Butterflies of Albania: new surveys, four new records and a new checklist (Lepidoptera: Papilionoidea)

Emil Blicher Bjerregård, Martin Bjerg, Allan Bornø Clausen, Kaj Dahl, Søren Peter Glintborg & Christian Videnkjær

Abstract. The butterfly fauna of Albania is probably the least studied in Europe. Albania has been completely isolated for decades and is known as an extremely difficult country for studying insects. In the summer of 2019 Dansk Lepidopterologisk Forening arranged the expedition called CASMEK1 to Albania to provide information about the butterfly fauna. In 2017 two expeditions were carried out by VVE1 and VVE2, which were two teams with focus on studying the butterfly fauna of Albania. Among other observations, VVE1 and VVE2 found four new species for Albania. Also, for this survey, four further new species for Albania were recorded: *Limenitis camilla* (Linnaeus, 1764), *Araschnia levana* (Linnaeus, 1758), *Euphydryas maturna* (Linnaeus, 1758), and *Erebia alberganus* (Prunner, 1798) (Nymphalidae). In addition to the new species for Albania, other interesting records are also reviewed in this article. Information is provided on *Spialia phlomidis* (Herrich-Schäffer, 1845) (Hesperiidae), *Colias aurorina* Herrich-Schäffer, 1850 (Pieridae), *Apatura iris* (Linnaeus, 1758), *Boloria titania* (Esper, 1793), *Melitaea diamina* (Lang, 1789), *Pseudochazara amymone* Brown, 1976, and *Pseudochazara tisiphone* Brown, 1981 (Nymphalidae). All three teams (CASMEK1, VVE1, and VVE2) contributed to the distribution records of the butterfly fauna of Albania.

Samenvatting. De vlinderfauna van Albanië is waarschijnlijk de minst bestudeerde van Europa. Albanië is decennialang volledig geïsoleerd geweest en staat bekend als een uiterst moeilijk land voor het bestuderen van insecten. In de zomer van 2019 organiseerde Dansk Lepidopterologisk Forening de expeditie CASMEK1 naar Albanië om informatie te verstrekken over de vlinderfauna. In 2017 werden twee expedities uitgevoerd door VVE1 en VVE2, twee teams die zich richtten op het bestuderen van de vlinderfauna van Albanië. Naast andere waarnemingen vonden VVE1 en VVE2 vier nieuwe soorten voor Albanië. Bij dit onderzoek werden nog eens vier nieuwe soorten voor Albanië genoteerd: *Limenitis camilla* (Linnaeus, 1764), *Araschnia levana* (Linnaeus, 1758), *Euphydryas maturna* (Linnaeus, 1758) en *Erebia alberganus* (Prunner, 1798) (Nymphalidae). Naast de nieuwe soorten voor Albanië worden in dit artikel ook andere interessante records besproken. Er wordt informatie verstrekt over *Spialia phlomidis* (Herrich-Schäffer, 1845) (Hesperiidae), *Colias aurorina* Herrich-Schäffer, 1850 (Pieridae), *Apatura iris* (Linnaeus, 1758), *Boloria titania* (Esper, 1793), *Melitaea diamina* (Lang, 1789), *Pseudochazara amymone* Brown, 1976 en *Pseudochazara tisiphone* Brown, 1981 (Nymphalidae). De drie teams (CASMEK1, VVE1 en VVE2) hebben alle bijgedragen aan de verspreidingsgegevens van de vlinderfauna van Albanië.

Résumé. La faune de papillons de l'Albanie est probablement la moins étudiée d'Europe. L'Albanie a été complètement isolée pendant des décennies et est connue comme un pays extrêmement difficile pour l'étude des insectes. Au cours de l'été 2019, la Dansk Lepidopterologisk Forening a organisé l'expédition appelée CASMEK1 en Albanie pour fournir des informations sur la faune des papillons. En 2017, deux expéditions ont été menées par VVE1 et VVE2, qui étaient deux équipes dont l'objectif était d'étudier la faune des papillons de l'Albanie. Entre autres observations, VVE1 et VVE2 ont découvert quatre nouvelles espèces pour l'Albanie. En outre, pour cette enquête, quatre autres nouvelles espèces pour l'Albanie ont été enregistrées : *Limenitis camilla* (Linnaeus, 1764), *Araschnia levana* (Linnaeus, 1758), *Euphydryas maturna* (Linnaeus, 1758) et *Erebia alberganus* (Prunner, 1798) (Nymphalidae). En plus des nouvelles espèces pour l'Albanie, d'autres signalements intéressants sont également passés en revue dans cet article. Des informations sont fournies sur *Spialia phlomidis* (Herrich-Schäffer, 1845) (Hesperiidae), *Leptidea juvernica* Williams, 1946, *Colias aurorina* Herrich-Schäffer, 1850 (Pieridae), *Apatura iris* (Linnaeus, 1758), *Boloria titania* (Esper, 1793), *Melitaea diamina* (Lang, 1789), *Pseudochazara amymone* Brown, 1976 et *Pseudochazara tisiphone* Brown, 1981 (Nymphalidae). Les trois équipes (CASMEK1, VVE1 et VVE2) ont contribué aux données de la distribution de la faune des papillons en Albanie.

Key words: Lepidoptera — Papilionoidea — *Limenitis camilla* — *Araschnia levana* — *Euphydryas maturna* — *Erebia alberganus* — *Spialia phlomidis* — *Colias aurorina* — *Apatura iris* — *Boloria titania* — *Melitaea diamina* — *Pseudochazara amymone* — *Pseudochazara tisiphone* — Albania — Distribution.

Bjerregård E. B.: Rebæk Søpark 5, 414, 2650 Hvidovre, Denmark. xanthomelas@live.dk

Bjerg M.: Hanehovedvej 154C, 330 Frederiksværk, Denmark. bjerg34@hotmail.com

Clausen A. B.: Gl. Københavnsvej 14, 3550 Slangerup Denmark. hegnstrup@hotmail.com

Dahl K.: Lathyrusvej 27, 3300 Frederiksværk, Denmark. sommerfugle@gmail.com

Glintborg S. P.: Porskaervej 5, 8600 Silkeborg, Denmark. spglintborg@gmail.com

Videnkjær C.: Lærkehaven 3, 2980 Kokkedal, Denmark. cuv@herlufsholm.dk

DOI: 10.6084/m9.figshare.22722871

Introduction

Albania is a country rich in biodiversity in the Balkans. But since the country was completely isolated for almost three decades from around 1960 to 1990 the butterfly fauna of the country has been poorly studied compared to most of the bordering countries: Kosovo, Montenegro, North Macedonia, and Greece. Albania is very mountainous and supports a rich butterfly fauna. Even though the butterfly fauna historically has been poorly studied the knowledge has been increasing in recent years. Most recently in 2017 two well-conducted surveys were carried out by two teams, VVE1 and VVE2 (Cuvelier *et al*. 2018), which managed to find four new species for Albania. In addition, they also made a lot of other interesting records, and DNA barcoding was carried out to provide information about

difficult taxa. Finally, they gathered all the historical information about the butterfly fauna in Albania and verified or rejected the data. Based on these investigations they published an updated Albanian checklist. Despite the thorough surveys by VVE1 and VVE2 teams (Cuvelier *et al*. 2018), they concluded that more new surveys were needed to elucidate the complete knowledge about the distribution of the butterflies of Albania. This survey, by CASMEK1 team, is a follow up on VVE1 and VVE2 results and the exploitation of the potential for discovering new species for Albania as well as for gathering additional, interesting records.

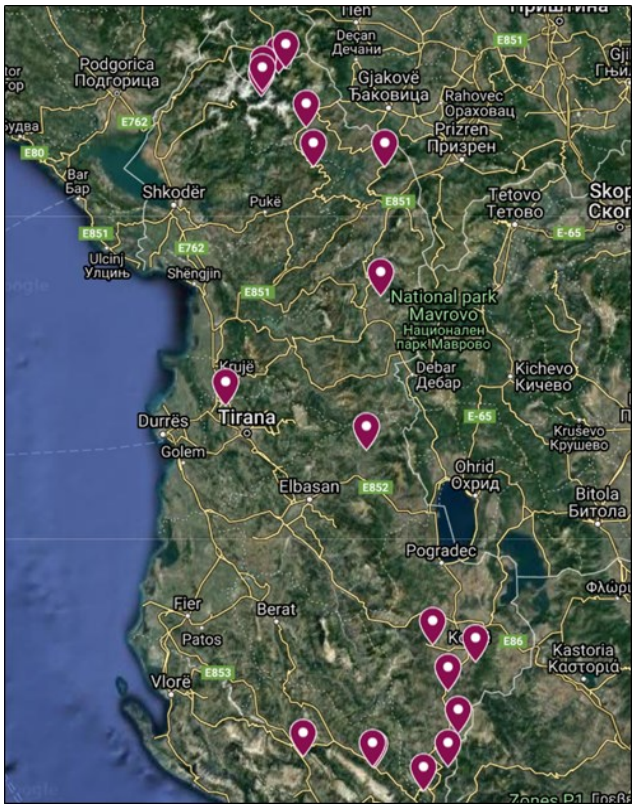

Fig. 1. Map of visited sites in Albania by CASMEK1 team.

The Danish survey from 2019 was arranged by Dansk Lepidopterologisk Forening and carried out by Emil Blicher Bjerregård, Martin Bjerg, Allan Bornø Clausen, Kaj Dahl, Søren Peter Glintborg and Christian Videnkjær; throughout this article this team will be referred to as CASMEK1 team, the initials of the participants' first names. The survey was carried out over 11 days, from 5.vii.2019 to 15.vii.2019 (Fig. 1). The first and last day were mainly spent travelling, which limited the survey on those days. From 6.vii.2019 to 8.vii.2019 the survey was carried out in Valbonë in northern Albania. An extremely rich butterfly fauna is to be found in the area and all the new species for Albania recorded by CASMEK1 team were found on those three days. 9.vii.2019 and 10.vii.2019 were mainly spent travelling from northern Albania to the south-eastern part of the country; and on these days the survey was not as systematic as for the first three days in Valbonë. From 11.vii.2019 to 14.vii.2019 the survey was carried out in south-eastern Albania, especially around Korçë.

Results

The most interesting records from the CASMEK1 survey were the discovery of four new species for Albania: *Limenitis camilla* (Linnaeus, 1764), *Araschnia levana* (Linnaeus, 1758), *Euphydryas maturna* (Linnaeus, 1758) and *Erebia alberganus phorcys* (Prunner, 1798). These four new species for Albania will be presented first and, subsequently, the additional records of *Spialia phlomidis* (Herrich-Schäffer, 1845), *Colias aurorina* Herrich-Schäffer, 1850, *Apatura iris* (Linnaeus, 1758), *Boloria titania* (Esper, 1793), *Melitaea diamina* (Lang, 1789), *Pseudochazara amymone* Brown, 1976 and *Pseudochazara tisiphone* Brown, 1981. All species are reviewed with maps, coordinates, images, data of collected butterflies and further information on observations. Results obtained from genitalia preparations and DNA barcoding are also reviewed.

Limenitis camilla (Linnaeus, 1764)
(Figs 2, 3, Table 1)

Fig. 2. *Limenitis camilla*, Gocaj, Valbonë 8.vii.2019. © Kaj Dahl.

Table 1. Sites for *Limenitis camilla*.

Sites	Date	Coordinates
Margjeka, Valbonë	6.vii.2019	42°25'20.9"N 19°52'24.2"E
Gocaj, Valbonë	6.vii.2019	42°29'47.3"N 19°57'01.6"E
Gocaj, Valbonë	8.vii.2019	42°29'47.3"N 19°57'01.6"E

Limenitis camilla (Nymphalidae) is widely distributed in Europe and known from most of the European countries. *Limenitis camilla* was erroneously included in the Albania list in 1972, but this proved to be a misidentified specimen of *Limenitis reducta* Staudinger, 1901. The possibility for the presence of *Limenitis camilla* in Albania was estimated as possible by VVE1 and VVE2 teams. *Limenitis camilla* is known from nearby localities in Montenegro, North Macedonia, and Greece.

CASMEK1 team succeeded in confirming *Limenitis camilla* for Albania. We found several sites for this species around Valbonë in the northern part of Albania. The first record for Albania of *Limenitis camilla* was a single

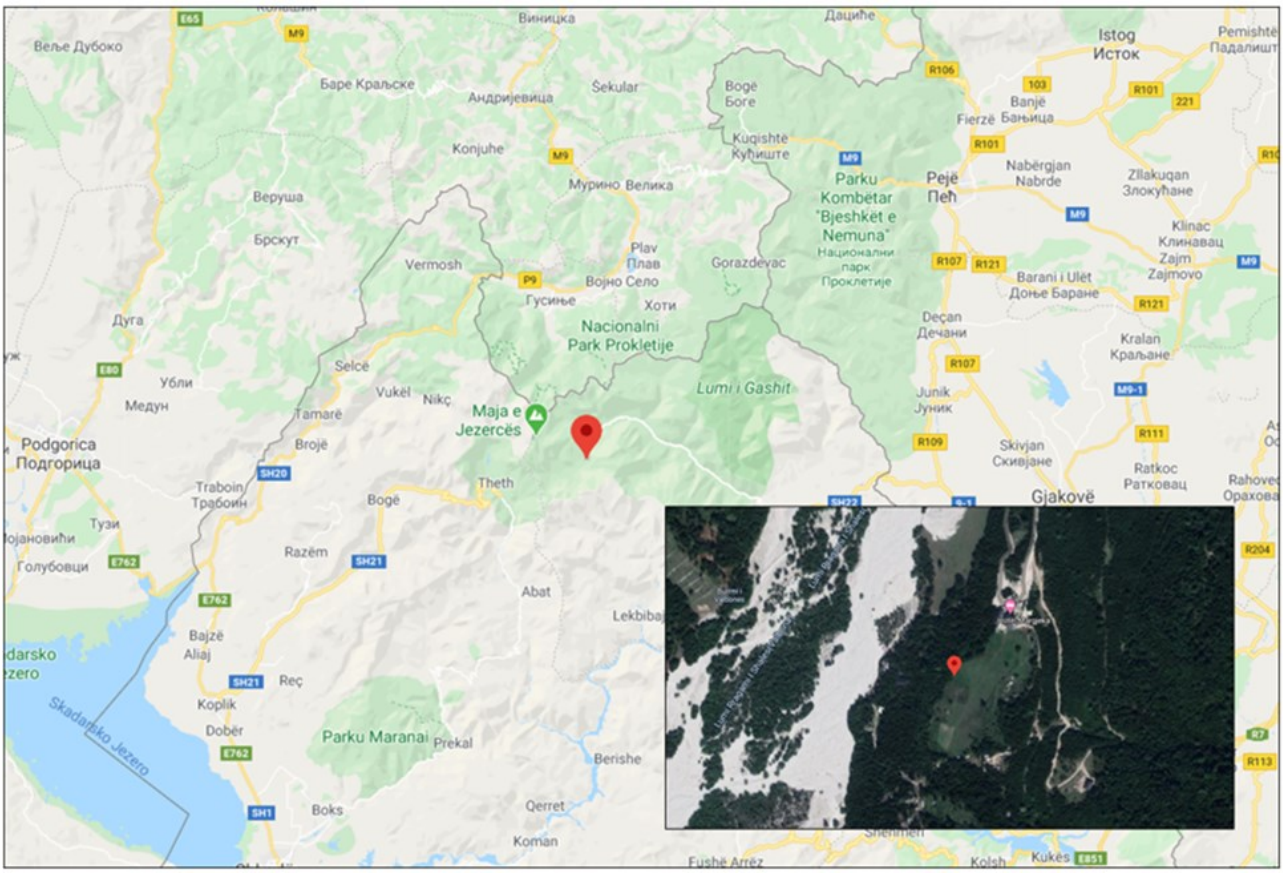

Fig. 3. The first record for Albania of *Limenitis camilla* near Margjeka, Valbonë, 6.vii.2019.

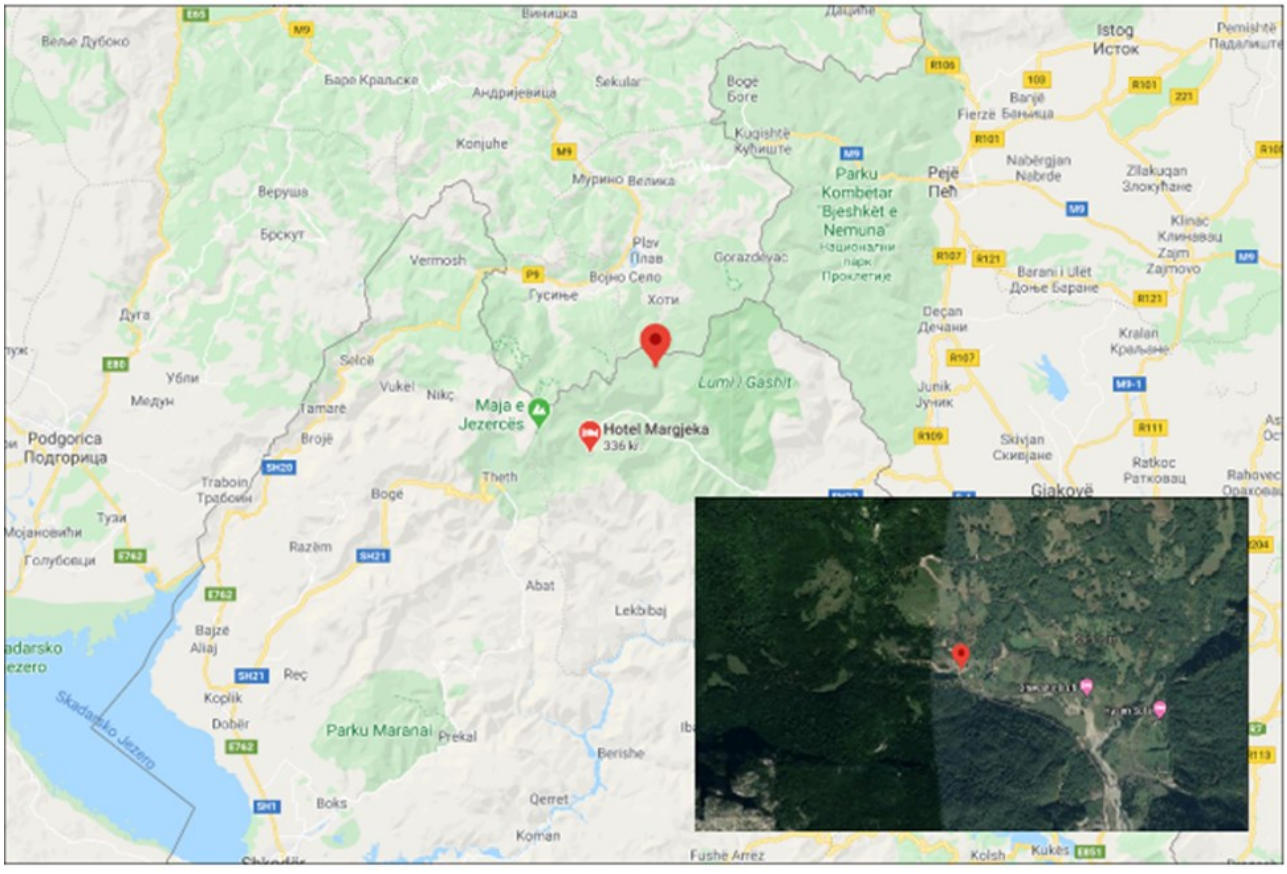

Fig. 4. First record for Albania of *Araschnia levana* near Gocaj, Valbonë 8.vii.2019.

specimen found at Margjeka, Valbonë and is shown on the map in Fig. 3. A strong population was found near Gocaj, Valbonë, 6.vii.2019 and 8.vii.2019 and the species was observed in numbers from the given coordinates and approximately two km to the south.

Araschnia levana (Linnaeus, 1758)
(Figs 4, 5, Table 2)

Fig. 5. *Araschnia levana*, Gocaj, Valbonë 8.vii.2019. First record for Albania. © Martin Bjerg.

Table 2. Sites for *Araschnia levana*.

Sites	Date	Coordinates
Gocaj, Valbonë	8.vii.2019	42°29'47.3"N 19°57'01.6"E
Bujan, Tropojë	9.vii.2019	42°19'17.4"N 20°04'14.3"E

Araschnia levana (Nymphalidae) is widely distributed in Europe and known from most European countries. Albania is right on the southern boundary of the species. According to VVE1 and VVE2 records, there was potential for *Araschnia levana* in northern Albania. VVE1 team found three specimens near Brëzne in Kosovo, approximately five km from the eastern border of Albania. Furthermore, the species has spread in both Macedonia and Greece in recent decades. CASMEK1 team found two specimens of *Araschnia levana* at two different sites, both in northern Albania. The first record of *Araschnia levana* was a single specimen found near Gocaj, Valbonë, 8.vii.2019. It was discovered at the same locality where *Euphydryas maturna* was found. The second specimen of *Araschnia levana* was found near Bujan, Tropojë, approximately 22 km southeast of the first locality near Gocaj in Valbonë. The exact location for the first record of *Araschnia levana* for Albania is shown on the map in Fig. 4. The coordinates for both records are shown in Table 2.

Euphydryas maturna (Linnaeus, 1758)
(Figs 6, 7, Table 3)

Euphydryas maturna (Nymphalidae) is a local species in Europe. It is rare in Scandinavia, absent in southwestern Europe, but widely distributed in central, eastern, and south-eastern Europe. In Albania *Euphydryas maturna* was first listed by Murraj (1972). Many other authors have since mentioned *E. maturna* from Albania, but according to Sachanowicz *et al*. (2016) the species should not figure on the Albanian checklist. The only specimen known from Albania did not have any label with the location and date. The specimen is in the collection of the Museum of Natural History in Tiranë. No specimens were found by VVE1 and VVE2 teams.

Fig. 6. *Euphydryas maturna*, Gocaj, Valbonë 6.vii.2019. First record for Albania. © Emil Blicher Bjerregård.

Table 3. Sites for *Euphydryas maturna.*

Sites	Date	Coordinates
Gocaj, Valbonë	6.vii.2019	42°29'47.3"N 19°57'01.6"E
Gocaj, Valbonë	8.vii.2019	42°29'47.3"N 19°57'01.6"E

In 2019 CASMEK1 team found a population of *Euphydryas maturna* near Gocaj, Valbonë. The first specimen was found the evening of 6.vii.2019; the first new record for Albania. On 8.vii.2019 CASMEK1 revisited the locality and confirmed the presence of a population, when approximately 15 specimens were found.

Erebia alberganus (Prunner, 1798)
(Figs 8, 9, Table 4)

The distribution of this species is limited to the Alps, nearby sites in France, Italy, and in the Balkans. In the Balkans, the subspecies *Erebia alberganus phorcys* (Freyer, 1836) is present. No specimens were found by VVE1 and VVE2 teams. We found *Erebia alberganus* as a new species for Albania at Kukaj, Valbonë on 7.vii.2019. Only one specimen was found. *E. alberganus phorcys* is also present in the nearby countries of Bosnia and Herzegovina, Serbia, Bulgaria, and North Macedonia.

Table 4. Sites for *Erebia alberganus*.

Sites	Date	Coordinates
Kukaj, Valbonë	7.vii.2019	42°27'43.1"N 19°52'42.6"E

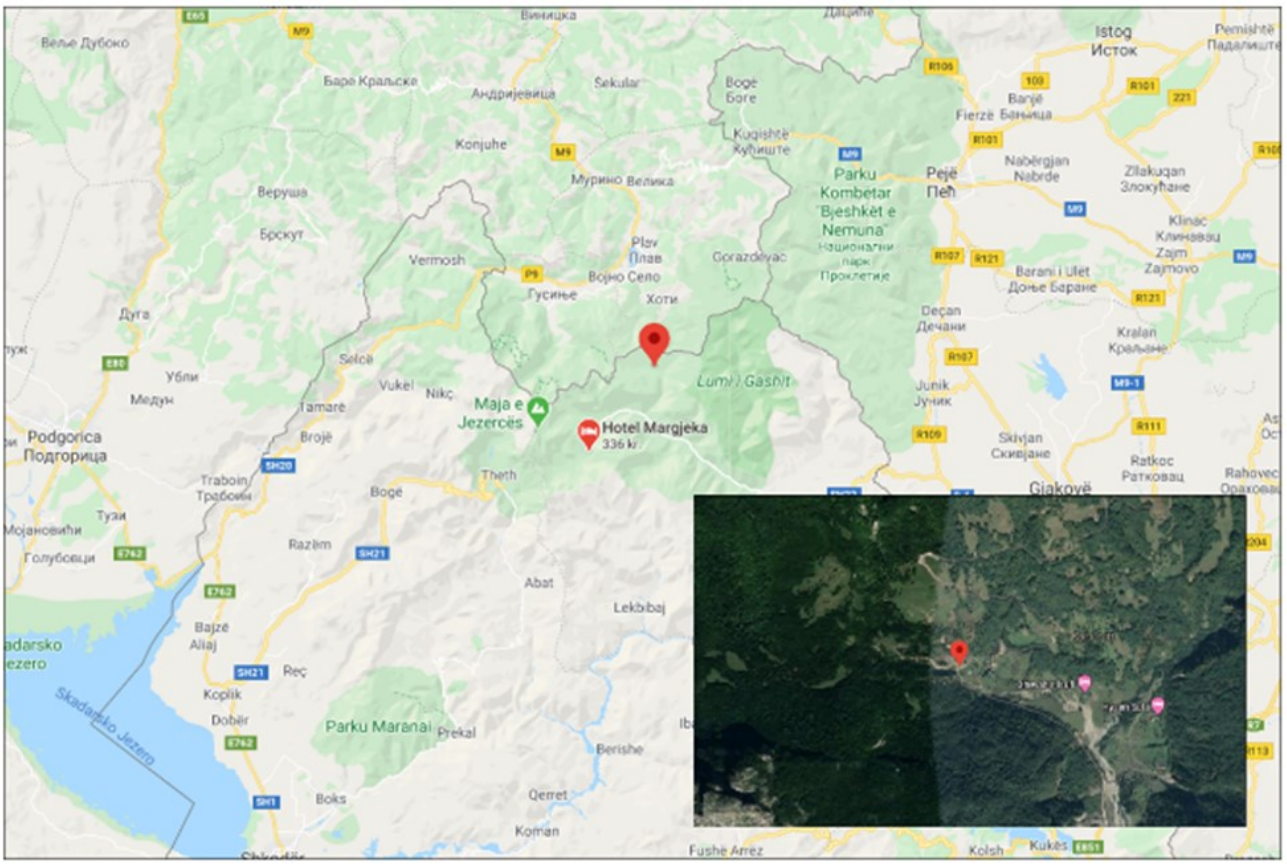

Fig. 7. First record for Albania of *Euphydryas maturna* near Gocaj, Valbonë 6.vii.2019.

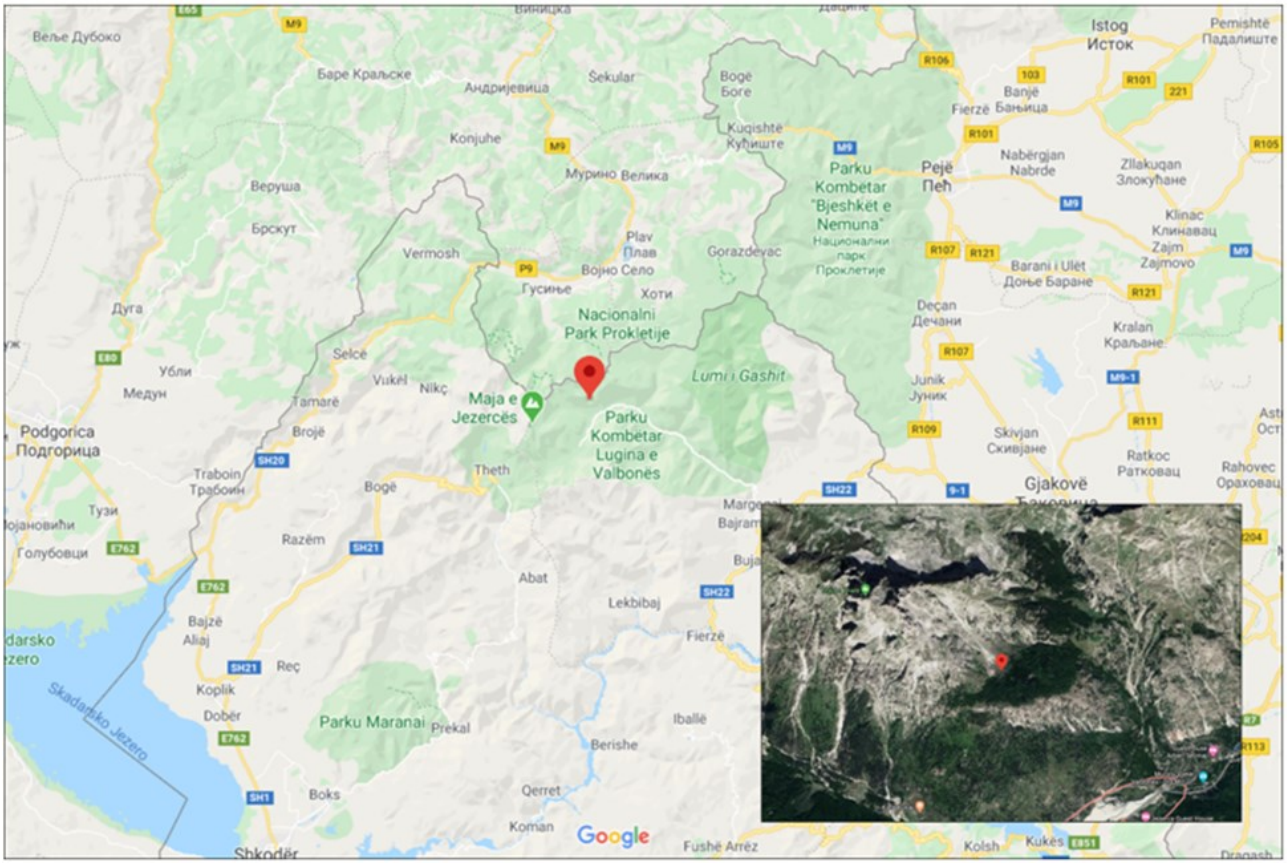

Fig. 8. First record for Albania of *Erebia alberganus* near Kukaj, Valbonë 7.vii.2019.

Fig. 9. First record for Albania of *Erebia alberganus phorcys* near Kukaj, Valbonë 7.vii.2019, leg. Søren Peter Glintborg, Emil Blicher Bjerregård and Allan Bornø Clausen. Coll. Søren Peter Glintborg. © Søren Peter Glintborg

Additional records

In addition to the four new species found for Albania, CASMEK1 team also managed to make a number of other interesting observations, recording a total of 136 butterfly species present. The most interesting species that the team recorded are presented individually, followed by the total list of observed species compiled by the CASMEK1 team.

Spialia phlomidis (Herrich-Schäffer, 1845) (Figs 10, 11, Table 5)

Fig. 10. *Spialia phlomidis*, Pepellash, Qafa e Qarrit, 11.vii.2019. © Kaj Dahl.

Fig. 11. Habitat for *Spialia phlomidis*, Pepellash, Qafa e Qarrit, 11.vii.2019. © Emil Blicher Bjerregård.

Table 5. Sites for *Spialia phlomidis*.

Sites	Date	Coordinates
Pepellash, Qafa e Qarrit	11.vii.2019	40°28'44.5"N 20°40'41.6"E
Sarandoporo, Korçë	13.vii.2019	40°05'39.0"N 20°37'31.3"E

Spialia phlomidis (Hesperiidae) is a local and rare species in Europe. The European distribution is mainly limited to the Balkans and nearby countries with populations in European Russia, Bulgaria, North Macedonia, European Turkey, Greece, and Albania.

VVE1 and VVE2 teams did not find any specimens of *Spialia phlomidis,* but the species is known from a few sites in the north-eastern and western parts of Albania and a single site in the southern part. CASMEK1 team found two new sites for *Spialia phlomidis*. A local population was found near Pepellash, Qafa e Qarrit, 11.vii.2019 where approximately 10 individuals were found. A single specimen was found near Sarandoporo, Korçë.

Colias aurorina Herrich-Schäffer, 1850 (Figs 12, 13, Table 6)

Fig. 12. *Colias aurorina heldreichii* f. *fountanei*, Rehovë, Ersekë, 12.vii.2019. © Emil Blicher Bjerregård.

Fig. 22. Habitat for *Colias aurorina heldreichii* near Rehovë, Ersekë, 12.vii.2019. © Emil Blicher Bjerregård

Table 6. Sites for *Colias aurorina*.

Sites	Date	Coordinates
Rehovë, Ersekë	12.vii.2019	40°20'19.1"N 20°43'31.2"E

Colias aurorina heldreichii (Staudinger, 1862) is the European subspecies of the widely distributed nominotypical *Colias aurorina* Herrich-Schäffer, 1850 (Pieridae). The subspecies *C. aurorina heldreichii* was described from Greece. It was thought to be endemic to Greece, but in 2012 it was discovered in Albania (Verovnik & Popović 2013). In 2019 CASMEK1 team confirmed the species' presence in south-eastern Albania. Approximately 30–40 individuals of *C. aurorina* were found at Rehovë, Ersekë at exactly the same location where *C. aurorina* was first found for Albania in 2012.

Apatura iris (Linnaeus, 1758)
(Fig. 14, Table 7)

Fig. 14. *Apatura iris*, Gocaj, Valbonë, 8.vii.2019, leg. Emil Blicher Bjerregård, Søren Peter Glintborg & Christian Videnkjær. Coll. Søren Peter Glintborg. © Søren Peter Glintborg.

Table 7. Sites for *Apatura iris*.

Sites	Date	Coordinates
Gocaj, Valbonë	8.vii.2019	42°29'42.9"N 19°57'07.3"E
Gërmenji, Korçë	13.vii.2019	40°13'32.3"N 20°39'36.8"E

In 2017 VVE1 team found a single specimen on Qafa Buni in northern Albania. VVE1 team was unsure if it was a migrating individual or had originated from a resident population. *Apatura iris* (Nymphalidae) is known from a few more sites in south-eastern Albania. In 2019 CASMEK1 team found two specimens of *Apatura iris* in Albania. The first specimen was found at Gocaj, Valbonë in northern Albania, being only the second record for the northern part of Albania. The second specimen found by CASMEK1 team was at Gërmenji in south-eastern Albania.

Boloria titania (Esper, [1793])
(Fig. 15, Table 8)

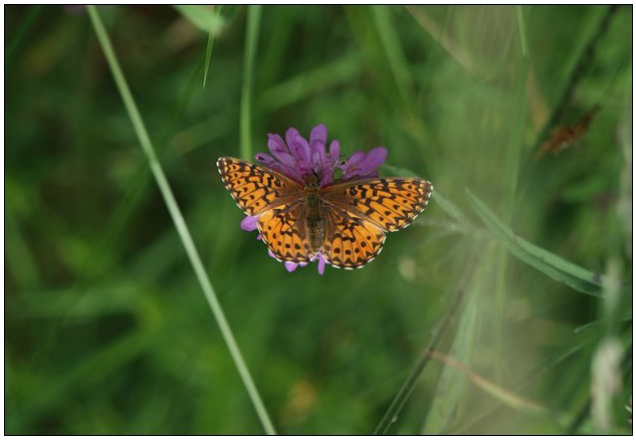

Fig. 15. *Boloria titania*, Çerem, Valbonë, 8.vii.2019. © Emil Blicher Bjerregård.

Table 8. Sites for *Boloria titania*.

Sites	Date	Coordinates
Çerem, Valbonë	8.vii.2019	42°30'36.9"N 19°59'17.6"E

The distribution of the subspecies *Boloria titania cypris* (Meigen, 1828) (Nymphalidae) is limited to the Balkans and the Alps. In the remaining parts of Europe, the nominotypical *Boloria titania titania* is distributed in Massif Central, Alpes-Maritimes in south-eastern France to north-western Italy. The species is also distributed in southern Finland, Estonia, Latvia, and European Russia as subspecies *Boloria titania bivina* (Fruhstorfer, 1908). In 2017 VVE1 team found a local population near Çerem, Valbonë in northern Albania. In 2019 its presence near Çerem was confirmed by CASMEK1 team. We found the species at exactly the same place as VVE1 team and can confirm that the population is strong and local. Many nearby areas were searched without any sightings of *Boloria titania*.

Melitaea diamina (Lang, 1789)
(Fig. 16, Table 9)

Fig. 16. Habitat for *Melitaea diamina* near Çerem, Valbonë, 6.vii.2019. © Emil Blicher Bjerregård.

Table 9. Sites for *Melitaea diamina*.

Sites	Date	Coordinates
Gocaj, Valbonë	6.vii.2019	42°27'40.1"N 19°56'50.7"E
Çerem, Valbonë	8.vii.2019	42°30'36.9"N 19°59'17.6"E

The species is only known from very few sites in Albania. *Melitaea diamina* (Nymphalidae) was first described from Albania by Sachanowicz *et a*l. (2016), when two populations were found in northern Albania. In 2017 VVE1 team found a strong population of *Melitaea diamina* at Çerem, Valbonë. In 2019 its presence near Çerem was confirmed by CASMEK1 team. We found the species at exactly the same site as VVE1 team. A new site for *Melitaea diamina was* also found by CASMEK1 team near Gocaj.

Pseudochazara amymone Brown, 1976
(Figs 17, 19, 20, Table 10)

Fig. 17. *Pseudochazara amymone*, Pepellash, Qafa e Qarrit, 11.vii.2019. © Martin Bjerg.

Fig. 10. Sites *for Pseudochazara amymone*.

Sites	Date	Coordinates
Drenovë, Korçë	11.vii.2019	40°34'29.3"N 20°47'59.5"E
Pepellash, Qafa e Qarrit	11.vii.2019	40°28'44.5"N 20°40'41.6"E

Pseudochazara amymone (Nymphalidae) is one of the most mysterious butterflies in Europe. Prior to 2010, the only information available on *P. amymone* was as follows: four specimens captured in north-western Greece, at Ioánnina, between the 5–10. July 1975; a single female also captured at Ioánnina, a few years later; and a specimen captured at Pepellash, Qafa e Qarrit in Albania in 1979. It was John Brown who found the first five specimens in Greece, and Kastriot Misja who found a specimen in Albania. In 2010, however, the species was rediscovered in south-eastern Albania, near Korçë. Finally, DNA barcoding has also shown that *P. amymone* is a separate species from *Pseudochazara mamurra* (Herrich-Schäffer, 1852) (Verovnik & Wiemers 2016). The distribution record in Albania for *P. amymone* found by Kastriot Misja was the only record known until recently.

Pseudochazara amymone was recorded from two different sites in Albania by CASMEK1 team. Two specimens were found at Drenovë, Korçë which is a known site for *P. amymone* and a single specimen was found a Pepellash, Qafa e Qarrit. At this site *P. amymone* was first found in Albania in 1979 but has not been reported from here since until this record by the CASMEK1 team.

Pseudochazara tisiphone Brown, [1981]
(Figs 18, 19, Table 11)

Fig. 18. *Pseudochazara tisiphone*, Pepellash, Qafa e Qarrit, 11.vii.2019. © Kaj Dahl.

Fig. 19. Pepellash, Qafa e Qarrit, 11.vii.2019. Habitat for *Pseudochazara amymone* and *Pseudochazara tisiphone*. © Emil Blicher Bjerregård.

Table 11. Sites for *Pseudochazara tisiphone*.

Sites	Date	Coordinates
Drenovë, Korçë	11.vii.2019	40°34'29.3"N 20°47'59.5"E
Pepellash, Qafa e Qarrit	11.vii.2019	40°28'44.5"N 20°40'41.6"E

Before 2016 this taxon was cited as a subspecies *Pseudochazara tisiphone* of *Pseudochazara mniszechii* (Herrich-Schaffer, [1851]) (Nymphalidae), widely distributed in Turkey. The taxonomical status of the genus *Pseudochazara* de Lesse, 1951 was examined by Takáts & Mølgaard (2016) and Verovnik & Wiemers (2016). DNA barcoding was used to provide information about the genus and to separate the species *P. mniszechii* and *P. tisiphone*. Using the molecular approach also *Pseudochazara amymone* and the Middle East species *Pseudochazara mamurra* were separated.

VVE1 team discovered a well-established population of *Pseudochazara tisiphone* around Bulqizë, Dibër and VVE2 team also observed *P. tisiphone* in the same area.

CASMEK1 team confirmed the strong population of this species at Drenovë, Korçë. A new, extremely strong population was also found near Pepellash, Qafa e Qarrit, where hundreds of specimens were found.

Conclusion

CASMEK1 survey was a follow up on VVE1 and VVE2 results. Four new species were found for Albania in just a single survey of 11 days ranging from 5.vii.2019 to 15.vii.2019, even though only a very small part of the country was investigated. It seems likely that several undiscovered species are still to be found considering that VVE1 and VVE2 teams also managed to find four new species in just two surveys in 2017. The Albanian butterfly checklist now contributes 200 species after the investigation in 2019 by CASMEK1 team. The Albanian checklist can be consulted in 'Checklist' below which is based on the previous checklist compiled by VVE1 and VVE2 teams. The nomenclature follows '*An updated checklist of the European Butterflies (Lepidoptera, Papilionoidea)*' (Wiemers *et al*. 2018). The 136 species in bold are the species found by CASMEK1 team.

Acknowledgements

We are thankful to Sylvain Cuvelier, Laurian Parmentier, Jurgen Couckuyt, Thomas Maertens, Delphine Vincke and Anila Paparisto from VVE1 and VVE2 teams for their inspirational research. We are especially grateful to Prof. Kastriot Misja who managed to provide information about the Albanian butterfly fauna for decades in a completely isolated country. We are also thankful to Flemming Vilhelmsen for examination of genitalia and to Galina Kuftina for examination of DNA to confirm the determination of some Pieridae species.

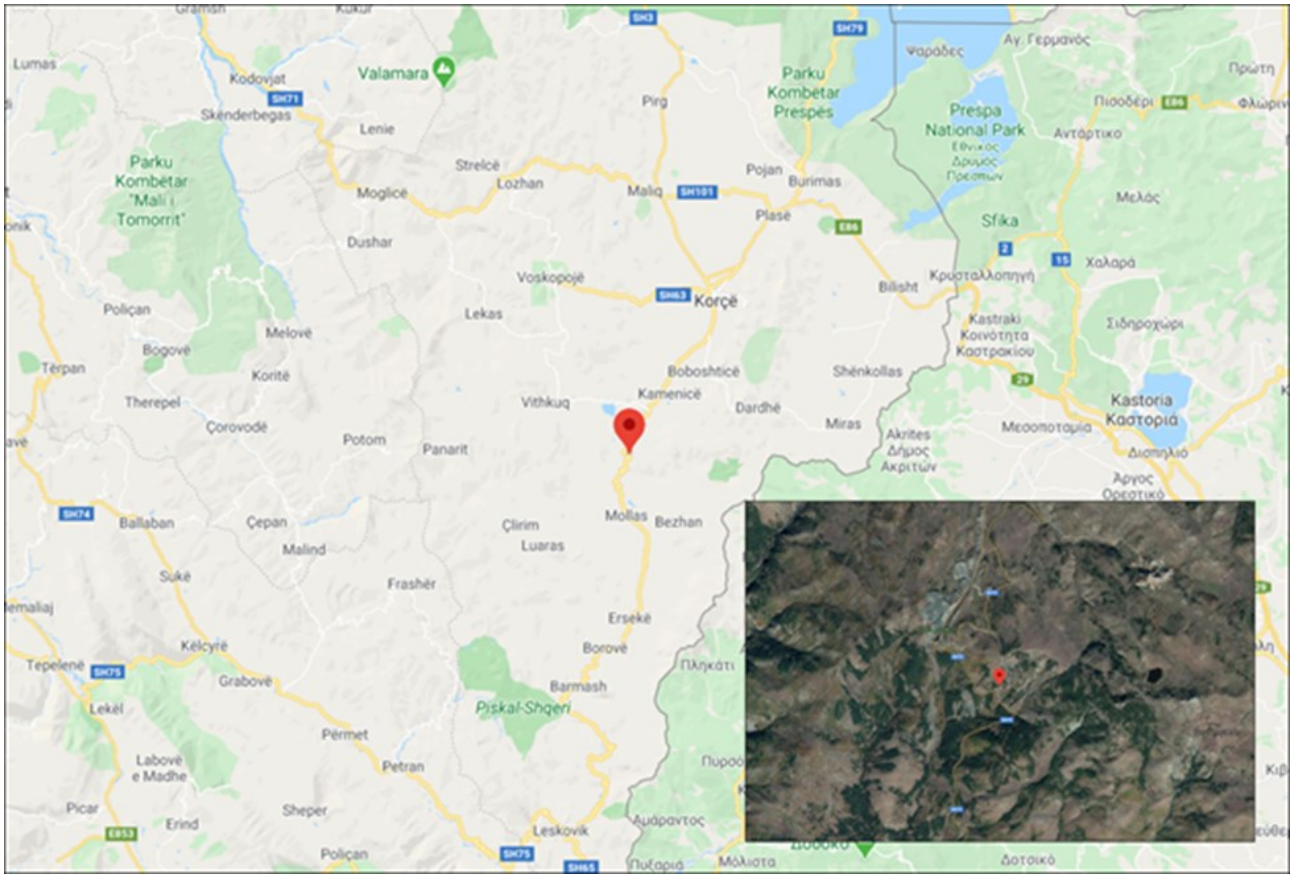

Fig. 20. Locality for *Pseudochazara amymone* near Pepellash, Qafa e Qarrit. The record by CASMEK1 was the first record since 1979 from Pepellash.

Checklist of butterflies of Albania

Papilionidae
Papilioninae
Iphiclides podalirius (Linnaeus, 1758)
Papilio alexanor Esper, 1800
Papilio machaon Linnaeus, 1758
Parnassiinae
Parnassius apollo (Linnaeus, 1758)
Parnassius mnemosyne (Linnaeus, 1758)
Zerynthia cerisy (Godart, [1824])
Zerynthia polyxena ([Denis & Schiffermüller], 1775)
Hesperiidae
Heteropterinae
Carterocephalus palaemon (Pallas, 1771)
Hesperiinae
Gegenes nostrodamus (Fabricius, 1793)
Gegenes pumilio (Hoffmansegg, 1804)
Hesperia comma (Linnaeus, 1758)
Ochlodes sylvanus (Esper, 1777)
Thymelicus action (Rottemburg, 1775)
Thymelicus lineola (Ochsenheimer, 1808)
Thymelicus sylvestris (Poda, 1761)
Pyrginae
Carcharodus alceae (Esper, 1780)
Carcharodus floccifera (Zeller, 1847)
Carcharodus lavatherae (Esper, 1783)
Carcharodus orientalis Reverdin, 1913
Erynnis marloyi (Boisduval, 1834)
Erynnis tages (Linnaeus, 1758)
Muschampia proto (Ochsenheimer, 1808)
Pyrgus alveus (Hübner, [1803])
Pyrgus andromedae (Wallengren, 1853)
Pyrgus armoricanus (Oberthür, 1910)
Pyrgus carthami (Hübner, [1813])
Pyrgus cinarae (Rambur, 1839)
Pyrgus malvae (Linnaeus, 1758)
Pyrgus serratulae (Rambur, 1839)
Pyrgus sidae (Esper, 1784)
Spialia phlomidis (Herrich-Schäffer, 1845)
Spialia orbifer (Hübner, [1823])
Pieridae
Dismorphiinae
Leptidea duponcheli (Staudinger, 1871)
Leptidea sinapis (Linnaeus, 1758)
Coliadinae
Colias alfacariensis Ribbe, 1905
Colias aurorina Herrich-Schäffer, 1850
Colias croceus (Geoffroy, 1785)
Colias caucasica Staudinger, 1871
Gonepteryx cleopatra (Linnaeus, 1767)
Gonepteryx farinosa (Zeller, 1847)
Gonepteryx rhamni (Linnaeus, 1758)
Pierinae
Anthocharis cardamines (Linnaeus, 1758)
Anthocharis damone Boisduval, 1836
Anthocharis gruneri Herrich-Schäffer, 1851
Aporia crataegi (Linnaeus, 1758)
Euchloe ausonia (Hübner, [1804])
Euchloe penia (Freyer, 1851)
Pontia edusa (Fabricius, 1777)
Pieris balcana Lorković, [1969]
Pieris brassicae (Linnaeus, 1758)
Pieris ergane (Geyer, [1828])
Pieris krueperi Staudinger, 1860
Pieris mannii (Mayer, 1851)
Pieris napi (Linnaeus, 1758)
Pieris rapae (Linnaeus, 1758)
Riodinidae
Nemeobiinae
Hamearis lucina (Linnaeus, 1758)
Lycaenidae
Lycaeninae
Lycaena alciphron (Rottemburg, 1775)
Lycaena candens (Herrich-Schäffer, 1844)
Lycaena dispar ([Haworth], 1802)
Lycaena ottomana (Lefèbvre, [1831])
Lycaena phlaeas (Linnaeus, [1760])
Lycaena thersamon (Esper, 1784)
Lycaena tityrus (Poda, 1761)
Lycaena virgaureae (Linnaeus, 1758)
Theclinae
Callophrys rubi (Linnaeus, 1758)
Favonius quercus (Linnaeus, 1758)
Satyrium acaciae (Fabricius, 1787)
Satyrium ilicis (Esper, 1779)
Satyrium spini ([Denis & Schiffermüller], 1775)
Satyrium w-album (Knoch, 1782)
Thecla betulae (Linnaeus, 1758)
Polyommatinae
Aricia agestis ([Denis & Schiffermüller], 1775)
Cacyreus marshalli Butler, 1898
Celastrina argiolus (Linnaeus, 1758)
Cyaniris semiargus (Rottemburg, 1775)
Cupido alcetas (Hoffmansegg, 1804)
Cupido argiades (Pallas, 1771)
Cupido decoloratus (Staudinger, 1886)
Cupido minimus (Fuessly, 1775)
Cupido osiris (Meigen, 1829)
Cyaniris semiargus (Rottemburg, 1775)
Eumedonia eumedon (Esper, 1780)
Glaucopsyche alexis (Poda, 1761)
Iolana iolas (Ochsenheimer, 1816)
Kretania sephirus (Frivaldszky, 1835)
Lampides boeticus (Linnaeus, 1767)
Leptotes pirithous (Linnaeus, 1767)
Lysandra bellargus (Rottemburg, 1775)
Lysandra coridon (Poda, 1761)
Phengaris alcon ([Denis & Schiffermüller], 1775)
Phengaris arion (Linnaeus, 1758)
Plebejus argus (Linnaeus, 1758)
Plebejus argyrognomon (Bergsträsser, 1779)
Plebejus idas (Linnaeus, [1760])
Polyommatus admetus (Esper, 1783)

Continued	
Polyommatus amandus (Schneider, 1792)	**Danainae**
Polyommatus damon ([Denis & Schiffermüller], 1775)	*Danaus chrysippus* (Linnaeus, 1758)
Polyommatus daphnis ([Denis & Schiffermüller], 1775)	**Charaxinae**
Polyommatus dorylas ([Denis & Schiffermüller], 1775)	*Charaxes jasius* (Linnaeus, 1767)
Polyommatus eros (Ochsenheimer, 1808)	**Satyrinae**
Polyommatus escheri (Hübner, [1823])	***Aphantopus hyperantus*** (Linnaeus, 1758)
Polyommatus icarus (Rottemburg, 1775)	*Arethusana arethusa* ([Denis & Schiffermüller], 1775)
Polyommatus ripartii (Freyer, 1830)	***Brintesia circe*** (Fabricius, 1775)
Polyommatus thersites (Cantener, 1835)	***Chazara briseis*** (Linnaeus, 1764)
Pseudophilotes vicrama (Moore, 1865)	***Coenonympha arcania*** (Linnaeus, [1760])
Scolitantides orion (Pallas, 1771)	*Coenonympha leander* (Esper, 1784)
Tarucus balkanicus (Freyer, 1844)	***Coenonympha orientalis*** Rebel, 1909
Nymphalidae	***Coenonympha pamphilus*** (Linnaeus, 1758)
Limenitidinae	***Coenonympha rhodopensis*** Elwes, 1900
Limenitis camilla (Linnaeus, 1764)	***Erebia aethiops*** (Esper, 1777)
Limenitis reducta Staudinger, 1901	***Erebia alberganus*** (Prunner, 1798)
Heliconiinae	*Erebia cassioides* (Hohenwarth, 1792)
Argynnis pandora ([Denis & Schiffermüller], 1775)	*Erebia epiphron* (Knoch, 1783)
Argynnis paphia (Linnaeus, 1758)	*Erebia euryale* (Esper, 1805)
Boloria dia (Linnaeus, 1767)	*Erebia gorge* (Hübner, [1804])
Boloria euphrosyne (Linnaeus, 1758)	***Erebia ligea*** (Linnaeus, 1758)
Boloria graeca (Staudinger, 1870)	*Erebia medusa* ([Denis & Schiffermüller], 1775)
Boloria pales ([Denis & Schiffermüller], 1775)	*Erebia melas* (Herbst, 1796)
Boloria titania (Esper, [1793])	***Erebia oeme*** (Hübner, [1804])
Brenthis daphne ([Denis & Schiffermüller], 1775)	***Erebia ottomana*** Herrich-Schäffer, 1847
Brenthis hecate ([Denis & Schiffermüller], 1775)	*Erebia pandrose* (Borkhausen, 1788)
Brenthis ino (Rottemburg, 1775)	*Erebia pronoe* (Esper, 1780)
Fabriciana adippe ([Denis & Schiffermüller], 1775)	*Erebia rhodopensis* Nicholl, 1900
Fabriciana niobe (Linnaeus, 1758)	*Erebia triarius* (Prunner, 1798)
Issoria lathonia (Linnaeus, 1758)	***Hipparchia fagi*** (Scopoli, 1763)
Speyeria aglaja (Linnaeus, 1758)	*Hipparchia fatua* Freyer, 1843
Apaturinae	*Hipparchia semele* (Linnaeus, 1758)
Apatura ilia ([Denis & Schiffermüller], 1775)	*Hipparchia statilinus* (Hufnagel, 1766)
Apatura iris (Linnaeus, 1758)	*Hipparchia senthes* (Fruhstorfer, 1908)
Apatura metis Freyer, 1829	*Hipparchia syriaca* (Staudinger, 1871)
Nymphalinae	*Hipparchia volgensis* (Mazokhin-Porshnyakov, 1952)
Aglais io (Linnaeus, 1758)	*Hyponephele lupina* (Costa, 1836)
Aglais urticae (Linnaeus, 1758)	***Hyponephele lycaon*** (Kühn, 1774)
Araschnia levana (Linnaeus, 1758)	*Kirinia roxelana* (Cramer, 1777)
Euphydryas aurinia (Rottemburg, 1775)	***Lasiommata maera*** (Linnaeus, 1758)
Euphydryas maturna (Linnaeus, 1758)	***Lasiommata megera*** (Linnaeus, 1767)
Melitaea athalia (Rottemburg, 1775)	*Lasiommata petropolitana* (Fabricius, 1787)
Melitaea cinxia (Linnaeus, 1758)	***Maniola jurtina*** (Linnaeus, 1758)
Melitaea diamina (Lang, 1789)	***Melanargia galathea*** (Linnaeus, 1758)
Melitaea didyma (Esper, 1778)	***Melanargia larissa*** (Geyer, [1828])
Melitaea ornata Christoph, 1893	*Melanargia russiae* (Esper, 1783)
Melitaea phoebe ([Denis & Schiffermüller], 1775)	*Minois dryas* (Scopoli, 1763)
Melitaea trivia ([Denis & Schiffermüller], 1775)	***Pararge aegeria*** (Linnaeus, 1758)
Nymphalis antiopa (Linnaeus, 1758)	***Proterebia phegea*** (Borkhausen, 1788)
Nymphalis polychloros (Linnaeus, 1758)	***Pseudochazara amalthea*** (Frivaldszky, 1845)
Nymphalis xanthomelas ([Denis & Schiffermüller], 1775)	***Pseudochazara amymone*** Brown, 1976
Polygonia egea (Cramer, 1775)	*Pseudochazara geyeri* (Herrich-Schäffer, 1846)
Polygonia c-album (Linnaeus, 1758)	***Pseudochazara tisiphone*** Brown, [1981]
Vanessa atalanta (Linnaeus, 1758)	***Pyronia cecilia*** (Vallantin, 1894)
Vanessa cardui (Linnaeus, 1758)	***Pyronia tithonus*** (Linnaeus, 1771)
Libytheinae	***Satyrus ferula*** (Fabricius, 1793)
Libythea celtis (Laicharting, 1782)	

Literature

Cuvelier S., Parmentier L., Paparisto A. & Couckuyt J. 2018. Butterflies of Albania - Fluturat e Shqipërisë. New surveys, new species and e new checklist (Lepidoptera: Papilionoidea). — *Phegea* **46**(2): 48–69. http://www.phegea.org/Phegea/2018/Phegea46-2_48-69.pdf

Murraj X. 1972. Les papillons du jour en Albanie (Rhopalocera). — *Buletini i Shkencave të Natyrës* **3–4**: 83–107.

Sachanowicz K., Luczkowski S. & Larysz A. 2016. State of Knowledge of Butterfly Fauna of Albania, with Three New Species for the Country. — *Acta zoologica bulgarica* **68**(4): 511–518.

Takáts K. & Mølgaard M. 2016. Partial mtCOI-sequences of Balkanic species of *Pseudochazara* (Lepidoptera: Nymphalidae, Satyrinae) reveal three well-differentiated lineages. — *Entomologica romanica* **19**: 21–40.

Verovnik R. & Popović M. 2013a. First record of the Greek Clouded Yellow (*Colias aurorina* Herrich-Schäffer, 1850) for Albania. — *Natura Sloveniae* **15**: 27–32.

Verovnik R. & Wiemers M. 2016. Species delimitation in the Grayling genus *Pseudochazara* (Lepidoptera, Nymphalidae, Satyrinae) supported by DNA barcodes. — *ZooKeys* **600**: 131–154. https://zookeys.pensoft.net/article/7798/

Wiemers M., Balletto E., Dincă V., Frica F. Z., Lamas G., Lukhtanov V., Munguira L. M., van Swaay C. A. M., Vila R., Vliegenthart A., Wahlberg N. & Verovnik R. 2018. An updated checklist of the European Butterflies (Lepidoptera, Papilionoidea). *ZooKeys* **811**: 9–45. https://zookeys.pensoft.net/article/28712/

Corrigendum

Phegea 50(4): Laurian Parmentier “Contribution to the butterfly (Rhopalocera) fauna of Albania with confirmation of the presence of the black hairstreak *Satyrium pruni* (Papilionoidea: Lycaenidae) in the country” on p. 162: *recte* ‘the Republic of North Macedonia’.