

# Butterflies and Skippers in the Dodecanese Islands (Greece): new data and an update on their distribution (Lepidoptera: Hesperioidea & Papilionoidea)

Sylvain Cuvelier & Morten Schneider Mølgaard

**Abstract.** The Dodecanese, the most southerly group of Greek islands in the Aegean Sea, cover a large geographical area and are situated near the mainland of Turkey. The distribution of butterflies on the 12 main islands of the archipelago has been previously studied but considerable gaps in territorial and temporal coverage remain. Many species of butterflies and skippers have a distribution that shows low population densities and various species could easily have been overlooked in the past. In 2011 both authors obtained new data regarding the distribution of different butterfly species and gathered unpublished observations from colleagues. Doubtful and/or data-deficient records are analysed. An updated overview of the Dodecanese butterfly distribution with comparison to the literature is provided.

**Samenvatting.** Dagvlinders en Dikkopjes in de Dodekanesos (Griekenland): Nieuwe gegevens en een overzicht betreffende de verspreiding (Lepidoptera: Hesperioidea & Papilionoidea)

De Dodekanesos, de meest zuidelijk gelegen groep Griekse eilanden in de Egeïsche Zee, bestrijkt een groot geografisch gebied en bevindt zich dicht bij het Turkse vasteland. De verspreiding van de dagvlinders op de twaalf belangrijkste eilanden van de archipel werd voorheen al onderzocht maar er blijven belangrijke hiaten in territoriale en temporale dekking. Veel soorten dagvlinders en dikkopjes hebben er een lage populatiedichtheid en verschillende soorten konden in het verleden gemakkelijk over het hoofd gezien zijn. In 2011 vonden de twee auteurs nieuwe gegevens over de verspreiding van verschillende dagvlindersoorten en verzamelden onuitgegeven observaties van collega's. Twijfelachtige en/of onvoldoende gedocumenteerde gegevens worden geanalyseerd. Een geactualiseerd overzicht, in vergelijking tot de literatuur over de verspreiding van de dagvlinders in de Dodekanesos, is voorzien.

**Resumé.** Dagsommerfugle på De Dodekanesiske Øer (Grækenland): Nye oplysninger og en opdatering af udbredelsen (Lepidoptera: Hesperioidea & Papilionoidea)

De Dodekanesiske Øer, den sydligst beliggende gruppe af græske øer i Det Ægæiske Hav, dækker et stort geografisk areal og ligger nær det tyrkiske fastland. Dagsommerfuglenes udbredelse på de 12 største af disse øer er hidtil blevet studeret, men hidtil med betydelige huller geografisk og tidsmæssigt. Mange dagsommerruglearter har en udbredelse med lav populationstæthed, og adskillige arter har let kunnet blive overset. I 2011 tilvejebragte denne artikels forfattere nye oplysninger vedrørende forskellige dagsommerfuglearters udbredelse og indsamlede tillige nogle endnu upublicerede oplysninger fra kolleger. Tvivlsomme og/eller manglende oplysninger bliver analyseret. Et opdateret overblik over de dodekanesiske dagsommerfugles udbredelse sammenlignet med litteraturen bliver præsenteret.

**Key words:** Greece – Dodecanese Islands – *Rhopalocera* – *Spialia orbifer* – *Carcharodus stauderi* – *Thymelicus lineola* – *Thymelicus hyrax* – *Pelopidas thrax* – *Pontia edusa* – *Colias croceus* f. *erateformis* – *Gonepteryx cleopatra fiorii* mosaic gynandromorph – *Lampides boeticus* – *Pseudophilotes vicrama* – *Glaucopsyche alexis* – *Melitaea trivialis* – *Hipparchia senthes* – *Hipparchia statilinus* – *Hyponephele lupina* – *Ypthima asterope* – distribution – faunistics.

Cuvelier, S. H.: Diamantstraat 4, 8900 Ieper, Belgium. sylvain.cuvelier@pandora.be

Mølgaard, M. S.: Gertrud Rasks Vej 86, DK-9210 Aalborg SØ, Denmark. msm2@stofanet.dk

## Introduction

The Dodecanese are the most southerly group of Greek islands in the SE Aegean Sea, lying east of the Cyclades, west of the coast of Asia Minor and northeast of Kriti. The name “Dodecanese” means “Twelve Islands” although there are more than twelve. These twelve main islands are: Astipálea, Kálimnos, Kárpathos, Kásos, Kastellórizo (= Megísti), Kos, Léros, Nísiros, Pátmos, Ródos, Sími and Tílos (Fig. 1). Such archipelagos offer an interesting pattern of species diversity and are suitable for observing evolutionary events (Dennis *et al.* 2000). Long term isolation on islands can lead to endemism at species or subspecies level and is indicative of geological or historical events. Relict populations of species also provide clues for such events.

Extensive surveys on the butterfly distribution in the Dodecanese and nearby islands of the Aegean Archipelago plus adjacent Turkey were carried out in the recent past. Many species show low population density as in the rest of the Greek islands. Species can easily be

missed despite a number of visits to specific islands and have higher risks of extinction due to human activity.

An interesting publication on the butterfly diversity of the whole Aegean archipelago gave a good synthesis for the Dodecanese islands (Dennis *et al.* 2000). A model, using a set of geographical variables, examined the probability of species to be further expected for the Aegean islands (Dennis *et al.* 2001) including the twelve Dodecanese islands.

Since then new data have been published by different authors (Mølgaard 2002, Coutsis 2005, Coutsis & Ghalvalás 2006, Cuvelier 2009, Anastassiou *et al.* 2010, John *et al.* 2010, Mølgaard 2010, Coutsis & Anastassiou 2011), as well as a new overview, with distribution maps for all butterfly species of Greece, including the twelve islands of the Dodecanese (Pamperis 2009). It is however clear that there remain big gaps in territorial and temporal coverage. For future updates collecting of voucher specimens concerning species considered to be new records for islands is needed, as these might also be

useful for DNA-based identifications and also to establishing interrelationships with other populations.

During a partly joint field trip from 2.vi.2011 to 18.vi.2011 the authors visited different islands in the Dodecanese in order to study the entomological fauna. This article is a contribution to increase the knowledge on the distribution of the Rhopalocera in the Dodecanese islands and includes additional information provided by different colleagues. Special attention is paid to 16 species with new and/or unpublished data. Literature was also screened and some comments and/or additional information are given on specific records. All observations from the field trip are presented (Table 1 & 2) and an updated overview (Table 3) of the butterfly distribution in the twelve major Dodecanese islands is included.

## Methods

From 2.vi.2011 to 11.vi.2011 the first author investigated different localities in Kos, Nísiros, Tílos and Kárpathos (Table 1). From 12.vi.2011 to 18.vi.2011 both authors investigated various localities in Ródos and Sími (Table 2). Coordinates and altitudes of all localities were measured with a GPS (Garmin eTrex Legend C).

Unpublished observation data from colleagues who recently visited the Dodecanese islands, were gathered by both authors and are included in the notes and in the updated overview (Table 3).

Available literature was also screened. Every unexpected and/or doubtful record from literature was double checked and is commented upon.

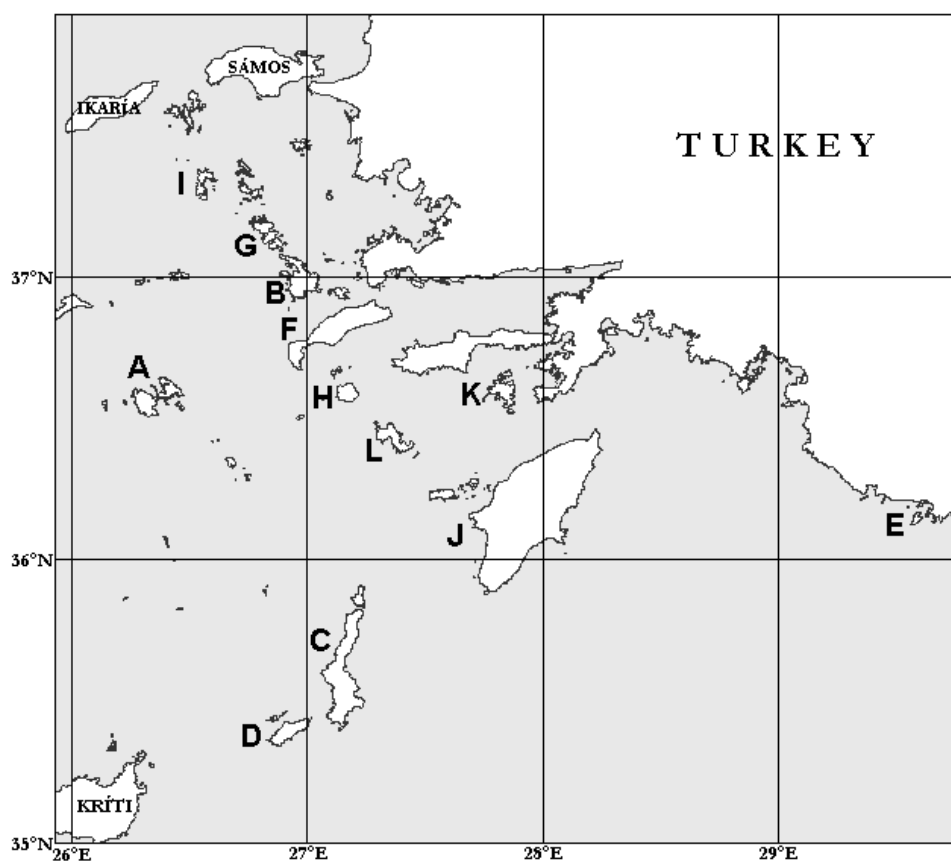


Fig. 1. Map of Dodecanese islands with adjacent parts of other island archipelagos and Turkey.

Legend:

- A: Astipálea
- B: Kálimnos
- C: Kárpathos
- D: Kásos
- E: Kastellórizo
- F: Kos
- G: Léros
- H: Nísiros
- I: Pátmos
- J: Ródos
- K: Sími
- L: Tílos

### Notes from personal observations and from colleagues

***Spialia orbifer*** (Hübner, 1823). New to Kárpathos.

On 11.vi.2011 the first author collected one worn male *S. orbifer* at 700 m altitude in a phrygana habitat on the way up to the Kalí Límni (summit of Kárpathos, 1215 m). Other species seen in this locality were *C. croceus*, *V. atalanta*, *M. telmessia* and *P. icarus*.

The species wasn't predicted for this island (Dennis *et al.* 2001) and was till now only known from 4 Greek islands of the Dodecanese, all nearby the Turkish coast. The nearest island is Ródos where the species is quite widespread (Olivier 1993, Pamperis 2009). *S. orbifer* is

also known from Turkish coastal localities (Hesselbarth *et al.* 1995).

***Carcharodus stauderi*** (Reverdin, 1913)

Recently it was stated that there were no published records of *C. stauderi*, as far as known to the authors, for Sími (Coutsis & Anastassiú 2011). They referred to a specimen, identified by genitalia, collected at 50 m on 2.vi.1993 by A. Olivier, now deposited in the collection of N. Ghalavás, Athens, Greece. The presence was however already mentioned before (Dennis *et al.* 2000) and as A. Olivier is one of the co-authors, it looks probable that this was the origin. Confirmation is given by our own observations (Table 2) and by T. Friis-Larsen (pers.

communication) who also observed *C. stauderi* in the vicinity of Sími harbour.

***Thymelicus hyrax*** (Lederer, 1861). New to Sími.

In the recent Greek distribution maps (Pamperis 2009) there is neither an indication for Sími nor is the species mentioned in a very recent article (Coutsis & Anastassiú 2011).

During our stay in Sími the first author collected 2 males and 4 females of *T. hyrax*. The single-brooded species was quite common but at the end of the flight period. We only found the species in one locality, north of Sími harbour on 14.vi.2011.

The species was predicted with >50 % probability for Sími in a multiple discriminant analysis based on geographic variables but regarded as unlikely in the text and appendix 2 (Dennis *et al.* 2001).

The species is known from Ródos (Olivier 1993, Pamperis 2009) and reconfirmed by M. Gascoigne-Pees who observed worn males on 24.v.2002 on Mt. Marmári. *T. hyrax* has also been found in some localities of the nearby Turkish coast (Hesselbarth *et al.* 1995).

***Thymelicus lineola*** (Ochsenheimer, 1808)

In his observation list, J. Walterus took note of one specimen *T. lineola* seen at Tingáki Lagoon, Kos, on 16.vi.2011. This was totally unexpected because this species is known only from the Greek mainland (Pamperis 2009). Both *T. sylvestris* and *T. acteon* have however been observed in Kos by different entomologists. Along the adjacent Turkish coast *T. lineola* has not been documented (Hesselbarth *et al.* 1995).

More information was considered mandatory and a photograph of the specimen and the tip of the antenna were requested.

Following details were first given by J. Walterus (email 18.viii.2011): "*T. lineola* in Kos – Tingáki Lagoon: butterfly caught and determined on the spot 100 % certain *lineola*, but not taken home – specimen had damaged wings caused by the present dragonflies." Insisting to know more, precise information was requested in order to know exactly how the identification was made. Additional details were again provided (email 19.viii.2011): "Butterfly caught with the net, antennae: underside black (orange yellow for *sylvestris*)."

Taking into consideration the actual known distribution in Greece and in Turkey, the absence of a voucher specimen and the described way of how identification was made, this is considered as very doubtful and therefore *T. lineola* is included in the updated overview (Table 3) with a question mark.

Although Lésvos is no part of the Dodecanese archipelago it is worth mentioning that the presence of *T. lineola* is also given in a species list for this Aegean island: (<http://home.zonnet.nl/lesvos/vlinders.htm>). In a first answer (email 31.viii.2011), S. van Leeuwen informed that the identification was done on the spot by visual inspection of the underside of the tip of the antennae. However again no photograph was available for control.

S. van Leeuwen wrote that *T. lineola* was present in low numbers in a strong population of *T. sylvestris*.

Additional information (email 1.ix.2011) was given: butterflies observed only once during a walk from Agiásos to Asómatos on 16.v.2006 and stating in this last reply not to be 100 % certain of the identification.

Also this information asks for substantiated confirmation before it can be considered that the species is indeed present in Lésvos.

***Pelopidas thrax*** (Hübner, 1821)

During his two stays in Kos from 30.ix.2010 to 6.x.2010 (Walterus & Walterus 2011) and from 14.ix.2011 to 21.ix.2011, J. Walterus (pers. comm.) observed the species on the northern side of the island:

- Psalídi, E of Kos town, 1.x.2010: 1 sp.; 3.x.2010: 1 sp.; 5.x.2010: 2 sp.
- Troúlos Beach, 1.x.2010: 1 sp.
- Between Troúlos and Zipári, 5.x.2010: 1 sp.
- Tingáki lagoon, 17.ix.2011: 1 sp.; 20.ix.2011: 1 sp.; 21.ix.2011: 2 sp.

This confirms the presence of the species in Kos (Cuvelier 2009). One of the specimens collected in 2011 by Walterus had not yet fully developed wings, giving further support to the fact that *P. thrax* is resident in Kos.

***Pontia edusa*** (Fabricius, 1777). New to Sími.

The second author observed the species in one locality north of Sími harbour on 14.vi.2011. Analyzing the literature, we only found an indication expressed by a blue dot (= at least one record from the bibliography) in the recent distribution map (Pamperis 2009) but were not aware of the source of information. Trying to elucidate this unclear situation, we contacted L. Pamperis who replied: "For *P. edusa* Dennis Entomologist Gazette 52/2001 pages 3–39). My mistake because of prediction more than 50%. Blue dot should be replaced by?"

Thus the observation of the second author is the first for this island and confirms the prediction with >50% probability (Dennis *et al.* 2001). *P. edusa* is now documented for 10 of the 12 islands and is present on the nearby Turkish coast (Hesselbarth *et al.* 1995).

***Colias croceus*** (Fourcroy, 1785) f. *erateformis* Niculescu, 1976

On 15.vi.2011, on the southern side of the Profitis Ilías, Ródos Island, and at an altitude of 650 m, the first author collected a worn, lemon yellow, male *Colias* (Plate 1: 1) that reminded of the rare observations of *C. croceus* f. *erateformis* in Cyprus (John *et al.* 2006). Two typical male *C. croceus* were also collected by the first author, flying in the same locality. Another specimen with intermediate colour was also collected by the second author in the same locality on the same date.

The final identification as *C. croceus* f. *erateformis*, of the specimens in Cyprus, was based on the male genitalia (John *et al.* 2006). Specimens with intermediate wing pattern and/or genitalia have been documented from localities where *C. croceus* and *C. erate* fly together, what might be due to hybridization (e.g. Dincă *et al.* 2011).

However, identification based on male genitalia is reliable when its morphology is typical of one or the other species and, furthermore, if in a given geographic area only *C. croceus* is present. As the nearest observations of *C. erate* are from European Turkey and as this species expands to the north-west in good years, it is unlikely that it should appear in the Dodecanese. Thus, typical *C. croceus* genitalia were expected. The

male genitalia of the lemon yellow specimen (Fig. 2c) and of two typical males (Fig. 2a & 2b) from the same locality and date were dissected and photographed by V. Dincă. The three preparations indeed show the expected wide head of the valve and the evenly curved posterior border without angle that is typical for *C. croceus*.



Fig. 2. Lateral view of male genitalia of *Colias croceus* (phallus and left valva removed in all cases); a.– Typical male *C. croceus* (genit. prep. 1772/Dincă); b.– Typical male *C. croceus* (genit. prep. 1773/Dincă); c.– *C. croceus* forma *erateformis* (genit. prep. 1774/Dincă). All specimens collected in Ródos, Profitis Iliás, 650 m, 15.vi.2011 (leg. S. Couvelier).

#### ***Gonepteryx cleopatra fiorii* (Turati & Fiori, 1930)**

On 16.vi.2011, the second author collected a mosaic gynandromorph of *G. cleopatra fiorii* on the eastern slope of Mt. Atávros, 1 km south of the village of Ágios Isídoros, Ródos. The specimen was found in a typical habitat of this species: phrygana with flowers and rocks. One half of the upperside and underside of the specimen has a normal male wing pattern but the other half shows the light yellow female ground color with a few patches of the deep orange male color on the forewing and mainly in the cell (Plate 1: 2).

So far, it is the only gynandromorph specimen of *G. cleopatra fiorii* known in literature and such specimens are obviously rare.

#### ***Lampides boeticus* (Linnaeus, 1767)**

In a recent article, this species was not mentioned for Sími (Coutsis & Anastassíu 2011) but is given as a personal observation (Pamperis 2009).

Near the summit of Vígla, 612 m altitude, M. Gascoigne-Pees also observed *L. boeticus* on 30.v.2002 (pers. comm.). This seems the first record for the island as we were informed by L. Pamperis that he found the species at Áno Sími on 21.x.2004 at 100–150 m (pers. comm.).

The presence of the species on Sími was predicted with >50% probability (Dennis *et al.* 2001). The species is known from 10 Dodecanese islands and has also been recorded on the nearby Turkish coast (Hesselbarth *et al.* 1995).

***Pseudophilotes vicrama* (Hemming, 1929)** New to Sími.

This small species must be quite easily overlooked as it was not recorded for Kos despite different explorations of the island summarized in an excellent review article (Olivier & De Prins 1996) and only documented later (Olivier 1998).

This also seems to be the case for Sími that was visited by several entomologists at different times of the year but the butterfly wasn't recorded in a recent article (Coutsis & Anastassíu 2011). There is also no indication for Sími in the recently published map (Pamperis 2009).

The second author received info from A. Viborg concerning the observation of *P. vicrama*, on 28.v.2011, above the harbour of Sími (pers. comm.).

The occurrence of the species was predicted with >50% probability (Dennis *et al.* 2001) and is now known from 11 islands in the Dodecanese. This is in striking contrast with the absence of this species from the nearby Turkish coast (Hesselbarth *et al.* 1995). This is probably again due to the fact that the species is easily overlooked.

#### ***Glaucopsyche alexis* (Poda, 1761). New to Nísiros.**

J. Walterus observed a male *G. alexis* and collected a worn female on 23.vi.2011 in a flowery area with dense vegetation, between Mandráki and Loutrá, Nísiros. After determination the worn specimen wasn't however kept as voucher specimen. This is in line with a prediction >50% probability for Nísiros (Dennis *et al.* 2001). Recently the species has also been documented for Kárpáthos (Pamperis 2009). The species is now known from half of the Dodecanese islands and is present along the nearby Turkish coast.

***Melitaea trivia*** (Denis & Schiffermüller, 1775). New to Nísiros.

On 23.vi.2011 J. Walterus collected one, not perfectly fresh, male specimen in Nísiros between Mandráki and Loutrá, in an area with bare soil and sparse vegetation. Photographs were sent of upper and underside for confirmation. *M. trivia* was not predicted for this island (Dennis *et al.* 2001) but is present in different localities on the nearby island Kos (Olivier & De Prins 1996, Pamperis 2009). It has also been found on the adjacent Turkish coast (Hesselbarth *et al.* 1995).

*M. trivia* was predicted for Sími with >50% probability. This prediction has recently been confirmed (Pamperis 2009) by his observation on 8.v.1993 near Sími harbour between 50 to 200 m (pers. comm.). Additional proofs come from the observations of M. Gascoigne-Pees who collected a fresh male on 30.v.2002 walking from the Vígla summit to Sími village. On 4.vi.2002 he again saw one male butterfly and found larvae on *Verbascum* and finally collected a few *M. trivia* larvae on 6.vi.2002 just before returning to the U.K.

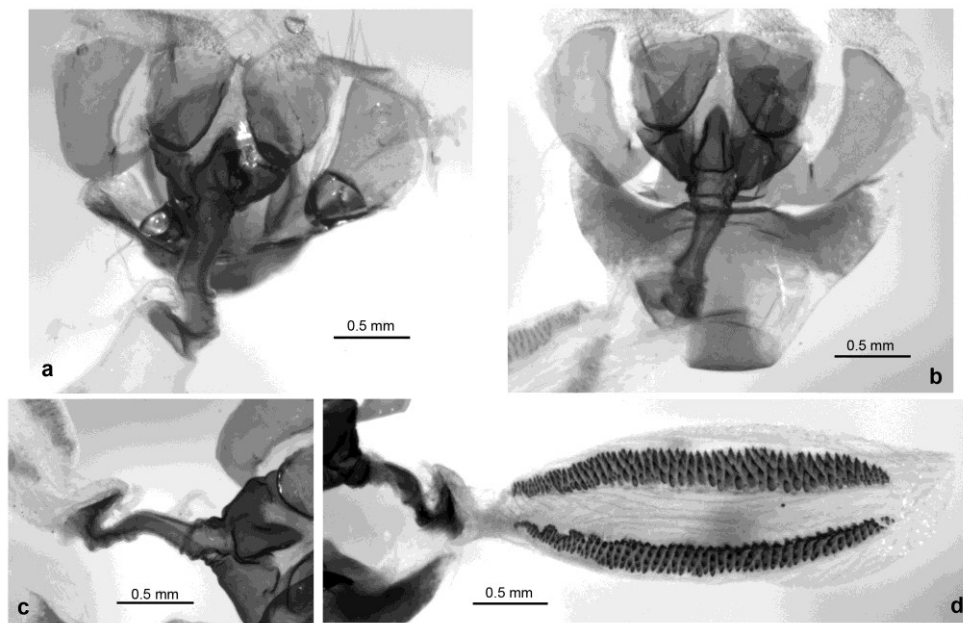


Fig. 3. Female genitalia of putative *Hipparchia senthes* collected on Nísiros, terraces above Panagiá Kyrá, 650 m, 5.vi.2011 (leg. S. Cuvelier). a.– Dorsal view of sterigma; b.– Ventral view of sterigma with the ventral tray unfolded; c.– The mid-dorsal process, the ductus bursae and the distal end of corpus bursae; d.– The ductus bursae, the distal end of corpus bursae and the corpus bursae with the 2.55 mm long signa. Genit. prep. 1775/Dincă.

***Hipparchia senthes*** (Frühstorfer, 1908) New to Nísiros.

On 5.vi.2011, at noon, the first author collected one fresh female of a *Hipparchia* sp. on terraces above Panagiá Kyrá, Nísiros. A thorough search in the locality for more material remained without result. Late in the afternoon of the same day, in a flowery gully above Páli, a male *Hipparchia* was observed but couldn't be collected as it flew away over a stony ridge. On 7.vi.2011 searching again near Panagiá Kyrá, another male *Hipparchia* escaped, flying out of view over the terraces. The species seems very rare.

There has never been a record of a *Hipparchia* from Nísiros as far as known. On the neighbouring island of Kos only *Hipparchia senthes* is known (Olivier & De Prins 1996, Dennis *et al.* 2000). Additionally, both *H. senthes* and *H. mersina* (Staudinger, 1871) are present on the nearby Turkish coast (Hesselbarth *et al.* 1995). *H. mersina* is also present in two other Aegean islands: Lésvos and Sámos (Dennis *et al.* 2000, Pamperis 2009). *Hipparchia pellucida* seems very rare in western Turkey (Hesselbarth *et al.* 1995) and is also present in Lésvos and Ikaría (Dennis *et al.* 2000, Pamperis 2009), while *Hipparchia christenseni* Kudrna, 1977 is endemic to Kárpáthos (Kudrna 1977, Pamperis 2009). The presence of *H. mersina* is predicted with >50% probability for Nísiros (Dennis *et al.* 2001).

Is there a *Hipparchia* population in Nísiros or were the observed butterflies vagrants? Having observed fresh butterflies, two males and one female, in the beginning of June, this is suggestive of a resident population but the butterfly's rarity remains puzzling. The flight wasn't typical for migrant behaviour.

The female was set and upperside and underside are shown (Plate 1: 3). Before cutting the abdomen for genitalia examination, a photograph was taken to document the absence or presence of a sphragis. No sphragis was visible and the hairs on the abdomen looked very well preserved, suggesting that this female had not copulated. Subsequently the female genitalia were dissected and photographed by V. Dincă (Fig. 3a, 3b, 3c, 3d). No sphragis and no spermatophore were found during the dissection confirming the visual inspection on the spot of this female specimen.

The descriptions below are done in comparison to the text and illustrations provided by Coutsis (1984) and the terminology of female genitalia parts follows the same publication. Since the female genitalia of *H. christenseni* have not been illustrated by Coutsis (1984), the specimen from Nísiros was compared to the illustration and text on the female genitalia in the publication of Riemis (1986). However, we have now been informed (Coutsis, pers. comm.) that the female genitalia of *H. christenseni* have recently been checked and proved to be identical to

those of *H. volgensis* (Mazochin-Porshnjakov, 1952) and *H. pellucida* (Stauder, 1923), while being quite different from those of *H. senthes*.

The dorsal lamellae of the sterigma are smaller than in *H. mersina* and *H. pellucida*, and closer in size to *H. senthes* (Fig. 3a, 3b). The mid-dorsal process (Fig. 3a, 3b, 3c) is shorter and wider than in *H. pellucida* and *H. christenseni*, but displays rather intermediate characters between *H. mersina* and *H. senthes*. It is short and it does not reach the half of the dorsal lamellae (similarly to *H. senthes*), but it has a less wide base than in *H. senthes* and from this point of view reminds more of *H. mersina*. The ductus bursae (Fig. 3a, 3c, 3d) reminds of the one in *H. senthes*. It is longer than in *H. pellucida* and the bend of the ductus bursae is prominent and well-detached from the distal end of the corpus bursae (unlike *H. mersina*, where the bend is rather compressed against the distal end of the corpus bursae).

The corpus bursae (Fig. 3d) is large and has 2.55 mm long signa, which correspond to *H. senthes* (just above 2.5 mm length) and are longer than in *H. christenseni* (about 2 mm length according to the illustrations of Riemis [1986]), *H. pellucida* (slightly under 2 mm length) and *H. mersina* (about 1.5 mm length).

Taking into account all above-mentioned characters, we tentatively assign the examined specimen to *H. senthes*. However, since only one specimen was available and the taxonomy of the *Hipparchia* group is not fully resolved, additional studies are necessary to confirm these results.

#### ***Hipparchia statilinus*** (Hufnagel, 1766)

J. Walterus mentioned two *H. statilinus* observed between Tróulos and Zipári, Kos. The first specimen was observed on 3.x.2010, the second on 5.x.2010 (Walterus & Walterus 2011). *H. statilinus* is known only from the Greek mainland (Pamperis 2009) and has not been documented from the adjacent Turkish coast (Hesselbarth *et al.* 1995). The rather similar *Hipparchia fatua* (Freyer, 1844) is known as well from Kos as from the nearby Turkish coast.

More details (email 18.viii.2011) were given: "Concerning 2010: certainly *statilinus* not *fatua*, both specimens determined with my grandfather – 100 % certain *statilinus*."

A more detailed answer on how the identification was made was given the next day (email 19.viii.2011): "*H. statilinus* observed from a distance. Identification: upperside forewings: white spots in c3 and c4, underside hindwing: clearly and striking white band in postdiscal area."

The lack of a voucher specimen and the way the identification was made leaves clear doubts. Confusion with *H. fatua* cannot be excluded at all. Therefore *H. statilinus* is included with a question mark in the updated overview (Table 3).

#### ***Hyponephele lupina*** (Costa, 1836)

For a long time the species was not known for Sími (Dennis *et al.* 2000) and it was not even predicted for this island (Dennis *et al.* 2001). It also seems quite rare on the

nearby Turkish coast (Hesselbarth *et al.* 1995). In a recent article *H. lupina* was not mentioned by the authors in their observation list or in the list of missed species during their visit (Coutsis & Anastassiú 2011).

However, an indication of its presence on the island (red dot) is given by Pamperis (2009) on a distribution map. This is a personal observation from L. Pamperis in the area of Sími harbour on 8.v.2003 between 50 to 300 m (pers. comm.).

We received additional evidence from M. Gascoigne-Pees who observed 4 males and three females near Vígla, the summit of Sími, on 30.v.2002 and this is in fact the earliest observation of *H. lupina* known to us. The species is present in only three islands of the Dodecanese archipelago.

#### ***Ypthima asterope*** (Klug, 1832)

*Y. asterope* is primarily found in large parts of Africa, coastal regions of the Middle East, the southern Mediterranean coastal regions of Turkey, reaches Cyprus and is rarely encountered in some nearby islands of the Aegean Sea (John *et al.* 2010). It is a sedentary butterfly, thus suggesting that the species reached the Mediterranean through the mountains east of the Red Sea (Olivier 1993) and that some Aegean islands were colonized from Turkey without developing a subspecies in the Mediterranean. Other authors consider that the origin of *Y. asterope* in this area is from a northward shift of the Afrotropical biome during a warm interglacial. After having adapted to different, local conditions, the species has been able to survive until today (John *et al.* 2010).

For Greece, the species was reported for the first time from Sími after a visit in April 1973 (Koutsaftikis 1974). On 16.iv.1990, 4 very fresh males were again collected (Olivier 1991). There is further confirmation for Sími (Pamperis 2009).

The next publications mentioning this species in Europe postulated a new endemic subspecies, *Y. asterope marlenii* Kattulas & Koutsaftikis (Kouftsftikis 1977, Kattulas & Koutsaftikis 1977) from Kastellórizo. After examination of extensive material from this island, collected on 17–18.iv.1990, it was however considered to closely resemble the nominotypical *Y. asterope* and sunk in synonymy (Olivier 1990). Further confirmation of its presence in Kastellórizo is provided (Pamperis 2009).

Subsequently, in May 1976, a male specimen was captured in Sámos by an ornithologist (John 2010) and was given to J. Asselbergs who reported it (Asselbergs 1978). This is the most westerly Aegean island in which the species has been recorded and also the northernmost limit of its range.

The species was also found on the SE coast of Ródos (van der Poorten 1985). From 1st to 8th June 1984 he found different specimens at only a few meters from the sea. In his article he states to have found later, in the Zoölogisch Museum of Amsterdam, two male specimens originating also from this island and collected on 16.vi.1970 by A. C. & W. N. Ellis. These are the first known records of *Y. asterope* for Europe. Further documented records (Olivier 1993) are: LínDOS

(Nekrópolis), 20.x.1971; Kolýmbia, 26.iv.1986; 1 km. S. Línos (0-50 m), 28.v.1989; Mt. Marmári, 3 km W. Línos (100-250 m), 4.vi.1990.

M. Gascoigne-Pees gave us detailed information concerning an additional observation on 8.vi.1990 at Línos (pers. comm.). Visiting the same locality back on 24.v.2002, M. Gascoigne-Pees (pers. comm.) was not able to find the species again. From Ródos further confirmation is given (Pamperis 2009).

During the morning of 12.vi.2011 the authors first visited the exact locality (precise information kindly given by M. Gascoigne-Pees) on Mt. Marmári without any sign of this species. The area was very dry and overgrazed by goats and there were almost no grasses to be seen. Only two butterflies were seen during our visit (Table 1, week 2, locality 3). A second and larger area (Table 1, week 2, locality 4) with different orientation of the slopes possibly offering better opportunities was also explored. The flora was fresher but overgrazing was again a real problem and only few butterflies were observed. Here too we were not able to find *Y. asterope*.

In 2009 Torben Friis-Larsen informed the second author about his observation of 6 *Y. asterope* just above Sími harbour on 12.vi.2009 flying together with *C. stauderi*. On 28.v.2011 Arne Viborg also observed a fresh male above Sími harbour (pers. communication).

From 13.vi.2011 to 14.vi.2011 we visited Sími and found different areas north of Sími harbour where *Y. asterope* was common (Plate 1: 4, 5). The butterflies were found in a steep dry gully and in lower areas of dry rocky hills. In all localities where we observed *Y. asterope* long grasses (Poaceae) were abundant (Plate 1: 6). In typical phrygana we didn't observe the species at all. We also travelled across Sími towards the south, east and west coast, but we did not see the species elsewhere, neither did we see suitable habitats.

During the trip we saw that the coastline of Turkey, Sími lying less than 5 km from it, was often very clouded and regular rain was observed. It is interesting to note that M. Gascoigne-Pees (pers. comm.) was not able to find *Y. asterope* from 26.v.2002 to 31.v.2002 and from 2.vi.2002 to 4.vi.2002 on Sími and stating "...but I was evidently too late for *Y. asterope* ..."

All these data confirm that the species most likely is quite opportunistic in adapting the number and timing of broods to prevailing climatic conditions (John *et al.* 2010). We also have the impression that it is best to look for the butterfly in the morning hours as it hides under stones and bushes during the warmest hours of the day (Hesselbarth *et al.* 1995, John *et al.* 2010). In optimal conditions it seems that *Y. asterope* can have three generations in the Aegean islands: the first with a maximum in the second half of April, the second in the middle of June and the third from September until October.

Opposed to the recent statement of no threat (Pamperis 2009) we have seen that recent urbanization works drastically decreased one of the natural habitats near Sími harbour and another potential threat is overgrazing from the many sheep and goats on the island.

## Notes on the literature survey

### *Archon apollinus* (Herbst, 1798)

*A. apollinus* is well documented for the island of Kos but the situation for Ródos is not clear. The existing records concern a brief and debatable description of caterpillars, observed at the end of March, by Hofrat Martin (Rebel 1916, 1924); a mention of encountering this species in Ródos, without precise locality and date was made by Pierron (1978). These data were copied by different authors (Olivier 1993, Tolman & Lewington 1997, Dennis *et al.* 2000, Pamperis 2009). Then there is a record from the mountain Profitis Ilías in north-central Ródos: "Mt. Profitis Ilías ... False Apollos [the English name of *A. apollinus*, red.] can be found occasionally..." (Gibbons 2003).

Recently the conclusion was however drawn that confirmation of these records is desirable and necessary (Coutsis & Ghalalás 2006) because the present data are not reliable enough and because no other published record exists despite collecting, at the appropriate moment, by different lepidopterists. The occurrence of *A. apollinus* for Ródos is therefore considered as very doubtful and included with a question mark in the updated overview (Table 3).

### *Satyrium spini* (Denis & Schiffermüller, 1775)

This species has only recently been documented for the first time from the Dodecanese archipelago by a photograph of a specimen seen in one locality at 200 m in Kastellórizo on 2.vi.1991 (Pamperis 2009). L. Pamperis observed several individuals of *S. spini*, for the first time on 1.vi.1991, in the same locality (pers. comm.). The legend under the photograph states that the habitus is slightly different from specimens in continental Greece: lighter colour on the wings and white line on the underside of the hindwings accompanied by a pale line internally (Pamperis 2009). *S. spini* is known from the nearby Turkish coast (Hesselbarth *et al.* 1995) and its occurrence in Kastellórizo is not unexpected despite the fact that its presence for the Dodecanese islands was not predicted (Dennis *et al.* 2001).

### *Lycaena thetis* (Klug, 1834)

A photograph of a male specimen of this species is mentioning Nísiros and bears the following label: "île de Nísiros, Mt Elias, VII" (Darcemont & Legakis 2010).

This is an unexpected record. Like often in Greece there is indeed a mountain with the name Profitis Ilías on the island of Nísiros but this summit of the island is only 698 m high. It is very unlikely in the S. E. Aegean, and at such a low altitude, that the typical habitat and the butterfly's larval host plant would be present.

This very strange information was also mentioned to us by L. Pamperis (pers. comm.) who had been in contact with the first author and who told him that the data for *L. thetis* are from a French colleague (Serge Peslier) with a label: *L. thetis*: Mt. Elias 29-VII-2001, Hager leg. L. Pamperis suspects that the specimen was probably sold by Hager to Peslier and mislabeled for Nísiros but in

reality collected on Profitis Ilías in Óros Taygetos (pers. comm.).

We consider that there is too much doubt about the occurrence of *L. thetis* on this island and do not include it in the updated overview (Table 3).

#### ***Zizeeria karsandra*** (Moore, 1865)

*Z. karsandra* has been observed once, May 1958, in Ródos (Bender 1963) and has never been confirmed since then. This observation has been copied in some publications (Bretherton 1966, Bernardi 1971). In other publications *Z. karsandra* was not mentioned and/or included, due to the lack of evidence (Olivier 1993, Hesselbarth *et al.* 1995, Tolman & Lewington 1997, Dennis *et al.* 2000, and 2001, Makris 2003). There is no prediction for *Z. karsandra* because for the entire Aegean islands sufficient material was lacking to include it in the statistical model (Dennis *et al.* 2001).

Typical habitats are damp lowland places in hot gullies and river beds with local but often strong populations. In a single locality *Z. karsandra* can be common especially in summer and autumn but such a small butterfly can easily be overlooked as it flies very close to the ground (5–10 cm). Hatching might be influenced by local precipitations especially from early summer to the start of the autumn, making it difficult to predict when chances are best to look for it.

The butterfly is not present on the adjacent Turkish coast (Hesselbarth *et al.* 1995) and this is an important indication that its presence in Ródos is not to be automatically extrapolated.

*Z. karsandra* is common and widespread in Cyprus (Makris 2003) and also present in south-eastern Anatolia, Turkey (Hesselbarth *et al.* 1995).

Very controversial is the situation for Kríti and the existence of this species in Greece is even mentioned as highly improbable (Anastassiou *et al.* 2010). This implies as well that the authors do not expect the presence of *Z. karsandra* in Ródos. Several photographs however have been published, clearly showing *Z. karsandra* with the following legend: CRE, Chaniá, 0m, 28.x.1994 (Pamperis 1997 & Pamperis 2009). In 2010, L. Pamperis again observed and photographed *Z. karsandra*, west of Chania on 5.xi.2010 (email 10.xi.2011). This is clearly later than the dedicated search, at the end of September 2009, by H. Anastassiou investigating many potential habitats all over Kríti (Anastassiou *et al.* 2010). Confirmation from an independent source is needed to put an end to this controversy.

For Ródos there is the clear need for confirmation. It is considered here as very doubtful and included in the updated overview (Table 3) with a question mark.

#### ***Cupido minimus*** (Fuessly, 1775)

*C. minimus* has been recorded once on 30.v.1983 from Kos with the following statement: “west of Kos town. Locally common in grassy valley. Found in mainland Greece but new to Dodecanes” (Thomson 1985).

This is the only time the species has been mentioned for all Aegean islands. This observation was taken over in

literature (Olivier 1986, Tolman & Lewington 1997, Pamperis 2009). In a synthesis of the butterflies of Kos, the presence of *C. minimus* was however considered as very unlikely (Olivier & De Prins 1996) and after contact with G. Thomson, A. Olivier & De Prins did not include this species in the list for Kos because no voucher specimen was available. Subsequently this species was not included as well in the list of recorded butterflies (Dennis *et al.* 2000) or in the prediction model (Dennis *et al.* 2001) for the whole Aegean archipelago, omitting also the article with the original record (Thomson 1985) in the references.

*C. minimus* is not known from the nearby Turkish coast (Hesselbarth *et al.* 1995), this being unfavourable for the butterfly's potential presence in the Dodecanese archipelago.

As *C. minimus* flies in Scotland, it can be suspected that G. Thomson was familiar with this species. During a recent exchange of emails on this subject, he confirmed again not to have taken any specimens mentioning: “I did catch them, however, so that they could be identified.” Details on the exact locality were asked by the first author (email 3.ix.2011) and a map was provided by G. Thomson (email 17.ix.2011) mentioning: “...but this is from memory and it was quite a long time ago. I do remember going through another village after going west of Kos town. I was walking so wouldn't have gone very far.”

The map points towards the global area south of Platáni, southwest of Kos town. The area still looks good on Google Earth. A search for *C. minimus* south of Platáni is mandatory to solve this issue.

The situation has some parallels with the record of *Z. karsandra* for Ródos and is considered as very doubtful. *C. minimus* is included in the updated overview (Table 3) with a question mark.

#### ***Polyommatus daphnis*** (Denis & Schiffermüller, 1775)

*P. daphnis* has been mentioned for Sími (Tolman & Lewington 1997, Tolman 2001). The indication (blue dot) on a recent distribution map in Pamperis (2009) refers to the citation by Tolman (Pamperis, pers. comm.). During our stay on the island we did not see any locality with a potential habitat for this species. Preparing this article we searched for specific details. Different attempts were made to contact directly the author and indirectly through the publisher. All attempts failed. We also contacted J. Coutsis who mentioned (email 16.x.2011) that he knew no potential habitat on Sími and had serious doubts about the presence of *P. daphnis* on the island of Sími.

The species has not been documented from the nearby Turkish coast (Hesselbarth *et al.* 1995) but is showing a scattered distribution towards the east.

Despite the fact that *P. daphnis* is documented for Sámos, where suitable habitats are present, we consider the occurrence of *P. daphnis* as very doubtful for the Dodecanese archipelago and include the species in the updated overview (Table 3) with a question mark.



Table 1. Visited localities by the authors (numbers refer to the localities in Table 2).

Period 1 – N°	Date	Location	Island	Altitude [m]
1	2.vi.2011	Paleá Pýli Fortress	Kos	332
2	3.vi.2011	Ágios Fokás	Kos	30
3	3.vi.2011	Psalídi	Kos	54
4	3.vi.2011	Paleá Pýli Fortress	Kos	332
5	4.vi.2011	Mt. Díkeos, near top	Kos	778
6	4.vi.2011	Ziá above village to Mt. Díkeos	Kos	683
7	4.vi.2011	Ágios Fokás	Kos	30
8	5.vi.2011	Above Panagiá Kyrá terraces	Nísiros	405
9	5.vi.2011	Pachiá Ámmos Beach	Nísiros	0
10	5.vi.2011	Nikiá Profitis Iliás above village	Nísiros	473
11	5.vi.2011	0,5 km SE Páli	Nísiros	78
12	6.vi.2011	Mandráki hotel, Romántzi harbour	Nísiros	12
13	6.vi.2011	Mandráki Paleókastro	Nísiros	101
14	6.vi.2011	0,5 km SE Páli	Nísiros	78
15	7.vi.2011	Above Panagiá Kyrá terraces	Nísiros	405
16	7.vi.2011	0,5 km SE Páli	Nísiros	78
17	7.vi.2011	1 km SE Páli	Nísiros	207
18	7.vi.2011	700 m W of Livádia	Tílos	94
19	8.vi.2011	1 km S of Livádia	Tílos	90
20	8.vi.2011	2 km S of Livádia	Tílos	214
21	9.vi.2011	Lefkós	Kárpathos	157
22	10.vi.2011	Lefkós	Kárpathos	157
23	10.vi.2011	Kárpathos town	Kárpathos	204
24	11.vi.2011	Lefkós	Kárpathos	157
25	11.vi.2011	Pylés village	Kárpathos	325
26	11.vi.2011	Óthos village	Kárpathos	500
27	11.vi.2011	Apéri village	Kárpathos	290
28	11.vi.2011	Kalí Límni	Kárpathos	706
Period 2 – N°				
1	11.vi.2011	Hotel Sabina, Theológos	Ródos	4
2	12.vi.2011	Hotel Sabina, Theológos	Ródos	4
3	12.vi.2011	Mt. Marmári, 2 km WSW of Lindos	Ródos	102
4	12.vi.2011	Mt. Marmári, 3 km WNW of Lindos	Ródos	150
5	12.vi.2011	Ágios Isídoros; valley near chapel	Ródos	502–545
6	12.vi.2011	Profitis Iliás; near chapel and hotel	Ródos	635
7	12.vi.2011	Profitis Iliás; eastern side over the top	Ródos	380
8	13.vi.2011	Just above Sími harbour	Sími	47
9	14.vi.2011	Just above Sími harbour	Sími	47
10	14.vi.2011	1 km NW of Sími harbour	Sími	19
11	14.vi.2011	Emboriós	Sími	32
12	15.vi.2011	Profitis Iliás; path on southern side	Ródos	650
13	15.vi.2011	10 km NE of Ágios Isídoros	Ródos	301
14	15.vi.2011	6 km N of Ágios Isídoros	Ródos	370
15	15.vi.2011	4 km NE of Ágios Isídoros	Ródos	451
16	15.vi.2011	Émbonas	Ródos	432
17	16.vi.2011	4 km NE of Ágios Isídoros	Ródos	451
18	16.vi.2011	Ágios Isídoros; valley near chapel	Ródos	545
19	17.vi.2011	Mt. Atáviro; just under summit	Ródos	1037
20	17.vi.2011	Mt. Atáviro; summit	Ródos	1194
21	17.vi.2011	Mt. Atáviro; highest obs. of <i>H. syriaca</i>	Ródos	1044
22	17.vi.2011	Mt. Atáviro; edge of forest	Ródos	590
23	17.vi.2011	S of Kattávia near Plimmíri	Ródos	0
24	18.vi.2011	10 km NE of Ágios Isídoros	Ródos	301
25	18.vi.2011	Profitis Iliás; western side	Ródos	351
26	18.vi.2011	Petaloudes	Ródos	120

Table 2. Butterfly species observed by the authors (localities refer to Table 1).

Species	Localities period 1	Localities period 2
<i>Papilio machaon</i>	10, 12, 13, 14, 23, 25	–
<i>Iphiclydes podalirius</i>	14, 19	–
<i>Pieris brassicae</i>	1, 2, 3, 4, 5, 6, 7, 8, 10, 12, 13, 14, 17, 18	1, 5, 6, 7, 8, 9, 10, 12, 13, 16, 17, 18, 22, 24, 25
<i>Pieris rapae</i>	2, 3, 4, 5, 6, 7, 8, 10, 12, 13, 14, 17	8, 9, 10, 12, 18
<i>Pontia edusa</i>	9, 14, 17	10, 17, 18, 24
<i>Colias croceus</i>	1, 2, 3, 4, 5, 6, 7, 8, 10, 12, 13, 14, 18, 26, 28	4, 5, 6, 7, 12, 13, 17, 18, 20, 22, 25
<i>Gonepteryx cleopatra</i>	22, 26	5, 12, 13, 16, 17, 18, 24, 25, 26
<i>Satyrrium ilicis</i>	6, 8, 10, 14, 15	8, 9
<i>Lycaena phlaeas</i>	2, 3, 6, 8, 10, 11, 13, 14, 16, 17, 19, 21, 22	3, 4, 5, 6, 7, 8, 9, 10, 17, 20, 22, 24
<i>Leptotes pirithous</i>	2, 8, 24	–
<i>Lampides boeticus</i>	13, 14, 22	–
<i>Pseudophilotes vicrama</i>	2, 3, 4, 14, 15, 18, 22	–
<i>Plebeius loewii</i>	2, 7, 18, 19, 20	5, 13, 18, 22
<i>Polyommatus icarus</i>	1, 3, 4, 21, 28	1, 7, 12, 13, 22, 23
<i>Charaxes jasius</i>	–	5, 12, 17, 18, 26
<i>Limnitis reducta</i>	–	16
<i>Vanessa atalanta</i>	1, 4, 5, 6, 8, 10, 12, 13, 14, 28	–
<i>Vanessa cardui</i>	2, 5, 7, 10, 16	5, 8, 9, 10
<i>Polygonia egea</i>	4, 10, 11, 27	–
<i>Hipparchia syriaca</i>	–	5, 6, 13, 14, 15, 16, 17, 18, 21, 22
<i>Hipparchia senthes</i>	8, 11, 15	
<i>Hipparchia christenseni</i>	21, 22, 24	
<i>Hipparchia fatua</i>	12, 18	8, 9, 10
<i>Pseudochazara anthelea</i>	5	5, 18, 19
<i>Maniola telmessia</i>	1, 2, 3, 4, 6, 7, 18, 19, 20, 21, 22, 24, 28	4, 5, 6, 7, 8, 9, 10, 12, 13, 15, 16, 17, 18, 19, 20, 22, 24, 26
<i>Maniola halicarnassus</i>	8, 10, 11, 12, 13, 14, 15, 16, 17	–
<i>Ypthima asterope</i>	–	8, 9, 10
<i>Lasiommata megera</i>	1, 3, 5, 7, 13, 14, 22	8, 9, 10
<i>Lasiommata maera</i>	2, 7, 13	8, 9, 10, 12, 13, 18
<i>Kirinia roxelana</i>	4, 11, 13, 14, 17	12, 13, 17, 18, 24, 25, 26
<i>Hyponephele lupina</i>	7	–
<i>Spialia orbifer</i>	1, 4, 28	5
<i>Muschampia proto</i>	–	8, 9, 10, 11
<i>Carcharodus alceae</i>	3, 4, 6, 7, 9, 13, 14, 17	4, 5, 12, 13, 18, 24
<i>Carcharodus orientalis</i>	14	–
<i>Carcharodus stauderi</i>	13, 18, 20	3, 5, 9, 10, 11
<i>Thymelicus sylvestris</i>	5	–
<i>Thymelicus acteon</i>	2, 3, 4, 6, 7	5, 8, 9, 10, 13
<i>Thymelicus hyrax</i>	–	10

***Thaleropsis ionia*** (Eversmann, 1851)

One record exists for this species: a male specimen (1986, Kastellórizo) in the Goulandris Natural History Museum, Kifissia, Greece. As far as we know there has never been another observation of *T. ionia* from the

island. It has however been found in different nearby Turkish localities (Hesselbarth *et al.* 1995).

In Kastellórizo only one *Celtis* tree, host plant in Turkey, was found (Pamperis 2009). It is interesting that L. Pamperis was driven to this *Celtis* tree by the person, now deceased, who did collect for the Goulandris Natural

History Museum and who was not able to remember this particular butterfly. Two conclusions are possible: the specimen was either a vagrant from the nearby Turkish coast or there has been a mistake in the labeling of the specimen. The status of *T. ionia* remains unclear. In the updated overview (Table 3) the species is included for Kastellórizo as data deficient.

### *Aglais io* (Linnaeus, 1758)

From the Aegean, *A. io* is only mentioned once from Sámos and Sími (Tolman & Lewington 1997, Tolman 2001) without any details. The indication (blue dot) in a recent distribution map in Pamperis (2009) is based on these literature-derived data. Nowhere else in literature, either through personal investigation, or through information provided by colleagues, did we ever find data suggesting that the species was ever recorded in the

Dodecanese islands. All attempts to know more about these statements failed (cfr supra). In an email (16.x.2011) J. Coutsis also expressed his clear doubts. The nearest observation in Turkey is far away (Hesselbarth *et al.* 1995) from the Dodecanese archipelago. We consider that there is too much doubt about the occurrence of *A. io* to justify the inclusion of it in Table 3.

### Updated overview of the butterfly distribution in the Dodecanese islands

Based on the previous chapters of this article we hereby provide an updated overview as shown in Table 3. The symbols in the table are explained in the legend below.

Symbol	Category	Definition
x	Strong evidence	Different observations and/or from different Dodecanese islands. + Voucher specimen present without doubt on label. + Presence in other Aegean island(s) and/or nearby Turkey. + No doubt ever expressed in literature by an author.
dd	Data deficient	Mentioned only once from one Dodecanese island. + Voucher specimen absent or with doubt concerning label. + Presence in other Aegean island(s) and/or nearby Turkey. + Doubt expressed in literature by an author or present authors.
?	Very doubtful	Mentioned only once from one Dodecanese island. + Voucher specimen absent. + Absence in other Aegean islands and nearby Turkey. + Doubt expressed in literature by different authors or present authors.

Table 3. Geographical distribution of the butterflies (Hesperioidea & Papilionoidea) of the Dodecanese archipelago per island.

SPECIES	Astipálea	Kalimnos	Kápathos	Kásos	Kastellórizo	Kos	Léros	Nisiros	Pátmos	Ródos	Sími	Tílios	Number of islands
Legend (Fig. 1.)	A	B	C	D	E	F	G	H	I	J	K	L	
<b>Hesperiidae</b>													
<i>Spialia orbifer</i>			x		x	x				x	x		5
<i>Muschampia proto</i>			x		x					x	x	x	5
<i>Muschampia tessellum</i>											x		1
<i>Carcharodus alceae</i>	x	x	x	x	x	x	x	x	x	x	x	x	12
<i>Carcharodus orientalis</i>		x				x		x					3
<i>Carcharodus stauderi</i>		x				x	x	x		x	x	x	7
<i>Thymelicus acteon</i>					x	x				x	x		4
<i>Thymelicus hyrax</i>					x					x	x		3
<i>Thymelicus sylvestris</i>		x				x					x		3
<i>Thymelicus lineola</i>						?							0
<i>Gegenes pumilio</i>		x			x	x	x		x	x	x		7
<i>Pelopidas thrax</i>					x	x				x			3

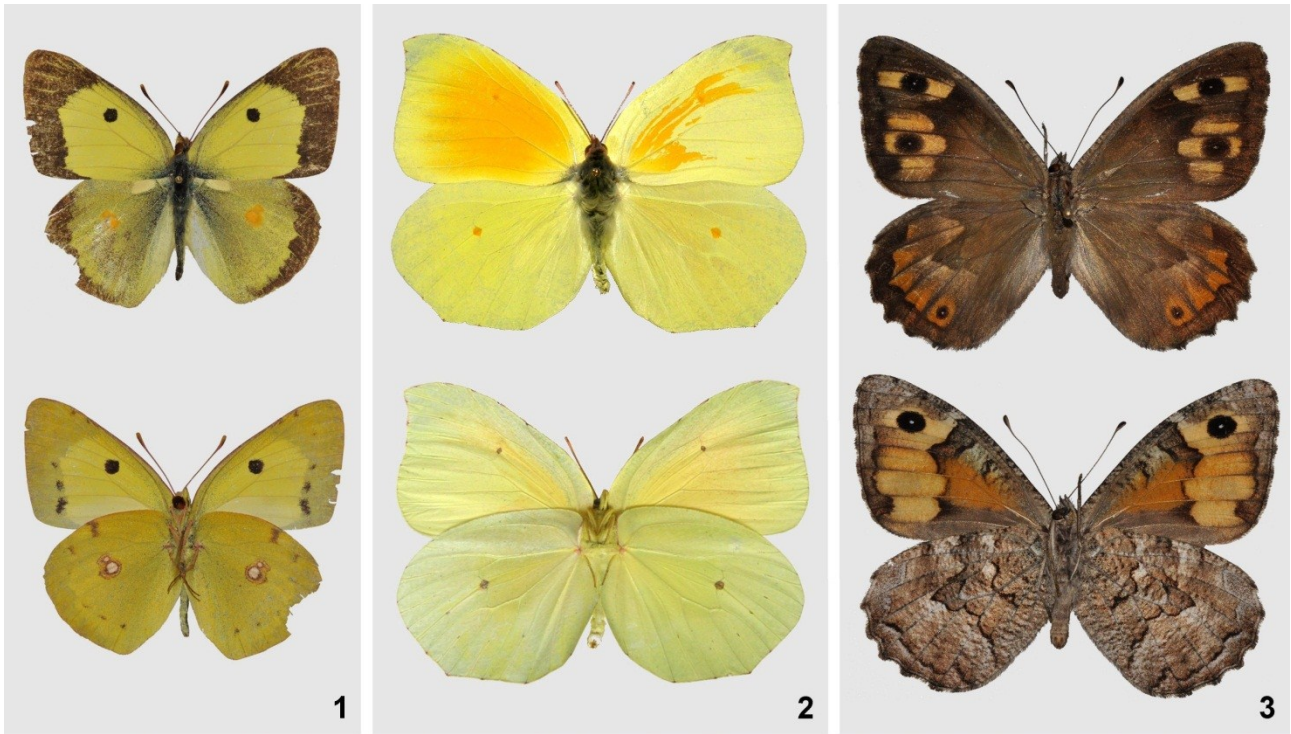


Plate 1. 1.– *Colias croceus* f. *erateformis*, Ródos, Profítis Ilías, 650 m, 15.vi.2011 (Photo: S. Cuvelier); 2.– *Gonepteryx cleopatra fiorii* mosaic gynandromorph, Ródos, Mt. Atávros, 1 km S. of Ágios Isídoros, 500 m, 16.vi.2011 (Photo: M. Mølgaard); 3.– *Hipparchia senthes*, Nísiros, Panagiá Kyrá, 5.vi.2011 (Photo: S. Cuvelier); 4, 5.– *Ypthima asterope*, Sími, Sími harbour, 0–100 m, 14.vi.2011 (Photo: S. Cuvelier); 6.– Habitat of *Y. asterope* on Sími, N. Sími harbour, 14.vi.2011 (Photo: M. Mølgaard).

SPECIES	Astipálea	Kalimnos	Kápathos	Káso	Kastellórizo	Kos	Léros	Nisíros	Pátmos	Ródos	Sími	Tílos	Number of islands
Legend (Fig. 1.)	A	B	C	D	E	F	G	H	I	J	K	L	
<b>Papilionidae</b>													
<i>Archon apollinus</i>						x				?			1
<i>Zerynthia cerisy</i>		x			x	x	x	x	x	x	x		8
<i>Papilio machaon</i>		x	x		x	x	x	x	x	x	x	x	10
<i>Iphiclides podalirius</i>		x			x	x	x	x	x	x	x	x	9
<b>Pieridae</b>													
<i>Pieris brassicae</i>		x	x	x	x	x	x	x	x	x	x	x	11
<i>Pieris rapae</i>	x	x	x		x	x	x	x	x	x	x	x	11
<i>Pieris krueperi</i>						x							1
<i>Aporia crataegi</i>										x			1
<i>Pontia edusa</i>		x	x		x	x	x	x	x	x	x	x	10
<i>Euchloe ausonia</i>		x	x		x	x	x	x	x	x		x	9
<i>Anthocharis cardamines</i>			x		x					x	dd		3
<i>Colias croceus</i>	x	x	x	x	x	x	x	x	x	x	x	x	12
<i>Gonepteryx cleopatra</i>			x							x			1
<i>Gonepteryx farinosa</i>					x	x				x	x	x	5
<b>Lycaenidae</b>													
<i>Callophrys rubi</i>		x	x			x	x			x			5
<i>Favonius quercus</i>										x			1
<i>Satyrium ilicis</i>					x	x		x		x	x		5
<i>Satyrium spini</i>					x								1
<i>Lycaena phlaeas</i>	x	x	x		x	x	x	x	x	x	x	x	11
<i>Lycaena thersamon</i>						x	x		x	x			4
<i>Zizeeria karsandra</i>										?			0
<i>Lampides boeticus</i>		x	x		x	x	x	x	x	x	x	x	10
<i>Leptotes pirithous</i>	x	x	x		x	x		x	x	x	x		9
<i>Cupido minimus</i>						?							0
<i>Pseudophilotes vicrama</i>	x	x	x	x	x	x	x	x		x	x	x	11
<i>Glaucopsyche alexis</i>		x	x			x	x	x		x			6
<i>Celastrina argiolus</i>			x			x				x			3
<i>Chilades trochylus</i>				x						x			2
<i>Aricia agestis</i>		x	x		x	x	x	x		x		x	8
<i>Plebejus loewii</i>		x			x	x	x		x	x		x	7
<i>Meleageria daphnis</i>											dd		0
<i>Polyommatus thersites</i>						x				x			2
<i>Polyommatus icarus</i>	x	x	x		x	x	x	x	x	x	x	x	11
<b>Nymphalidae</b>													
<i>Danaus chrysippus</i>	x					x		x		x		x	5
<i>Charaxes jasius</i>										x			1
<i>Thaleropsis ionia</i>					dd								0
<i>Limenitis reducta</i>						x		x		x			3
<i>Vanessa atalanta</i>		x	x		x	x	x	x	x	x	x	x	10
<i>Vanessa cardui</i>	x	x	x	x	x	x	x	x	x	x	x	x	12
<i>Nymphalis polychloros</i>						x		x		x	x		4
<i>Polygonia egea</i>		x	x		x	x	x	x	x		x		8

SPECIES	Astipálea	Kalimnos	Kárpáthos	Káсос	Kastellórizo	Kos	Léros	Nisiros	Pátmos	Ródos	Sími	Tílos	Number of islands
Legend (Fig. 1.)	A	B	C	D	E	F	G	H	I	J	K	L	
<i>Argynnis pandora</i>					x	x							2
<i>Melitaea trivia</i>		x				x		x			x		4
<i>Hipparchia syriaca</i>										x			1
<i>Hipparchia christenseni</i>			x										1
<i>Hipparchia senthes</i>						x	x	x					3
<i>Hipparchia statilinus</i>						?							0
<i>Hipparchia fatua</i>		x			x	x	x	x		x	x	x	8
<i>Pseudochazara anthelea</i>		x				x				x			3
<i>Maniola halicarnassus</i>								x					1
<i>Maniola telmessia</i>		x	x	x	x	x	x		x	x	x	x	10
<i>Hyponephele lupina</i>						x				x	x		3
<i>Ypthima asterope</i>					x					x	x		3
<i>Pararge aegeria</i>			x			x							2
<i>Lasiommata maera</i>		x			x	x	x	x	x	x	x		8
<i>Lasiommata megera</i>		x	x		x	x	x	x		x	x		8
<i>Kirinia roxelana</i>		x	x		x	x	x	x		x	x		8
<b>Totals</b>	<b>9</b>	<b>32</b>	<b>28</b>	<b>7</b>	<b>36</b>	<b>49</b>	<b>29</b>	<b>30</b>	<b>21</b>	<b>52</b>	<b>36</b>	<b>22</b>	

## Conclusion

We have provided new and unpublished data for many species of butterflies in the Dodecanese archipelago. The literature has been critically screened and commented. We provide an updated overview (Table 3) about the distribution of butterflies (Hesperioidea and Papilionoidea) for the twelve main islands of the Dodecanese archipelago.

From the Dodecanese archipelago 63 species are now well documented. The available data for two species (*P. daphnis* and *T. ionia*) are considered to be data deficient. The occurrence of *A. cardamines* on Sími was mentioned only once (notes of Prof. Koutsaftikis, 08.iv. without given year, at the Goulandris Museum of Athens) and could never be confirmed since, despite visits of different entomologists to this island at that time of the year. We consider this as data deficient for Sími. The presence of five species (*T. lineola*, *A. apollinus* from Ródos, *Z. karsandra*, *C. minimus* and *H. statilinus*) is considered to be very doubtful and two species (*A. io* and *L. thetis*) were excluded from the updated overview.

Further research on the butterfly distribution in the Dodecanese archipelago is needed for all islands implying coverage of different periods of the year. This will certainly generate new data and might give clear answers concerning species that have been given the status of “data-deficient” or of “very doubtful”.

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