BUTTERFLIES OF ALBANIA NEW DATA AND GOING ONLINE FLUTURAT E SHQIPËRISË TË DHËNA TË REJA DHE FAQJA ONLINE (LEPIDOPTERA: PAPILIONOIDEA)

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Abstract

In 2005, Misja [28] published the first distribution maps for the Albanian butterfly fauna. In June 2018 a review article [7] with new distribution maps [8] was published and recorded three new butterfly species for Albania, confirmed two data deficient species from a previous checklist [44] and adapted the status of six species for which recent evidence was lacking. This update resulted in 196 species with confirmed occurrence, 4 data deficient species and 9 species with potential to be discovered. Since 2018, new field research and data from external sources resulted in a 76,d3 % increase of observations. 7 new species were observed and 2 data deficient species have been confirmed. Thus, 205 species are now confirmed from Albania and it is likely that more species will be found. Included in this paper are suggestions for further research on potential and data-deficient taxa. The known data on the distribution of food-plants for these species have also been taken into account. A website (https://biodiversity.unitir.edu.al/index.html) dedicated to the butterflies of Albania is launched. To increase the accuracy of the distribution maps, the Atlas [8] is moved to the new website. Finally, we make a call to share all Albanian butterfly observations to increase the knowledge of the rich Albanian fauna.

We dedicate this publication to the late Prof. Kastriot Misja who died from Covid on 25.ii.2022

Key words: *Papilionoidea* – butterflies – *Polyommmatus lurae – Polyommatus orphicus – Satyrium pruni – Araschnia levana – Danaus chrysippus – Euphydryas maturna – Limenitis camilla – Erebia albergana – Pseudochazara tisiphone – Proterebia phega* – Albania – faunistics.

Përmbledhje

Në vitin 2005, Misja [28] publikoi hartat e para të shpërndarjes për faunën e fluturave shqiptare. Në qershor të vitit 2018 u publikua një artikull rishikues [7] me hartat e reja të shpërndarjes [8], i cili regjistroi tre lloje të reja fluturash për Shqipërinë, dhe konfirmoi dy lloje, për të cilat kishte mangësi të të dhënave krahasuar me listën e mëparshme të kontrollit [44] dhe përshtati, bazuar në prova të reja, statusin e gjashtë llojeve të klasifikuara më parë me mungesë të dhënash. Bazuar në prova të reja ky përditësim rezultoi në një listë prej 196 lloje fluturash, prej të cilave 4 lloje me të dhëna të mangëta dhe 9 lloje me potencial për t'u zbuluar. Që nga ky publikim, kërkime të reja në terren dhe të dhëna nga burime të jashtme, rezultuan në një rritje prej 76,3 % të numrit të observimeve. Tashmë janë vëzhguar 7 lloje të reja dhe janë konfirmuar 2 lloje me të dhëna të mangëta. Kështu, nga Shqipëria tashmë janë konfirmuar 205 lloje fluturash dhe me shumë ngjasa ka vend edhe për lloje të tjera potenciale për t'u zbuluar. Të përfshira në këtë punim janë sugjerimet për kërkime të mëtejshme mbi taksat potenciale dhe me mangësi të të dhënave. Po ashtu në këtë botim janë marrë parasysh edhe të dhënat e njohura për shpërndarjen e bimëve që shërbejnë si burim ushqimor për këto lloje. Për të shpejtuar përditësimin e hartave të shpërndarjes [8], Atlasi i fluturave të Shqipërisë zhvendoset në faqen e re, të internetit: (https://biodiversity.unitir.edu.al/index.html), të hapur rishtasi përkushtuar fluturave të Shqipërisë. Së fundi bëjmë një thirrje për të gjithë sudiuesit për të ndarë të gjitha vëzhgimet e tyre të fluturave shqiptare me qëllim përditësimin në kohë të njohurive për faunën e pasur të fluturave të Shqipërisë.

Fjalë kyçe: *Papilionoidea* – fluturat – *Polyommmatus lurae* – *Polyommatus orphicus* – *Satyrium pruni* – *Araschnia levana* – *Danaus chrysippus* – *Euphydryas maturna* – *Limenitis camilla* – *Erebia albergana* – *Pseudochazara tisiphone* – *Proterebia phega* – Shqipëria – fauna.

Introduction

The 2018 review and checklist [7] for the Albanian butterfly fauna was based on 8.564 observations. This clearly indicates the low intensity of butterfly investigations for such a diverse country. The data originated from all available historical publications and field trips. The obvious conclusion of the review [7] was that the knowledge of the Albanian butterfly fauna was insufficient and focus was given to do more research by updating the checklist, listing potential species to look for in Albania and/or to be confirmed because of their data deficient status. The review [7] intended to stimulate entomologists to perform new surveys during different months and in all areas of the country. Providing maps [8], clearly showed the limited knowledge about the distribution of various species and stimulated researchers to improve it. Recently, the potential of the Albanian butterfly diversity has attracted the attention of researchers. Dincă *et al*. [10] included specimens from Albania in the European barcode library, Dapporto *et al*. [9] also included data from Albania in the Atlas of mitochondrial diversity of Western Palearctic butterflies and Parmentier *et al*. [34] described a new endemic species from Albania.

Material and methods

New field research by the authors, observations provided by different entomologists and the consultation of open source portals that were critically screened, resulted in interesting new data. All the available literature known to the authors has been taken into account for this update. The nomenclature follows Wiemers *et al*. [47] and the recent adaptations from Dapporto *et al*. [9].

Abbreviations used: a.s.l.: above sea level, DD: data deficient, GR: Greece, MAC: Republic of North Macedonia, MNE: Republic of Montenegro, RKS: Republic of Kosovo.

Map symbols: 🔴 Historical data. 🟠 Additional data from the 2018 update [7-8]. 🟢 New observation since the 2018 update [7-8].

Notes

Satyrium pruni (Linnaeus, 1758) (Plate 1)

In 2018, the last checklist [7] for the butterflies of Albania reviewed the available literature for *S. pruni*. Due to the absence of clear evidence this species was considered as a potential species to be discovered in Albania. On 24.vii.2018, Laurian Parmentier [33] sampled a worn female in the Dibër district, central eastern Albania, about 60 km from the nearest know locality in MAC. It is expected that more localities, from N. Albania to the centre of the Elbasan country, will be found especially when searching in June.

Polyommatus lurae Parmentier, Vila & Lukhtanov 2022 (Fig. 1a-b; plate 1)

The recent discovery of a new taxon, based on mitochondrial barcoding (COI sequences), a nuclear marker (ITS2), karyotyping and colour morphometrics, in the *Polyommatus* (*Agrodiaetus*) group from Lurë (Dibër) was described as *P. lurae* [34]. It is linked to biotopes with ophiolitic substrates, typically found in Albanian biotopes. It is the first Albanian endemic butterfly species. However, the distribution of the different brown *Agrodiaetus* taxa in the Balkan is insufficiently substantiated. While fresh males of *P. lurae* might be discriminated visually based on its very dark habitus [34], other external characters between the different, cryptic taxa are overlapping and cause confusion, e.g. the presence or the degree of reduction of the white streak on the underside hindwing. Strong differences in male genitalia are also lacking in the *Polyommatus* (*Agrodiaetus*) complex.

This implies that the published distribution maps in this group need further study. As discussed [34], *P. lurae* might in the future well be documented from a broader Albanian range and even from the neighboring countries. Based on COI barcoding only (no karyotyping) one *Polyommatus* (*Agrodiaetus*) specimen, sampled by Sylvain Cuvelier and Morten Mølgaard on 17.vii.2013 near Voskopojë (Korçë county) on a paler brown ophiolite substrate already brings an important extension to the Albanian distribution range of *P. lurae*. The status of *P. lurae* and other taxa of the brown *Polyommatus* (*Agrodiaetus*)

group is under further investigation and both more data concerning biological properties and deeper genomic studies are expected in the future.

Fig. 1a. Copula of *Polyommatus lurae*, Lurë region, 24.vii.2022 **Fig. 1b**. Habitat of *Polyommatus lurae*, Lurë region. (photographer: Laurian Parmentier)

Polyommatus orphicus Kolev, 2005 (Fig. 2a-b; Plate 1)

Together with the discovery of *P. lurae*, far from the known Greek and Bulgarian populations, *P. orphicus* was also documented [34] from eastern to central Albania, near the biotopes of *P. lurae* and with a larger distribution range, discovered in July 2017 by Laurian Parmentier and who confirmed a good population in 2018 at Valikardhë. The species is more linked to karst biotopes [34]. Putative hybridizations between *P. lurae* and *P. orphicus* were described [34] in the contact zone and at intermediate habitats, illustrating again how complex the situation in the *Polyommatus* (*Agrodiaetus*) group is.

Fig. 2a. Habitat of *Polyommatus orphicus*, Valikardhë region. **Fig. 2b**. Nectaring *Polyommatus orphicus* in situ, Valikardhë region, 19.vii.2018 (Photographer: Laurian Parmentier)

Proterebia phegea (Borkhausen, 1788) (Plate 1)

There are no historical observations of *P. phegea* from Albania but the country is located in between three disjunct areas from where the species has been well documented. In the Balkan, the species was first mentioned from Dalmatia being present in Croatia and with a marginal extension in Bosnia and Herzegovina. In Greece, the species was documented first from western Macedonia and later from the Rhodope Mountains. On 27.iv.2022 Verovnik R. & Verovnik J. [45], discovered a population on south-facing slopes near Bulqizë (Dibër). This is the second locality in the Balkan where *P. phegea* occurs on ophiolite substrate. The species is also present on the south-western slopes of Oros Vourinos (GR) in ophiolite zones (personal observation of the first author). More early spring surveys might increase the range of *P. phegea* in the vast ophiolitic zone in eastern Albania. Areas with karstic limestone substrate in western and eastern Albania should also be investigated as from mid-March and could further expand the Albanian distribution range of this species.

Erebia albergana (Prunner, 1798) (Plate 1)

This species is widely distributed over the Alps but local in the Italian Apennines and the Balkan peninsula [22] where the species is known from the western and central Stara Planina in Bulgaria [1], from SE Serbia [15, 35] on the Stara Planina and from SW Serbia on Mokra Gora [27] near the border with MNE and RKS. The species is documented from MAC on the Šar Planina - Korab mountain [18, 20, 38], from MNE on the Čakor pass [12] and Bjelasica Mt. [16] and from RKS [48], south of Dragaš. One worn male of *E. albergana* has recently been found [49] near Valbonë (personal communication M. Bjerg, August 2019) in the North Albanian Alps. This is a further extension for this species in the Balkan Peninsula. Other localities will probably be discovered in the North Albanian Alps as more suitable habitats are present.

Kirinia climene (Esper, 1783) (Fig. 3-4; Plate 1)

A single worn female was collected a long time ago near Krumë in NE Albania [36]. During 2013, Melovski researched the Albanian side of the Prespa National Park. *K. climene* is not mentioned in the list of recorded species [5, 24]. Cuvelier and Dincă found a few tattered *K. climene* on 13.vii.2022 west of Liqeni i Prespës within the Prespa National Park. The species is also known from MAC [18-19] and from NW GR [28-29]. Potential habitats are open forests, clearings and pastures with rather broadleaved grasses at the base of tree trunks. The butterflies fly from June to August with a peak in the second half of June and the first half of July. During the hottest hours of the day, the butterflies often rest on tree trunks and can easily be confused with *Maniola jurtina* (Linnaeus, 1758) a common species in such biotopes. The hills north of Krumë look suitable and a confirmation of its presence there is needed.

Fig. 3. *Kirinia climene* male (left) and female (right), Mali i Thatë, 1250-1500 m a.s.l., 13.vii.2022 (photographer: Sylvain Cuvelier)

Fig. 4. Habitat of *Kirinia climene*, Mali i Thatë, 1400 m a.s.l., 13.vii.2022 (photographer: Sylvain Cuvelier)

Pseudochazara tisiphone, Brown, [1981] (Plate 1)

On 23-24.vii.2022, Xhuliana Qirinxhi accompanied by Rigela Fero and Laurian Parmentier found two worn males and two relatively fresh females of *P. tisiphone* on ophiolite substrate, in the Lurë-Dejë National Park. This is a northwards extension of more than 30 km from the nearest localities (Bulqizë and Krastë). There is a good chance that there are even more unknown populations of *P. tisiphone* in other ophiolite massifs.

Araschnia levana (Linnaeus, 1758) (Plate 1)

This species is slowly expanding its range in the Balkan Peninsula and as suggested in the review [7], *A. levana* has indeed been found in NE Albania near Valbonë and Shumat (personal communication M. Bjerg, August 2019). The species will likely expand further in the northern half of the country and even the Korçë area might be reached as *A. levana* has also been confirmed from NW Greece near the Prespa Lake [32].

Limenitis camilla (Linnaeus, 1764) (Fig. 5; Plate 1)

This species was wrongly included for Albania by Murraj [29] as the figure in that publication clearly showed *L. reducta*. But *L. camilla* remained a potential species as it was cited from localities in MAC [2, 18] and from the northern part of MNE [42]. On 23.vi.2017, *L. camilla* was photographed south of Gusinje in southern MNE [50] at a few kilometers from the Albanian border. The first proof that *L. camilla* is present in Albania came from an Israelian expedition. On 03.vii.2016 in the Valbonë valley, near Rragam at 1.160 m altitude, a male specimen was collected by Ofir Tomer (Fig. 3). Independent observations [49, 51] from Çerem (personal communication M. Bjerg, August 2019) and the Valbonë valley confirm the presence of *L. camilla* in Albania. The species might be more widespread as more suitable habitats are present in the north-eastern part of Albania. Another observation [52] on 25.vi. 2017, south of Korçë and east of Dardhë, without photograph is doubtful. In the well-researched nearby Greek area, *L. camilla* has never been observed [31-32]. We do not retain this observation as it looks a potential mix-up with *L. reducta*

Fig. 5. *Limenitis camilla* ♂ (upper- & underside), Rragam, 1160 m a.s.l., 3.vii.2016 (collector and photographer: Ofir Tomer)

Euphydryas maturna (Linnaeus, 1758) (Plate 1)

The species had been cited [29] from Albania but the only record was based on a specimen without a label or locality from the collection of the Museum of Natural History in Tiranë. Based on lacking evidence [37], *E. maturna* was given a DD status. The species was found in northern MNE [42] and cited [41] from two sites of the Zeta-Skadar Plain in MNE, near NW Albania. Different

observations of *E. maturna* are known from MAC, in the adjacent National Park of Mavrovo [20] and in the red list [18] of the country *E. maturna* is mentioned as vulnerable. *E. maturna* was confirmed [49] from Çerem (personal communication M. Bjerg, August 2019) in the Valbonë valley and it can be expected that the species is more widespread in the North Albanian Alps.

Danaus chrysippus (Linnaeus, 1758) (Fig. 6a-b; Plate 1)

On 6.xi.2018, the fourth author found numerous, fresh specimens flying in a fairly open forest area near the Karavasta Lagoon (Fier County).

Fig. 6a. Habitat of *Danaus chrysippus*, near the Karavasta Lagoon, 7 m a.s.l., 6.xi.2016. **Fig. 6b**. Nectaring D. chrysippus, near the Karavasta Lagoon, 7 m a.s.l., 6.xi.2016. (Photographer: Josif Paparisto)

D. chrysippus is a strong migrator sometimes reaching Albania where irregular coastal observations have been documented. In the Balkan Peninsula, temporary populations, especially later in the season, have been mentioned. Overwintering, as far as we know of, has not yet been proven. It is not clear if populations are able to survive longer term in this part of the Balkan Peninsula. Different Apocynaceae species are cited [6] as hostplant in the checklist of European butterfly larval foodplants: *Apteranthes burchardii*, *Araujia sericifera*, *Asclepias curassavica*, *Cynanchum acutum*, *Gomphocarpus fruticosus* and *Gomphocarpus physocarpus*. As well *C. acutum* as *G. fruticosus* were mentioned [13] as hostplant of *D. chrysippus* in Greece. *G. fruticosa* has often been cited and is confirmed by the first author from Perdika (Epirus, Greece), at only 35 km south of Albania. *G. fruticosus* is know from Borsh (Vlorë County, southern Albania) but not from the area around the Karavasta Lagoon where *Periploca graeca* is the only Apocynaceae known (personal communication Lulëzim Shuka, November 2022). *P. graeca* is listed [14] as one of the hostplants in Anatolia (Turkey). The fourth author did not observe caterpillars or pupae as the butterflies were in full emergence but this observation could represent a new hostplant for *D. chrysippus* in Europe. To be confirmed.

This update and atlas are made up from three parts: the historical data that were compiled for the 2018 review [7], the data in the 2018 update from surveys prior to the publication of the review and the atlas [7-8] and the new observations since the 2018 update [7-8].

In the 2018 review and atlas [7-8] 8.564 observations were included. Nahirnić (personal communication) provided information about one missing observation of *Charaxes jasius* (Linnaeus, 1767) in the 2018 maps [8] and of two observations, cited in Rebel & Zerny [36] for *Pyrgus serratulae* (Rambur, 1839) and *Lasiommata petropolitana* (Fabricius, 1787), that were not assigned correctly in the maps to Mt. Galičica (MAC) but were placed a few kilometers south of the exact locality in MAC. It was verified and adapted in the new atlas.

New personal research of the authors, data kindly provided by other researchers and collected from recent publications are the basis for the current update. In total, 6.533 new observations (+76.3%) have been added to the existing database. Map 12 (Plate 1) shows the coverage at country level of the new dataset.

There are vast areas that remain unexplored and have potential to discover new species for the country and/or to confirm some data deficient taxa.

The map does not show the intensity of research in the different areas of Albania. In many areas, the data are from a single survey at a specific day, often in summer. It is clear that many areas deserve more intensive research and also during different seasons. The temporal coverage of the actual dataset is low and this has an impact that cannot be estimated on the knowledge of the single-brooded spring species. Many Albanian mountain areas are difficult to access, especially on the higher parts above the tree line. This presumably has a major influence on the actual knowledge of species that are typical of subalpine and alpine habitats.

Our objective is also to provide a complete bibliography about the butterflies of Albania. Since the review [7], recent research concerning *Melanargia galathea* (Linnaeus, 1758) was published in 2018 by Vrenozi *et al*. [46]. Nahirnić & Beshkov (2022) published a list of rare butterflies, observed in Albania 2016-2019 and in 2022. We are aware of few other publications with some citations of butterfly observations in Albania. They are given in the references [3-5 and 24].

The checklist (Table 1) is adapted. We removed all the species with unexpected status and adapted the taxonomy to the actual standards [9, 47].

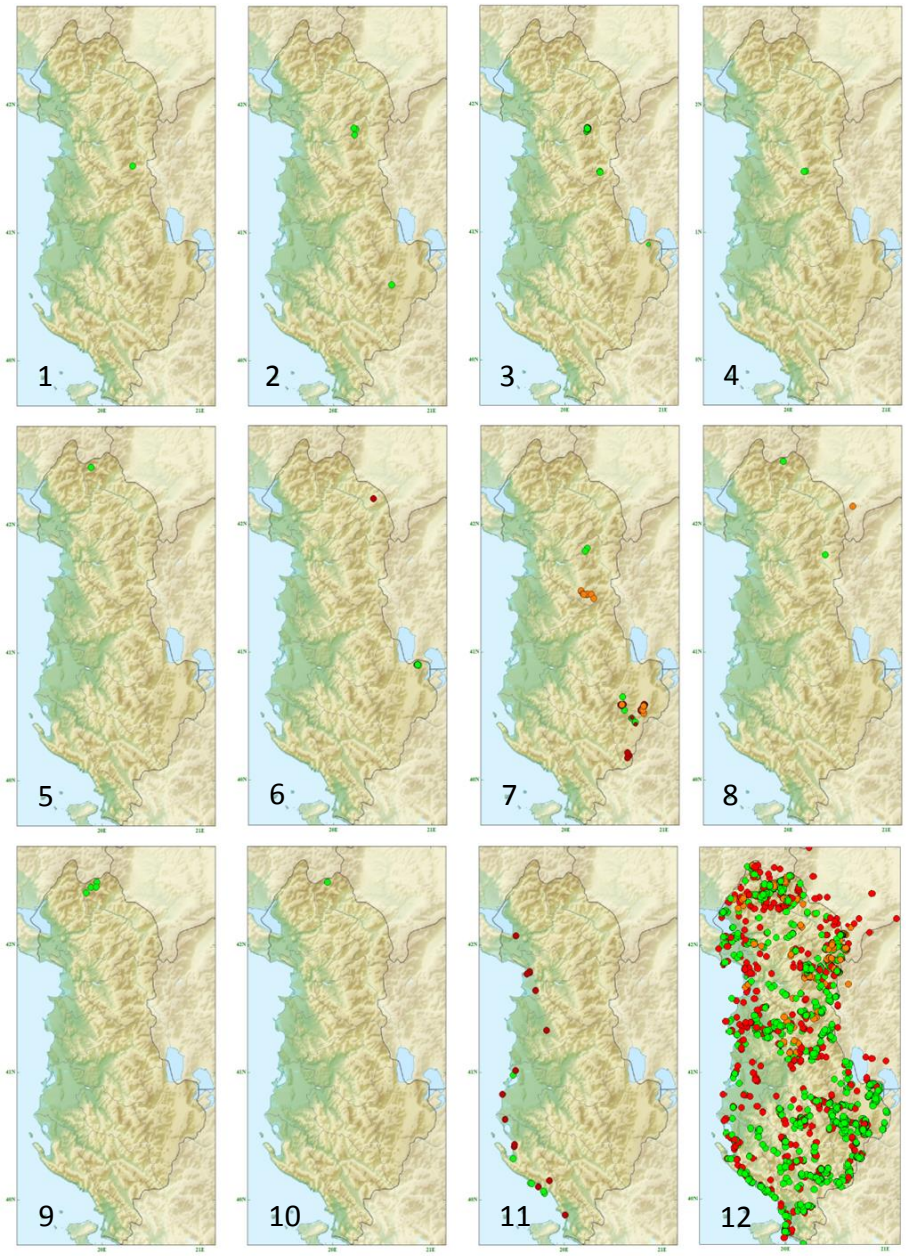

Plate 1. Distribution maps of the new and confirmed species for Albania. 1. *Satyrium pruni*; 2. *Polyommatus lurae*; 3. *Polyommatus orphicus*; 4. *Proterebia phegea*; 5. *Erebia albergana*; 6. *Kirinia climene*; 7. *Pseudochazara tisiphone*; 8. *Araschnia levana*; 9. *Limenitis camilla*; 10. *Euphydryas maturna*; 11. *Danaus chrysippus*; 12. Coverage at country level of the new dataset.

Suggestions for research on potential and data deficient taxa

Muschampia tessellum (Hübner, 1803)

Only Murraj [29] listed and figured a specimen of this big and relatively easy to observe Skipper without mentioning any detail on locality and date. It is considered DD in the last checklist [7]. Near Albania the species is known from Western Macedonia (GR) [31-32] and Galičica Mt. (MAC) [19]. The only foodplants that have been confirmed in Europe are *Phlomis samia* and *Phlomis tuberosa*. So far, *P. samia* has not been documented from Albania. *P. tuberosa* is present near Cerjë, *Phlomis fruticosa* (Fig. 7a) is widespread and *Phlomis herba-venti* (Fig. 7b-c) is known from Mali i Thatë.

This xero-thermophilic species can be found from May till late July. It can be searched on moderately dry to mesophilic, extensively grazed, pastures with some trees and shrubs from lowland to 1900 m a.s.l.

Fig. 7a. *Phlomis fruticosa*, Llogora Pass. **Fig. 7b-c.** *Phlomis herba-venti*, Mali i Thatë (photographer: Lulëzim Shuka)

Heteropterus morpheus (Pallas, 1771)

Due to the lack of clear evidence, *H. morpheus* was given the status unexpected in the last checklist [7] but in the checklist of the butterflies of MNE, Franeta [12] mentions personal observations of *H. morpheus* from the Lovćen National Park and in the Đalovića gorge during the first half of June. More recently, *H. morpheus* was also recorded for the first time from RKS [17] in the Bjeshket e Nemuna National Park, less than 20 km northeast of Albania. These 4 specimens were found in the second half of June at an altitude of 1310 m a.s.l. We change the status of *H. morpheus* from unexpected to potential and suggest to search during the month of June, in the valleys of NE Albania in moist biotopes with tall grasses, mainly *Calamagrostis canescens* and *Molinia caerulea* (Fig. 8).

Fig. 8. Semi-wet and wet meadows with *Calamagrostis canescens, Molinia caerulea*, *Carex* spp., *Eriophorum angustifolium* and *Dactylorhiza* sp., Uji i Ftohtë, Guri i Topit (Pogradec district), 1550 m a.s.l., (photographer: Lulëzim Shuka)

Pontia chloridice (Hübner, 1813).

This species was mentioned only once from Albania by Rebel & Zerny [36] from Orosh and is considered DD. The nearest areas with recent observations, are the Vardar Valley in southeastern MAC [11] and the Greek administrative region of Central Macedonia [31-32]. The species has two to three generations per year. In Albania, the foodplant, *Cleome ornithopodioides*, has been reported from the village Haimel (Shkodër) at 10-50 m altitude and is probably also present in the valley of the Mat River. *C. ornithopodioides* is a very inconspicuous plant and thinking of stony river beds, it might be present in other places in Albania. The species can be searched from early April till early autumn in lowland, stony river valleys with wide alluviums.

Agriades dardanus (Freyer, 1843)

It is a species that has never been mentioned from Albania and is extremely local in the Balkan Peninsula, known from a limited number of mountains in Bosnia and Herzegovina, MAC [18], Bulgaria [1] and GR [31-32]. The species flies in one generation in June and July between 1250 to 2200 m a.s.l. It is a small, inconspicuous butterfly that flies low over the ground, frequently stopping for nectaring or sitting on stones.

Androsace villosa (Fig. 9) is present in Albania near Vermosh, on Maja e Gjallicës, Mali i Munellës, Mali i Korabit and Mali i Thatë and some localities show resemblance to the known biotopes of *A. dardanus*. Therefore, we add *A. dardanus* as a potential species. Research for *A. dardanus* should be focused, from mid-June to mid-July, on small rocky ridges with *A. villosa*.

Fig. 9. *Androsace villosa*, Kërçi i Djegun, North Albanian Alps. **Fig. 10.** *Lathyrus niger*, Prespa NP, South Albania. (Photographer: Lulëzim Shuka)

Neptis sappho (Pallas, 1771)

As far as known to us, there exists no historical observation of this species in Albania and it was not mentioned [7] as a potential species for Albania. In the open source website Observado (consulted on 18.ii.2022) one observation [53] was given from the North Albanian Alps, between Dragobi and Valbonë on 18.viii.2018. Unfortunately there was no photograph or comment available. This observation was changed to uncertain after Observado requested more information. *N. sappho* is known from MAC [2, 18] and there are recent observations [54-55], close to the Albanian border. The species has been found in the north of MNE [56-58] and in southern RKS [21]. In this area, *N. sappho* is at its southern distribution limit and seems local and uncommon. The mentioned Albanian locality looks suitable and the observation date indicates a second generation butterfly. This date serves as an argument to exclude a potential *N. rivularis*, also a DD taxon for Albania. We regard the species as potentially occurring in Albania. It is included and a map is added in the Atlas, for the moment with a small dot (to be confirmed) to give focus to research of this species. *N. sappho* produces at least two annual broods and can be found from early May to September in hot, damp woodland, rich in *Lathyrus* (Fig. 10) and in areas that are overgrown by invasive *Robinia*. Best chances to find it, are during the morning and late afternoon. At midday, they are usually found at higher levels up to the crowns of the trees and on hot days their activity is strongly reduced.

Neptis rivularis (Scopoli, 1763)

N. rivularis has been documented from Mt. Galičica [19] and it is also included in a conference paper for the nearby National Park of Mavrovo [20] in MAC. The species has been mentioned from Albania but in every reference it seems to be a confusion with *Limenitis reducta* Staudinger, 1901. The

specimens labeled as *N. rivularis* in the collection of the Natural Sciences Museum of Albania in Tiranë were all *L. reducta* and Prof. K. Misja confirmed that he had never observed the species. It is a single brooded species and flies in between the generations of *N. sappho* with a peak at the end of June and early July. *N. rivularis* is to be searched for in warm, damp open deciduous woodland with *Aruncus* (Fig. 11) and *Filipendula* (Fig. 12a-b) in eastern Albania. Another host plant, *Spiraea*, does not occur in the wild in Albania. *N. rivularis* is often found in river valleys and ravines on damp ground or perching for long periods on the foliage of trees and bushes.

Fig. 11. *Aruncus dioicus*, Krej Lurë-Fushë Lurë. **Fig. 12a-b.** *Filipendula vulgaris*, Gjergjevicë (photographer: Lulëzim Shuka)

Nymphalis vaualbum ([Denis & Schiffermüller], 1775).

Having no direct evidence for *N. vaualbum* from Albania but a few observations from the adjacent areas, it remains a potential target for research, especially in northeastern Albania. Two observations are known from northern MNE [12], in 1973 and 2000, in the same locality on Mt. Durmitor. In 2009 *N. vaualbum* was recorded for the first time from Mt. Shar Planina in MAC [23]. Follow up research in 2009 and 2010 revealed no further evidence of its presence. As this is a strong migrator it is unclear what the meaning of this single observation is. In springtime, overwintering specimens can be seen but the second half of June is probably the best moment to look for it in NE Albania focusing on hot, humid tracks in dense deciduous forests with nearby running water.

Melitaea arduinna (Esper, 1783).

The species has never been mentioned from Albania but is known from nearby on Galičica Mt [19] in MAC and from Greek localities above Lake Prespa [31-32]. The species is single brooded and on the wing from end May to early July. In the southernmost European biotopes *M. arduinna* inhabits dry, extensively used pastures with different *Centaurea* species (Fig. 13a-b; 14), often *C. graeca*, and in northern Balkan it also flies in mesophilous meadows (Fig. 18), sheltered woodland clearings, gorges and gullies. Biotopes west of Lake Prespa and Lake Ohrid, nearby known localities in GR and MAC, are to

be explored during the flight period of *M. arduinna* but not only as different *Centaurea* species are described from northern Albania [39-40].

Fig. 13a-b. *Centaurea graeca*, Prespa NP. **Fig. 14.** *Centaurea rupestris* subsp. *kozanii*, Cerjë, Prespa NP (photographer: Lulëzim Shuka)

Melitaea aurelia Nickerl, 1850

The species has been found in MNE [42], MAC [26] and GR [43] and potential biotopes are present in many Albanian mountain areas. This species can easily be confused with the common *Melitaea athalia* (Rottemburg, 1775). *M. aurelia* is single brooded and on the wing from June to mid-July. The biotopes are nutrient poor grasslands with abundant *Plantago lanceolata* (Fig. 15-17) and sometimes *Veronica*. *M. aurelia* does not support too intensive grazing. Small *Melitaea* males need to be sampled for dissection for a conclusive identification.
Searches can be focused on a wide area from the North Albanian Alps to the hills near Lake Prespa.

Fig. 15. Biotope with *Plantago lanceolata*, Mali i Oplasit (Hasi district) (photographer: Donald Shuka)

Fig. 16. *Plantago lanceolata*, Tiranë (photographer: Lulëzim Shuka)

Fig. 17. *Plantago lanceolata*, Kolsh (Kukësi district) (photographer: Lulëzim Shuka)

Coenonympha glycerion (Borkhausen, 1788).

Evidence for *C. glycerion* in Albania is clearly lacking but the species was given a potential status in the last checklist [7] because the species is documented from northern MNE [42] and nearby MAC [18, 20, and 25]. It is a single brooded species flying from June to August in flowery, grassy places with scrubs. Biotopes ranging from hot dry to damp localities with *Bromus* and *Poa* species (Fig. 19) are suitable. Research should focus on suitable habitats from NE Albania to Mali i Korabit during the months of June to July.

Fig. 18. Mesophilous meadows, Mali me Gropa (photographer: Lulëzim Shuka)
Fig 19. Habitats with *Bromus*, *Festuca* and *Poa*, Mali i Korabit (Korabi Mt) (photographer: Lulëzim Shuka)

Checklist

Butterflies	Status	Fluturat
Papilionidae		**Fluturat tabake**
Iphiclides podalirius	**1**	Flatrabishtori podalir
Papilio alexanor	**1**	Flatrabishtori aleksanor
Papilio machaon	**1**	Flatrabishtori makaon
Parnassius apollo	**1**	Apollonja/flokëbora e Apollos
Parnassius mnemosyne	**1**	Mnemosinja
Zerynthia cerisy	**1**	Cerisja
Zerynthia polyxena	**1**	Poliksenia
Hesperiidae		**Fluturat kapiten**
Gegenes nostrodamus	**1**	Mesdhetarja njollabardhë
Gegenes pumilio	**1**	Pumilia
Hesperia comma	**1**	Komma
Ochlodes sylvanus	**1**	Kuqaloshja njollakatrore
Thymelicus acteon	**1**	Antenëgrepja acteon
Thymelicus lineola	**1**	Okërverdha shiritshkurtër
Thymelicus sylvestris	**1**	Okërverdha shiritzi
Carterocephalus palaemon	**1**	Antenëgrepja katrore
Heteropterus morpheus	**P**	E kafejta e madhe me kuadrate
Carcharodus alceae	**1**	Mëllagangrënësja
Carcharodus floccifera	**1**	Flociferja
Carcharodus lavatherae	**1**	Flatramermerta
Carcharodus orientalis	**1**	Aziatikja
Erynnis marloyi	**1**	E kafejta e bojatisur
Erynnis tages	**1**	E kafejta e zymtë
Muschampia alta	**1**	Antenëgrepja e urtë
Muschampia tessellum	**DD**	E kafejta mozaik
Pyrgus alveus	**1**	Thinjoshja
Pyrgus andromedae	**1**	Thinjoshja alpine
Pyrgus armoricanus	**1**	Pirgusi i Oberturit
Pyrgus carthami	**1**	Kafezijoshja
Pyrgus cinarae	**1**	Thinjoshja e rërët
Pyrgus malvae	**1**	Mëllagëngrënësja njollashumtë
Pyrgus serratulae	**1**	Ngjyrëullijta
Pyrgus sidae	**1**	Kafeportokalleja
Spialia orbifer	**1**	Antenëgrepja hungareze
Spialia phlomidis	**1**	Flomidja
Pieridae		**Fluturat bardhoshe**
Colias alfacariensis	**1**	Verdhoshja e turbullt e Bergerit
Colias aurorina	**1**	Grekja me krah me re
Colias caucasica	**1**	Verdhoshja e turbullt e Ballkanit
Colias crocea	**1**	Verdhoshja krocea
Gonepteryx cleopatra	**1**	Kleopatra
Gonepteryx farinosa	**1**	Limonja e arrçit
Gonepteryx rhamni	**1**	Limonja e barbletës
Leptidea duponcheli	**1**	Flutura e Duponkelit
Leptidea juvernica	**1**	Bardhoshja kriptike e drurit

Butterflies	Status	Fluturat
Leptidea sinapis	**1**	Flutura e mustardës
Anthocharis cardamines	**1**	Flutura aurorë
Anthocharis damone	**1**	Lindorja majëshenjuar portokalli
Anthocharis gruneri	**1**	Aurora e Grunerit
Aporia crataegi	**1**	Bardhoshja e murizës
Euchloe ausonia	**1**	Ausonja
Euchloe penia	**1**	Verdhoshja e vogël
Pieris balcana	**1**	Bardhoshja e Ballkanit
Pieris brassicae	**1**	Flutura e lakrës
Pieris ergane	**1**	Bardhoshja e vogël e lartësive
Pieris krueperi	**1**	Bardhoshja e Kruperit
Pieris mannii	**1**	Bardhoshja e vogël e jugut
Pieris napi	**1**	Flutura e repës
Pieris rapae	**1**	Flutura e vogël e lakrës
Pontia chloridice	**DD**	Bardhoshja kloridikë
Pontia edusa	**1**	Bardhoshja lindore
Lycaenidae		**Fluturat e vogla**
Lycaena alciphron	**1**	Flakëroshja verdhoshe
Lycaena candens	**1**	Flakëroshja e Ballkanit
Lycaena dispar	**1**	Flakëroshja e artë e madhe
Lycaena ottomana	**1**	Flakëroshja e jugut
Lycaena phlaeas	**1**	Flakëroshja e artë
Lycaena thersamon	**1**	Tersamonia
Lycaena tityrus	**1**	Flakëroshja e errët
Lycaena virgaureae	**1**	Flakëroshja e rrallë
Agriades dardanus	**P**	Dardania
Aricia agestis	**1**	Flatrakafejta bordurëkuqe
Aricia anteros	**1**	Ballkanja anteros
Aricia artaxerxes	**1**	Flatrakafejta verlore
Cacyreus marshalli	**1**	E bronzta e geraniumeve
Celastrina argiolus	**1**	Flatrabluja e manaferës
Cupido alcetas	**1**	E blujta Provençale me bishta të shkurtër
Cupido argiades	**1**	Trupshkurtra blu-vjollcë
Cupido decoloratus	**1**	Ezbardhëllemja
Cupido minimus	**1**	Vogëlushja blu
Cupido osiris	**1**	E blujta e Osirit
Cyaniris semiargus	**1**	Kaltëroshja vjollcë e pyllit
Eumedonia eumedon	**1**	Flatrakafenjta e kamaroshës
Glaucopsyche alexis	**1**	Aleksja
Iolana iolas	**1**	Kaltëroshja e madhe
Kretania sephirus	**1**	Zefiri blu
Lampides boeticus	**1**	Trupgjata vjollcë-blu
Leptotes pirithous	**1**	Trupshkurtra vjollcë-blu
Lysandra bellargus	**1**	Flatrablujta bukuroshe
Lysandra coridon	**1**	Kaltëroshja e argjendë
Phengaris alcon	**1**	Kaltëroshja e vogël e kënetës
Phengaris arion	**1**	Kaltëroshja njollazezë

Butterflies	Status	Fluturat
Plebejus argus	**1**	Kaltëroshja argus
Plebejus argyrognomon	**1**	Argirognomonia
Plebejus idas	**1**	Idas blu
Polyommatus admetus	**1**	Anomalja e madhe
Polyommatus amandus	**1**	Kaltëroshja e hijshme
Polyommatus damon	**1**	Kaltëroshja e gjelbërt
Polyommatus daphnis	**1**	Flatradhëmbaçja blu
Polyommatus dorylas	**1**	Kaltëroshja e jonxhës
Polyommatus eros	**1**	Flatrakaltra e zakonshme e livadheve
Polyommatus escheri	**1**	Esheria
Polyommatus icarus	**1**	Flatrablujta e zakonshme
Polyommatus lurae	**1**	**Luranja**
Polyommatus orphicus	**1**	**Orifucsi i kafejtë**
Polyommatus ripartii	**1**	Anomalja e vogël
Polyommatus thersites	**1**	Flatrablujta e shkathët
Pseudophilotes bavius	**P**	Baviusja blu
Pseudophilotes vicrama	**1**	Flatrabluja njollëzezë
Scolitantides orion	**1**	Flatrakafeblujta
Tarucus balkanicus	**1**	Ballkanja
Callophrys rubi	**1**	Ferrakja
Favonius quercus	**1**	Bishtakja vjollcë e dushkut
Satyrium acaciae	**1**	Bishtakja e akacies
Satyrium ilicis	**1**	Bishtakja e dushkut
Satyrium pruni	**1**	**Kordelja e zezë**
Satyrium spini	**1**	Bishtakja e kulumbrisë
Satyrium w-album	**1**	Bishtakja e vidhit
Thecla betulae	**1**	Bishtakja e mështeknës
Riodinidae		**Fluturat me njolla metalike**
Hamearis lucina	**1**	Luçina
Nymphalidae		**Fluturat me këmbë furça**
Apatura ilia	**1**	Apartura
Apatura iris	**1**	Perandori i purpurt
Apatura metis	**1**	Perandori i purpurt i Freyerit
Charaxes jasius	**1**	Dybishtakja jasius
Danaus chrysippus	**1**	Shtegëtarja krisipus
Argynnis pandora	**1**	Pandora
Argynnis paphia	**1**	Pafia
Boloria dia	**1**	Flatravjollca e vogël
Boloria euphrosyne	**1**	Flutura bordurargjendë
Boloria graeca	**1**	Fritilari ballkanik
Boloria pales	**1**	Flutura e bariut
Boloria titania	**1**	Titania
Brenthis daphne	**1**	Dafnja
Brenthis hecate	**1**	Hekatja
Brenthis ino	**1**	Flatramermerta e vogël
Fabriciana adippe	**1**	Adipja
Fabriciana niobe	**1**	Niobja

Butterflies	Status	Fluturat
Issoria lathonia	**1**	Flatrargjenda e vogël
Speyeria aglaja	**1**	Njollaperla
Libythea celtis	**1**	Caracja
Limenitis camilla	**1**	**Admirali i bardhë**
Limenitis reducta	**1**	Admiralja e bardhë e jugut
Neptis rivularis	**DD**	Avioni hungarez
Neptis sappho	**P**	Avioni i zakonshëm
Aglais io	**1**	Flutura sypallua e ditës
Aglais urticae	**1**	Flutura e hithrave
Araschnia levana	**1**	**Portokallia e ndezur me njolla të zeza**
Euphydryas aurinia	**1**	E hershmja
Euphydryas maturna	**1**	Maturna
Melitaea arduinna	**P**	Freyerina
Melitaea athalia	**1**	Athalia
Melitaea aurelia	**P**	Aureliana
Melitaea cinxia	**1**	Cinksia
Melitaea diamina	**1**	Krahportokallikafta me kuti të zeza
Melitaea didyma	**1**	Kuqaloshja
Melitaea ornata	**1**	Lindorja
Melitaea phoebe	**1**	Flutura e livadheve
Melitaea trivia	**1**	Trivia
Nymphalis antiopa	**1**	Zimbajtësja
Nymphalis polychloros	**1**	Shumëngjyrëshja
Nymphalis vaualbum	**P**	Presje e rreme
Nymphalis xanthomelas	**1**	Këmbëverdha
Polygonia c-album	**1**	C-bardha
Polygonia egea	**1**	Egea
Vanessa atalanta	**1**	Admiralja
Vanessa cardui	**1**	Shtegëtarja
Aphantopus hyperantus	**1**	Hiperantia
Arethusana arethusa	**1**	Aretusa
Brintesia circe	**1**	Brintesia
Chazara briseis	**1**	Briseida
Coenonympha arcania	**1**	Arkania
Coenonympha glycerion	**P**	Gliceroni
Coenonympha leander	**1**	Leandra
Coenonympha orientalis	**1**	Orjentalja
Coenonympha pamphilus	**1**	Pamfilia
Coenonympha rhodopensis	**1**	Rodopensis
Erebia aethiops	**1**	Zijoshja aethiops
Erebia albergana	**1**	**Unazka e bajames**
Erebia cassioides	**1**	Zioshja kasiodes
Erebia epiphron	**1**	Zijoshja epifron
Erebia euryale	**1**	Zijoshja eurialë
Erebia gorge	**1**	Zijoshja gorge
Erebia ligea	**1**	Zijoshja kafe
Erebia medusa	**1**	Zijoshja e pyllit

Butterflies	Status	Fluturat
Erebia melas	**1**	Zijoshja melas
Erebia oeme	**1**	Zijoshja njollaçift
Erebia ottomana	**1**	Otomanja
Erebia pandrose	**1**	Zijoshja pandrosë
Erebia pronoe	**1**	Zijoshja pronoje
Erebia rhodopensis	**1**	Zijoshja rodopensis
Erebia triarius	**1**	Zijoshja triare
Hipparchia fagi	**1**	Pylltarja
Hipparchia fatua	**1**	Fatua
Hipparchia semele	**1**	Semelja
Hipparchia senthes	**1**	Senthesi
Hipparchia statilinus	**1**	Statilinja
Hipparchia syriaca	**1**	E mermerta siriane
Hipparchia volgensis	**1**	Volgensis
Hyponephele lupina	**1**	Ulpina
Hyponephele lycaon	**1**	Likaonja
Kirinia climene	**1**	**Klimenja**
Kirinia roxelana	**1**	Rokselanja
Lasiommata maera	**1**	Njollasykafejta
Lasiommata megera	**1**	Megera
Lasiommata petropolitana	**1**	Petropolitanja
Maniola jurtina	**1**	Jurtina
Melanargia galathea	**1**	Galatea
Melanargia larissa	**1**	Laramanja Larisë
Melanargia russiae	**1**	Laramanja e lartësive
Minois dryas	**1**	Driada
Pararge aegeria	**1**	Egeriaμ
Proterebia phegea	**1**	**Unazka dalmatiane**
Pseudochazara amalthea	**1**	Antela
Pseudochazara amymone	**1**	Aminonia
Pseudochazara geyeri	**1**	Flutura e Geyerit
Pseudochazara tisiphone	**1**	Tisifonia
Pyronia cecilia	**1**	Çeçilja
Pyronia tithonus	1	Titonja
Satyrus ferula	1	Ferulja

Table 1. Checklist. Indicated in blue are recently documented species and added potential species. Indicated in orange are data deficient species. The status of all species has been updated versus the previous checklist [7]

Butterflies of Albania - Fluturat e Shqipërisë goes online:

https://biodiversity.unitir.edu.al/index.html

To increase awareness about the rich Albanian butterfly fauna and to stimulate research, we launch a website (Fig. 20) dedicated to the Albanian butterflies. As part of this website, the updated checklist is now also available online and will be adapted when new evidence comes available to us on: https://biodiversity.unitir.edu.al/Albania_Checklist.htm.

To allow entomologists to do more targeted research we also incorporate the distribution maps in the new website:

https://biodiversity.unitir.edu.al/ATLAS.html

The maps can now be adapted shortly after new data becomes available. Together with the launch of the website we make a call to report all your observations to the first author.

Fig. 20. Homepage of the website Butterflies of Albania – Fluturat e Shqipërisë

Conclusion

The discovery of 7 new species and the confirmation of 2 DD species brings the total number of Albanian butterfly species to 205. Table 2 gives a summary of the changes in status and focuses as well on the data deficient and potential species for Albania. This publication increases the available observations by 76.3 %. This better coverage results in an increased knowledge of the distribution of all species. The 2018 checklist [7] and distribution maps are updated. In the future, new data from field research will surely add more species to the Albanian butterfly fauna and improve our knowledge regarding their distribution in the country. The availability of a website dedicated to the butterflies of Albania, providing updated distribution maps, will hopefully speed up the knowledge of the Albanian butterflies.

Species	**Status 2018**	**New status**	**Reason**
Heteropterus morpheus	0	P	Occurring in neighbouring country
Muschampia tessellum	P	DD	Foodplant not known from Albania
Pontia chloridice	DD	DD	No change
Agriades dardanus	0	P	Different localities with *A. villosa*
Polyommatus lurae	0	1	New species
Polyommatus orphicus	0	1	New for Albania
Pseudophilotes bavius	0	P	Occurring in neighbouring country
Satyrium pruni	0	1	New for Albania
Limenitis camilla	0	1	New for Albania
Neptis rivularis	DD	DD	No change
Neptis sappho	0	P	Occurring in neighbouring country
Araschnia levana	0	1	New for Albania
Euphydryas maturna	DD	1	New for Albania
Melitaea arduinna	0	P	Occurring in neighbouring country
Melitaea aurelia	P	P	No change
Nymphalis vaualbum	P	P	No change
Coenonympha glycerion	P	P	No change
Erebia albergana	0	1	New for Albania
Kirinia climene	DD	1	Confirmed for Albania
Proterebia phegea	0	1	New for Albania

Table 1. Summary of the changes in status. Comparison of the status concerning the data deficient and potential species for Albania.

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