Freyer, [1850]), *P. thersites* (Cantener, [1835]), *P. icarus* (Rottemburg, 1775), *Plebejus sephirus* (Fruvaldszky, 1835), *P. argus* (L., 1758), *Rubrapterus bavius* (Eversmann, 1832), *Tomares nogelii* (Herrich-Schäffer, 1851), Hesperidae: *Carcharodus orientalis* Reverdin, 1913, *C. alcaeae* (Esper, [1780]), *Erynnis tages*, *Pyrgus melotis* (Duponchel, [1834]), *P. armoricanus* (Oberthür, 1910), *P. sidae* (Esper, [1784]), *Spialia orbifer* (Hübner, 1823).

G (1500-1750 m): At these heights, the anthropogenic effect is very low, and collection and observation were mostly performed in coniferous forest openings, rocky areas, and dried river beds.

Butterfly species: Papilionidae: *Parnassius mnemosyne* (L., 1758), *Zerynthia cerisy* (Godart, [1824]), Pieridae: *Leptidea duponcheli* (Staudinger, 1871), *Colias crocea* (Fourcroy, 1785), *C. alfariensis* Ribbe, 1905, *Pieris ergane* (Geyer, [1828]), *P. brassicae* (L., 1758), *Zegris eupheme* (Esper, [1804]), Nymphalidae: *Issoria lathonia* (L., 1758), *Melitaea telona* Fruhstorfer, 1908, *M. didyma* (Esper, 1778), *M. cinxia* (L., 1758), *Vanessa cardui* (L., 1758), Satyrinae: *Coenonympha pamphilus* (L., 1758), *Lasiommata maera* (L., 1758), Lycaenidae: *Aricia agestis* ([D. and Sch.], 1775), *Callophrys rubi* (L., 1758), *Cupido osiris* (Meigen, [1829]), *Glaucopteryx alexis* (Poda, 1761), *G. astraeva* (Freyer, [1851]), *Lycaena tityrus* (Poda, 1761), *L. asabinus* (Gerhard, [1850]), *Polyommatus antiochenus*, *P. bellis* (Freyer, [1842]),

P. bellargus (Rottemburg, 1775), *P. coelestinus ponticus* (Courvoisier, 1911), *P. amandus* (Schneider, 1792), *P. cornelia* (Freyer, [1850]), *P. thersites* (Cantener, [1835]), *P. icarus* (Rottemburg, 1775), *Plebejus sephirus* (Frivaldszky, 1835), *Pseudophilotes vicrama* (Moore, 1865), *Rubraapterus bavius* (Eversmann, 1832), *Tomares nesimachus* (Oberthür, 1893), Hesperidae: *Carcharodus orientalis* Reverdin, 1913, *C. alceae* (Esper, [1780]), *Erynnis tages* (L., 1758), *Pyrgus melotis* (Duponchel, [1834]), *P. serratulae* (Rambur, 1839), *Spialia orbifer* (Hübner, 1823).

H (1750 m-): Above 1750 m: High mountain steppes. The weather is windy and rainy.

Butterfly species: Pieridae: *Pontia callidice* (Hübner, 1800), Nymphalidae: *Aglais urticae* (L., 1758), *Issoria lathonia* (L., 1758), *Melitaea cinxia* (L., 1758), *Vanessa cardui* (L., 1758), Lycaenidae: *Callophrys paulae* Pfeiffer, 1932, *Lycaena asabinius* (Gerhard, [1850]), *Polyommatus cornelia* (Freyer, [1850]), *Tomares nesimachus* (Oberthür, 1893), Hesperidae: *Erynnis tages* (L., 1758).

DISCUSSION

The number of butterfly species was considerably high compared to previous studies on spring species in the southern parts of Turkey.

Indeed, Kemal and Koçak (2017b) recorded 95 taxa of vernal Lepidoptera from the Euphrates Region in Southern Turkey, with only 16 butterflies (3 Nymphalidae, 3 Hesperidae, 5 Lycaenidae, and 5 Pieridae). Kemal and Koçak (2017a) recorded 59 taxa of vernal Lepidoptera in SE Turkey, but only 14 butterflies (Nymphalidae 2, Lycaenidae 5, Pieridae 6, Satyridae 1). Kemal and Koçak (2018a) recorded only 16 species from four families (Nymphalidae 1, Lycaenidae). The same authors listed 29 spring butterflies from 6 families in another study (Kemal and Koçak 2018b). 104 butterfly species were identified by Seven and Bozacı (2020). The reason for the high species diversity of spring butterfly species in the study is related to the Mediterranean climate. According to the results of the study, the highest diversity was at between 1250 and 1500 m with 58 species. The increase in butterfly species numbers resulted from the decrease in the anthropogenic effects on habitats, and the plentifulness of favourable natural spaces at these heights. Favorable seasonal temperatures and weather conditions were another positive factors. It was seen that the species number at 1500 m was quite low. One of the reasons for this decrease was the food plants visited butterfly had not bloomed yet due to the weather conditions at these altitudes and climatic events such as rain, wind, and temperature. Naturally, with the increase in temperatures, species diversities and species compositions are expected to increase.

In the study area were identified the representatives of Mediterranean species *Luthrodes galba* (Lederer, 1855), *Ziezeria karsandra* (Moore, 1865), and *Ypthima asterope* (Klug, 1832). *Pontia callidice* (Hübner, [1800]), *Callophrys danchenkoii* Zhdanko, 1998 and *Callophrys paulae* Pfeiffer, 1932 are local-spreading species that lived at high mountain steppes, could only be detected from only one station in the area.

The taxonomic status of *Pontia daplidice/edusa* species group was unclear. Two seemingly identical species have been separated on the basis of biochemical and DNA data. Specimens from different populations could be unseparated on a morphological basis and the recent split of the species based on allozyme differences causes additional taxonomic problems with old taxa (Tshikolovets 2011). The Asian contact zone between *P. daplidice* and *P. edusa* has not well known and need further investigation. According to the available data and biogeographic considerations, it probably runs from Hatay in southern Turkey along the Turkish border with Syria and Iraq, and the border of Iraq and Iran to the Persian Gulf (John et al. 2013). Koçak and Kemal (2018) reported that *P. edusa* had spread in every region of Turkey and *P. daplidice* had spread only in Hatay and Şanlıurfa. According to the biogeographical data, collected specimens have been accepted as *P.edusa* clade.

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ÖZET

Bu makale, Doğu Akdeniz Bölgesi'nin daha önce yayınlanmış bahar kelebeklerinin bir devamı niteliğindedir. Daha önce 68 istasyondan listelenen türlerin toplama istasyonu bilgileri bu çalışmaya dahil edilmiştir. İstasyonlar dikey dağılımlarına göre 8 gruba ayrılmıştır. Farklı rakımlardaki habitat tipleri tanımlanmıştır. Bu habitatlarda tespit edilen Lepidoptera toplulukları verilmiştir. *Pontia daplidice/edusa* tür grubunun bölgedeki durumu tartışılmıştır.

Anahtar kelimeler: kelebek, dikey yayılım, yaşam alanı, Doğu Akdeniz Bölgesi

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