

Observations on the composition of butterfly fauna in regions of Svaneti and Imereti, Georgia

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Abstract

The results of butterfly monitoring during the first entomological expedition (26. 6. – 2. 7. 2019) to Svaneti and Imereti regions in western Georgia is reported. Totally, 33 species of butterflies and skippers were recorded in the vicinity of Mestia, Tsvirmi, Bogreshi, Ushguli, Kutaisi and Sataplia. Among others, European near threatened species such as *Parnassius apollo*, *Parnassius mnemosyne* and *Polyommatus eros* were observed.

Keywords: Distribution, faunistic, Rhopalocera, Hesperioidea, monitoring, Caucasus

1. Introduction

According to annotated check list of Georgian butterfly fauna published in 2004 there are 228 species recorded for Georgia (Didmanidze 2004). The later notes on species composition in this Caucasian country are also available from Korb & Bolshakov (2016), Tshikolovets (2011) and Tshikolovets & Nekrutenko (2012). According to these sources, 211 species of Rhopalocera and Hesperioidea are reported to be present in Georgia. In addition, there are 254 species listed by Christopher Jonko on his web page (Jonko 2019) with the dynamic (regularly updatable) distribution data mainly provided by citizen sciences framework. Based on only these reported species counts, it is immediately clear that Georgian butterfly fauna is still not well understood and several other species are expected to occur in there (for instance species inhabiting surrounding countries). Therefore, the authors are convinced that regular targeted monitoring might reveal new species for Georgia. Moreover, description of new species could not be excluded. The total number of Georgian

butterfly fauna is thus expected to be even higher. Apart the notes from Tshikolovets & Nekrutenko (2012) and fragmented data for separate species from Jonko (2019), the detailed data on most butterfly species distribution in Georgia are currently not available. Therefore, we decided to collect the information about butterflies during our fieldtrip in Georgia. Even though unfavorable weather conditions complicated the expedition schedule, authors observed the butterflies in Svaneti and Imereti regions at the several localities in western Georgia, where no data for butterfly distribution are presented in Tshikolovets & Nekrutenko (2012). This faunistic note thus contributes to supply and refine the available data on Georgian butterflies.

2. Methods

The butterflies were monitored in 26. 6.–2. 7. 2019 in non-regular intervals, in dependence of the weather. In case of non-protected species, the specimens were captured by entomological net and preserved in paper envelopes (ex. in results). The specimens are stored in personal collection of V. Vrabec (Kolín, Czech Republic). In case of interest, the collected material is available for students or scientist. The butterfly species suspected to be on Georgian red list and the non-captured individuals were recorded photographically (marked as observ. in results). Identification of the species was made according to the above mentioned works.

Study sites:

The localities were numbered chronologically from 1 to 8 and such numbers are used for the localities in the further text.

1. Georgia, Svaneti region, Mestia town, gardens and orchards, 1450 m a. s. l., 43°03'N, 42°44'E env., 26. - 28. vi. 2019. Locality is listed in Tshikolovets & Nekrutenko (2012) as “Mestia” (Fig.1).
2. Georgia, Svaneti region, Mestia dist., Tsvirmi – Bogreshi, 1550 – 1750 m a. s. l., 43°00'N, 42°49'E, 27. vi. 2019. Locality is not listed in Tshikolovets & Nekrutenko (2012).
3. Georgia, Svaneti region, 3 km W from Ushguli, 1950 - 2100 m a. s. l., 42°55'N, 42°58'E env., 27. vi. 2019. Locality is not listed in Tshikolovets & Nekrutenko (2012) (Fig.3; fig.7).

4. Georgia, Svaneti region, Mestia env., Cloud Base Hut, 2250 m a. s. l., 43°04'N, 42°43'E, 28. – 29. vi. 2019. Locality is not listed in Tshikolovets & Nekrutenko (2012) (Fig.8).
5. Georgia, Svaneti region, Mestia dist. Koruldi lakes, 2400- 2750 m a. s. l., 43°05'N, 42°42'E env., 29. vi. 2019. Locality is not listed in Tshikolovets & Nekrutenko (2012).
6. Georgia, Imereti region, Kutaisi dist., Kutaisi city near former parliament building, 140 m a. s. l., 42°16'N, 42°40'E env., 1. vii. 2019. Locality is listed in Tshikolovets & Nekrutenko (2012) as “Kutais” or “Kut’aisi”.
7. Georgia, Imereti region, Kutaisi dist., Kutaisi “Kolkhuri” botanical garden, 150 m a. s. l., 42°16'N, 42°42'E env., 1. vii. 2019. Locality is probably listed in Tshikolovets & Nekrutenko (2012) as “Kutais” or “Kut’aisi” (Fig.11).
8. Georgia, Imereti region, N Kutaisi Tsqaltubo dist., Sataplia nat. res. Colchid forest, 400-450 m a. s. l., 42°18'N, 42°40'E env., 2. vii. 2019. Locality is not listed in Tshikolovets & Nekrutenko (2012) (Fig.13; fig.15).

3. Results

Here, the authors report the list of observed butterflies (sorted by families and subsequently alphabetically) following the nomenclature according to Tshikolovets et Nekrutenko (2012). Číslo před údajem o počtu dokladových exemplářů nebo pozorování odpovídají číslům lokalit v seznamu uvedeném výše.

Hesperiidae

Ochlodes sylvanus sylvanus (Esper, 1779): Loc. 3: 4 ex.

Pyrgus melotis ponticus (Reverdin, 1914): Loc. 4: 1 ex.

Pyrgus serratulae grisescens (Alberti, 1969): Loc. 6: 4 ex.

Thymelicus sylvestris syriacus (Tutt, 1905): Loc. 3: 1 ex.

Papilionidae

Parnassius apollo suaneticus Arnold, 1909: Loc. 3: observ.

Parnassius mnemosyne mnemosyne (Linnaeus, 1758): Loc. 3: observ.; Loc. 4: 6 ex.

Pieridae

Aporia crataegi crataegi (Linnaeus, 1758): Loc. 1: observ.; Loc. 2: 16 ex.; Loc. 3: 3 ex.; Loc. 4: 1 ex.

Colias croceus croceus (Fourcroy, 1785): Loc. 3: 1 ex.; Loc. 6: 2 ex.
Gonepteryx rhamni rhamni (Linnaeus, 1758): Loc. 3: 1 ex.; Loc. 8: observ.
Pieris napi meridionalis (Heyne, 1895): Loc. 7: observ.
Pieris rapae rapae (Linnaeus, 1758): Loc. 7: observ.

Lycanidae

Callophrys rubi chalybeitincta Sovinsky, 1905: Loc. 3: 1 ex.
Lycaena candens candens (Herrich-Schäffer, 1851): Loc. 4: 1 ex.
Plebejus agestis agestis (Denis & Schiffermüller, 1775): Loc. 3: 2 ex.
Plebejus anteros anteros (Freyer, 1838): Loc. 3: 1 ex.
Plebejus eumedon eumedon (Esper, 1780): Loc. 3: 4 ex.
Polyommatus amandus amandus (Schneider, 1792): Loc. 2: observ.; Loc. 3: 4 x
Polyommatus eros tshetverikovi Nekrutenko, 1977: Loc. 3: 1 ex.
Polyommatus semiargus semiargus (Rottemburg, 1775): Loc. 3: 2 ex.; Loc. 4: 1 ex.

Nymphalidae

Aglais urticae urticae (Linnaeus, 1758): Loc. 3: 1 ex.
Argynnis aglaja aglaja (Linnaeus, 1758): Loc. 3: 2 ex.
Argynnis paphia paphia (Linnaeus, 1758): Loc. 8: observ.
Erebia medusa medusa (Denis & Schiffermüller, 1775): Loc. 3: 2 ex.; Loc. 4: 6 ex.
Euphydryas aurinia bulgarica (Fruhstrofer, 1917): Loc. 3: 1 ex.
Melitaea caucasogenita caucasogenita Verity, 1930: Loc. 4: 2 x.
Melitaea cinxia cinxia (Linnaeus, 1758): Loc. 3: 5 ex.; Loc. 6: 1 ex.
Melitaea diamina diamina (Lang, 1789): Loc. 3: 1 ex.
Melitaea interrupta interrupta Kolenati, 1846: Loc. 3: 1 ex.; Loc. 4: 7 ex.
Neptis rivularis rivularis (Scopoli, 1763): Loc. 3: 3 x.
Pararge aegeria tircis (Godart, 1827): Loc. 7: 1 ex.
Polygonia c-album c- album (Linnaeus, 1758): Loc. 3: 3 ex.
Vanessa atalanta atalanta (Linnaeus, 1758): Loc. 8: observ.
Vanessa cardui cardui (Linnaeus, 1758): Loc. 1: observ.; Loc. 3: 1 ex.; Loc. 4: 1 ex.; Loc. 5: observ.; Loc. 6: observ.

In total, 33 species were observed in the study sites of Svaneti and Imereti. The highest number of butterflies was observed in Ushguli (24 species) followed by Mestia Cloud Base Hut (9), Kutaisi city (4), Kutaisi botanical garden (3), Sataplia (3), Tsvirmi - Bogreshi (2), Mestia town (2) and Koruldi lake (1). In Ushguli, protected *Parnassius apollo* (Fig.5; fig.6) and some other interesting species such as *P. mnemosyne*, *Polyommatus eros*, *Melitaea interrupta* were detected. In Cloud Base Hut in Mestia, presence of *Parnassius mnemosyne* (Fig.9), *Melitaea caucasogenita*, *Melitaea interrupta* was proved.

4. Discussion

Butterflies, resp. Rhopalocera and Hesperioidea are most likely the most studied group within the order of Lepidoptera. In comparison with Europe, the knowledge on Georgian butterfly fauna is limited similar to most of other groups of invertebrates (Mumladze et al. 2009). As these insects are often used as model species for ecological and environmental research or even as umbrella species (Beneš et al. 2002), the detailed data on their current distribution are crucial in order to protect the unique habitats inhabited by diverse fauna within this country. The attention should be especially paid on endemic Caucasian or Transcaucasian species as e. g. *Melitaea caucasogenuita* and *M. interrupta*.

In Europe, *Parnassius apollo*, *Parnassius mnemosyne* and *Polyommatus eros* are classified as “near threatened” (NT) according to the Red List (Van Swaay et al. 2010). However, only *Parnassius apollo* is listed in Georgian Red List and as such it is protected by the law in Georgia. The other recorded species e.g. *Ochlodes sylvanus*, *Pyrgus serratulae*, *Thymelicus sylvestris*, *Aporia crataegi*, *Gonepteryx rhamni* (Fig.14), *Pieris napi*, *Pieris rapae*, *Callophrys rubi*, *Lycaena candens* (Fig.10), *Polyommatus amandus*, *Aglais urticae*, *Argynnis paphia*, *Erebia medusa*, *Euphydryas aurinia*, *Melitaea cinxia*, *Melitaea diamina*, *Neptis rivularis*, *Pararge aegeria* (Fig.12), *Polygonia c-album*, *Vanessa atalanta*, *Vanessa cardui* are considered as “least concern” (LC) in the European Red List. Moreover, the species might be listed even in higher risk categories of local Red Lists, depending on the conditions in the individual states (Maes et al. 2019).

The regular monitoring, ideally on daily basis, is the crucial tool. To objectively assess the real state of the abundance and distribution of butterflies, excluding the urbanization in the vicinity of Mestia, no apparent negative factor was observed at the localities visited during the expedition. Conversely, the meadows in the visited region are still maintained by pasture and traditional non-intensive agriculture, which is beneficial for majority of the butterflies (Bubová et al. 2015). On the other hand, only long-term monitoring can confirm this suggestion and possibly reveal some disbalances of local butterfly populations.

5. Conclusion

This faunistic note provides the information about observation of 33 species of butterflies (Rhopalocera) and skippers (Hesperioidea) in Georgia. The highest diversity was found out in Ushguli (24 species) where, protected *Parnassius apollo* and other important species *P. mnemosyne*, *Polyommatus eros*, *Melitaea interrupta* were detected. In Cloud Base Hut in Mestia, presence

of *Parnassius mnemosyne*, *Melitaea caucasogenita*, *Melitaea interrupta* was proved.

6. Acknowledgements

Authors thank to Luděk Farský and Radka Fialová for their help in field. We also thank to Ketí Phaliani, Nano Phaliani, Nick Phaliani, Zura Phaliani, Tamaz Berishvili and Mzia Okruashvili for their help and technical support for the whole duration of the expedition.

7. References

- Beneš J., Konvička M., Dvořák J., Fric Z., Havelda Z., Pavlíčko A., Vrabec V. & Weidenhoffer Z. (eds.) 2002: Butterflies of the Czech Republic: Distribution and conservation I., II. SOM, Praha, 857 pp.
- Bubová T., Vrabec V., Kulma M. & Nowicki P. 2015: Land management impacts on European butterflies of conservation concern: a review. *Journal of Insect Conservation*. 19(5): 805-821.
- Didmanidze E. 2004: Annotated list of diurnal butterflies (Lepidoptera: Rhopalocera) of Georgia and adjacent territory from Southern Caucasus. *Proceedings of the Institute of Zoology*. 22: 197-226.
- Jonko C. 2018: Lepidoptera Mundi. <https://lepidoptera.eu/>. Accessed 8 Nov 2019
- Korb S. K. & Bolshakov L. V. 2016: A systematic catalogue of butterflies of the former Soviet Union (Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kyrgyzstan, Kazakhstan, Latvia, Lithuania, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan) with special account to their type specimens (Lepidoptera: Hesperioidea, Papilionoidea). *Zootaxa*, 4160(1): 3-324.
- Maes D., Verovnik R., Wiemers M., Brosens D., Beshkov S., Bonelli S., Buszko J., Cantú-Salazar L., Cassar L-F., Collins S., Dincă V., Djuric M., Dušej G., Elven H., Franeta F., Garcia-Pereira P., Geryak Y., Goffart P., Gór Á., Hiermann U., Höttinger H., Huemer P., Jakšić P., John E., Kalivoda H., Kati V., Kirkland P., Komac B., Kőrösi Á., Kulak A., Kuussaari M., L'Hoste L., Lelo S., Mestdagh X., Micevski N., Mihoci I., Mihut S., Monasterio-León Y., Morgun D. V., Munguira M. L., Murray T., Stadel Nielsen S., Ólafsson E., Öunap E., Pamperis L. N., Pavlíčko A., Pettersson L. B., Popov S., Popović M., Pöyry J., Prentice M., Reyserhove L., Ryrholm N., Šašić M., Savenkov N., Settele J., Sielezniew M., Sinev S., Stefanescu C., Švitra G., Tammaru T., Tiitsaar A., Tzirkalli E., Tzortzakaki O., van Swaay C. A. M., Lykke Viborg A., Wynhoff I., Zografou k. & Warren M.

- S. 2019: Integrating national Red Lists for prioritising conservation actions for European butterflies. *Journal of Insect Conservation*, 23(2): 301-330.
- Mumladze L., Japoshvili B., Anderson E. P. 2019: Faunal Biodiversity Research in the Republic of Georgia: A Short Review of Trends, Gaps, and Needs in the Caucasus Biodiversity Hotspot. Preprints 2019, 2019080249 (doi: 10.20944/preprints201908.0249.v1).
- Tshikolovets V. V. 2011: Butterflies of Europe & the Mediterranean area. Tshikolovets Publications, Zoological Museum, National Museum of Natural History National Academy of Science of Ukraine, Kyiv, Pardubice, 544 pp.
- Tshikolovets V. & Nekrutenko Y. 2012: The Butterflies of Caucasus and Transcaucasia (Armenia, Azerbaijan, Georgia and Russian Federation). Tshikolovets Publications, Kyiv, Pardubice, 423 pp.
- Van Swaay C. et al., 2010: European Red List of butterflies. Publications Office of the European Union, Luxembourg, 50 pp.



Figure 1: Locality 1, Mestia, Svaneti region.



Figure 2: *Vanessa cardui* one of the most common Georgian butterfly in June.



Figure 3: Settlement of Ushguli and its surroundings.



Figure 4: *Aporia crataegi*, the most abundant species around Mestia and Ushguli, drinking at the puddles on the road.



Figure 5: Habitat of the protected species of *Parnassius apollo* (as well as of *Neptis rivularis* and several species of *Melitaea*) at Locality 3 (near Ushguli).



Figure 6: The individual of protected species *Parnassius apollo* which was observed at Locality 3 (near Ushguli).



Figure 7: Locality 3 in the vicinity of Usghuli village. Mountain meadows with occurrence of *Parnassius mnemosyne*, *Aporia crataegi*, *Gonepteryx rhamni*, *Polyommatus amandus*, *Argynnis aglaja* and other species.



Figure 8: Locality 4 – Mestia, Cloud Base Hut.



Figure 9: *Parnassius mnemosyne* resting on the blossom in the rainy weather, Locality 4 – Mestia, Cloud Base Hut.



Figure 10: High abundance of *Lycaena candens* was observed at Locality 4 – Mestia, Cloud Base Hut.



Figure 11: Locality 7 - Kutaisi Kolkhuri botanical garden.



Figure 12: Numerous *Pararge aegeria tircis* inhabited shady places at Locality 7 in Kutaisi Kolkhuri botanical garden.



Figure 13: Locality 8 – Sataplia, view from the look-out towards Kutaisi.



Figure 14: *Gonepteryx rhamni* was abundant at Locality 8 – Sataplia.



Figure 15: Interior of Colchic forest at Locality 8 – Sataplia.