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FIRST OVERVIEW OF THE BUTTERFLY (RHOPALOCERA) FAUNA OF THE ELAPHITI ISLANDS (SOUTHERN DALMATIA, CROATIA)

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The present study provides the first comprehensive overview of the butterfly fauna of the Elaphiti Islands. The research includes data from the three inhabited islands of the archipelago - Šipan, Lopud, and Koločep (Kalamota), as well as a smaller number of records from other islands and islets within the archipelago. It was conducted during all seasons, in the period from 2018 to 2024, which was preceded by one visit in 2015. The highest number of field visits was carried out on the island of Lopud, and a total of 58 butterfly species were recorded. Analyzing the islands individually, the largest number of species (55) was recorded on the largest island of Šipan, followed by Lopud with 50 species and Koločep with 42 species. A comparison with other Adriatic islands indicates that Lopud and Šipan are currently among the best-studied islands, featuring significant species and habitat diversity on the archipelago. The first record of *Kirinia roxelana* on the Adriatic islands is also reported as well as new distribution data for *Gegenes pumilio.* These findings provide a valuable contribution to the biogeography of butterflies in the Mediterranean region of Croatia.

Key words: Adriatic islands, Šipan, Lopud, Koločep, diversity, *Kirinia roxelana, Gegenes pumilio*

Dender, D., Martinović, M. & Koren, T.: Prvi pregled faune danjih leptira (Rhopalocera) Elafitskih otoka (južna Dalmacija, Hrvatska). Nat. Croat., Vol. 35, No. 1, 197-213, 2026, Zagreb.

Ovo istraživanje pruža prvi sveobuhvatan pregled faune danjih leptira Elafitskih otoka. Istraživanje obuhvaća podatke s tri naseljena otoka arhipelaga — Šipana, Lopuda i Koločepa (Kalamote) — kao i manji broj opažanja s drugih otoka i otočića unutar arhipelaga. Provedeno je tijekom svih godišnjih doba u razdoblju od 2018. do 2024., čemu je prethodio posjet u 2015. godini. Najveći broj terenskih obilazaka proveden je na otoku Lopudu, gdje je zabilježeno 58 vrsta leptira. Najveći broj vrsta, njih 55, zabilježen na najvećem otoku Šipanu, dok je na Lopudu zabilježeno 50, a na Koločepu 42 vrste. Usporedba s drugim jadranskim otocima pokazuje kako su Lopud i Šipan trenutno među najbolje istraženim otocima, a čitav se arhipelag odlikuje značajnom raznolikošću vrsta i staništa. Istraživanje donosi prve podatke o vrsti *Kirinia roxelana* s jadranskih otoka, a prikazani su i novi podaci o rasprostranjenosti vrste *Gegenes pumilio.* Ova saznanja pružaju vrijedan doprinos biogeografiji leptira u mediteranskoj regiji Hrvatske.

Ključne riječi: Jadranski otoci, Šipan, Lopud, Koločep, raznolikost, *Kirinia roxelana, Gegenes pumilio*

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INTRODUCTION

The Elaphiti Islands are a small archipelago located in the Dubrovnik-Neretva County, the southernmost county of Croatia. These south Dalmatian islands stretch from the southeastern part of the Pelješac Peninsula in the north to the Lapad Peninsula (Dubrovnik) in the south, spanning 26 km in length. The archipelago includes the islands of Olipa, Jakljan, Šipan, Lopud, Koločep (Kalamota), and Daksa, as well as islets and rocks such as Tajan, Crkvina, Goleč, Kosmeč, Mišnjak, Ruda, Sutmiho, Sveti Andrija, Veliki Skupio, Mali Skupio, and Grebeni. The largest island is Šipan, covering 15.81 km², followed by Lopud (4.63 km²), Jakljan (3.40 km²), and Koločep (2.44 km²), while the remaining islands are smaller than 1 km². The Elaphiti Islands are separated from the mainland by the Koločep Channel, which has an average width of 1.5 km but varies between 1.35 km and 7 km. The highest point is Velji Vrh on Šipan, with an elevation of 234 meters above sea level. The permanently inhabited islands are Šipan, Lopud, and Koločep (Magaš *et al.*, 2001).

According to the Köppen's classification, the surveyed islands fall under the Mediterranean climate with dry and hot summers and mild, precipitation-rich winters (Csa) for the period 1961–1990 (Filipčić, 1998). The average temperature in January, the coldest month of the year, for nearby Dubrovnik (where long-term measurements are available) was 9.1°C for the period 1960–2020, while the warmest month, August, had an average temperature of 25.3°C. December is the month with the fewest sunshine hours, averaging 120.9, whereas July has the most, with 350.5 sunshine hours (DHMZ, 2025).

The archipelago belongs to the Mediterranean phytogeographical region. This region is primarily characterized by the Mediterranean-littoral vegetation belt, which includes the following associations: the Stenomediterranean vegetation zone of wild olive forests (*Oleo-Ceratonion*), the Eumediterranean vegetation zone of holm oak forests (*Quercion ilicis* p.p.), and the Submediterranean vegetation zone of oriental hornbeam (*Ostryo-Carpineon orientalis* p.p.). The Stenomediterranean vegetation zone is dominated by species such as *Pinus halepensis*, *Juniperus phoenicea*, *Pistacia lentiscus*, *Olea sylvestris*, *Ceratonia siliqua*, *Myrtus communis,* and others, while *Quercus ilex* is the most important edificator of the Eumediterranean vegetation zone (Trinajstić, 1998). These zones dominate the Elaphiti Archipelago area. However, in flatter areas with deeper soil on the island of Šipan, such as parts of Šipansko polje, the Submediterranean vegetation zone develops with prevalence of deciduous oak species. Within these vegetation zones, however, the present-day landscape is not composed exclusively of the potential natural forest vegetation but also includes a diverse mosaic of habitats resulting from long-term human influence. Centuries of agricultural activities, grazing, wood harvesting, and more recent land abandonment have contributed to the development and persistence of various habitat types, including grasslands, rocky pastures, garrigue communities, agricultural mosaics, and different successional stages of shrub and woodland vegetation. As a result, the Elaphiti Archipelago has developed into a heterogeneous landscape characterized by a mosaic of forested and open habitats. This long-term interaction between natural environmental conditions and human land use has contributed to the high habitat diversity and landscape heterogeneity observed across the archipelago today.

A significant portion of the Elaphiti Islands (excluding only Sveti Andrija, Daksa, and Grebeni) is included in the Natura 2000 network, designated as a Site of Community Importance - *HR4000028 Elafiti* under the Habitats Directive 92/43/EEC. The heterogeneous landscape mosaic resulting from the long-term interaction between natural processes and human land use includes several habitat types of conservation importance within the Natura 2000 network. Among these are habitat types 2110 Embryonic shifting dunes, 5330 Thermo-Mediterranean and pre-desert scrub, and 6220 Pseudo-steppe with grasses and annuals of the Thero-Brachypodietea (Bioportal.hr, 2024). While the mainland part of the Dubrovnik region was one of the most often visited areas for many eminent entomologists of the 19th and 20th centuries and historical literature was fruitful with records on butterfly fauna (Schwingenschuss & Wagner, 1925; Burgermeister, 1964), not a single record has ever been published from nearby Elaphiti islands.

This study aims to present the results of a multi-year butterfly survey of the Elaphiti Islands, thereby filling a gap in the knowledge of butterfly distribution in Croatia.

MATERIALS AND METHODS

The current work was conducted from July 29, 2018, to December 28, 2024, preceded by a single field visit to Koločep on June 18, 2015. Most of this research focused on the three inhabited islands of the archipelago: Šipan, Lopud, and Koločep. To cover the representative habitats of the studied area, a total of 18 sampling sites were visited: five on Šipan, five on Lopud, and two on Koločep (Fig. 1). Study sites were selected to encompass the widest possible range of habitats present on each of the surveyed islands, ranging from open habitats with sparse woody vegetation cover to forest habitats. The remaining six sites are located on smaller islands and islets within the archipelago and one on Jakljan Island, which have not been systematically surveyed. Despite being the third-largest island in the archipelago, Jakljan was largely excluded from this study. A brief visit yielded only limited incidental data. The island is uninhabited, lacks regular ferry connections, and does not feature open grassland habitats comparable to those present on the three primary surveyed islands. Data from these smaller islands and islets were mostly collected in May and June 2021 by Jelena Bujan (JB), who provided photographs and observation coordinates, which authors were able to identify. An exception is the island of Sveti Andrija, which the two authors themselves visited twice during the research period. Data from the island of Šipan were collected by Dubravko Dender (DD) and Matea Martinović (MM) and most of the data from the island of Lopud by Dubravko Dender. Except for the first visit to the island of Koločep in 2015 by Toni Koren (TK), the majority of the data for that island was collected by Matea Martinović, who also collected data from Jakljan Island. A smaller number of records from the islands of Lopud and Šipan were collected by Antonio Juan Zaninovic Aldea (AJZA).

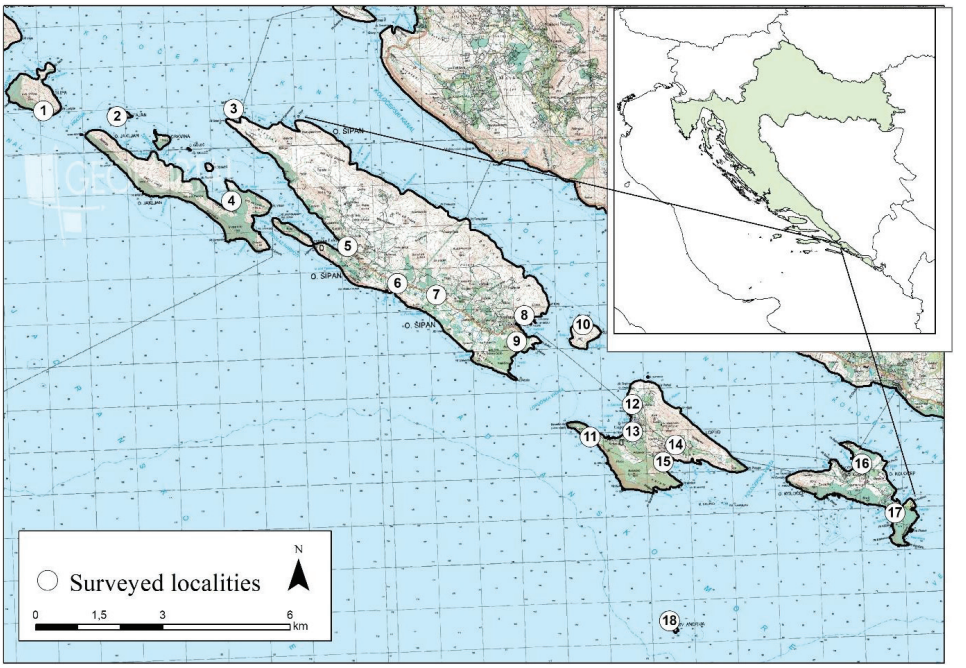

Fig. 1. Map of the surveyed localities on Elaphiti Islands. Locality numbers correspond to those in the list of localities.

Most of the sites on the three larger islands were visited several times during the season to cover the flight period of all butterfly species. The majority of this research was conducted on the island of Lopud, where one of the authors stayed periodically during all seasons, including late autumn and winter. During the period of late autumn and early winter, targeted visits were made to the island's thermophilic habitats, where the flight of certain butterfly species was detected.

Butterflies were observed visually or sampled using a net, identified and released, while a few questionable *Gegenes* specimens were collected for the genital examination (de Jong & Coutsis, 2017). Photo documentation of numerous species has been created, including the majority of rare and irregularly recorded species. The android application and digital platform Biologer (Popović *et al.*, 2020) was used to record field data during this research, and data collected from 2019 are stored there. The nomenclature follows the Lepiforum website (Lepiforum e.V., 2024).

Sampling sites are listed in geographical order from the northwest towards the southeast (Fig. 1). For each site the following information is given: locality name, a short description of the habitat, coordinates, elevation, dates of the visits, and initials of observers.

1. Olipa; rocky grassland, garrigue; 42,7594° N, 17,7762° E, 116 m a.s.l.; 3.6.2021 JB, 11.6.2021 JB
2. Tajan; Mediterranean forest and macchia; 42,7576° N, 17,7974° E, 39 m a.s.l.; 5.6.2021 JB
3. Mišnjak; Mediterranean macchia and garrigue; 42,7584° N, 17,8309° E, 6 m a.s.l, 27.5.2021 JB, 9.6.2021 JB

4. Jakljan; Mediterranean forest and macchia; 42,739° N, 17,8294° E, 40 m a.s.l, 15.7.2023 MM
5. Šipan, Šipanska Luka; ruderal areas, small patches of arable land, olive groves, Mediterranean forest, macchia and garrigue; 42,7285° N, 17,8623° E, 44 m a.s.l., 29.6.2020 DD; 4.4.2021 DD; 3.6.2021 DD & MM, 6.5.2023 DD, 15.8.2023 DD, 26.8.2023 DD, 14.6.2024 DD, 28.12.2024 DD & MM
6. Šipan, north of Cvjetkovići; agricultural land - grasslands and arable land, ruderal areas; 42,7203° N, 17,8763° E, 66 m a.s.l., 17.5.2019 DD & AJZA, 16.3.2020 DD & MM, 20.6.2020 DD & MM, 29.6.2020 DD, 18.10.2020 DD & MM, 4.4.2021 DD, 3.6.2021 DD & MM, 11.8.2021 DD, 6.5.2023 DD, 14.6.2024 DD, 28.12.2024 DD & MM
7. Šipan, Mjetkov tor - west of the toponym; agricultural land - grasslands, arable land and olive groves, ruderal areas, Mediterranean forests (Fig. 2d); 42,7176° N, 17,8873° E, 61 m a.s.l., 17.5.2019 DD & AJZA, 16.3.2020 DD & MM, 20.6.2020 DD & MM, 29.6.2020 DD, 18.10.2020 DD & MM, 4.4.2021 DD, 3.6.2021 DD & MM, 11.8.2021 DD, 6.5.2023 DD, 27.12.2023 DD, 14.6.2024 DD, 28.12.2024 DD & MM
8. Šipan, Zabrđe - around the settlement; ruderal areas, agricultural land - olive groves, grasslands and arable land, Mediterranean forest, macchia and garrigue; 42,7126° N, 17,9125° E, 46 m a.s.l., 17.5.2019 DD & AJZA, 16.3.2020 DD & MM, 20.6.2020 DD & MM, 29.6.2020 DD, 18.10.2020 DD & MM, 30.5.2021 JB, 6.6.2021 DD, 11.8.2021 DD, 6.5.2023 DD, 30.5.2023 DD, 27.12.2023 DD, 28.12.2024 DD & MM
9. Šipan, Suđurađ - south of the settlement; ruderal areas, agricultural land - olive groves, grasslands and arable land, Mediterranean forest, macchia and garrigue; 42,7071° N, 17,9101° E, 57 m a.s.l.; 15.9.2018. DD, 17.5.2019 DD & AJZA, 16.3.2020 DD & MM, 20.6.2020 DD & MM, 29.6.2020 DD, 30.9.2020 AJZA, 18.10.2020 DD & MM, 4.4.2021 DD, 3.6.2021 DD & MM, 6.6.2021 DD, 11.8.2021 DD, 6.5.2023 DD, 30.5.2023 DD, 27.12.2023 DD, 14.6.2024 DD, 28.12.2024 DD & MM
10. Ruda; Mediterranean macchia; 42,7102° N, 17,9293° E, 52 m a.s.l.; 12.6.2021 JB
11. Lopud, Benišin rat; Mediterranean forest and macchia, ruderal areas; 42,6864° N, 17,9302° E, 100 m a.s.l.; 22.9.2018. MM, 5.4.2021 DD, 21.4.2021 DD, 4.6.2021 DD
12 Lopud, northern part of the island - west of Sutmiho; ruderal areas, olive groves, Mediterranean forest, macchia and garrigue, rocky grassland (Fig 2c); 42,693° N, 17,9426° E, 80 m a.s.l.; 3.3.2019 DD, 4.3.2019 DD, 9.3.2019 DD, 10.3.2019 DD, 5.5.2019 DD, 8.5.2019 DD, 18.5.2019 DD, 19.5.2019 DD, 24.6.2019 DD, 25.6.2019 DD, 4.7.2019 DD, 5.7.2019 DD, 8.9.2019 DD, 23.9.2019 DD, 26.9.2019 DD, 9.10.2019 DD, 10.10.2019 DD, 14.3.2020 DD, 15.3.2020 DD, 16.3.2020 DD, 17.3.2020 DD, 16.6.2020 DD, 17.6.2020 DD, 18.6.2020 DD, 19.6.2020 DD, 20.6.2020 MM, 20.6.2020 DD, 21.6.2020 DD, 22.6.2020 DD, 27.6.2020 DD, 28.6.2020 DD, 29.6.2020 DD, 30.6.2020 DD, 29.8.2020 DD, 24.9.2020 AJZA, 25.9.2020 AJZA, 18.10.2020 DD, 19.10.2020 DD, 16.11.2020 DD, 17.11.2020 DD, 18.11.2020 DD, 19.11.2020 DD, 20.11.2020 DD, 21.11.2020 DD, 24.11.2020 DD, 25.11.2020 DD, 26.11.2020 DD, 27.1.2021 DD, 28.1.2021 DD, 30.1.2021 DD, 4.2.2021 DD, 5.2.2021 DD, 27.3.2021 DD, 28.3.2021 DD, 29.3.2021 DD, 30.3.2021 DD, 31.3.2021 DD, 1.4.2021 DD, 2.4.2021 DD, 4.4.2021 DD, 5.4.2021 DD, 19.4.2021 DD, 20.4.2021 DD, 23.4.2021 DD, 26.4.2021 DD, 27.4.2021 DD, 28.4.2021 DD, 29.4.2021 DD, 3.6.2021 DD & MM, 4.6.2021 DD, 5.6.2021 DD, 7.6.2021 DD, 8.6.2021 DD, 9.6.2021 DD, 11.6.2021 DD, 8.7.2021 DD, 9.7.2021 DD, 2.8.2021 DD, 3.8.2021 DD, 4.8.2021 DD, 9.8.2021 DD, 10.8.2021 DD, 12.8.2021 DD, 13.8.2021 DD, 17.1.2022 DD, 19.1.2022 DD, 24.1.2022 DD, 25.1.2022 DD, 26.1.2022 DD, 27.1.2022 DD, 8.3.2022 DD, 9.3.2022 DD, 10.3.2022 DD, 17.4.2022 DD, 18.4.2022 DD, 30.5.2022 DD, 4.6.2022 DD, 5.6.2022 DD, 6.6.2022 DD, 7.6.2022 DD, 8.6.2022 DD, 9.6.2022 DD, 19.6.2022 DD, 20.6.2022 DD, 21.6.2022 DD, 22.6.2022 DD, 23.6.2022 DD, 24.6.2022 DD, 25.6.2022 DD, 2.7.2022 DD, 3.7.2022 DD, 4.7.2022 DD, 5.7.2022 DD, 6.7.2022 DD, 28.8.2022 DD, 29.8.2022 DD, 30.8.2022 DD, 31.8.2022 DD, 2.9.2022 DD, 30.10.2022 DD, 31.10.2022 DD, 26.12.2022 DD, 27.12.2022 DD, 28.12.2022 DD, 29.12.2022 DD, 30.12.2022 DD, 31.12.2022 DD, 3.5.2023 DD, 4.5.2023 DD, 5.5.2023 DD, 28.5.2023

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13. Lopud, arround the Lopud settlement; ruderal areas, agricultural land - olive groves, grasslands and arable land, Mediterranean forest, macchia and garrigue, grasslands on sandy soil (Fig. 2b); 42,6872° N, 17,9424° E, 49 m a.s.l.; 9.12.2018 DD, 3.3.2019 DD, 4.3.2019 DD, 10.3.2019 DD, 5.5.2019 DD, 12.5.2019 DD, 4.7.2019 DD, 14.3.2020 DD, 15.3.2020 DD, 18.6.2020 DD, 19.6.2020 DD, 21.6.2020 DD, 28.6.2020 DD, 19.10.2020 DD, 18.11.2020 DD, 19.11.2020 DD, 20.11.2020 DD, 21.11.2020 DD, 24.11.2020 DD, 25.11.2020 DD, 30.1.2021 DD, 27.3.2021 DD, 28.3.2021 DD, 2.4.2021 DD, 5.4.2021 DD, 21.4.2021 DD, 4.6.2021 DD, 7.6.2021 DD, 3.8.2021 DD, 4.8.2021 DD, 5.8.2021 DD, 10.8.2021 DD, 17.1.2022 DD, 22.1.2022 DD, 9.3.2022 DD, 12.3.2022 DD, 18.4.2022 DD, 30.5.2022 DD, 4.6.2022 DD, 8.6.2022 DD, 20.6.2022 DD, 21.6.2022 DD, 22.6.2022 DD & MM, 23.6.2022 DD, 24.6.2022 DD, 2.7.2022 DD, 3.7.2022 DD, 4.7.2022 DD, 6.7.2022 DD, 31.8.2022 DD, 2.9.2022 DD, 30.10.2022 DD, 31.10.2022 DD, 26.12.2022 DD, 31.12.2022 DD, 4.5.2023 DD, 28.5.2023 DD, 29.5.2023 DD, 15.8.2023 DD, 16.8.2023 DD, 17.8.2023 DD, 24.8.2023 DD, 26.12.2023 DD, 27.12.2023 DD, 29.12.2023 DD, 30.12.2023 DD, 31.3.2024 DD, 2.4.2024 DD, 3.4.2024 DD, 11.6.2024 DD, 12.6.2024 DD, 13.6.2024 DD, 14.10.2024 DD, 25.12.2024 DD, 26.12.2024 DD, 27.12.2024 DD, 28.12.2024 DD, 29.12.2024 DD
14. Lopud, central part of the island; Mediterranean forest macchia and garrigue, ruderal areas, agricultural land - grasslands, olive groves, vineyards and small patches of arable land, rocky grasslands, grasslands on sandy soil; 42,6841° N, 17,9547° E, 127 m a.s.l.; 9.12.2018 DD, 3.3.2019 DD, 5.5.2019 DD, 14.3.2020 DD, 18.6.2020 DD, 19.6.2020 DD, 21.6.2020 DD, 28.6.2020 DD, 19.10.2020 DD, 18.11.2020 DD, 25.11.2020 DD, 30.1.2021 DD, 27.3.2021 DD, 28.3.2021 DD, 2.4.2021 DD, 5.4.2021 DD, 21.4.2021 DD, 4.6.2021 DD, 6.6.2021 DD, 7.6.2021 DD, 11.6.2021 DD, 3.8.2021 DD, 5.8.2021 DD, 10.8.2021 DD, 17.1.2022 DD; 9.3.2022 DD, 12.3.2022 DD, 18.4.2022 DD, 30.5.2022 DD, 8.6.2022 DD, 22.6.2022 DD, 23.6.2022 DD, 2.7.2022 DD, 3.7.2022 DD, 4.7.2022 DD, 6.7.2022 DD, 31.8.2022 DD, 2.9.2022 DD, 30.10.2022 DD, 31.10.2022 DD, 26.12.2022 DD, 4.5.2023 DD, 28.5.2023 DD, 15.8.2023 DD, 24.8.2023 DD, 25.12.2023 DD, 29.12.2023 DD, 31.3.2024 DD, 3.4.2024 DD, 11.6.2024 DD, 12.6.2024 DD
15. Lopud, southern part - around Prijevoj; Mediterranean forest macchia and garrigue, ruderal areas; 42,6806° N, 17,9509° E, 61 m a.s.l.; 3.3.2019 DD, 5.5.2019 DD, 14.3.2020 DD, 18.6.2020 DD, 21.6.2020 DD, 28.6.2020 DD, 5.9.2020 AJZA, 19.10.2020 DD, 18.11.2020 DD, 25.11.2020 DD, 30.1.2021 DD, 27.3.2021 DD, 28.3.2021 DD, 2.4.2021 DD, 5.4.2021 DD, 21.4.2021 DD, 4.6.2021 DD, 7.6.2021 DD, 11.6.2021 DD, 3.8.2021 DD, 5.8.2021 DD, 10.8.2021 DD, 9.3.2022 DD, 18.4.2022 DD, 30.5.2022 DD, 8.6.2022 DD, 3.7.2022 DD, 6.7.2022 DD, 2.9.2022 DD, 30.10.2022 DD, 26.12.2022 DD, 4.5.2023 DD, 15.8.2023 DD, 24.8.2023 DD, 29.12.2023 DD, 31.3.2024 DD, 11.6.2024 DD
16. Koločep, Donje Čelo - northern part; Mediterranean forest macchia and garrigue, ruderal areas, agricultural land - grasslands, olive groves and small patches of arable land, rocky grasslands (Fig 2a); 42,6787° N, 18,008° E, 65 m a.s.l.; 18.6.2015 TK, 22.3.2019 MM, 16.7.2020 MM, 24.11.2020 DD, 25.2.2021 MM, 16.4.2021 MM, 29.4.2021 DD, 9.6.2021 MM, 12.6.2021 JB, 2.6.2022 MM
17. Koločep, Gornje Čelo - southern part; Mediterranean forest macchia and garrigue, ruderal areas, agricultural land - grasslands, olive groves and small patches of arable land; 42,668° N, 18,017° E, 64 m a.s.l.; 29.7.2018 MM, 24.8.2018 MM, 27.2.2019 DD, 22.3.2019 MM, 18.8.2019 MM, 25.8.2019 MM, 26.8.2019 MM; 29.8.2019 MM, 15.9.2019 MM, 25.2.2021 MM, 16.4.2021 MM, 9.6.2021 MM
18. Sveti Andrija; Mediterranean forest, macchia and garrigue, rocky grassland; 42,6468° N, 17,9512° E, 87 m a.s.l.; 20.9.2018 MM, 18.5.2021 JB, 10.6.2021 DD & JB

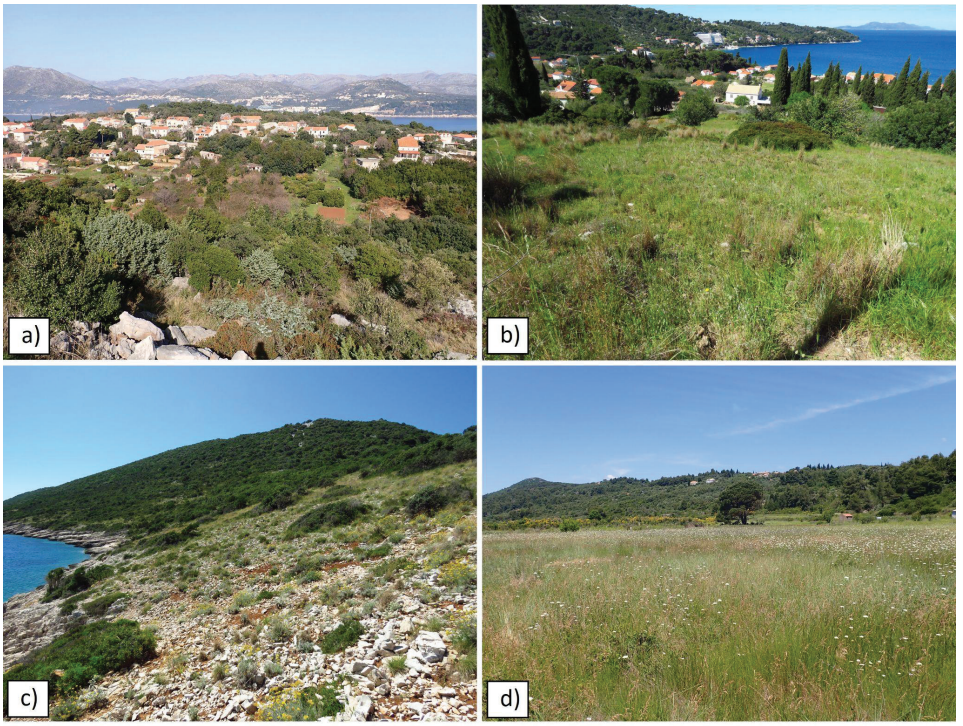

Fig. 2. Habitats on selected islands from the Elaphiti Islands: a) diverse habitats around Donje Čelo on Koločep Island, b) grassland on sandy soil on Lopud Island, c) rocky grassland on Lopud, d) Šipansko polje (photos by D. Dender & M. Martinović).

RESULTS

A total of 58 butterfly species from five families were recorded across 18 sampling sites on the Elaphiti Islands (Tab. 1). Nymphalidae were the most numerous family with a total of 21 recorded species, followed by Lycaenidae with 15, Pieridae with 14, Hesperiidae with 5 and Papilionidae with 3 species recorded.

Considering the three surveyed islands individually, the highest number of species was recorded on Šipan, with as many as 55 species. On Lopud, the most thoroughly researched island, 50 species were identified, while the least explored Koločep hosted 42 species. On the smaller islands a total of 12 species were recorded, with the highest individual count of six species found on Sveti Andrija.

The most widespread species recorded during the survey was *Gonepteryx cleopatra*, which was observed at 17 of the 18 surveyed localities. High levels of occurrence were also recorded for *Limenitis reducta*, which was found at 13 localities. Several other species were recorded at a large number of sites, including *Iphiclides podalirius*, *Colias crocea*, *Lycaena phlaeas*, *Vanessa atalanta*, and *Maniola jurtina* (12 localities each), as well *as Pieris brassicae*, *Pieris mannii*, *Pieris rapae*, *Lasiommata megera*, *Pararge aegeria*, and *Coenonympha pamphilus* (11 localities each).

Several species were recorded with single specimens, either across the archipelago or on individual islands: *Ochlodes sylvanus* and *Aporia crataegi* (Šipan), *Polygonia c-album* and *Colias alfacariensis* (Lopud). On Lopud Island, which has been the most intensively studied island, three additional species have been recorded only once: *Glaucopsyche alexis* with a single specimen, *Brintesia circe* with three specimens at the same site during the same field visit, and *Lysandra bellargus* with a total of four specimens (3 males and one female) on the same site during the same field visit. These species have not been observed again during subsequent surveys in the same season, leaving open the possibility of occasional migration. Also, *Euchloe ausonia* was recorded only sporadically and in low numbers on Lopud. Aside from observations from two different years at site 12 (Fig. 1), where a single individual was recorded for one year and four individuals in the final year of the study, a lone individual was found in 2020 at site 14 (Fig. 1). The species is otherwise abundant on Šipan Island and regularly recorded on Koločep Island. On Šipan, caterpillars of this species were also found on *Bunias erucago*, yet individuals of this species were not found at sites with this plant species on Lopud Island, except in the aforementioned cases.

There are also single observations of certain species for Šipan and Koločep Islands. However, due to fewer visits to these islands and a better understanding of the populations on Lopud Island, additional data for Šipan and Koločep is expected to be collected in the future, but we highlight a single observation of *Leptidea sinapis* from both Šipan and Koločep.

Most of the species recorded on the smaller islands align with the most frequently observed and abundant species found on the three best-studied islands of the archipelago. Notable exceptions include observations of *Lysandra bellargus* and *Satyrus ferula* on the island of Olipa, and *Iolana iolas* on the islet of Tajan. Except on Olipa, *L. bellargus* was also recorded on the islands of Šipan and Lopud, *S. ferula* on Lopud and Koločep, and *Iolana iolas* on Koločep and Šipan.

Within this study, data on butterfly activity during late autumn and early winter, the least favorable period of the year, were also collected, primarily on Lopud Island, with additional surveys conducted on Šipan. During December and January, a total of 15 species were recorded, although observations usually comprised only a few individuals of several species. The only exception was *Vanessa atalanta*, which was recorded throughout the year and was particularly abundant and widespread during the calendar autumn and winter months, when it was more common than during spring and early summer. Reproduction of this species was also documented during this period through observations of both caterpillars and eggs on *Parietaria* sp.

Species with one or two records of individual specimens observed during the least favorable time of the year, across different years, include: *Leptotes pirithous* (December 31, 2023 - Lopud), *Celastrina argiolus* (December 26, 2023 - Lopud), *Libythea celtis* (December 27, 2024 - Lopud), *Issoria lathonia* (December 29 and 31, 2023, same individual - Lopud), *Lasiommata megera* (January 30, 2021, and December 31, 2023 - Lopud), *Pararge aegeria* (December 25, 2023 - Lopud), *Gonepteryx rhamni* (January 30, 2021 - Lopud), and *Pieris mannii* (December 27, 2023 - Šipan).

Lycaena phlaeas, *Vanessa cardui*, *Colias crocea*, *Gonepteryx cleopatra*, *Pieris brassicae*, and *P. rapae* are also scarce and difficult to detect during that period. However, records

of these species span at least across three different years, and in at least one of those years they were represented by more than single, isolated sightings.

For some species, reproduction or attempts of reproduction during the winter period were observed, like already mentioned *Vanessa atalanta*. On site 12, oviposition of *V. cardui* was recorded on January 25, 2022, at an air temperature of only 7°C, while oviposition of *Pieris brassicae* was observed on December 29, 2022 (Fig 3b). Mating of *Lycaena phlaeas* was observed on December 29, 2023 (Fig. 3d), at the same site (Fig. 1).

Seven recorded species are included in the Red list of butterflies of Croatia *Pieris brassicae* (DD), *Thymelicus acteon* (DD), *Glaucopsyche alexis* (NT), *Pseudophilotes vicrama* (NT), *Scolitantides orion* (NT), *Papilio machaon* (NT) and *Zerynthia polyxena* (NT) (Šašić *et al*., 2015). Additionally, *Z. polyxena* is listed in Annex IV of the Habitat Directive (OJ EC, 1992).

Tab. 1. Checklist of butterfly species recorded from Elaphiti Islands. Locality numbers correspond to those in the List of localities and Fig. 1.

	Species	**Locality number**
	Hesperiidae	
1.	*Gegenes pumilio* (Hoffmannsegg, 1804)	7, 8, 9, 12, 13, 14, 15
2.	*Carcharodus alceae* (Esper, 1780)	6, 7, 8, 9, 12, 13, 14, 16
3.	*Pyrgus malvae* (Linnaeus, 1758)	6, 7
4.	*Thymelicus acteon* (Rottemburg, 1775)	5, 6, 7, 8, 9, 16
5.	*Ochlodes sylvanus* (Esper, 1777)	9
	Papilionidae	
6.	*Iphiclides podalirius* (Linnaeus, 1758)	5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17
7.	*Papilio machaon* Linnaeus, 1758	5, 6, 7, 8, 9, 12, 13, 14, 15, 16
8.	*Zerynthia polyxena* ([Denis & Schiffermüller], 1775)	7, 9
	Pieridae	
9.	*Leptidea sinapis* (Linnaeus, 1758)	5, 16
10.	*Anthocharis cardamines* (Linnaeus, 1758)	5, 7, 9, 12, 13, 14, 15, 16
11.	*Aporia crataegi* (Linnaeus, 1758)	7
12.	*Pieris balcana* Lorković, [1969]	7, 9, 12, 13, 14, 15, 16, 17
13.	*Pieris brassicae* (Linnaeus, 1758)	5, 7, 8, 9, 12, 13, 14, 15, 16, 17
14.	*Pieris ergane* (Geyer, 1828)	5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16
15.	*Pieris mannii* (Mayer, 1851)	7, 8, 9, 11, 12, 13, 14, 15, 16, 17
16.	*Pieris rapae* (Linnaeus, 1758)	6, 7, 8, 9, 12, 13, 14, 15, 16, 17, 18
17.	*Euchloe ausonia* (Hübner, 1804)	5, 6, 7, 8, 9, 12, 14, 16
18.	*Pontia edusa* (Fabricius, 1777)	5, 6, 7, 8, 9, 12, 13, 14, 15, 16
19.	*Colias alfacariensis* Ribbe, 1905	13
20.	*Colias crocea* (Geoffroy, 1785)	5, 6, 7, 8, 9, 12, 13, 14, 15, 16, 17, 18
21.	*Gonepteryx cleopatra* (Linnaeus, 1767)	1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17, 18
22.	*Gonepteryx rhamni* (Linnaeus, 1758)	5, 7, 8, 9, 12, 13, 14, 15, 16, 17
	Lycaenidae	
23.	*Lycaena phlaeas* (Linnaeus, [1760])	5, 6, 7, 8, 9, 12, 13, 14, 15, 16, 17, 18
24.	*Callophrys rubi* (Linnaeus, 1758)	5, 7, 9, 12, 14, 15, 16
25.	*Favonius quercus* (Linnaeus, 1758)	5, 14, 15
26.	*Satyrium ilicis* (Esper, 1779)	3, 5, 7, 8, 9, 12, 13, 14, 15, 16, 17
27.	*Lampides boeticus* (Linnaeus, 1767)	9, 12, 14

	Species	**Locality number**
28.	*Leptotes pirithous* (Linnaeus, 1767)	8, 9, 12, 13, 14, 15, 17
29.	*Cacyreus marshalli* Butler, 1898	5, 9, 12, 13, 14, 17
30.	*Celastrina argiolus* (Linnaeus, 1758)	5, 6, 7, 8, 9, 12, 13, 14, 15, 16, 17
31.	*Pseudophilotes vicrama* (Moore, 1865)	7, 9, 12, 14, 15, 17
32.	*Scolitantides orion* (Pallas, 1771)	5, 9, 12, 13, 14, 15, 16
33.	*Glaucopsyche alexis* (Poda, 1761)	6, 9, 14
34.	*Iolana iolas* (Ochsenheimer, 1816)	2, 8, 16
35.	*Aricia agestis* ([Denis & Schiffermüller], 1775)	6, 7, 8, 9, 12, 13, 14, 15, 16
36.	*Lysandra bellargus* (Rottemburg, 1775)	1, 5, 8, 14
37.	*Polyommatus icarus* (Rottemburg, 1775)	5, 6, 7, 8, 9, 12, 13, 14, 15, 16
	Nymphalidae	
38.	*Libythea celtis* (Laicharting, 1782)	5, 7, 8, 9, 12, 13, 14, 15, 16, 17
39.	*Charaxes jasius* (Linnaeus, 1767)	5, 8, 9, 12, 13, 14, 15, 16, 17
40.	*Issoria lathonia* (Linnaeus, 1758)	9, 12, 13, 14, 15, 17
41.	*Vanessa atalanta* (Linnaeus, 1758)	5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17
42.	*Vanessa cardui* (Linnaeus, 1758)	6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17
43.	*Nymphalis polychloros* (Linnaeus, 1758)	6, 7, 8, 12, 13, 14, 16
44.	*Polygonia c-album* (Linnaeus, 1758)	12
45.	*Melitaea cinxia* (Linnaeus, 1758)	6, 7, 8, 9
46.	*Melitaea didyma* (Esper, 1778)	5, 6, 7, 8, 9, 12, 13, 14, 15
47.	*Limenitis reducta* Staudinger, 1901	4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17
48.	*Lasiommata maera* (Linnaeus, 1758)	1, 5, 6, 7, 8, 9, 12, 13, 14, 15, 16
49.	*Lasiommata megera* (Linnaeus, 1767)	5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17
50.	*Pararge aegeria* (Linnaeus, 1758)	5, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17
51.	*Coenonympha pamphilus* (Linnaeus, 1758)	5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17
52.	*Kirinia roxelana* (Cramer, 1777)	5, 8, 9, 12, 13, 14, 15
53.	*Maniola jurtina* (Linnaeus, 1758)	5, 6, 7, 8, 9, 12, 13, 14, 15, 16, 17
54.	*Satyrus ferula* (Fabricius, 1793)	1, 11, 12, 13, 14, 15, 16
55.	*Hipparchia semele* (Linnaeus, 1758)	9, 12, 14, 15
56.	*Hipparchia statilinus* (Hufnagel, 1766)	5, 9, 12, 13, 14, 15, 17
57.	*Hipparchia syriaca* (Staudinger, 1871)	5, 7, 8, 12, 13, 14, 15, 17
58.	*Brintesia circe* (Fabricius, 1775)	5, 6, 7, 8, 9, 14

Fig. 3. Characteristic butterfly species from Elaphiti Islands: a) *Kirinia roxelana* from Lopud, b) *Pieris brassicae* - oviposition at the end of December, c) *Gegenes pumilio* from Lopud, d) *Lycaena phlaeas* - mating at the end of December (photo by D. Dender).

DISCUSSION

By comparing the results of research conducted on this archipelago with data from studies of other islands in the Croatian part of the Adriatic (Withrington & Verovnik, 2008; Verovnik, 2011; Koren *et al*., 2018), we can conclude that the Elaphiti Islands today represent one of the best-researched island groups in this island belt, with the islands of Šipan and Lopud being among the most thoroughly studied.

The highest number of species was recorded on Šipan. In addition to its larger area, this can be attributed to the extensive Šipansko polje, a karst valley stretching between the settlements of Sudurađ and Šipanska Luka (localities 6, 7 and 9, Fig. 1). Together with the surrounding cultivated and ruderal areas this region represents the largest area of open grassland habitats on all studied islands in the surveyed area. Most individuals on the archipelago of the species *Melitaea cinxia*, *Brintesia circe*, and *Glaucopsyche alexis* were found at these three localities, while the species *Ochlodes sylvanus*, *Pyrgus malvae*, *Zerynthia polyxena*, and *Aporia crataegi* were recorded exclusively on them.

On Lopud, three species recorded on the other two islands were not found: *Thymelicus acteon*, *Iolana iolas*, and *Leptidea sinapis*. Notably, *Th. acteon* is quite abundant and widely distributed across most surveyed sites on Šipan Island, probably due to the

vast grasslands present on the island which contain its larvae host plants, mainly *Brachypodium* grasses.

The absence of *Iolana iolas* on Lopud is attributed to the lack of its host plant, *Colutea arborescens* (Hećimović & Hećimović, 1986), whereas all records of the species on Koločep, Šipan, and the islet of Tajan were associated with the presence of this plant.

Observations of *Leptidea sinapis* on Šipan and Koločep were limited to single individuals on each island which may indicate a migration from the nearby mainland where the species is very abundant.

Šipan Island leads in species richness, and it can be concluded that nearly all species inhabiting the archipelago are present there, with the exception of *Satyrus ferula*. This species has been recorded within the archipelago on Olipa Island, where a larger area of rocky grasslands now exists, due to a fire in 2016. It is also regularly observed during its flight period on Lopud Island and Koločep Island where such habitats persist. However, specific and more extensive areas of rocky grasslands were not observed on Šipan during this research, and this is considered the main reason for the species' absence from this island.

Given the size of Koločep Island and the presence of habitats similar to those on Lopud Island, it is expected that future research on this island will result in a slightly higher number of species, likely similar to those recorded so far on Lopud Island. At the same time, no significant changes in the number of recorded species are expected on Lopud Island and Šipan Island, particularly as the authors are familiar with the state of butterfly fauna on the nearby mainland.

Additional observations are expected on most of the smaller islets within the archipelago, as well as for Olipa Island, where grassland areas have been established due to recent fire, in contrast to most of the other islets covered by forest and maquis. For Jakljan Island, the discovery of additional species is also expected; however, since grassland areas are almost completely absent on this island, the species diversity is not anticipated to be as high as on the three surveyed islands.

Considering the relatively small distances between individual islands and islets within the archipelago, and the proximity of the entire archipelago to the mainland, there is an open possibility of continuous migrations for some species within the islands and nearby mainland, including the Pelješac Peninsula. This hypothesis is potentially supported by sporadic records of several species on on Lopud Island. Three species, whose specimens were recorded in at least two different flight seasons on Šipan Island, have been observed only once on Lopud: *Glaucopsyche alexis*, *Brintesia circe*, and *Lysandra bellargus*. Previous and repeated attempts to find these species again were unsuccessful, leaving open the possibility of only occasional colonization of the island or the wandering of individual specimens from nearby areas. Similarly, the irregular recording of a small number of *Euchloe ausonia* specimens suggests a comparable scenario. Except for one observation at site 14 on Lopud, all other sightings of this species have been at site 12 (Fig. 1). Over the past decade, this location has undergone the clearing of previously overgrown olive groves and open areas, significantly increasing the extent of open habitats there. Consequently, the species may continue to be regularly recorded at this site. The opening of habitats at this location has also led to regular sightings of other species not previously recorded

at the site, such as *Gegenes pumilio*, *Carcharodus alceae, Pseudophilotes vicrama, Issoria lathonia*, *Melitaea didyma*, indicating relatively rapid colonization of these newly established suitable habitats. On the other hand, *Polygonia c-album* and *Colias alfacariensis* are considered irregular visitors to the archipelago, specifically Lopud. On the coastal mainland, there are no permanent populations of *C. alfacariensis*, as the species is only sporadically recorded, primarily in autumn, while *Polygonia c-album* is considered to be a highly localized and rare species in the broader Dubrovnik area (personal observations).

Individual observations of certain species, based on which the existence of permanent populations cannot be confirmed with certainty, also exist for Šipan and Koločep. However, since the number of visits to Šipan, and especially to Koločep, is significantly lower compared to Lopud, the possibility of small populations on these islands remains. Nonetheless, the individual observations of *Ochlodes sylvanus, Leptidea sinapis*, and *Aporia crataegi* on Šipan Island, as well as *L. sinapis* on Koločep Island, stand out because these species have not been recorded on the best-studied Lopud Island.

Given the sporadic nature of these observations and the limited frequency of visits to certain islands within the archipelago, future research and systematic surveys will be crucial to better understand the population dynamics, potential habitats, and dispersal patterns of these species. Additionally, environmental factors influencing occasional migrations or colonization events should be considered in further studies to assess their impact on the observed patterns of species presence. The inclusion of both historical and new data will enhance the overall understanding of butterfly communities across the archipelago and may help clarify whether these rare occurrences represent overlooked, small populations, occasional visitors, or a new colonisation and change in species range.

This study further enhances the current knowledge of butterfly fauna of the Adriatic islands (Withrington & Verovnik, 2008; Verovnik, 2011; Koren *et al*., 2018) and indicates the need for further studies and additional visits even to the better-studied islands. The findings of this study partially confirm this, as the total of 58 recorded species within the Elaphiti archipelago is exceptionally high. The number of species recorded even on individual better researched islands (Šipan - 55; Lopud - 50) is higher than that of many southern Adriatic islands. Number of recorded species on some of them confirms this: Lastovo Archipelago - 31 (Koren & Lauš, 2020), Mljet - 49 (Kučinić *et al*., 2010), Čiovo - 30 and Šolta - 37 (Koren *et al*., 2015). The number of species recorded on Korčula, one of the largest islands in the Adriatic, with the exclusion of questionable species (Koren *et al*., 2018) and addition of the recently recorded *Kirinia roxelana* (personal observations) is 58, which is identical to the number from the Elaphiti Islands.

This trend continues when comparing the archipelago and its islands with islands of the central Adriatic, such as Murter with 42 species (Koren *et al*., 2015), Ugljan with 43 species, Pašman with 50 species and Dugi otok with 47 species (Verovnik, 2011). For instance, the number of species recorded on Pašman currently matches that of the much smaller Lopud, while the number of species on Ugljan is only slightly higher than that on the tiny Koločep, which the authors of this study consider insufficiently explored.

A similar conclusion can be drawn when comparing these results with those from larger islands in the northern Adriatic, such as Pag with 54 and Rab with 55 species (Withrington & Verovnik, 2008) and the somewhat smaller Vir island with 42 species (Koren *et al*., 2015).

Thus, this research serves as an indicator of the need for further investigations on many Adriatic islands. At the same time, it highlights the fact that some smaller islands, regardless of their limited area, can support significant butterfly diversity if they have a variety of habitats, as is the case with the Elaphiti Archipelago.

During this research *Gegenes pumilio* (Fig. 3c) was recorded on two of the three islands. It was recorded on Šipan Island, of which one male specimen was collected from locality 7 and dissected (Fig. 1). Additionally, during the last field visit on December 28, 2024, caterpillars of this species were found in localities 8 and 9 (Fig. 1). Both were found on the species *Hyparrhenia hirta*. On Lopud, the species was recorded at almost all sampled sites, primarily during late summer and early autumn, with two specimens collected. One female was captured while flying slowly and landing on *H. hirta*, likely attempting oviposition, and one male was collected from a nearby open area. The observations of *G. pumilio* contribute to the knowledge of the species distribution on the Adriatic islands, as it has so far been recorded on a relatively small number of islands (Withrington & Verovnik, 2008; Verovnik, 2011, Koren *et al*., 2015).

The second interesting species, *Kirinia roxelana* (Fig. 3a) was found during this research on Šipan and Lopud Island. In Croatia it had only been reported from the mainland of Dubrovnik-Neretva County, including the Pelješac peninsula, based solely on historical records and had never been documented on any island (Werner, 1895; Koren, 2015; Koren *et al*., 2019b). Due to its secretive behaviour, this species is often overlooked, as, during the hot period of the day, it hides in heavy shade resting on tree branches. On Lopud, the species was recorded in almost all broadleaf forest habitats. It is most common during June and July. Additionally, the authors of this study, M. Martinović and D. Dender, collected more recent data for the Pelješac Peninsula in 2020 and 2021. On June 1, 2022, D. Dender observed and photographed an individual on Korčula Island during a brief visit to the forest vegetation reserve Kočje near the village of Žrnovo. This was the first record of the species on Korčula, as it had not been documented during either historical or recent surveys (Koren *et al*., 2018). Thanks to these new observations, there is now a clearer picture of the distribution of *K. roxelana* in Croatia. With these findings, the number of species recorded on the Croatian islands (Koren *et al*., 2014) increased to 123 species.

Notes on the winter activity of the butterflies in the Elafiti archipelago

Data on butterfly flight periods, particularly winter activity in Croatia, remain scarce due to the lack of long-term monitoring and targeted studies, as well as the traditional emphasis of faunistic research on the spring and summer months (Lorković, 2009). In the southern part of Croatia including the investigated area, imagos of various species begin their flight period already in February. Observations from the beginning of March on the island of Lopud, but also the author's year-long research of the mainland, lead to such a conclusion. While the majority of Mediterranean butterfly species complete their active reproductive cycles by late summer, the excep-

tionally mild autumn and winter conditions, characteristic for the southern Adriatic coast, allow several multivoltine and migratory species to significantly prolong their flight periods. Consequently, adults of these species can be regularly observed well into November, with a smaller, yet notable, number of individuals exhibiting opportunistic winter activity during December or even January, a phenomenon increasingly documented in coastal refugia across the Mediterranean Basin (Dennis, 1993; García-Barros *et al*., 2002).

However, except for the widespread *Vanessa atalanta*, other species during December and January appear in small numbers and remain almost exclusively within settlements and their surroundings. In these areas, agricultural practices such as mowing, gardening and other habitat management activities, ensure an adequate supply of available food—flowering plants. Continuous research over multiple years would provide a better understanding of the consistency of these occurrences in the coldest part of the year. Monitoring such phenomena would also be valuable in the context of tracking climate change and the impact of warming on flight periods of the individual species. Butterflies are well-established, highly sensitive bioindicators of climate change due to their poikilothermic nature, and shifts in their phenology - such as earlier first appearance dates and advanced mean flight dates - have been strongly correlated with rising winter and spring temperatures across the Mediterranean Basin (Stefanescu *et al*., 2003). Furthermore, recent large-scale analyses of long-term monitoring systems indicate that phenological sensitivity to climate warming is highly variable throughout the seasons, demonstrating that early-season emergence is significantly more sensitive to temperature anomalies than later generations (MacGregor *et al*., 2022). This highlights that understanding local variations in flight period flexibility across different months is increasingly critical, as current warming trends may favour specific seasonal adaptations, including alterations in diapause or migratory behavior (Stefanescu *et al*., 2003; MacGregor *et al*., 2022). Adults of certain species during late autumn and winter have also been recorded in recent years in the nearby Konavle region (Koren *et al*., in review), and similar cases are known to the authors from other parts of the broader Dubrovnik area.

The conservation of butterflies in the Elafiti archipelago

While seven recorded species are listed in the Red List of butterflies of Croatia (Šašić *et al*., 2015), all these species are also common and widely distributed in suitable habitats in the wider Dubrovnik region (personal observations). A review of online biodiversity data platforms such as Biologer (Biologer.hr, 2024) and iNaturalist (iNaturalist, 2024) supports the same conclusion for the Dinaric region of Croatia or, in some cases, for much of the country.

The conservation of butterflies, and thus other components of biodiversity in this archipelago, should primarily focus on preserving grasslands and similar open habitats, which are generally disappearing in Croatia due to the abandonment of agricultural practices, particularly grazing (Marković, 2003). This is also the current situation on these islands, where livestock is present only in small numbers on Šipan and Lopud, but not in quantities sufficient to prevent or slow down the succession of these habitats. The expansion of *Pinus halepensis* into abandoned or recently burned

areas further accelerates the succession process, a phenomenon observed on the recently burned areas of Olipa Island. Habitat types such as 2110 Embryonic shifting dunes, 5330 Thermo-Mediterranean, and pre-desert scrub, and 6220 Pseudo-steppe with grasses and annuals of the Thero-Brachypodietea are listed as conservation targets within the Natura 2000 ecological network area *HR4000028 Elafiti* (Bioportal.hr, 2024). However, the total area of these habitats, according to official data, is currently only 11.6 hectares, which is exceptionally small. In addition to succession, these and similar open habitats are further threatened by infrastructure development, particularly on Lopud Island, due to tourism-driven construction. On the other hand, in the past decade, alongside new construction on Lopud, previously abandoned structures have been restored, and their surroundings have seen the re-establishment of abandoned agricultural lands, primarily in the form of open olive groves. While this benefits butterfly populations associated with open habitats, these newly established open areas are often subject to intensive mowing. The conservation of butterflies and other species associated with grasslands and similar open habitats should primarily focus on preserving these habitats and improving conditions in existing ones. Such goals should be implemented in future Natura 2000 management plan of the Elaphiti Islands, which currently does not exist (Bioportal.hr, 2025). Starting of butterfly monitoring in the archipelago would be one of the desirable activities in the future which will ensure standardized data collection for assessing species richness, population dynamics, and habitat quality, thereby supporting evidence-based conservation strategies and activities.

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