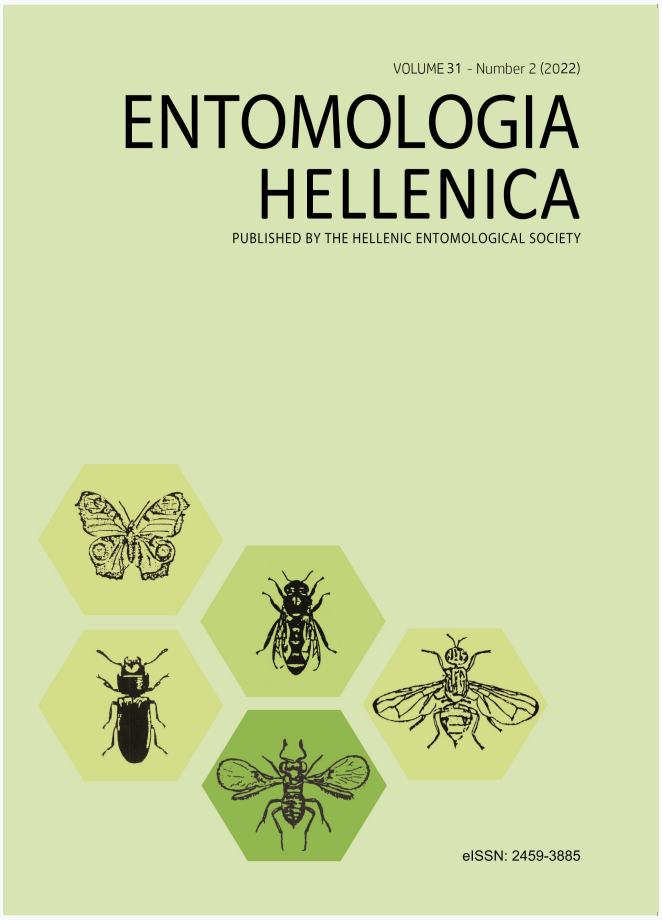
ENTOMOLOGIA HELLENICA

Vol 31, No 2 (2022)

Vol. 31 No. 2 (2022): Entomologia Hellenica



Butterflies (Lepidoptera: Papilionoidea) of northwestern and western Crete (Greece) in early July, with the finding of new larval host plant for Lampides boeticus

Luka Šturm

To cite this article:

Šturm, L. (2022). Butterflies (Lepidoptera: Papilionoidea) of northwestern and western Crete (Greece) in early July, with the finding of new larval host plant for Lampides boeticus: Surveying the distribution of diurnal butterflies of western Crete. *ENTOMOLOGIA HELLENICA*, *31*(2), 50–60. Retrieved from https://ejournals.epublishing.ekt.gr/index.php/entsoc/article/view/29961

ENTOMOLOGIA HELLENICA **31** (2022): 50–60

Received 21 March 2022 Accepted 18 May 2022 Available online November 2022

Butterflies (Lepidoptera: Papilionoidea) of northwestern and western Crete (Greece) in early July, with the finding of new larval host plant for *Lampides boeticus*

LUKA ŠTURM

Department of Food Science and Technology, University of Ljubljana, Biotechnical Faculty, Jamnikarjeva 101, SI-1000 Ljubljana, Slovenia

ABSTRACT

During the summer of 2021, the northwestern and western areas of the Greek island of Crete were surveyed to confirm certain observations of diurnal butterfly fauna of the island. Research was focused especially on the unsurveyed north-western parts of the island, as well as surveying the species that are extending their area of distribution (*Cacyreus marshalli* (Butler), *Lampides boeticus* (L.)). From 47 species reported from the island, 23 were observed. The surveys were all carried out during an especially hot and dry weather period (30-37 °C), between 30th of June and 6th of July. Additionally, a new larval host plant for *L. boeticus* was confirmed, as oviposition of females on *Campsis radicans* (Seem.) was observed on several occasions.

KEY WORDS: *Campsis radicans*; new localities; oviposition; northwestern peninsula.

Introduction

With an area of 8336 km^2, Crete is the fifth largest island in the Mediterranean Sea and the largest island of Greece (Sakellariou and Galanidou 2016). It is one of the most mountainous islands in Europe, having more than 50 mountain peaks exceeding 2000 m. The highest peak is located in Idi massif in the central part of the island and reaches an altitude of 2456 m (Agou et al. 2019; Kougioumoutzis et al. 2020). Due to the three mountain massifs, coupled with many lower semi-mountainous areas, Crete has a high fragmentation of land area, including numerous rivers and streams, further enriching its diverse geology (Agou et al. 2019).

Crete has a sub-humid Mediterranean climate with humid and relatively cold winters, and dry and warm summers (Morianou et al. 2021). The mean annual air temperature is around 20 °C, while frost temperatures are almost never registered at the lower parts (Bergmeier 1997). The highest mountain peaks, on the other hand, are covered with snow throughout the winter (Bretherton 1969). The coastal areas, where urban settlements and agriculture are concentrated, exhibit a typical Mediterranean climate, with transitions to semi-dessert (Agou et al. 2019; Kougioumoutzis et al. 2020). The coastal areas are the driest and the warmest, with 300-700 mm precipitation per year (Bergmeier 1997; Morianou et al. 2021), while the mountainous areas are the most humid, reaching 2000 mm of rainfall per year (Morianou et al. 2021). Most rainfall occurs from December to February, while the summer drought, which lasts up to 7 months, almost completely destroys the vegetation (Bergmeier 1997). The strong winds worsen the situation by desiccating

**Corresponding author: luka.sturm@bf.uni-lj.si; lukalory@gmail.com*

certain flowering phrygana plants (Bergmeier and Matthäs 1996).

Crete is considered one of the richest hotspots in Europe in terms of endemic species of plants, which is mostly due to its unique geology, isolation and climate (Kougioumoutzis et al. 2020). The habitat types of Crete are also very diverse – from almost dessert-like cliffs, beaches, and lower hilly areas near the coast, where phrygana and macchia are the dominant plant communities (Troníček 1938), agricultural and urban areas with olive plantations, oleanders, cultivated plants and flowers, to the more humid mountain slopes, gorges, and river valleys. Phrygana, one of the most unique habitats on the island, is on the NW and W dominated by *Coridothymus capitatus* ((L.) Hoffmanns. & Link), *Sarcopoterium spinosum* ((L.) Spach) and *Ballota pseudodictamnus* ((L.) Benth.), typical for most of the island (Bergmeier 1997). Agricultural areas mostly consist of olive plantations (*Olea europaea* (L.)), which host a community dominated by grasses (*Hyparrhenia hirta* ((L.) Stapf), *Aristida caerulescens* (Desf.), etc.) (Bergmeier 1997) and individual flowers (*Picris altissima* (Desf.)) (Bergmeier 1997), whereas urban settlements mostly include different cultivated flowers like *Campsis radicans* (Seem.), *Pelargonium* sp., *Geranium* sp., trees like *Oleander* sp., different Palmaceae, etc. On the other hand, mountainous regions consist mainly of mixed and conifer forests in the gorges, while vast numbers of indigenous flowers reign the mountain slopes.

Crete also inhabits a relatively high number of butterfly species (47), some of which are endemic to the island (*Coenonympha thyrsis* (Freyer), *Hipparchia cretica* (Rebel), *Pseudochazara anthelea* ssp. *amalthea* (Frivaldsky), *Kretania psylorita* (Freyer) and *Zerynthia cretica* (Rebel)) (Nel and Nel 2003; Pamperis 2010). For these reasons, Crete butterfly fauna was widely studied. The first studies

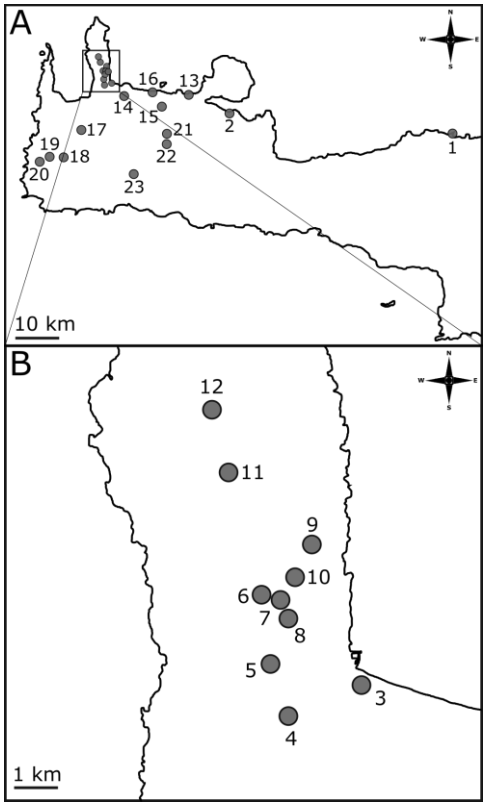


FIG. 1: Map of western Crete (1–2, 13–23) (A) and a close up of a mostly unsurveyed part of the biggest north western peninsula (3–12) (B) with marked surveyed localities.

concentrated mostly on the general overview of the species encountered, and also included a few species which were later unconfirmed or already disappeared from the island (e.g. *Cupido minimus* (Fuessly)) (Rebel 1916; Warnecke 1928; Troníček 1938; Bretherton 1969; Higgins 1973; Willemse 1975; Sala and Bollino 1997; Mérit and Mérit 1998; Nel and Nel 2003). The latest studies however, focus mainly on specific butterflies of the island, especially the species which emerged only recently (e.g. *Zizeeria karsandra* (Moore) and *Cacyreus marshalli* (Butler)) or are deemed endemic (e.g. *Z. cretica*) (Larsen 1986; Dennis 1996; Anastassiu et al. 2010; John et al. 2018; Rowlings and Cuvelier 2018). Since most of the island was already surveyed at one point or another, there are

hardly any areas left unsearched, with the exception of certain remote or less interesting parts of the island (Pamperis 2010; www.butterfliesofcrete.com 2021). This article focuses mainly on the localities found on or near the biggest northwestern peninsula north of the town of Kolymvari and around the village of Rodopos, which are largely still unsurveyed. Some additional observations were also performed around the rivers Tavronitis and Keritis, as well as in some interesting localities previously surveyed by others (Willemse 1975; Mérit and Mérit 1998; Pamperis 2010) in the western and central northern (coastal) parts of the island (Fig. 1).

FIG. 2: Different localities/habitats found in NW and W Crete: A) Elos (4.7.2021); B) Kefali (4.7.2021); C) Plokamiana (4.7.2021); D) Lakkoi (4.7.2021); E) Chania (3.7.2021); F) and G) Agia Irini gorge (6.7.2021); H) hills N of Rodopos; I) Astratigos with Kolymvari in the background; J) hills SW of Afrata.

Materials and Methods

The study was performed mostly in the northwestern and western parts of the island of Crete, including some localities from the central northern (coastal) part. The butterflies were determined via catch and release method and the species were determined using the Tolman and Lewington (2008) field guide. As most species of butterflies on Crete are easyli distinguishable, most identifications could take place without catching the butterfly. On the other hand, harder-to-identify species were either photographed, or caught in the net, identified and later released. Individuals which could not be 100 % correctly identified are not included in the list. The exact locality and details regarding coordinates (WGS 84 Web Mercator projection; EPSG:3857), altitude, habitat and date of each observation are given in Table 1. In the case of a broader locality, coordinates are given for the most

appropriate observation spot. The localities are given by the order of observation date.

Results and Discussion

During the survey of the northwestern and western parts of the island of Crete, a total of 23 species were observed, out of the 47 (49 %) that have been reported for the island (Pamperis 2010). Among these, two (*Pontia edusa* (Fabricius) and *Pieris brassicae* (L.)) were observed only once, while five species were found at at least 10 different localities (Tab. 2). Among the most widespread butterflies were *Pieris rapae* (L.), *Papilio machaon* (L.), *Pararge aegeria* (L.), *Lasiommata megera* (L.) and *Lampides boeticus* (L.), which is in accordance with other authors (Rebel 1916; Higgins 1973; Mérit and Mérit 1998), especially when the lack of localities from any of the three mountain massifs is considered. Among the most numerous were *P. rapae* and *L. boeticus*, both of which could be found in most of the researched localities, almost always near agricultural or urban habitats. On the other hand, species such as *Hipparchia cretica*, otherwise regarded as one of the most common species on the island (Rebel 1916; Mérit and Mérit 1998; Pamperis 2010), was observed at only two occasions. While only two imagines were found in Elos (Fig. 2, A), hundreds of them were observed inside the Agia Irini gorge. Anyhow, the number of active butterflies was relatively low during the hottest parts of the day, similarly as observed by other authors at this time of year (Higgins 1973). Extremely hot and dry weather conditions sometimes known for Mediterranean likely also contributed to their generally lower numbers, as observed in a study by Herrando et al. (2019).

Low number of butterflies was also apparent on the largest, until now mostly unsurveyed, northwestern peninsula of the island. Here, in the central parts, notably at the localities north of Rodopos and near the Afrata-Astratigos road (Fig. 2A, J), where the habitat mostly consists of dried phrygana, only *Coenonympha thyrsis*, *L. megera* and *Polyommatus icarus* (Rottemburg) were observed in high numbers. These localities, besides being dried by immense heat, were also the windiest and highest parts of the peninsula. In this area, butterflies were found in small dried-up river gorges, where the wind and heat were less intensive, and at least some flowering plants were found. On the southern part of the peninsula, however, the butterflies were more numerous, especially in small villages, where flowering plants were still plentiful. Here, *L. boeticus*, *P. rapae* and *P. machaon* were the most abundant species. Especially abundant were the butterflies of *L. boeticus*, which were sometimes observed in dozens, mostly flying around the flowering plants inside small parks or larger gardens.

Despite the overall hot weather and relatively few species found, some interesting observations were nonetheless made. Most importantly, some species were reported at certain localities for the first time. New localities were thus confirmed for *Cacyreus marshalli* (3, 6), *Carcharodus alceae* (Esper) (3, 4), *Celastrina argiolus* (L.) (3, 8), *C. thyrsis* (11, 12), *L. boeticus* (1, 3, 4, 6, 8, 9, 10, 13, 18, 19, 23), *Gegenes pumilio* (Hoffmannsegg) (3, 4, 6), *Gonepteryx cleopatra* (L.) (3, 5, 8, 9), *Lycaena phlaeas* (L.) (4, 14, 18), *P. aegeria* (3, 6), *P. rapae* (1, 16), *P. icarus* (3, 7, 10, 11, 12, 16), *P. edusa* (3), *Vanessa cardui* (L.) (1), and *L. megera* (4, 6, 7, 8, 11, 12) (Rebel 1916; Warnecke 1928; Higgins 1973; Willemse 1975; Sala and Bollino 1997; Mérit and Mérit 1998; Pamperis 2010; www.butterfliesofcrete.com 2021).

The number of new localities for certain butterfly species is not surprising, since the biggest northwestern peninsula was very poorly explored until now, and most observations in this part of the island were made in the vicinity of Kolymvari or further east near Chania (Rebel 1916; Mérit and Mérit 1998; Pamperis 2010; www.butterfliesofcrete.com 2021).

TABLE 1: Localities visited during the 30.6.–6.7.2021 survey of Crete and their description.

No.	Locality	Coordinates	Description of the habitat	Altitude	Date
1	Bali	X: 35.411534, Y: 24.782511	Mostly anthropogenic: arid scrub, gardens, cultivated flowers, wild flowers and trees on rocky ground (oleander, *Heliotropium* sp.), close proximity to the sea	15–25 m	30.6.2021
2	Aptera (highway)	X: 35.466789, Y: 24.135580	Mostly anthropogenic: cultivated deciduous trees (oleander, olive), flowers by the road	80–90 m	30.6.2021
3	Kolymvari	X: 35.542742, Y: 23.780298	Mostly anthropogenic: arid scrub and grasslands, fields, gardens, parks, cultivated flowers, abandoned estates	5–40 m	30.6.–5.7.2021
4	Koumouli	X: 35.533797, Y: 23.759599	Mixed natural and anthropogenic: olive groves, fields, arid scrub, wild flowers	120–140 m	2.7.2021
5	Aspra nera (crossroad W of village)	X:35.545616, Y: 23.755192	Mostly anthropogenic: olive groves, arid scrub, wild flowers, abandoned buildings	200–220 m	2.7.2021
6	Rodopos	X: 35.561584, Y: 23.755217	Mostly anthropogenic: parks, gardens, cultivated flowers, arid scrub, olive groves	230–240 m	2.7.2021
7	Rodopos (hills SE above town)	X: 35.558834, Y: 23.757862	Mostly natural: arid scrub and grasslands, olive groves, macadam road with wild flowers	270–290 m	2.7.2021
8	Astratigos	X: 35.556435, Y: 23.762502	Mixed natural and anthropogenic: gardens, olive groves, cultivated flowers, rocky slopes, arid scrub	200–210 m	2.7.2021
9	Afrata	X: 35.570288, Y: 23.766473	Mostly anthropogenic: gardens, cultivated flowers, arid scrub, olive groves, fields	135–145 m	2.7.2021
10	Astratigos – Afrata (road between villages)	X: 35.559239, Y: 23.763268	Natural: phrygana – dense arid scrub on rocky ground	170–190 m	2.7.2021
11	Rodopos (beginning of a macadam road in the hills N of town)	X: 35.587692, Y: 23.749653	Mixed natural and anthropogenic: olive groves, phrygana – dense arid scrub on rocky ground, dry riverbed, rocky pastures, vineyards	420–440 m	2.7.2021
12	Oros Titiron (dry riverbed E below the hilltop, near the road, N of Rodopos)	X: 35.602380, Y: 23.743666	Natural: phrygana – dense arid scrub on rocky ground, dry riverbed, rocky pastures	500–520 m	2.7.2021
13	Chania	X: 35.518949, Y: 24.014405	Mostly anthropogenic: gardens, parks, cultivated flowers, cultivated trees, close proximity to the sea	1–10 m	3.7.2021

TABLE 1 (cont.)

14	Polemarchi (near Tavronitis riverbed)	X: 35.510011, Y: 23.817907	Mostly anthropogenic: gardens, cultivated flowers, arid scrub, olive groves, fields	45–55 m	3.7.2021
15	Kirtomados (road near Keritis river NW of village)	X: 35.488852, Y: 23.914757	Mixed anthropogenic and natural: olive groves, fields, arid scrub, riverbed, peach and orange groves	50–60 m	3.7.2021
16	Gerani – Platanias (Keritis river delta)	X: 35.517613, Y: 23.891034	Mixed anthropogenic and natural: regulated riverbed, scrub, cultivated and wild flowers, fields	5–10 m	3.7.2021
17	Topolia	X: 35.430428, Y: 23.686085	Mostly anthropogenic: gardens, cultivated trees and flowers, olive groves, arid scrub	230–260 m	4.7.2021
18	Elos	X: 35.359959, Y: 23.639097	Mixed natural and anthropogenic: gardens, parks, olive groves, cultivated flowers, scrub, phrygana – dense arid scrub on rocky ground, deciduous forest, small stream	520–580 m	4.7.2021
19	Kefali	X: 35.363863, Y: 23.597344	Mostly anthropogenic: gardens, olive groves, cultivated flowers, arid scrub, pastures	450-470 m	4.7.2021
20	Plokamiana (dry riverbed S of village)	X: 35.347799, Y: 23.584307	Mostly natural: dry riverbed, arid scrub, deciduous forest, overgrowing olive groves	190-210 m	4.7.2021
21	Botanical parks & gardens of Crete (S of Fournes)	X: 35.419093, Y: 23.939196	Mostly anthropogenic: botanical park with different (including tropical, subtropical and native) cultivated trees and flowers, dry stony riverbed, scrub	140–210 m	4.7.2021
22	Lakkoi	X: 35.394823, Y: 23.942221	Mostly anthropogenic: gardens, olive groves, cultivated trees and flowers, scrub	480–520 m	4.7.2021
23	Agia Eirini (Agia Irini gorge S of village)	X: 35.324126, Y: 23.842279	Natural: mixed forest, arid scrub, dry riverbed, stony cliffs	540–600 m	6.7.2021

And while certain findings are of no real interest (e.g., new localities for some of the most abundant species on the island), others are quite surprising. The most important observations were made for *L. boeticus*, which was found at 11 new localities, while previously not being observed on the northwestern coast at all (Rebel 1916; Mérit and Mérit 1998; Pamperis 2010), let alone from the biggest northwestern peninsula. Important observations were also made for the relatively new addition to the Cretan fauna, *C. marshalli* (John et al. 2018), and the relatively rare *G. pumilio*, which was so far reported only by a handful of authors (Troníček 1938; Pamperis 2010). It is especially surprising, that *C. marshalli* already consolidated on the island (www.butterfliesofcrete.com 2021), despite being unknown from the entire Greece not two decades ago (Anastassiu et al. 2010) and was firstly observed on Crete only a few

years back (John et al. 2018). It seems, that certain plants commonly found in urban areas (*Geranium* sp., *Pelargonium* sp.), coupled with suitable weather conditions, are enabling fast colonisation of the species, similar as in the Canary Islands (Wiemers et al. 2013). Considering the fast colonisation of the urban areas there is also a justified concern, that the species might start using wild *Geranium* species as host plants as well, thus competing with the native species, such as *Aricia agestis* (Denis & Schiffermüller).

TABLE 2: Species of butterflies found in Crete during 30.6.–6.7.2021. The localities are indicated by numbers from 1 to 23 as in the list and description of localities.

Family/*species*	Locality	No. of localities
Papilionidae		
Iphiclides podalirius	3, 8, 9, 13, 17, 19, 21	7
Papilio machaon	2, 3, 5, 6, 7, 8, 9, 14, 17, 18, 19, 20, 21, 23	14
Pieridae		
Colias crocea	3, 7, 16, 18, 19, 23	6
Gonepteryx cleopatra	1, 2, 3, 5, 8, 9, 18, 19, 23	9
Pieris brassicae	23	1
Pieris rapae	1, 2, 3, 4, 5, 6, 7, 8, 13, 14, 15, 16, 17, 18, 19, 21, 23	17
Pontia edusa	3	1
Lycaenidae		
Aricia agestis	18, 19	2
Cacyreus marshalli	3, 6	2
Celastrina argiolus	3, 8, 19, 22	4
Lampides boeticus	1, 3, 4, 6, 8, 9, 10, 13, 15, 16, 17, 18, 19, 21, 23	15
Lycaena phlaeas	4, 14, 18	3
Polyommatus icarus	3, 7, 10, 11, 12, 16, 18, 23	8
Nymphalidae		
Coenonympha thyrsis	7, 10, 11, 12, 18, 23	6
Hipparchia cretica	18, 23	2
Lasiommata megera	4, 6, 7, 8, 11, 12, 18, 19, 21, 22, 23	11
Maniola jurtina	3, 18, 23	3
Pararge aegeria	3, 6, 13, 15, 17, 18, 19, 21, 22, 23	10
Polygonia egea	18, 19, 21, 22	4
Vanessa atalanta	7, 22	2
Vanessa cardui	1, 3, 4	3
Hesperiidae		
Gegenes pumilio	3, 4, 6, 15	4
Carcharodus alceae	3, 4, 18, 19, 20, 23	6

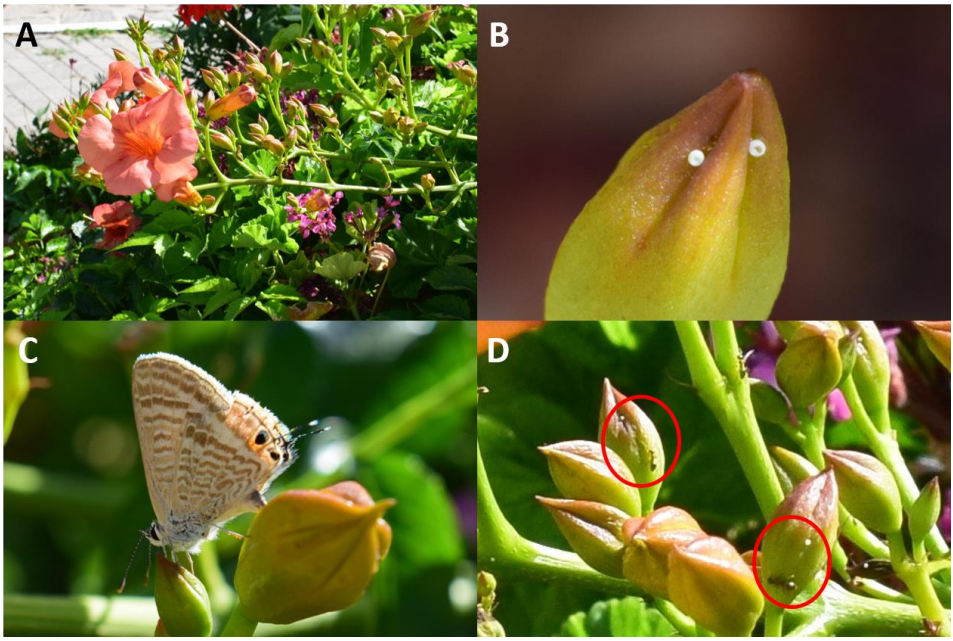


FIG. 3: *Campsis radicans* found in the central park in the village of Rodopos: A) flowering plant with buds; B) eggs of *Lampides boeticus* on the flower bud; C) oviposition of *L. boeticus* on the flower bud; D) encircled with red - ants tending the *L. boeticus* eggs on the flower buds.

Also important is the finding of a new larval host plant for the butterfly *L. boeticus*, one of the most widely distributed butterflies in the world, currently found across the Palaearctic region, parts of Africa, Madagascar, South-East Asia, Australia, Oceania and Hawaii (Lohman et al. 2008). It is otherwise a well-known polyphagous butterfly, feeding on many cultivated plants such as legumes (including *Vicia faba* (L.) and *Pisum sativum* (L.)) and sometimes considered as serious pest due to its high prevalence in peas in some countries (Larsen 1986; Lohman et al. 2008; www.plantwise.org 2021). It is also being connected with many other species of plants, especially cultivated flowers, like *Kennedia prostrata* (R.B.), *Virgilia oroboides* (P.J. Bergius), etc. (www.plantwise.org 2021). However, oviposition of females on the cultivated ornamental flower *Campsis radicans* (Fig. 3, A) was observed for the first time (Harding 1971; Lohman et al. 2008; www.plantwise.org 2021). *C. radicans*, a species native to North America, is a common cultivated liana/shrub, which was brought to Europe (Italy) in the 17th century and has quickly spread throughout the Mediterranean basin (Bergmeier 2011; Jeberean et al. 2016). Due to its high drought resistance and big yellow to red blossoms it is a very common plant in parks and gardens, especially in countries such as Greece (Bergmeier 2011; own observations), Croatia (Tafra et al. 2013) and parts of Slovenia (own observations). The oviposition of females on the flower buds and stems of the *C. radicans* was observed multiple times, mostly on the biggest northwestern peninsula in the villages of Rodopos (Fig. 3, C), Afrata and Astratigos. Here the butterflies were found in great numbers, especially in the village of Rodopos, where dozens of imagines were observed in a single spot. Sometimes, several eggs were observed on even just one flower bud/stem (Fig. 3, B). Also, ants were seen visiting the flower buds tending the newly laid eggs, which is common for myrmecophilous species such as *L. boeticus* (Obregón-Romero and Gil-T 2011; Obregón et al. 2015). Observation of oviposition on *C. radicans* is mostly important

from the economical view, as *C. radicans* is also widely cultivated among florists (Bergmeier 2011; Tafra et al. 2013). Just like in the case of *C. marshalli*, where the butterfly is considered a non-negligible pest for the cultivated species of *Pelargonium* and *Geranium*, *L. boeticus* could cause a considerable damage on cultivations of *C. radicans*. Additionally, as *L. boeticus* was observed in many new localities along the coast, on a previously unknown host plant, the species might adapt to additional larval host plants and thus might amplify its economic damage or start competing with other species of butterflies in their native habitats.

Conclusions

During the surveys in the western and northwestern parts of Crete, including the so far mostly overlooked northwestern peninsula, 23 species of butterflies were observed, many on new localities. Among the recorded species were also two Cretan endemics, *Hipparchia cretica* and *Coenonympha thyrsis*. The relatively low number of butterflies/species can be attributed to the intense heatwave and summer drought, which were present at the time of the surveys. The most important new localities were found for the species *Gegenes pumilio*, *Lampides boeticus* and *Cacyreus marshalli*, the latter two of which were found to be expanding their areal and consequently consolidating on the island. While *C. marshalli* was found on two new localities, *L. boeticus* was observed on 11 previously unknown areas. Also, a new larval host plant – *Campsis radicans* – was found for the butterfly *L. boeticus*, where oviposition of the females was observed multiple times at different localities. As *C. marshalli* and *L. boeticus* are consolidating in urban areas of Crete, the fear exists, that in the foreseeable future they may begin to compete with other native species on the island as well.

Acknowledgements

The author would like to express his gratitude to prof. dr. Nejc Jogan, who has helped with the identification of the island flora.

References

Agou, V. D., E. A. Varouchakis and D. T. Hristopulos. 2019. Geostatistical analysis of precipitation in the island of Crete (Greece) based on a sparse monitoring network. Environ. Monit. Assess. 191(353): 24 pp.

Anastassiu, H. T., N. Ghavalas and J. G. Coutsis. 2010. First record of *Cacyreus marshalli* in Greece, and comments on the potential occurrence of *Zizeeria karsandra* on the Greek island of Crete (Lepidoptera: Lycaenidae). Phegea 38(3): 85–92.

Bergmeier, E., and U. Matthäs. 1996. Quantitative studies of phenology and early effects of non-grazing in Cretan phrygana vegetation. J. Veg. Sci. 7: 229-236.

Bergmeier, E. 1997. Combined effects of fire and grazing on phrygana vegetation – a case study in SW Crete (Greece). Ecol. Mediterr. 23(3/4): 1–10.

Bergmeier, E. 2011. New floristic records, confirmations and other phytogeographical notes from Crete (Greece). Willdenowia 41(1): 167–177.

Bretherton, R. F. 1969. Notes on Butterflies (Rhopalocera) in Crete in June, 1969. Entomol. Rec. J. Var. 81: 296–302.

Dennis, R. L. H. 1996. Oviposition in Zerynthia cretica (Rebel, 1904): loading on leaves, shoots and plant patches (Lepidoptera, Papilionidae). Nota Lepid. 18(1): 3–15.

Harding, J. W. 1971. Observations on *Lampides boeticus* (L.) (Lepidoptera:

Lycaenidae). N. Z. Entomol. 5(1): 70–73.

Herrando, S., N. Titeux, L. Brotons, M. Anton, A. Ubach, D. Villero, E. García-Barros, M. L. Munguira, C. Godinho and C. Stefanescu. 2019. Contrasting impacts of precipitation on Mediterranean birds and butterflies. Sci. Rep. 9: 7 pp.

Higgins, L. G. 1973. Crete in late June 1973. Entomol. Rec. J. Var. 85: 291–293.

Jeberean, M. G., M. Bala, C. Berar, C. E. Tota and M. Silivasan. 2016. Results on the effect of stimulators rooting on cuttings of *Campsis radicans* in different culture conditions. Int. Multidiscip. Sci. GeoConference: SGEM, Sofia 1: 749–754.

John, E., B. Thomas, O. Başbay, Z. Cebeci and J. G. Coutsis. 2018. The arrival of *Cacyreus marshalli* Butler, 1898 (Lepidoptera: Lycaenidae, Polyommatinae) in Crete, with additional notes on range expansion in Greece and along coastal areas of northwestern Turkey. Entomol. Gaz. 69: 85–97.

Kougioumoutzis, K., I. K. Kokkoris, M. Panitsa, P. Trigas, A. Strid and P. Dimopoulos. 2020. Plant Diversity patterns and conservation implications under climate-change scenarios in the Mediterranean: the case of Crete (Aegean, Greece). Diversity 12(7): 270, 22 pp.

Larsen, T. B. 1986. Tropical butterflies of the Mediterranean. Nota Lepid. 9(1–2): 63–77.

Lohman, D. J., D. Peggie, N. E. Pierce and R. Meier. 2008. Phylogeography and genetic diversity of a widespread Old World butterfly, *Lampide boeticus* (Lepidoptera: Lycaenidae). BMC Evol. Biol. 8(301): 14 pp.

Mérit, X. and V. Mérit. 1998. Contribution a la connaissance lépidoptérique de l'île de Crète. Linneana Belg. 16: 291–297.

Morianou, G., N. N. Kourgialis, V. Pisinaras, G. Psarras and G. Arambatzis. 2021. Assessing desertification sensitivity map under climate change and agricultural practices scenarios: the island of Crete case study. Water Supply 21(6): 2916–2934.

Nel, J. and A. Nel. 2003. Contribution à la connaissance des Lépidoptères de l'île de Crète (Grèce) (Lepidoptera). B. Soc. Ent. Fr. 108(3): 277–282.

Obregón, R., M. R. Shaw, J. Fernández-Haeger and D. Jordano. 2015. Parasitoid and ant interactions of some Iberian butterflies (Insecta: Lepidoptera). SHILAP Revta. Lepid. 43(171): 439–454.

Obregón-Romero, R. and F. Gil-T. 2011. Twenty-seven new records of associated ants with thirteen myrmecophilus lycaenid butterflies from Spain. Atalanta 42(1/4): 139–142.

Pamperis, L. N. 2010. The butterflies of Greece. Editions Pamperis, Athens, 2nd ed. 766 pp.

Rebel, H. 1916. Die lepidopterenfauna Kretas. Annalen des Naturhistorischen Museums Wien 30: 66–172, pl. IV.

Rowlings, M. and S. Cuvelier. 2018. *Zizeeria karsandra* (Lepidoptera: Lycaenidae) recorded from Crete (Greece): observations, distribution and habitats. Phegea 46(4): 126–131.

Sakellariou, D. and N. Galanidou. 2016. Pleistocene submerged landscapes and Palaeolithic archaeology in the tectonically active Aegean region. Geol. Soc. Lond. Spec. Publ. 411: 145–178.

Sala, G. and M. Bollino. 1997. A contribution to the knowledge of the Papilionidae of Kriti Island. Atalanta 28(1/2): 28–35.

Tafra, D., M. Milović and M. Padža. 2013. Non-native flora of the town of Omiš (Dalmatia, Croatia). Nat. Croat. 22(1): 135–146.

Tolman, T. and R. Lewington. 2008. Collins butterfly guide. The most

complete guide to the butterflies of Britain and Europe. HarperCollins Publishers Ltd., London, 384 pp.

Troníček, E. 1938. Contribution to the knowledge of the lepidopterological fauna of Crete (Lep.). Acta Ent. Mus. Nat. Pra. 26(358): 15 pp.

Warnecke, Von G. 1928. VI. Lepidoptera. In: Roewer, C. F. (Ed.). Zoologische streifzüge in Attika, Morea, und besonders auf der insel Kreta, II. Abh. naturw. Ver. Bremen 27: 81–85.

Wiemers, M., B. Acosta-Fernández, T.B. Larsen. 2013. On the recent invasionof the Canary Islands by two butterfly species, with the first record of *Leptotes pirithous* (Linnaeus, 1767) from Gran Canaria, Spain (Lepidoptera: Lycaenidae). SHILAP Revista de Lepidopterología 41(161): 95-10

Willemse, L. 1975. Distribution record of Rhopalocera (Lepidoptera) in the Greek mainland and Crete. Entomol. Ber. 35(10): 141–149.

www.butterfliesofcrete.com (2021): Butterflies of Crete. https://butterfliesofcrete.com/families-species/ (accessed: 2.2.2022, 18:30)

www.plantwise.org (2021): Plantwise knowledge bank: Lampides boeticus, Host plants/species affected. https://www.plantwise.org/KnowledgeBank/datasheet/29761#HostPlantsSection (accessed: 18.1.2022, 17:45).

Butterflies (Lepidoptera: Papilionoidea) of northwestern and western Crete (Greece) in early July, with the finding of new larval host plant for *Lampides boeticus*

LUKA ŠTURM

Τμήμα Επιστημών και Τεχνολογίας Τροφίμων, Πανεπιστήμιο της Λιουμπλιάνα, Βιοτεχνική Σχολή, Τζαμνικάριεβα 101, SI-1000 Λιουμπλιάνα, Σλοβενία

ΠΕΡΙΛΗΨΗ

Κατά τη διάρκεια του καλοκαιριού 2021, οι βορειοδυτικές και δυτικές περιοχές του ελληνικού νησιού της Κρήτης ερευνήθηκαν για να επιβεβαιωθούν ορισμένες παρατηρήσεις για την πανίδα ημερόβιας πεταλούδας του νησιού. Η έρευνα επικεντρώθηκε ιδιαίτερα στα μη διερευνημένα βορειοδυτικά τμήματα του νησιού, καθώς και στα είδη που επεκτείνουν την περιοχή εξάπλωσής τους (*Cacyreus marshalli* (Butler), *Lampides boeticus* (L.)). Από 47 είδη που έχουν αναφερθεί για το νησί, παρατηρήθηκαν τα 23. Όλες οι έρευνες πραγματοποιήθηκαν κατά τη διάρκεια μιας ιδιαίτερα ζεστής και ξηρής περιόδου (30-37 °C), μεταξύ 30 Ιουνίου και 6 Ιουλίου. Επιπρόσθετα, επιβεβαιώθηκε ένα νέο φυτό ξενιστής προνυμφών για το *L. boeticus*, καθώς η ωοτοκία θηλυκών σε *Campsis radicans* (Seem.) παρατηρήθηκε σε αρκετές περιπτώσεις..

