"*The Butterflies of Greece*" anno 2021: new evidence or business as usual?

Sylvain Cuvelier

Abstract. A review of the new version (2021) of "The Butterflies of Greece" by Lazaros Pamperis is presented. A comparison is made with the previous versions (2009 & 2018). Is this a new landmark making the new information a source of additional and more reliable data for Greece? The increased number of records (60%) and geographical coverage (30%) is important. It is regrettable that the reliability of the data remains unsatisfactory.

Samenvatting. Een review van de recentste versie (2021) van het boek "The Butterflies of Greece" van Lazaros Pamperis wordt gepresenteerd waarbij een vergelijking wordt gemaakt met de vorige versies (2009 & 2018). Is dit een nieuwe mijlpaal waardoor de informatie een bron van additionele en meer betrouwbare gegevens voor Griekenland wordt? De toename van gegevens (60%) en dekking (30%) is belangrijk. De betrouwbaarheid van de gegevens blijft onvoldoende, wat te betreuren valt.

Résumé. Une revue de la version la plus récente (2021) du livre "The Butterflies of Greece" de Lazaros Pamperis est présentée. Une comparaison est faite avec les versions précédentes (2009 & 2018). Est-ce qu'il s'agit d'un nouveau jalon, faisant des nouvelles informations une source de données additionnelles et plus fiable pour la Grèce ? L'augmentation des enregistrements (60%) et de la couverture (30%) est importante. La fiabilité des données reste insuffisante, ce qui est regrettable.

Key words: Butterflies of Greece – Papilionoidea – Review.

Cuvelier S.: Diamantstraat 4, B-8900 Ieper, Belgium. sylvain.cuvelier@telenet.be

Introduction

In 2009, a second edition of "The Butterflies of Greece" (Pamperis 2009) was welcomed following 25 years of personal efforts by a mountain and butterfly lover, Lazaros Pamperis, who has written a completely new book compared to his first edition (Pamperis 1997). Both the enthusiasm and the criticism concerning both books were justified: the information in the text remained limited, hardly any photographs of habitats were presented, the maps contained doubtful records without citing the source or origin and left no way for an interested reader to analyse the data in depth.

It is well known that the author only observes and photographs butterflies, although being aware (Pamperis 2008: p. 25) that visual identification is not possible for some species for which examination of the genitalia and/or DNA analysis are necessary to confirm identification. For such taxa, the data provided is unconfirmed. In 2016, the author launched an app (iOS and Android) making the graphs and maps from the second book easier to consult, free of charge, in a digital format. A positive evolution allowing a better examination of the small graphs and maps. The app also includes some interesting addenda and corrigenda.

Subsequently, the author has also provided new, limited input on his website and recently a Facebook group for the butterflies and moths of Greece & Cyprus (www.facebook.com/groups/420659294633829/) was launched. The author also launched another website (www.pamperis.gr/recognition/index.html) for automatic recognition of the Greek butterflies based on photographic material, an initiative that seems suitable for an interested layman. A number of recent articles have changed the taxonomic insights and nomenclature for different taxa of the Greek butterfly fauna (Verovnik & Wiemers 2016, Vishnevskaya *et al*. 2016, Wiemers *et al*. 2018 and Hinojosa *et al*. 2020).

During recent years, there have been fewer publications of surveys in Greece. Meanwhile, the author continued his personal fieldwork and collection of information from external sources. After more than ten years, new data about the distribution of the Greek butterflies and changing taxonomic insights required a thorough revision. In January 2021, the author (www.pamperis.gr/THE_BUTTERFLIES_OF_GREECE/MAPS.html) uploaded new maps with all the records up to 31.xii.2020. The maps are available in three format-coordinate systems (WGS84, GGRS87 and ETRS89). It is important to know that in between the publication of the second book and this recent update, there were also various updates (2018–2020) on his website that remained unnoticed. They can still be downloaded from the same URL (consulted last on 20.i.2021).

Analysis

This recent publication includes more than 425.000 records, from personal observations and external sources, compared with over 265.000 records in the previous book (2009). The new data from external sources and personal observations are presented in three formats (WGS84, GGRS87 and ETRS89). An increase of 60% deserves appreciation for such a laborious work. Clearly the details concerning the geographical coverage, altitudes and flight time have been adjusted and enlarged for many species, potentially giving broader insights. This analysis is based on the new 2021 (WGS84) document being the same format as already used in 2009 and one of the three intermediate templates edited by the author in 2018.

For eleven species, *P. napi*, *P. balcana*, *C. erate*, *L. sinapis*, *L. juvernica* (with a quote), *H. senthes*, *H. volgensis*, *P. alveus* (with a quote), *P. armoricanus*, *C. orientalis* and *C. flocciferus*, the author included a warning "identification uncertain". However, this list is incomplete, and should include the species pairs

H. fagi/H. syriaca, *G. pumilio/G. nostrodamus*, *M. phoebe/M. ornata* and others which need dissection and/or DNA analysis for identification.

For all species with problematic identification based on external characters, the maps need a cautious interpretation and cannot be relied upon as a basis for conservation and other scientific work.

The discovery of new *Polyommatus* (*Agrodiaetus*) species in the Balkans is challenging because little is known about their real distribution. *P. eleniae* (Coutsis & De Prins 2005) has been considered conspecific with *P. orphicus* by Vishnevskaya *et al*. (2016) who also discovered a new species, *P. timfristos*, from Mt. Timfristos and Mt. Parnassos. These species are all related to the *P. aroaniensis* species-group. There are no comments in regard to the new maps of *P. aroaniensis* and *P. orphicus* on how previous data have been allocated and it looks like earlier dots of *P. eleniae* became question marks in the *P. orphicus* map. The newly described species *P. timfristos* is correctly given for the three localities from literature (Vishnevskaya *et al*. 2016 and Mølgaard 2020).

The *P. aroaniensis* map is nothing more or less than a global impression concerning the distribution of the *P. aroaniensis* species-group in Greece. A researcher, interested in gathering evidence-based data for this species-group, should be aware of the necessity to adjust the map. On page 116 of the new pdf, the name of the species is not given, but it can only be *P. icarus*. As *P. andronicus* has been synonymized by some authors and is not retained in Wiemers *et al*. (2018), the data were probably merged.

Coutsis (2018) provided substantiated evidence that *H. pellucida* is not present in the Greek eastern Aegean islands. This species was removed without comment. One needs to guess to what *Hipparchia* taxon the former *H. pellucida* data were allocated, probably to the new *H. volgensis* page as this looks the most logical procedure. Even when giving the benefit of the doubt to the author, because the taxonomy in the *Hipparchia* genus still is far from clear, it would have been interesting to comment on how the taxa *muelleri* and *delattini* that were used in previous publications by the author were allocated, and are no longer found in the new documents.

Pseudochazara anthelea is now separated from *P amalthea* and follows a recent revision (Verovnik & Wiemers 2016) but what happened to the data for some other *Pseudochazara* taxa is unexpected, puzzling and not commented upon.

For *P. graeca* there is a marked increase of external data. The altitudinal range remains unchanged. There is a small increase of personal observations and no changes for the altitude. The blue dots (external data) for Mount Olympos, geographically well detached from the known distribution area and the Florina district, have been changed to question marks without comment. These two localities have to be interpreted as doubtful rather than potential because both areas have been visited in the past by many entomologists without any substantiated records of *P. graeca*.

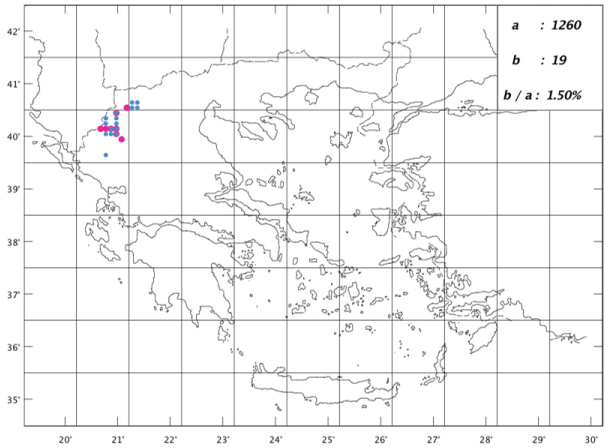

Fig. 1a. Distribution map of *Pseudochazara tisiphone*, book (2009) & app (2016).

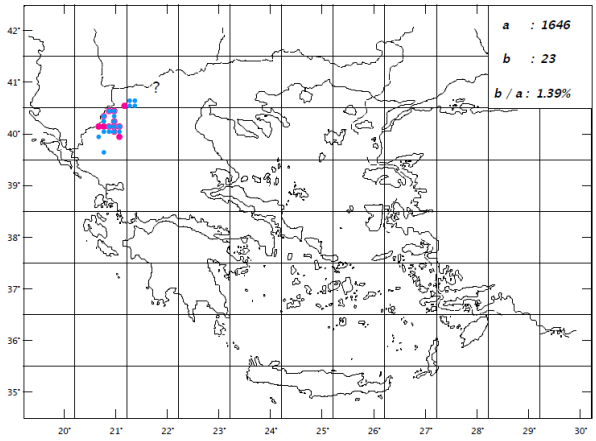

Fig. 1b. Distribution map of *Pseudochazara tisiphone*, 2021 pdf.

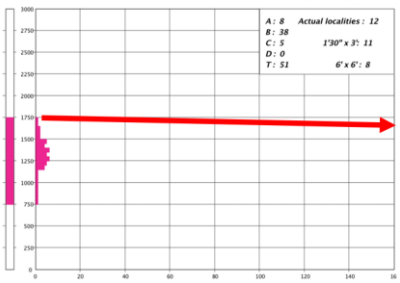

Fig. 2a. Altitude graph of *Pseudochazara tisiphone*, book (2009) & app (2016): 750–1.750 m.

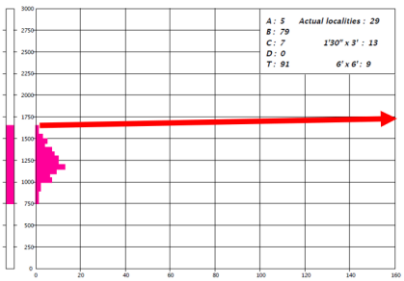

Fig. 2b. Altitude graph of *Pseudochazara tisiphone*, 2018 pdf: 750–1.650 m.

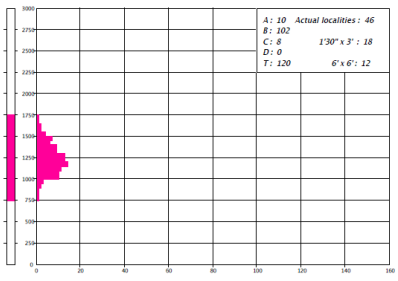

Fig. 2c. Altitude graph of *Pseudochazara tisiphone*, 2021 pdf: 750–1.750 m.

For *P. tisiphone*, there are slight changes (Fig. 1) between the first map in the book (2009), the map in the 2018 pdf and the most recent 2021 pdf that might explain the changes of altitudes (Fig. 2). Only 100 m difference in altitude between the graphs is not a major change, but it would have been interesting to know the reasons for the up and down adjustments.

For a long time *P. tisiphone* was considered to be a Greek endemic, although it had already been documented in 1984 from Albania (Misja & Kurrizi). It might well be that the Greek populations are only a minor part of the global range of *P. tisiphone* with thriving Albanian populations (Šašić *et al*. 2015). Recently, the species was even discovered (Cuvelier *et al*. 2018) near Bulqizë (Dibër county, central Albania), more than 100 km northwest of the nearest known Greek locality, considerably increasing its known range. In between the actual documented places there are many, unexplored and apparently suitable habitats and it would not be surprising that Albania is in fact the stronghold of *P. tisiphone*. It is strange that there is no conservation status for this species in Maes *et al*. (2019) but with the actual knowledge it looks not threatened.

Also *Pseudochazara amymone* is not a Greek endemic species. After the original description by Brown (1976), Misja & Kurrizi (1984) documented this species for Albania but this publication remained unknown for many years. New data from Albania (Eckweiler 2012, Verovnik *et al*. 2014, Gascoigne-Pees *et al*. 2014, Cuvelier & Mølgaard 2015 & Šašić *et al*. 2015) confirmed its presence. *P. amymone* has been found in good numbers in different localities and it will probably be found in more Albanian localities on ophiolite substrate. An overview of the number of personal observations of *P. amymone* in Greece given in different publications, together with external information gathered by the author over the years, is presented (Figs 3a–c, 4a–c). However the analysis of the incomplete and the absence of indisputable data for *P. amymone* remains puzzling.

The three versions (2008, 2018 and 2021) of the map (Fig. 3), always give the same blue dot, not a personal observation, at Ioannina (Epiros, Greece). One can guess that this is according to Brown (1976), mountains just N. of Ioannina and/or a short quote in Arnscheid (1981). It has never been stated as far as known what precisely this blue dot was referring to.

Fig. 3a. Distribution map of *Pseudochazara amymone,* book (2009) & app (2016).

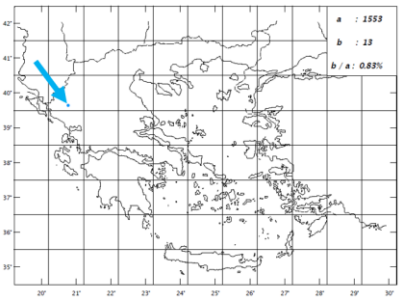

Fig 3b. Distribution map of *Pseudochazara amymone,* 2018 pdf.

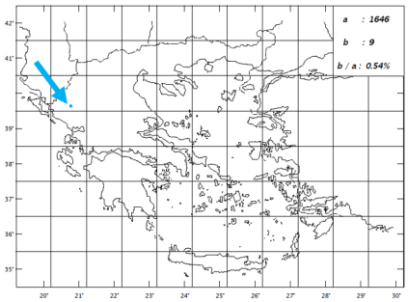

Fig 3c. Distribution map of *Pseudochazara amymone,* 2021 pdf.

Table 1. Overview of the insert in the maps.

	Book (2009)	pdf (2018)	pdf (2021)
a	1.260	1.553	1.646
b	10 →	13 →	9
a/b	0,79%	0,83%	0,54%

Table 1 gives an overview of the details in the upper right insert of the maps, showing important differences between the different versions. The increase (30%) in number of squares (a) surveyed by the author shows the major efforts done over the years throughout Greece.

Symbol (b) is an amalgam of external and personal entries. It is not possible to see the cause of this noteworthy decrease due to insufficient information. Perhaps it is because of corrections to prevous misidentifications, but it would be useful to know.

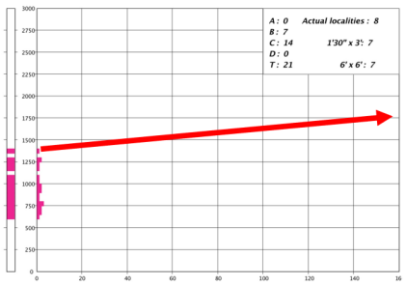

Fig. 4a. Altitude graph of *Pseudochazara amymone,* book (2009) & app (2016).

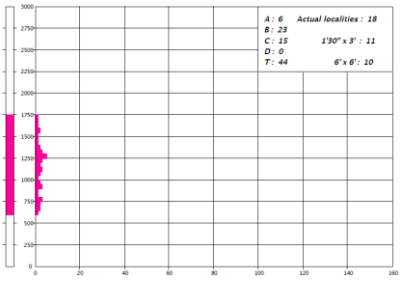

Fig. 4b. Altitude graph of *Pseudochazara amymone,* 2018 pdf.

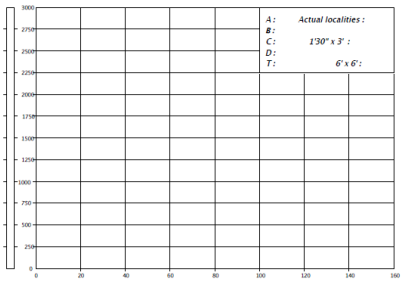

Fig 4c. Altitude graph of *Pseudochazara amymone,* 2021 pdf.

Table 2. Overview of data inserted in the graphs (book 2009, 2018 and 2021 pdf).

	Book (2009)	pdf (2018)	pdf (2021)
	External / Personal	External / Personal	External / Personal
Actual localities	10 / 8	14 / 18	- / -
A (1.501–3.000 m)	0 / 0	0 / 6	- / -
B (1.001–1.500 m)	0 / 7	0 / 23	- / -
C (501–1.000 m)	3 / 14	4 / 15	- / -
D (0–500 m)	0 / 0	0 / 0	- / -
T (0–3.000m)	3 / 21	4 / 44	- / -
1'30'' x 3'	na / 7	na / 11	- / -
6' x 6'	6 / 7	7 / 10	- / -

The three versions of the altitude graphs (symbol C and F in the book) raise many questions, as no comment is given. The graphs concerning external data remain almost identical over time because, to the knowledge of this reviewer, no objective article has been published since 2009 about their whereabouts in Greece. The graphs (Fig. 4) with the personal data are very different and deserve attention. The graph from the 2018 pdf gives much more data than the book (2008) or app (2016). However, quite unexpectedly, the graph with personal observations in the 2021 pdf is left blank.

The lower altitudinal limit remains unchanged but there is a major increase in altitude at the upper limit. Between the first map and the 2018 pdf it has been increased from 1,400 to 1,750 m. Why the graphs in the 2021 pdf are blank is open for interpretation.

Table 2 focuses on the upper right inserts in the three graphs of Fig. 4 (symbols K and L for external information; M and N for personal observations in the book) providing an overview of the available data.

Between the book (2009) and the 2018 pdf there was an increase in different parameters:

- the observations, 350 metres higher, are the major difference from 2009 to 2018.

- the number of observations, increases from 3 to 4 for external sources and from 21 to 44 personal observations.

- the observations come from more localities but the interpretation of the data as presented is difficult, e.g. how to understand that external sources increases from 10 to 14 localities with for T only increasing by 1.

How one needs to look at the empty graph in the 2021 pdf is as mysterious as the Greek whereabouts of *P. amymone* since Brown discovered the species in 1975. Has the author changed his mind about some observations or is it purely to keep the secret of the holy grail?

In the compiled European Red List database (Maes *et al*. 2019) *P. amymone* is classified as vulnerable. It is not on the Habitats Directive and is stated to be one of the species that is in most need of ecological research and/or monitoring in Europe. Will hiding information concerning a species help its conservation in Greece? In the 2018 pdf the author inserted *"Pseudochazara amymone* found in Albania in many localities": a quote that is no longer present in the 2021 pdf. With this note, it seems the author is diverting people away from Greece. Indeed, a twitcher who just wants to put this species on his observation list can go to the mountains south of Korçë and will have no problem finding this demystified butterfly. A researcher, willing to make an important contribution by discovering new populations, can visit unexplored ophiolite nappes in S.E. Albania or adjacent N.W. Greece (Epiros and Macedonia).

P. amymone males can be distinguished objectively in flight at some distance from *P. tisiphone* and *P. graeca*, despite its outstanding natural protection on steep, inaccessible and unstable slopes. This is no longer the most wanted and endangered butterfly in Europe. Nowadays, there are Greek endemics, e.g. *Polyommatus iphigenia nonacriensis* (Brown, 1976) or *Turanana taygetica* (Rebel, 1902) that are more threatened for various reasons, such as more limited distribution, habitat destruction, increasing grazing pressure, and climate change, and deserve more attention and caution.

The recent discovery (Hinojosa *et al*. 2020) that *Muschampia proto* comprises in fact three cryptic species came late in 2020 and is not included in the recent document. For Greece, it means that *M. proto* agg. consists of *M. alta* in mainland Greece and *M. proteides* in the Dodecanese islands. It can be expected that, in the future, at least a note will become available on the website on the intentions of the author.

Conclusion

A considerable increase of 60% of observations and a 30% increase in coverage of the Greek territory, is the main result of the lifelong work by the author and deserves commendation from everybody who is interested in Greek butterflies.

Whether this is a breakthrough, making this new information a source of more reliable, evidence-based data for Greece, remains questionable. It is a missed opportunity to present a more valuable and transparent dataset with objective information.

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