

Notes on the biology of some butterflies in Greece (Lepidoptera: Papilionoidea)

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Abstract

Information on larval host-plants, life-cycle and behaviour of Greek butterflies gathered between 2000 and 2013 is presented. Observations were made on 141 species of butterfly and more than 450 records were made of larval host-plants in the wild. Observations on ants attending *Polyommata* caterpillars as well as a few parasitoids collected from reared caterpillars are also presented.

Key words: butterflies, Greece, larval host-plants, life-cycle, egg-laying, behaviour, myrmecophily, parasitoids

Introduction

Greece is a popular destination for lepidopterists and its butterfly fauna appears to be quite well-known, especially thanks to the books of Pamperis (1997, 2009) and the papers of Coutsis (mostly 1969, 1972a, 1973a, 1978), Brown (1976, 1977a, 1977b), Willemse (1975, 1980, 1981) and Olivier (1987, 1993). This knowledge mostly concerns distribution and ecology with very little about biology. Life-cycles and larval host-plants have been only partially investigated, especially by Coutsis (1970, 1972b, 1973b, 1973c, 1976, 1979), Dennis (1991, 1996), Fuchs (1988, 1992a, 1992b, 1995), Lafranchis (2003a, 2003b, 2004a, 2005, 2007a), Tolman (1992a, 1992b, 1993, 1994, 1995a, 1995b, 1995c, 1995d) and Wagner (www.pyrgus.de). This paper intends to complete these former works with additional information on the biology of Greek butterflies gathered since the author moved to Greece in 2000.

Details on host-plants, life-cycle and behaviour all come from personal observations in the field except for the duration of most early stages collected from breeding in natural conditions. A plant is considered as a host-plant only when caterpillars have been seen eating it in the wild or when egg-laying has been observed and known to occur on the plant on which the caterpillar feeds. Many observations of larval host-plants in the old literature refer to caterpillars basking on plants that they have never eaten or on various plants where female butterflies lay eggs simply because they grow close to the larval host-plant. This behaviour is a well-known in various genera (species of *Pyrginae* and *Polyommata* whose eggs overwinter, *Lycaena*, *Parnassius*, *Argynnis*, *Issoria*, *Boloria* and various *Satyrinae*). The fact that a butterfly is seen in the vicinity of a plant that elsewhere is known or supposed to be a larval host-plant has never been proof that this plant is the local food-plant. This is unfortunately often forgotten in the literature, including in recent papers.

Plant nomenclature mainly follows Lafranchis & Sfikas (2009).

Hesperiidae

Erynnis tages (Linnaeus, 1758)

Egg-laying has been observed several times on the upperside of the leaflets of *Lotus corniculatus* L. (Peloponnese, Macedonia) and once on the stem and on the leaflets of *Hippocrepis comosa* L. (northern Peloponnese, 1700 m). These Fabaceae are the main larval host-plants throughout the European range of this Pyrginae species.

Erynnis marloyi (Boisduval, [1834])

This little-known butterfly is the only European Hesperiidae species whose larva feeds on shrubs (Lafranchis, 2003a). The yellow eggs are laid singly mostly on the woody twigs of *Pyrus spinosa* Forssk., in the mountains also on short *Prunus cocomilia* Ten. (Rosaceae). Larvae fed on both these plants and accepted *Prunus spinosa* L. in captivity. Egg stage lasts two weeks, larval stage 12 weeks in the summer and pupal stage 16 days. Males are fond of hill-topping on hillsides and mountains up to 2100 m. Courtship includes a dancing flight at low height lasting at least 10 minutes, the male moving around the female, always keeping very close to her.

Carcharodus alceae (Esper, [1780])

Widespread and often common in Greece where females lay eggs singly on Malvaceae, usually on the upperside of the leaves, sometimes on the stem. Larvae are easy to find in the tent made of a folded part of the leaf, mostly on *Malva sylvestris* L. but also on *M. neglecta* Wallr. in Macedonia and Epirus, *Alcea pallida* Willd., *A. rosea* L. and *Lavatera cretica* L. in the Peloponnese (up to 1500 m), *Abutilon theophrasti* Medicus in central Greece, *Lavatera punctata* All. on Samos. Larvae are often parasitized by *Cotesia glabrata* (Telenga) (Hymenoptera, Braconidae), sometimes by *Hyposoter ebeninus* (Gravenhorst) (Hymenoptera, Ichneumonidae). Eggs laid in November hatch after 15 days. The freshly hatched larva does not eat the egg case and weaves a light cocoon in the junction of two veins of the leaf. Pupal stage lasts 10 days.

Carcharodus orientalis Reverdin, 1913

Eggs are laid singly, usually on the upperside of the leaves of Lamiaceae, often on basal leaves, but also on the calyx. Recorded food-plants are *Ballota acetabulosa* L. and *Marrubium velutinum* subsp. *cylleuum* Boiss. & Heldr. in the Peloponnese, *Stachys germanica* L., *Marrubium velutinum* Sm. and *M. thessalum* Boiss. & Heldr. in central Greece, *M. peregrinum* L. in Epirus, *Stachys iva* Griseb., *S. sylvatica* L. and *Ballota nigra* L. in Macedonia. The egg stage lasts two weeks. The freshly hatched caterpillar makes a tunnel with silk on the upperside of the leaf and eats the epidermis beneath. Later, the larva spends the day in a tent made with two or three leaves, leaving its shelter at night to feed on the nearby leaves. Pupation takes place in a nest made with several upper leaves. Pupal stage lasts two weeks (Lafranchis, 2003a). Butterflies fly in three broods at low level, in two broods in the mountains up to 1700 m and in a single summer brood at 1800–2100 m.

Spialia phlomidis (Herrich-Schäffer, [1845])

This local butterfly seems to be strictly linked to the genus *Convolvulus* in Greece. Egg-laying has been observed on the underside of the leaves of *C. boissieri* Steudel in Macedonia and *C. cantabrica* L. in the Peloponnese and central Greece. Hibernated larvae have been found on the latter plant in nests made with several leaves at the base of the plant. Wagner (2009) records *Convolvulus lineatus* L. as the host-plant near Lake Prespa (Macedonia). Males patrol continuously above the dry slopes, flying fast and low above the ground. Females are less active, often sitting on the ground with the wings half-open. During courtship, the male faces the female and bends his body close to her at the same time nervously vibrating his wings. He then faces her motionless before bending his antennae several times towards her head.

Spialia orbifer (Hübner, [1823])

The only recorded food-plant is *Sanguisorba minor* Scop. (Rosaceae). Females of the first brood lay their eggs singly amongst the flower buds. The plant has already fruited when the second brood is on the wings in the summer and females then lay eggs on the upperside of the leaflets of the basal leaves, near the midvein. Hibernated larvae are difficult to find in their nest made with basal leaves and other plants. They differ from *S. sertorius* (Hoffmannsegg, 1804) in that the yellow markings, which are isolated spots, are not united in a lateral band as in *sertorius*.

Pupal stage lasts 16 days in spring. Butterflies of the second brood can be seen as late as early November.

Muschampia proto (Ochsenheimer, 1808)

The yellow-flowered shrub *Phlomis fruticosa* L. (Lamiaceae) is the main larval food-plant all over its Greek range. It is a typical plant of low scrub, which becomes largely dominant in grazed areas on limestone under Mediterranean climate. Eggs are laid on the underside of the leaves and on the stem of the host-plant but also on various dry substrates at the base of the plant. Larvae hatch in early spring and built characteristic nests on the top of the twigs, fastening the uppermost leaves together with silk. They resume feeding in May and most of them do not pupate immediately but wait for up to 14 weeks without feeding before pupating. Larvae that pupate without delay produce the first butterflies that hatch mid-June but most of the butterflies appear late August and September. A few larvae have been found on the basal leaves of *Phlomis samia* L. in the northern Peloponnese. Imagos are often very abundant and mostly feed on the flowers of *Carlina corymbosa* L., which is an important nectar source for many Greek butterflies in August.

Muschampia tessellum (Hübner, [1803])

The caterpillars of this very local butterfly are easy to find, as their tents are obvious on the large leaves of *Phlomis samia* L., the folded underside being much paler and contrasting with the dark green upperside of the leaf. Pupal stage lasts 6–7 weeks. Male butterflies are strongly territorial, perching on the top of a high herbaceous plant and chasing with a very fast flight all the small butterflies that pass in the vicinity.

Pyrgus malvae (Linnaeus, 1758)

Egg-laying and larvae have been observed on various Rosaceae: *Potentilla reptans* L. (Peloponnese, central Greece, Macedonia), *P. recta* L., *Rubus idaeus* L. and *Fragaria vesca* L. (Macedonia), *Agrimonia eupatoria* L. (central Greece, Macedonia).

Pyrgus armoricanus (Oberthür, 1910)

The most widespread *Pyrgus* is the only polyvoltine species in Greece with three annual broods at low level between April and October. Females lay eggs on the margin of the underside of the leaflets of *Potentilla reptans* L. (Peloponnese, Epirus, Macedonia) in mesic habitats and seasonally damp meadows and on *P. pedata* Willd. ex Nestler (Peloponnese), *P. recta* L. (Epirus and Macedonia) and *P. argentea* L. (Macedonia) in dry grasslands and open scrub.

Pyrgus serratulae (Rambur, [1839])

Females lay their eggs singly on the margin of the underside of the leaflets of *Potentilla pedata* Willd. ex Nestler (central Greece) and *P. recta* L. (Macedonia).

Pyrgus cinarae (Rambur, [1839])

Larvae of this very local butterfly have been found in their nest on the basal leaves of *Potentilla recta* L. (Rosaceae) growing in dry open stony grasslands in Macedonia.

Pyrgus sidae (Esper, [1784])

Females lay eggs singly on the top of the carpel of the flowers of *Potentilla recta* L. in Macedonia. Hibernated larvae were also found in spring in the basal leaves of this plant and on *P. pedata* Willd. ex Nestler in central Greece.

Thymelicus hyrax (Lederer, 1861)

A female was observed several times laying a single egg in the spikelets of *Piptatherum miliaceum* L. (Poaceae) along a path in dry low scrub on the island of Samos. Males are territorial and often perch on tall grasses.

Thymelicus sylvestris (Poda, 1761)

This widespread skipper lays a few eggs in a row in the leaf sheaths of Poaceae: *Avena barbata* Link, *Dactylis glomerata* L., *Phalaris canariensis* L. (Peloponnese), *Cynosurus echinatus* L. (Macedonia), *Phleum* sp. (central Greece) and *Aegilops* sp. (Chios).

Ochlodes sylvanus (Esper, [1779])

A female laid eggs on the underside of the leaves of *Piptatherum miliaceum* L. (Poaceae). This common butterfly flies in two broods at low level: from late April to late June and from late August to late October. Butterflies of the second brood are smaller, with the hind-wing underside almost plain greenish-yellow.

Gegenes nostradamus (Fabricius, 1793)

Both species of *Gegenes* were identified through their morphological features (Lafranchis, 2004b). A female *nostradamus* followed on the beach near Katerini, at the bottom of Mt Olympus (Macedonia) laid an egg on the upperside of a leaf of the large tufted *Saccharum ravennae* L. Near Diakopto (northern Peloponnese), I found a larva in its tent on a leaf of *Phragmites australis* Cav. along the mesic bank of the railway Athens-Patra. In captivity larvae of *nostradamus* accepted another Poaceae: *Sorghum halepense* L. The egg is large (1.2–1.3 mm across), greenish-white when just laid and changes colour after 30 hours: becoming pale yellow with a red apical blotch and a broken circle of the same colour above the base. Eggs hatch in the morning after seven days. The freshly hatched caterpillar is 4 mm long, pale yellow with a large black head and a dorsal black line across the first segment. It first eats the egg case and then builds a tent with a few silk threads between the margins of the leaf. The body turns green once the larva has started to eat the leaf. The growth is completed in five instars. There are two broods a year: May–June and August–October. Courtship has been observed twice. The male first sits near the female before moving in front of her; he then opens the wings and takes the female's antenna club between the base of the fore-wing and the costa of the hind-wing, where a conspicuous brush of hairs is located.

Gegenes pumilio (Hoffmansegg, 1804)

This butterfly is common and occurs in three broods in the coastal and lowland areas but is more scattered in the mountains. Numerous observations of egg-laying and larvae were made on Poaceae: *Hyparrhenia hirta* L. in dry habitats, *Sorghum halepense* L. in mesic habitats and on disturbed grounds near cultivations, *Phragmites australis* Cav. and *Imperata cylindrica* L. in damp habitats. Eggs are laid on both sides of the leaves, mostly on the upperside. They hatch within a week. The newly-emerged caterpillar first eats the upper part of the egg case and spends the rest of the first day building its shelter; it cuts the leaf a few millimetres from the margin and bends it, stitching it with 5–7 short silk threads at regular intervals. Larvae live in a tubular shelter on broad-leaved grasses but without protection on the leaf upperside on narrow-leaved grasses. There are five larval instars in summer completed in 27–32 days. Growth is very fast in the last instar, up to 5 mm in 24 hours. Larvae that overwinter go through six instars in six months. Pupal stage lasts 18–20 days in spring and 8–14 days in summer (Lafranchis, 2005).

Papilionidae

Parnassius apollo (Linnaeus, 1758)

Larvae have been found eating *Sedum album* L. (Crassulaceae) at 1800 m on Katara Pass (Pindos Mts., Epirus) and at 2400 m on Mt Giona (central Greece).

Parnassius mnemosyne (Linnaeus, 1758)

When laying eggs, the female briefly alights in the low vegetation, curves its abdomen and ejects an egg which falls near or on the ground. This behaviour was observed in woodland clearings at 1300 m in Epirus as well as on alpine screes at 2100 m in central Greece. In both cases, no sign of the food-plant could be found, as they bloom and fruit before the butterflies start to fly. Larvae have been found feeding on *Corydalis solida* L. at 1500 m and on *C. blanda* subsp. *oxelmannii* Lidén at 2100 m (Peloponnese), on *C. cava* Schw. in north-western Macedonia.

Archon apollinus (Herbst, 1798)

This uncommon butterfly is the only European papilionid whose caterpillars live in a tent made with folded leaves. There were found several times on *Aristolochia hirta* L. on the Aegean islands of Lesbos and Chios.

Zerynthia polyxena ([Denis & Schiffermüller], 1775)

Widespread in continental Greece, this attractive butterfly is able to colonize a large range of habitats thanks to the ecological diversity of the genus *Aristolochia* in Greece. The main food-plant in north-eastern Greece is *A. clematitis* L., which grows along banks and in river-beds. In central Greece and in Epirus, larvae are found on *A. rotunda* L. in riparian woodlands and in mesic meadows along the rivers whilst they live on *A. pallida* Willd. in drier habitats as in open oak woodlands, clearings and open scrub. In the northern Peloponnese, no fewer than four species of *Aristolochia* are used by *polyxena*: *A. microstoma* Boiss. & Spr. and *A. elongata* [Duchartre] in dry grasslands and rocky habitats from sea level to 1500 m, the evergreen climber *A. sempervirens* in dry coastal scrub and *A. rotunda* in mesic olive groves. Larvae found on one plant accept any of the others when offered in captivity.

Eggs are laid singly or in groups of up to six on the underside of the leaves. Several females can lay on the same plant and I have found up to 27 larvae on a single *A. clematitis*. In rainy weather, the caterpillars seek refuge in the tubular flowers. The five larval instars are completed in four weeks. In southern Greece (Peloponnese, Sterea Ellada, Evia), about 12% of the imagos belong to f. *ochracea* Staudinger (upperside ground-colour side orange-yellow instead of pure yellow), which affects both sexes.

Zerynthia cerisy (Godart, [1824])

Eggs are laid singly on the leaf underside of *Aristolochia clematitis* L. (north-eastern Epirus, Macedonia). Larvae were found on *Aristolochia hirta* L. on Lesbos. In Greece, this butterfly often breeds in disturbed areas, especially in unsprayed cultivations (olive groves or walnut orchards) and around villages.

Iphiclides podalirius (Linnaeus, 1758)

The Scarce Swallowtail flies in three annual broods in southern Greece, from early March (occasionally from mid-February) to late October. Butterflies of the third brood show a striking resemblance to *Iphiclides feisthamelii* (Lafranchis, Delmas & Mazel, 2015a). As in other parts of its range, this common butterfly breeds exclusively on shrubs and trees of the Rosaceae family: *Prunus cocomilia* Ten., *P. spinosa* L., *Pyrus spinosa* Forssk. and Apple (*Malus domestica* Borkh.) in dry grasslands, hedges and open scrub in various parts of mainland Greece. Egg-laying and larvae have also been observed in the northern Peloponnese on Almond (*Prunus dulcis* Mill.) and Plum (*Prunus domestica* L.) growing wild as well as on Apricot (*Prunus armeniaca* L.) and Peach (*Prunus persica* L.) planted in gardens. Most of the eggs we found in the summer were parasitized. One egg was laid on a leaf of Judas tree (*Cercis siliquastrum* L.) but no caterpillar was found later. This small tree was growing close to two apple trees and a plum tree with many eggs and a female probably misidentified this Fabaceae as a food-plant.

Papilio machaon Linnaeus, 1758

If native British populations are mostly monophagous, continental populations of *machaon* are known to feed on a large range of plants of the families Apiaceae and Rutaceae. In Greece, egg-laying and larvae were observed many times on *Foeniculum vulgare* Mill., less often on *Pastinaca sativa* L., *Pimpinella peregrina* L., *Scaligeria napiformis* Willd. ex Spreng. and *Daucus carota* subsp. *maximus* Desf. in the northern Peloponnese, on *Daucus carota* subsp. *carota* L. and *Ruta graveolens* L. in the southern Peloponnese, on *Ammi majus* L. in Epirus and on *Conium maculatum* L. in Macedonia. At 2280 m on Mt Taygetos (southern Peloponnese), a female was seen laying an egg on the small leaves of *Carum heldreichii* Boiss. In the Kresna gorge (south-western Bulgaria), a larva was found on *Seseli rigidum* Waldst. & Kit. In southern Greece at low level, butterflies fly from March (occasionally from mid-February) to late October, exceptionally in November and the last larvae are regularly found until December.

Papilio alexanor Esper, [1800]

Rather widespread in Greece and locally common, this elegant butterfly lives on several Apiaceae. The main host-plant in the Peloponnese is *Scaligeria napiformis* Willd. ex Spreng. that grows in stony habitats: road margins, the base of cliffs, olive groves and open scrub. Breeding places are not stable as this food-plant does not stand competition and disappears if the habitat becomes overgrown. It sometimes invades burnt areas and is soon followed by *alexanor*, as both males and females have a powerful flight that is used to explore wide areas. The butterfly can

therefore colonize temporary habitats from its permanent haunts. Other recorded host-plants in the northern Peloponnese are *Opopanax hispidus* Friv., *Pastinaca sativa* L. and *Johrenia distans* Griseb. Eggs are laid on the rays of the umbels. Caterpillars hatch after seven or eight days. First instar larvae are often killed by small spiders, which spin their web between the rays of the umbels of the host-plant. When the density of host-plant is low, up to 10 caterpillars can be found on a single vigorous plant. Second and third instar caterpillars are yellowish-white with bold black stripes and share the inflorescence of *Scaligeria* with the similarly coloured larvae of *Depressaria ululana* (Rössler, 1866) (Lepidoptera, Elachistidae).

Pieridae

Leptidea sinapis (Linnaeus, 1758)

Females lay eggs singly on both sides of the leaflets of Fabaceae. The main food-plant in dry habitats is *Dorycnium hirsutum* L. (Peloponnese, central Greece, Macedonia) and *Lotus corniculatus* L. is preferred in mesic meadows. Other natural host-plants include *Vicia tenuifolia* Roth and *Hippocrepis emerus* subsp. *emeroides* Boiss. & Sprun. (Peloponnese), *Lathyrus laxiflorus* Desf. (Macedonia) and *Lotus angustissimus* L. (Epirus).

Leptidea duponcheli (Staudinger, 1871)

This local butterfly seems to be strictly linked to perennial sainfoins throughout its European range (Hesselbarth, Van Oorschot & Wagener, 1995; Lafranchis, 2000, 2007b). In Greece, egg-laying was observed several times on the underside of the leaflets of *Onobrychis alba* Waldst. & Kit. (central Greece, Epirus) and *O. arenaria* Kit. (Epirus, Macedonia) in dry grasslands with scattered shrubs and along dry woodland margins. Mentions of host-plants belonging to other genera (Tolman & Lewington, 1997) almost certainly arise from misidentification of egg-laying females of the summer brood. The three host-plants given by this author are also listed for *L. sinapis*. Contrary to what is found in most identification guides, *sinapis* females have no white patch on the underside of the antennal tips and scarcely differ from *duponcheli*. The only reliable feature is the shape of vein 1 on the fore-wings (Lafranchis, 2007b). The egg stage lasts a week and its colour changes from greenish-white to pale orange. Caterpillars complete their growth in five instars lasting 27–29 days in spring. The pupal stage lasts two weeks in spring.

Aporia crataegi (Linnaeus, 1758)

This butterfly is widespread and common in Greece where its larvae live on shrubs of the Rosaceae family, mostly *Pyrus spinosa* Forssk. and *Prunus spinosa* L. In the Peloponnese, larvae and egg-laying were observed also on *Prunus webbii* Spach, *P. dulcis* Mill., *P. cocomilia* Ten. and endemic *Crataegus pycnoloba* Boiss. & Heldr. In Epirus and Macedonia, *Crataegus monogyna* Jacq. and *C. rhipidophylla* Gand. are also used as larval food-plants. Pupae are often found at a low height on dry grass stems. Larvae are often parasitized by *Cotesia pieridis* (Bouché) (Hymenoptera, Braconidae) and by *Brachymeria tibialis* (Walker) (Hymenoptera, Chalcididae) in the northern Peloponnese.

Pieris brassicae (Linnaeus, 1758)

Cabbage (*Brassica oleracea* L.) is a common food-plant in the villages in the autumn and early winter. As most Greek people, who grow vegetables to eat, are very reluctant to use pesticides, caterpillars are easy to find amongst the eaten leaves that often only have the veins remaining. *Tropaeolum majus* L. is also eaten in gardens. Recorded wild host-plants in Greece are *Brassica nigra* L., *Hirschfeldia incana* (L.) Lagr.-Foss., *Sinapis alba* L., *Raphanus raphanistrum* L. and *Lunaria annua* L. in the Peloponnese, *Sisymbrium officinale* L. and *Bunias erucago* L. in Epirus, *Nasturtium officinale* R.Br. in Thrace, *Sinapis arvensis* L. and *Capparis spinosa* L. on Chios and in the Peloponnese. On the last-mentioned plant, eggs are sometimes laid on the upperside of the leaves, whilst they seem to be always laid on the underside on other plants. Batches of eggs have been found on the flat pods of *Lunaria annua*. Mature larvae are resistant to light frost. Pupation takes place on walls and trees up to 4m above the ground. Amongst the parasitoids collected from larvae are *Cotesia glomerata* (L.) (Hymenoptera, Braconidae), *Hyposoter ebeninus* (Gravenhorst, 1829) and *Compsilura concinnata* Meig. (Diptera, Tachinidae). Butterflies leave the warm low-lying areas in June and spend the summer in gorges and mountain woodlands, where they avoid flying during the hot hours.

Pieris rapae (Linnaeus, 1758)

This is a very polyphagous butterfly in Greece with 22 recorded food-plants, mostly Brassicaceae. Together with Cabbage (*Brassica oleracea* L.), *Lobularia maritima* L. and *Tropaeolum majus* L. also host caterpillars in gardens. Along streams, females lay eggs on *Nasturtium officinale* R. Br., in damp mountains meadows on *Cardamine acris* Griseb. and *C. amara* L. In dry habitats (rocky slopes, cliffs, stony olive groves), they choose *Aurinia saxatilis* L. and *Capparis spinosa* L. Woodland margins and clearings provide *Arabis turrita* L. and *Lunaria annua* L. However, fallow lands, margins of cultivations, roadsides and other disturbed ground are the favourite habitats of this common butterfly, on a large range of host-plants: *Sinapis alba* L., *Brassica nigra* L., *Hirschfeldia incana* (L.) Lagr.-Foss., *Raphanus raphanistrum* L., *Eruca vesicaria* L., *Sisymbrium officinale* L., *S. orientale* L., *Rorippa sylvestris* L., *Lepidium draba* L., *L. graminifolium* L., *Calepina irregularis* Asso and *Reseda lutea* L. Egg-laying has been observed several times on a *Matthiola incana* L. planted in a garden, but no caterpillar could ever be found. A caterpillar found on a cabbage in a garden at Diakopto (northern Peloponnese) produced the parasitoid *Hyposoter ebeninus* (Gravenhorst, 1829). Butterflies fly and go on breeding throughout winter at low level in southern Greece and can survive a night at -7°C. The pupal stage lasts 5–6 weeks in winter.

Pieris ergane (Geyer, [1828])

Most European populations feed on *Aethionema saxatile* L. on which egg-laying and larvae often have been observed in various parts of Greece up to 2100 m. Greenish-white when just laid on a leaf, the egg turns pale yellow and later deep yellow. Incubation lasts a week and larval stage a month. In the summer, many host-plants have dried and females have to spend much time to find a green one. Competition is strong, as a plant usually cannot feed more than a single caterpillar. In cases where there are several eggs or larvae on one plant, which is not uncommon, the older one eats everything and is the only one to complete its growth, and then only if the plant is large enough.

Pieris krueperi Staudinger, 1860

This local butterfly inhabits rocky places, especially in the vicinity of cliffs, where its only recorded host-plant *Aurinia saxatilis* L. grows, and where males patrol almost continuously in sunny weather. Eggs are laid on both sides of the leaves of the food-plant and incubation lasts a week. The caterpillar has exactly the same grey-green colour of the leaves. Butterflies often roost at night and in dull weather on the leaves of *Phlomis fruticosa* L., where they benefit from a very good camouflage. The similarly coloured leaves of the shrub *Cistus albidus* L. are largely used as roosting places by *Pieris rapae* and *P. mannii* in the western Mediterranean.

Pieris napi (Linnaeus, 1758)

This species avoids dry habitats and is mostly found in Greece along streams and in wooded areas. Eggs are laid on the underside of the leaves of Brassicaceae: *Lunaria annua* L. (northern Peloponnese), *Rorippa sylvestris* L. (Epirus), *Arabis hirsuta* L. and *Alliaria petiolata* M. Bieb. (Macedonia).

Pontia edusa (Fabricius, 1777)

Widespread all over Greece and flying in several broods between late February and early November, this butterfly mostly breeds on disturbed ground on *Brassica nigra* L., *Hirschfeldia incana* (L.) Lagr.-Foss., *Sisymbrium orientale* L., *S. officinale* L., *Rapistrum rugosum* L., *Bunias erucago* L., *Lepidium draba* L., *L. graminifolium* L., *L. hirtum* L., *Berteroa obliqua* Sm. and *Reseda lutea* L. In the Kresna gorge (south-western Bulgaria), eggs were laid on *Berteroa incana* L. Females lay eggs on the flower buds when available, but on the leaves when the plants have fruited or only have rosette leaves. The pupal stage lasts two weeks in spring.

Anthocharis cardamines (Linnaeus, 1758)

This *Anthocharis* is the only polyphagous member of the genus in Greece and in Europe. No less than 10 host-plants have been recorded in Greece: *Biscutella didyma* L., *Lunaria annua* L., *Sinapis alba* L. and *Hirschfeldia incana* (L.) Lagr.-Foss. in the Peloponnese, *Alliaria petiolata* M. Bieb., *Arabis hirsuta* L., *A. sagittata* Bertol. and endemic *Leptoplax emarginata* Boiss. in northern Greece. Eggs are generally laid on the bud stalks but occasionally also on the underside of the leaves, as observed a few times on *Arabis glabra* L. and *Lepidium draba* L. in the mountains of the northern Peloponnese.

Anthocharis damone Boisduval, 1836

A very local butterfly that seems to be strictly linked to the genus *Isatis*. Egg-laying and larvae have been seen on *Isatis tinctoria* L. in Epirus from sea level to 1000 m and on *I. tomentella* Boiss. & Balansa at 500–1000 m in the Peloponnese. These plants were used in the past to dye clothes and are often found together with the butterfly near villages, ancient monasteries and castles.

Anthocharis gruneri Herrich-Schäffer, 1851

Many records of eggs and caterpillars on *Aethionema saxatile* L. Eggs are laid on the bud stalks and incubation lasts only four days. When no bud is available, the female occasionally lays egg on the underside of an upper leaf. The young caterpillar feeds on the buds, flowers and fruits. As the plant is small, large caterpillars also eat leaves and sometimes the stem. Butterflies fly in a single brood from late February to mid-June depending on season and altitude. Males appear one or two weeks before females. As in other *Anthocharis* species, males spend most of their time patrolling the habitat and check the identity of any white object. During the courtship, the male flies around the female that sits on a plant or on the ground. The mate-refusal posture of the female is common to other Pieridae: she opens the wings horizontally and raises the abdomen up.

Euchloe ausonia (Hübner, [1804])

This double-brooded butterfly is widespread and common at low level in Greece. It breeds on Brassicaceae growing mostly on disturbed grounds: *Sinapis alba* L., *Brassica nigra* L., *Hirschfeldia incana* (L.) Lagr.-Foss., *Sisymbrium officinale* L., *S. orientale* L., *Raphanus raphanistrum* L., *Eruca vesicaria* L., *Rapistrum rugosum* L. and *Bunias erucago* L. It was quite a surprise to see a female laying egg on *Arabis glabra* L. at 1800 m, along a mountain track on Mt Varnous (Macedonia). Eggs are laid singly on the flower buds or on their stalks and females usually do not stop on a plant that already has an egg. Pupal stage last two weeks in spring.

Several species of Pieridae share the same host-plants and their larvae can be found at the same time. However, they usually manage to limit competition, as illustrated by the following count of larvae made on two common Brassicaceae on a small hillside above Arta lagoon (Epirus):

Bunias erucago: 136 *Euchloe ausonia*, 6 *Pieris brassicae* and 1 *Pontia edusa*.
Sisymbrium officinale: 691 *P. brassicae*, 11 *E. ausonia* and 4 *P. edusa*.

Larvae of *P. brassicae* only eat the leaves and *E. ausonia* mostly feed on the upper part of the plants (flowers, pods) but also on leaves and stem when no more pods are available, which is often the case on *Bunias erucago* which is not a tall plant.

Euchloe penia (Freyer, [1851])

Our observations agree with those of other authors (Zuber, 1995; Tolman & Lewington, 1997) giving *Matthiola fruticulosa* subsp. *valesiaca* Gay as the only host-plant of this delicate and very local butterfly. Egg-laying was observed on various parts of the plants, as well as on stones at the bottom of plants, a very unusual behaviour for a pierid. The egg stage lasts eight days. The caterpillar goes through five instars completed in 23 days. Larvae benefit from a perfect camouflage, sharing the grey-green colour of the plant. They feed on buds, pods and leaves.

Colias libanotica Lederer, 1858

A mountain butterfly whose caterpillars feed on *Astragalus rumelicus* Bunge (Epirus), *Astragalus thracicus* subsp. *parmassi* Boiss. (southern Pindos, central Greece) and *Astragalus thracicus* subsp. *cylleus* Boiss. & Heldr. (northern Peloponnese). Eggs are laid singly on the upper side of the leaflets. The caterpillar hatches after 9–10 days, eats first the egg case and then the leaflets. It enters diapause in late August when still very small (probably in the second instar) under a leaf-stalk of the food-plant. It completes its growth as soon as the new leaves appear between March and May. The pupa hangs from a horizontal twig of the host-plant and the pupal stage lasts 9–10 days. Male butterflies patrol continuously above the slopes covered with the spiny shrublets of the foodplant. During the nuptial flight, the male flies before the female. When she sits in the vegetation, the male continues flying around until alighting close to mate. In the northern Peloponnese, butterflies roost very often on the large rosette leaves of *Verbascum* where they are very difficult to see.

Colias caucasica Staudinger, 1871

Very local on some mountains in northern Macedonia, this butterfly has been recorded laying eggs on the upperside of the leaflets of *Chamaecytisus hirsutus* L.

Colias crocea (Geoffroy, 1785)

This very common butterfly is very polyphagous though restricted to the Fabaceae family. Contrary to Tolman & Lewington (1997) who stated that it 'appears to be restricted to a single plant species at any given site' the author has observed butterflies laying eggs consecutively on different plants in the same place. When first arriving in an area, females seem to be able to identify very quickly (and from some distance) two or three host-plants, as they land immediately upon them, and completely ignore other plants that belong to the local range of food-plants (observations in my garden). The favourite genus is *Medicago* but the Greek list of host-plants has 30 species ranging from small annuals to trees: *Medicago sativa* L., *M. falcata* L., *M. lupulina* L., *M. coronata* L., *M. minima* L., *M. truncatula* Gaertn., *M. praecox* DC., *M. polymorpha* L., *M. orbicularis* L., *Lotus corniculatus* L., *L. angustissimus* L., *L. pedunculatus* Cav., *Ononis spinosa* L., *Trifolium dubium* Sibth., *T. physodes* Stev., *T. repens* L., *Melilotus indicus* L., *M. neapolitanus* Ten., *M. officinalis* L., *Colutea arborescens* L., *Robinia pseudoacacia* L., *Astragalus thracicus* subsp. *cylleneus* Boiss. & Heldr., *A. angustifolius* Lam., *A. depressus* L., *Vicia sativa* L., *V. villosa* Roth, *Hippocrepis comosa* L., *Onobrychis alba* Waldst. & Kit., *O. ebenoides* Boiss. & Sprun., *O. montana* subsp. *scardica* Griseb. (at 2100 m in northern Macedonia). Eggs are laid singly on the upperside of the leaflets, exceptionally on the stipules or on the calyx. At low altitudes in southern Greece, *crocea* flies throughout the year, being one of the most common butterflies in winter and continuing to breed except during the coldest days.

Gonepteryx cleopatra (Linnaeus, 1767)

Very widespread in Mediterranean Greece, eggs and larvae are often found on the leaves of *Rhamnus alaternus* L., as in most part of its European range. A pupa has been found hanging to the branch of a shrub 1.5 m above the ground and 2 m away from the nearest host-plant. Females are very keen at locating the host-plant, which is sometimes very isolated and concealed amongst other shrubs and small trees. One of those, growing right in the middle of an orange tree at least two kilometres away from the next member of its species, regularly received more eggs than was good for it.

Gonepteryx farinosa (Zeller, 1847)

Egg-laying and caterpillars have been observed several times on *Rhamnus lycioides* subsp. *graeca* B. & R. in very dry and hot scrub at low level (northern Peloponnese, southern Sterea Ellada). The egg has 10 ribs and incubation takes eight days. Caterpillars develop between the end of March and mid-May. The pupa is suspended to a twig of the host-plant and the pupal stage lasts 12 days. When the butterflies hatch, at the end of May and in June, the breeding habitats are very dry and with no flowers. They thus move to the mountain clearings and meadows up to 2300 m, where they find many flowers and are especially attracted to pinks (*Dianthus* spp.).

Lycaenidae

Favonius quercus (Linnaeus, 1758)

In the northern Peloponnese, a mature larva has been found eating flowers of *Quercus coccifera* L. at 1100 m as well as many eggs on the terminal buds of *Quercus pubescens* Willd. at 800 m. Butterflies sometimes gather in large numbers on small trees of *Pyrus spinosa* Forssk. far from any oak, as at 1700 m on the plateau on Mt Chelmos. Beating the very same trees in the following spring did not produce any caterpillars.

Satyrium spini ([Denis & Schiffermüller], 1775)

Several caterpillars were found eating *Rhamnus lycioides* subsp. *graeca* B. & R. in hot scrub in central Greece and in the northern Peloponnese, one attended by the ant *Crematogaster ionia* Forel.

Callophrys rubi (Linnaeus, 1758)

Females have been seen laying eggs on the calyx of the flower buds of *Dorycnium hirsutum* L., *Genista acanthoclada* DC., *Lotus corniculatus* L., *Chamaecytisus* sp. (Fabaceae) and on the terminal buds of *Rhamnus lycioides* L. and *Rubus* sp. (Rosaceae).

Lycaena thetis Klug, 1834

This local mountain butterfly is restricted to areas with *Acantholimon echinus* L., where the females lay their eggs singly, ejecting them on the ground around the spiny cushion of the host-plant. Males often keep a territory 5 to 10 m long in a small gully sheltered from the wind.

Lycaena tityrus (Poda, 1761)

Egg-laying has been observed on a dry leaf of *Rumex acetosella* L. (central Greece) and on the leaf-sheath of *Rumex tuberosus* L. (northern Peloponnese). A caterpillar found on the latter plant pupated in a dry leaf in June and the butterfly hatched a week later.

Lycaena thersamon (Esper, [1784])

Females have been seen laying eggs on the stem and the calyx of *Polygonum aviculare* L.

Lycaena alciphron (Rottemburg, 1775)

A single egg was laid by a female on *Rumex scutatus* L. in central Greece.

Lycaena phlaeas (Linnaeus, 1761)

Rumex pulcher L. is an important host-plant in mesic habitats in the Peloponnese, especially in autumn and winter. Egg-laying has also been observed in dry grasslands on both sides of the leaves, on leaf stalks and also on the stem of *Rumex tuberosus* L., as well as on dry or green leaves of other plants nearby.

Lycaena candens (Herrich-Schäffer, [1844])

On Mt Voras (northern Macedonia) at 2100 m, a female sat on a stem of *Rumex arifolius* All., and walked down until she found the base of a leaf stalk and then laid an egg in its axil. She then flew to another plant of the same species to lay a second egg in the same way. The caterpillar was first fed with this plant and later with other species of *Rumex*.

Leptotes pirithous L. (Linnaeus, 1767)

This small butterfly is very common in coastal areas of Greece in the late summer and in the autumn. Egg-laying and larvae have been observed on 11 plants belonging to four families. In spring, eggs are laid on the flower buds of *Dorycnium hirsutum* L. and *Melilotus neapolitanus* Ten. In summer, females lay on the flower buds of *Galega officinalis* L., *Medicago sativa* L., *Melilotus albus* Medik. and the ornamental tree *Sophora japonica* L. Along the rivers in northern Greece (Macedonia, Epirus) as well as in southern Republic of Macedonia, eggs are also laid on the axils of the flower spikes (still in bud) of *Humulus lupulus* L. In the autumn in the Peloponnese, I have found larvae in the flower spikes of *Lythrum salicaria* L. and seen females laying eggs on young shoots of *Lupinus albus* subsp. *albus* L., *Astragalus lusitanicus* subsp. *orientalis* Chater & Meikle as well as on the calyx of *Polygonum aviculare* L. Larvae have been found attended by the ant *Formica rufibarbis* F. in the river-bed of the Aaos (Epirus). Pupal stage lasts 5–7 days in summer.

Lampides boeticus L. (Linnaeus, 1767)

A common inhabitant of Greek gardens where it breeds on *Sophora japonica* L., *Vigna* sp. and especially on Bean (*Phaseolus vulgaris* L.). Egg-laying commonly occurs also on the calyx of *Campsis* × *taghiabuana* Vis. although I am not sure it is suitable as a larval food-plant. In scrub, along banks and woodland margins larvae eat the flowers and the pods of *Spartium junceum* L. (the main host-plant in the south and on the islands), *Colutea arborescens* L., *Calicotome villosa* Poir., *Hippocrepis emerus* subsp. *emeroides* Boiss. & Sprun., *Bituminaria bituminosa* L. and *Onobrychis alba* Waldst. & Kit.

Tarucus balkanicus (Freyer, [1844])

Eggs are laid on the underside of the leaves of *Paliurus spina-christi* Mill. and larvae are attended by the ant *Dolichoderus quadripunctatus* (L.) on the margins of Lake Kerkini (Macedonia).

Cupido argiades (Pallas, 1771)

Main larval host-plant seems to be *Melilotus albus* Medik. (Epirus, Macedonia), but eggs are also laid on the calyx of the flower buds of *Vicia villosa* Roth. Larvae have been found together with the ant *Formica rufibarbis* F. in the Aooos valley where a caterpillar was parasitized by *Chetina setigena* Rondan (Diptera, Tachinidae). Pupal stage lasts a week in summer.

In Macedonia, ***Cupido decoloratus*** (Staudinger, 1886) and ***Cupido alcetas*** (Hoffmansegg, 1804) both lay eggs on the calyx of the flower buds of *Medicago lupulina* L., the latter also on the flower bracts of *Galega officinalis* L.

Cupido minimus (Fuessly, 1775)

In Greece as in most of Europe, females lay eggs on the calyx of *Anthyllis vulneraria* L. (Epirus). Both the butterfly and the host-plant are common as high up as 2800 m on Mt Olympus, but I did not look for breeding evidence there.

Cupido osiris (Meigen, [1829])

This local butterfly is strictly linked to perennial sainfoins, and female butterflies usually stay on and around these plants that are also their main nectar source. They lay eggs singly on the calyx of the flower buds of *Onobrychis ebenoides* Boiss. & Sprun. (northern Peloponnese), *O. pindicola* Hausskn. (Epirus), *O. alba* Waldst. & Kit. (Epirus, Macedonia) and *O. arenaria* Kit. (Macedonia). Caterpillars have been found attended by the ants *Camponotus aethiops* (Latr.) and *C. dalmaticus* (Nyl.) in the northern Peloponnese. They grow quickly in May, feeding on the flowers and the fruits and enter diapause in early June. Pupation takes place in April in the following year without further feeding.

Celastrina argiolus (Linnaeus, 1758)

Females of this polyphagous butterfly lay eggs on the calyx of the flower buds of *Rubus sanctus* Schreb. (Peloponnese), *R. canescens* DC. (Epirus), *Paliurus spina-christi* Mill. (Epirus), *Rhamnus lycioides* L. (Crete), *Tamarix hampeana* Boiss. & Heldr. (southern Peloponnese), *Vicia villosa* Roth (southern Peloponnese) and *Spartium junceum* L. (Peloponnese), sometimes in the leaf axil of the last mentioned. Butterflies fly in three broods in southern Greece: late February–April, late May–July and September–October.

Glaucopsyche alexis (Poda, 1761)

Widespread in Greece, it lives on herbaceous and shrubby Fabaceae: *Spartium junceum* L., *Genista acanthoclada* DC., *Vicia villosa* Roth and *Onobrychis ebenoides* Boiss. & Sprun. in the Peloponnese, *O. alba* Waldst. & Kit. in northern Macedonia. Caterpillars are always found in the company of ants: *Camponotus aethiops* (Latr.), *C. laconicus* Emery, *C. piceus* (Leach) and *Plagiolepis pygmaea* (Latr.). Incubation lasts a week and the larval stage three weeks. Caterpillars of the last instars are very cannibalistic in captivity, eating larvae and pupae of their own species and of other Polyommatae.

Turanana taygetica (Rebel, 1902)

This very local small butterfly is rarely found far from its host-plant, although males occasionally leave their breeding grounds in search of water. They usually perch on stones and patrol the habitat in a low and fast flight. Females are less active and lay eggs on the calyx of the flower buds of *Acantholimon echinus* L., sometimes on the leaves.

Maculinea arion (Linnaeus, 1758)

Females lay eggs on the calyx of low thyme in dry grasslands and open scrub in Macedonia (*Thymus leucotrichus* Halácsy, *T. longicaulis* C. Presl and *T. sibthorpii* Benth.) and on *Origanum vulgare* L. along woodland margins in the mountains of central Greece and on Mt Rhodopi (eastern Macedonia).

Maculinea alcon rebeli (Hirschke, 1904)

Eggs have always been found on the flower buds and the upperside of the leaves of *Gentiana cruciata* L. in Macedonia and northern Epirus as well as in Republic of Macedonia and south-western Bulgaria.

Iolana iolas (Ochsenheimer, 1816)

The largest European *Polyommatae* has always been seen laying its flat eggs in the inner side of the teeth of the calyx of fresh pods of *Colutea arborescens* L. Butterflies usually spend the

night in small trees or shrubs at 3–4 m above the ground, but sometimes in the grass at the bottom of the host-plant especially when weather is poor.

Pseudophilotes vicrama (Moore, 1865)

This small butterfly is widespread in dry areas in Greece though usually not very abundant. The two annual broods breed on different Lamiaceae. In spring, eggs are laid on the calyx of the flower buds of thymes: *Coridothymus capitatus* L. (northern Peloponnese), *Thymus longicaulis* C. Presl. (Epirus) and *T. praecox* Opiz (Macedonia). In the summer, thyme flowers have dried and are no longer available; females lay eggs on the underside of the floral bracts of *Calamintha nepeta* L. or on the calyx of the flower buds of *Mentha microphylla* C. Koch and *Satureja montana* L.

Pseudophilotes bavius (Eversmann, 1832)

This very local butterfly has been seen laying eggs on the underside of the floral bracts of *Salvia verbenaca* L. in a low open scrub in the northern Peloponnese.

Chilades trochylus (Freyer, [1845])

This tiny butterfly is very secretive, as it spends much time sitting on the ground or nectaring on the flowers around *Andrachne telephioides* L. where females lay eggs on the upper side of the leaves, especially on the crowded upper leaves (Macedonia, Samos). They start laying eggs immediately after mating. Larvae hatch after 8–9 days and complete their growth in 22–31 days, eating the leaves and sometimes the fruits of the host-plant. The pupa is secured by means of a girdle to a stem of the host-plant and the pupal stage lasts 6 to 11 days in June. Butterflies are fond of the nectar of *Heliotropium* spp.

Cyaniris semiargus (Rottemburg, 1775)

A butterfly which is often given as monophagous on *Trifolium pratense* L. or almost so, but I have recorded egg-laying on nine other species of clovers, usually in places where *pratense* was absent. However, even when several species including *pratense* grow together, *pratense* is not always selected by females. A decisive clue seems to be the availability of buds in the flower head, which is carefully checked when nectaring. Eggs are laid on the calyx of the flower buds of *Trifolium pratense* L., *T. medium* L., *T. alpestre* L., *T. heldreichianum* Hausskn., *T. pignanii* Fauché & Chaub., *T. ochroleucon* Huds., *T. hybridum* subsp. *elegans* Savi, *T. repens* L. and *T. physodes* Stev. in Macedonia, *T. arvense* L. in Epirus. A female was observed laying eggs successively on two different clover species. In subalpine meadows in Epirus and Macedonia, egg-laying has been observed several times on the calyx of *Armeria canescens* Host. and up to nine eggs were found in a single flower head. Other authors have mentioned a similar behaviour in England on *Armeria vulgaris* Willd. (Scorer, 1913), in Denmark on *A. maritima* Willd. (Nygaard Kristensen, 1999), in France on *A. ruscinonensis* Girard (Lafranchis *et al.*, 2015b) and in southern Spain on *A. velutina* Welw. (Rodríguez, Fernández-Haeger & Jordano, 1991), with caterpillars feeding in the latter case. The southern subspecies *parnassia* Staudinger and *helena* Staudinger both largely lay eggs on *Trifolium physodes*.

Polyommatus coelestina (Eversmann, [1843])

Females lay eggs on the stipules and petioles of *Vicia tenuifolia* Roth., in the middle of the plant.

Polyommatus admetus (Esper, [1783])

Eggs are laid on the bracts of the pods or on the stem of the host-plant, sometimes on dry plants nearby. Caterpillars have been found feeding on *Onobrychis ebenoides* Boiss. & Sprun. and sometimes on *O. aequidentata* Sm. in the northern Peloponnese, on *O. alba* Waldst. & Kit. in central Greece and in Macedonia and on *Onobrychis arenaria* Kit. in Epirus. They are often attended by ants: *Camponotus aethiops* (Latr.), *C. piceus* (Leach), *C. oetzeni* Forel, *Plagiolepis pygmaea* (Latr.). Caterpillars found in Epirus are sometimes parasitized by *Cotesia tenebrosa* (Wesmael) and *Aplomya confinis* (Fallén) (Diptera, Tachinidae).

Polyommatus ripartii (Freyer, 1830)

The most widespread and common *Agrodiaetus* in Greece breeds on *Onobrychis ebenoides* Boiss. & Sprun. in the northern Peloponnese, on *O. alba* Waldst. & Kit. in most of Greece and on *O. arenaria* Kit. in Epirus. Caterpillars are often attended by ants: *Camponotus aethiops*

(Latr.), *C. gestroi* Emery, *C. oetzeni* Forel, *C. piceus* (Leach), *Lasius paralenius* Seifert, *Tapinoma simrothi* Krausse, *Lepisiota melas* Emery, *Crematogaster sordidula* (Nyl.), *Plagiolepis pygmaea* (Latr.), *P. vindobonensis* Lomnicki. Caterpillars are sometimes parasitized by *Hyposoter notatus* (Gravenhorst) (Hymenoptera, Ichneumonidae) in the northern Peloponnese.

Polyommatus nephothiptamenos (Brown & Coutsis, 1978)

Larvae of this local butterfly have been found on *Onobrychis alba* Waldst. & Kit. and on *O. montana* subsp. *scardica* Griseb. They were very rarely seen with ants and were rather often parasitized by *Ichneumon exilicornis* Wesmael (Hymenoptera, Ichneumonidae).

Polyommatus orphicus Kolev, 2005

This scarce butterfly, known only from Rhodopi Mts in Bulgaria apart from a single known site in Greece, lays eggs on the bracts of *Onobrychis alba* Waldst. & Kit.

Polyommatus aroaniensis (Brown, 1976)

Caterpillars have been found on *Onobrychis ebenoides* Boiss. & Sprun. and *O. alba* Waldst. & Kit. in the northern Peloponnese, often attended by ants: *Camponotus aethiops* (Latr.), *C. piceus* (Leach), *Crematogaster sordidula* (Nyl.) and *Plagiolepis pygmaea* (Latr.).

Polyommatus dorylas ([Denis & Schiffermüller], 1775)

The main larval food-plant in Europe and in Greece is *Anthyllis vulneraria* L. Eggs are laid on the underside of the leaflets.

Polyommatus amandus (Schneider, [1792])

Egg-laying and larvae have been observed on *Vicia tenuifolia* Roth (northern Peloponnese, Macedonia), *V. villosa* Roth (northern Peloponnese, Epirus) and *Vicia cassubica* L. (central Greece). On Mt Vermion (Macedonia), where the butterfly is very common with very few *Vicia* noted, several females were busy laying eggs on the upperside of the leaflets of *Lathyrus pratensis* L. In the northern Peloponnese, many caterpillars have been found attended by the ants *Camponotus aethiops* (Latr.) and *Crematogaster sordidula* (Nyl.) and one was parasitized by *Aplomya confinis* (Fallén) (Diptera, Tachinidae).

Polyommatus escheri (Hübner, [1823])

Egg-laying has been observed on the upperside of the leaflets of *Astragalus monspessulanus* L., the main host-plant in Europe.

Polyommatus thersites (Cantener, [1835])

This *Polyommatus* is strictly linked to sainfoins, on both annual and perennial species. This allows it to live in many open or semi-open habitats from sea level to 1800m. It flies in three broods, where food is available for the caterpillars in the summer: late April–May, July–early August and September–November. Females lay eggs on the leaflets, mostly on the upperside, also on the petiole, the stem, the calyx of the host-plant, sometimes on a nearby grass. *Onobrychis caput-galli* L. and *O. alba* Waldst. & Kit. seem to be the most widely used, but eggs and caterpillars have also been found on *O. aequidentata* Sm., *O. arenaria* Kit., *O. ebenoides* Boiss. & Sprun., *O. montana* subsp. *scardica* Griseb. and *O. pindicola* Hausskn. Caterpillars are often found with ants: *Camponotus aethiops* (Latr.), *C. piceus* (Leach), *Crematogaster sordidula* (Nyl.) and *Pheidole pallidula* (Nyl.). They are sometimes parasitized by *Cotesia tenebrosa* (Wesmael) (Hymenoptera, Braconidae).

Polyommatus icarus (Rottemburg, 1775)

Though strictly restricted to plants of the Fabaceae family, it is the most polyphagous lycaenid in Greece with 22 recorded host-plants, the favourite being clovers and medicks: *Trifolium campestre* Schreb. (Macedonia), *T. dubium* Sibth. (central Greece, Macedonia, Evia), *T. fragiferum* L., *T. nigrescens* Viv., *T. parnassi* Boiss. & Sprun. (at 2100–2300 m), *T. pratense* L. and *T. scabrum* L. (Peloponnese), *T. repens* L. (Macedonia), *Medicago disciformis* DC., *M. littoralis* Lois., *M. sativa* L. and *M. truncatula* Gaertn. (Peloponnese), *M. falcata* L. (northern Peloponnese, Macedonia), *M. minima* L. (northern Peloponnese, Epirus), *M. lupulina* L. (Macedonia), *Ononis spinosa* L. (northern Peloponnese, central Greece), *Melilotus albus* Medik. (Epirus), *M. indicus* L. (northern Peloponnese), *Lotus corniculatus* L. (Epirus, Macedonia), *L. angustissimus* L. and *L. ornithopodioides* L. (central Greece), *Astragalus sirinicus* Ten. (Epirus)

and *A. thracicus* subsp. *cylleneus* Boiss. & Heldr. (northern Peloponnese). Eggs are laid on the upperside of the leaflets, on the stipules and on the calyx. Larvae have been found with small ants, *Plagiolepis pygmaea* (Latr.), in the northern Peloponnese. A caterpillar found in Epirus was parasitized by *Chetina setigena* (Rondani) (Diptera, Tachinidae).

Polyommatus eros menelaos Brown, 1976

Females of this local endemic to Mt Taygetos (southern Peloponnese) lay eggs on the upperside of the leaflets of spiny *Astragalus taygeteus* Pers. & Strid but one has also been seen doing so several times on *Lotus corniculatus* L. and on nearby plants. We have no proof, however, that *Lotus* is actually eaten by the caterpillars. Butterflies can be seen between 1000 and 2400 m and breeding evidence has been recorded at 1700–2200 m. Males come to drink on the muddy banks of streams and gather in large numbers in the afternoon to roost in patches of tall grasses.

Polyommatus bellargus (Rottemburg, 1775)

In Macedonia and Epirus, females have been seen laying eggs on the underside of the leaflets of *Hippocrepis comosa* L. and on nearby plants, except near Kozani where they lay on *Securigera varia* L.

Polyommatus coridon (Poda, 1761)

As in most of its range, larvae and egg-laying were observed on *Hippocrepis comosa* L. Caterpillars spend the day under the creeping leaves of the foodplant, often in the company of small ants.

Polyommatus daphnis ([Denis & Schiffermüller], 1775)

Though found in various parts of southern Europe, the biology of this attractive butterfly is still imperfectly known. Females have been seen laying eggs on the calyx of the fruit of *Astragalus thracicus* subsp. *cylleneus* Boiss. & Heldr. (northern Peloponnese), on both sides of the leaflets of *A. depressus* L. (central Greece) and on the petiole of *A. sirinicus* Ten. (northern Epirus).

Agriades dardanus (Freyer, [1844])

Only known in Greece from Mt Orvilos on the border with Bulgaria, this scarce butterfly lays eggs on the upperside of the leaves of *Androsace villosa* L. which are eaten by the caterpillars.

Aricia anteros (Freyer, [1838])

Females lay eggs mostly on the underside of the leaves, sometimes on the upperside or on the sepals of the foodplant. They select for this purpose *Geranium pyrenaicum* Burm. (Macedonia), *G. asphodeloides* Burm. (central Greece), *G. subcaulescens* L'Hér. and *Erodium chrysanthum* L'Hér. (northern Peloponnese). Breeding habitats are diverse: clearings and woodland margins, dry grasslands, screes, from 600 to 2200 m. The egg stage lasts 10 days and pupal stage 18–19 days. The larva often cuts the leaf stalk and feeds on the fading leaf which becomes inrolled and provides it shelter. The same behaviour has been noted with *Aricia agestis* feeding on *Geranium rotundifolium* L. in France.

Aricia agestis ([Denis & Schiffermüller], 1775)

Geraniums are its main larval host-plants in Greece. Eggs are laid mostly on the underside of the leaves, sometimes on the upperside or on the stipules of *Geranium asphodeloides* Burm., *G. molle* L., *G. rotundifolium* L., *Erodium acaule* L., *E. cicutarium* L. and *E. malacoides* L. in the northern Peloponnese, *Geranium colombinum* L. in Epirus and *G. dissectum* L. in Macedonia. A female has been seen laying eggs on a small annual *Medicago* in the northern Peloponnese. An egg laid early December and left in the wild hatched in February.

Aricia artaxerxes (Fabricius, 1793)

Egg-laying has been noted on the upperside of the leaves of *Geranium subcaulescens* L'Hér. up to 2380 m in the mountains of central Greece.

Aricia eumedon (Esper, [1780])

In Macedonia, females lay eggs on the ovary of *Geranium sylvaticum* L. (Kastoria, Mt Phalakron) and *G. sanguineum* L. (Mt Rhodopi). A photo from Bernard Fransen shows egg-laying on *Erodium hartvigianum* Strid & Kit Tan on Mt Askion (Macedonia).

Kretania eurypilus (Freyer, [1851])

Egg-laying has been observed on *Astragalus rumelicus* Bunge at 2200 m on Mt Taygetos (Peloponnese). On Samos, the only spiny and shrubby *Astragalus* growing in the butterfly habitat is *A. creticus* Lam., which is very probably the local host-plant.

Kretania psylorita (Freyer, [1845])

When beating *Astragalus creticus* Lam. on Mt Ida (Crete), my son Antoine found a grown caterpillar of this endemic butterfly that was parasitized. As the larval description seems to be unknown, we provide a brief description: body yellowish-green with a broad dark green dorsal line; on the sides is a narrow blackish line above a pale one and below, just above the stigmata, are two close-set narrow reddish lines. The whole body is covered with sparse white hairs.

Plebejus pylaon (Fischer von Waldheim, 1832)

This butterfly, which is perhaps a species complex, is known to be oligophagous on the genus *Astragalus*. Egg-laying has been observed on the upperside of the leaflets (rarely on the underside) of *Astragalus thracicus* subsp. *parnassi* Boiss. and *A. angustifolius* Lam. in central Greece, *A. rumelicus* Bunge and *A. sirinicus* Ten. in Epirus, *A. onobrychis* L. in western and northern Macedonia, *A. monspessulanus* L. in the central Peloponnese. Eggs and a caterpillar attended by ants of *Camponotus* sp. were found on *A. thracicus* subsp. *cylleneus* Boiss. & Heldr. in the northern Peloponnese. We could not find any differences between larvae and pupae from the northern Peloponnese and from south-western Switzerland. Males patrol actively over the stands of the food-plant and often gather in large numbers to drink on mud.

Nymphalidae

Libythea celtis (Laicharting, 1782)

Caterpillars have been found on *Celtis australis* L. in central Greece, Epirus, Macedonia and Thrace. They are sometimes so numerous that all the Nettle trees can be completely defoliated over large areas, as happened in May 2004 in and around the Meteora monastery. Many larvae were found dying from starvation on the naked branches of the trees. In such years, butterflies can be seen in hundreds when they hatch in June and many fly towards the north in July. A migration over Mt Phalakron at 1800 m in July 2004 led to a strong influx in the Rhodopi Mts.

Danaus chrysippus (Linnaeus, 1758)

Main larval host-plant in Greece is *Cynanchum acutum* L. that commonly grows at low level on banks, along fences and on disturbed ground. Eggs are laid singly on both sides of the leaves. *Cynanchum* dies back in November or December and produces new shoots in April and there is no food available for the caterpillars in the winter. Pupae and young larvae die at 4–5°C and larger larvae at slightly lower temperatures. The chance of survival of this species between autumn and spring is therefore very thin. A pupa was found on a bank by my son Antoine in November 2004. It was hanging from a dry stem just above the ground and was still alive in February 2005. The butterfly was ready to hatch, the wings being clearly visible. However, the weather was wet and cloudy for more than a fortnight and the butterfly died within the pupal case. That is probably why there are extremely few records of *chrysippus* in Greece in spring, and butterflies are mainly seen between August and December with a peak in October–November. The nearest area of permanent residency is the Nile valley in Egypt, which is probably the origin of Greek *chrysippus*. Egg-laying has also been observed in a garden on ornamental *Araujia sericifera* Brot. and larvae were found feeding on *Gomphocarpus physocarpus* E. Mey, also a non-native, in another garden in the northern Peloponnese. Butterflies are inclined to gather in some places but the location varies from one year to the next. Only in years of abundance can they be seen everywhere, occasionally leaving the coastal plains to the valleys and mountains inland, as in 2007 when butterflies were recorded up to 1300 m in the northern Peloponnese. They start to fly when the temperature reaches 21°C in the sun after having basked with the wings open.

Charaxes jasius (Linnaeus, 1767)

Eggs and larvae are easy to find on the upperside of the leaves of *Arbutus unedo* L. and were also found a few times on *Arbutus andrachne* L., including a fourth instar caterpillar. Egg-laying

behaviour around Citrus trees was noted several times and a female actually laid an egg on the upperside of a leaf of a Lemon tree (*Citrus limon* L.) on 25 September 2012. The egg was left on the tree and checked daily. The caterpillar hatched six days later and the twig was then cut and put in a glass of water in a cage. The caterpillar, which had already eaten the eggshell, remained motionless the first day and left the lemon twig at night. It spent the following day on the plastic bottom of the cage and did not return to the lemon, the leaves of which were intact.

The larva usually spends the day on a silk pad on the upperside of a leaf but moves to a more shaded place when it is too warm, even in winter. It feeds at night when the temperature is above 8°C, but remains inactive in cooler weather. Pupal stage lasts 18 days in spring.

Limenitis reducta Staudinger, 1901

Eggs have been found on both sides of the terminal leaves of *Lonicera implexa* Aiton in dry scrub and woodland margins in the Peloponnese. Egg-laying has also been observed in gardens on ornamental *Lonicera japonica* Thunb. (northern Peloponnese, central Greece, as in southern France and northern Spain: Lafranchis *et al.*, 2015b). Incubation lasts only six days, the larval stage 25 days and the pupal stage eight days in the summer. There are three broods in southern Greece, flying between late April and mid-October.

Apatura iris (Linnaeus, 1758)

As in many parts of Europe, *Salix caprea* L. is probably the main host-plant in northern Greece: a female has been observed laying an egg on the leaves of this tree in northern Macedonia.

Nymphalis antiopa (Linnaeus, 1758)

Larvae are conspicuous as they live in a group. They have been found several times on *Salix alba* L. growing along rivers, often on branches hanging over the water (central Greece, Epirus, Macedonia). They leave the tree to pupate and are then found walking on the ground sometimes far from any possible host-plant. Pupation has been observed on a low plant 20 cm above the ground and on vertical rocks at 1 and 3 m above the ground.

Nymphalis polychloros (Linnaeus, 1758)

Sharing the same habits as the former species, larvae are easy to spot in spring on various trees, which they sometimes completely defoliate: *Celtis australis* L. in Epirus and Macedonia, *Ulmus minor* Mill. and *Prunus avium* L. in the southern Peloponnese, *Pyrus spinosa* Forssk. and *Salix alba* L. in the northern Peloponnese.

Larvae of *Aglais io* (Linnaeus, 1758) and *Aglais urticae* (Linnaeus, 1758) have been found many times on *Urtica dioica* L., the latter also on *U. urens* L. in the northern Peloponnese. Larvae of *urticae* were found up to 2350 m in the Peloponnese.

Vanessa atalanta (Linnaeus, 1758)

Widespread all over Greece, it breeds in low-lying areas between late September and June on *Urtica dioica* L., *U. urens* L., *U. pilulifera* L. and *Parietaria judaica* L. Eggs are laid on both sides of the leaves. Larvae feed on leaves and flowers. They damage the leaf stalk and live in the shelter provided by the fading leaf. In the northern Peloponnese, a caterpillar was found parasitized by *Sturmia bella* (Meigen) (Diptera, Tachinidae) and another one by *Microgaster nixalebion* Shaw (Hymenoptera, Braconidae).

When weather becomes hot, the butterflies leave the low-lying areas and move to the mountains where they tend to stay inactive in trees. They also breed up to 2200 m on *Urtica dioica* in summer. Butterflies return when grapes are ripe and are most abundant at low level in November. Males guard a territory along sunny paths and orchard margins, sitting wings open on the ground or on a low branch. They take off very quickly to chase any medium-size butterflies. When it is another male, the flight shows two stages: a dance with both butterflies turning around the other, followed by a very fast pursuit that ends when the other male leaves the territory. It is one of the first butterflies to become active in the morning, already flying when temperature is 15°C in the sun (8°C in the shade).

Vanessa cardui (Linnaeus, 1758)

As a very widespread and migrant butterfly, it is not surprising to record host-plants belonging to various families: the most largely used in Greece is *Malva sylvestris* L. (Malvaceae)

but larvae are also often found on *Carlina acanthifolia* All. (up to 2200 m in Epirus), *Cirsium eriophorum* L., *Onopordum acanthium* L., *O. illyricum* L., *O. bracteatum* Boiss. & Heldr., *Silybum marianum* L., *Filago pygmaea* L. (Asteraceae), more rarely on *Echium angustifolium* Mill., *E. italicum* L., *E. plantagineum* L. (Boraginaceae) and *Urtica urens* L. (Urticaceae). It flies and breeds throughout winter in southern Greece in some years. Caterpillars are often parasitized by *Sturmia bella* (Meigen) (Diptera, Tachinidae) and by *Cotesia vanessae* (Reinhard) (Hymenoptera, Braconidae).

Polygonia egea (Cramer, [1775])

Egg-laying and larvae have been observed in hundreds on the leaves of *Parietaria judaica* L. growing on walls or at the bottom. References to *Parietaria officinalis* L. as a larval host-plant (Tolman & Lewington, 1997 and others) probably arise from confusion with tall and large-leaved specimens of *P. judaica* which are common throughout its range. Distribution and ecology of *P. officinalis* do not fit with those of *P. egea*, especially in Greece.

The egg stage lasts five days in June. Pupae are found hanging on rocks and walls up to 3 m above the ground and imago hatch after two weeks. Butterflies fly in four broods which start mid-May, July, mid-September and late October, the latter being only very partial. They are active in sunny and mild days throughout winter. The life-cycle is completed in 38 days in the autumn. In the northern Peloponnese, several caterpillars were found parasitized by *Sturmia bella* (Meigen) (Diptera, Tachinidae).

Polygonia c-album (Linnaeus, 1758)

Eggs are laid on the margin of the leaves, more often on the upperside, rarely on the flower spike of *Urtica dioica* L., its favourite host-plant in Greece up to 1850 m (Peloponnese, central Greece, Epirus, Macedonia). Egg-laying and larvae have also been recorded on *Urtica pilulifera* L. (Epirus, pers. obs. Martin Catt), *Ribes uva-crispa* L. (northern and central Peloponnese), *Salix caprea* L. (Macedonia) and *Ulmus* sp. (Epirus).

Melitaea cinxia (Linnaeus, 1758)

This *Melitaea* always flies in Greece in a single brood in spring. Caterpillars are mostly found on *Plantago lanceolata* L. (Peloponnese, central Greece, Macedonia). On Mt Vitsi and Mt Varnous (north-western Macedonia), nests of young caterpillars are commonly found in the summer on *Centaurea deustiformis* Adam., on the latter mountain also on *Plantago lanceolata*. On Mt Vitsi, hibernated larvae appeared to show no interest at all in the *Centaurea* (although these had fresh leaves), but were avidly eating *Plantago holosteum* Scop. and the young shoots of a Scrophulariaceae (*Rhinanthus* sp. or *Veronica* sp.).

Melitaea arduinna (Esper, [1783])

Hibernated larvae have been found feeding on the leaves of *Centaurea affinis* Friv. in western Macedonia. Pupal stage lasts two weeks.

Melitaea phoebe ([Denis & Schiffermüller], 1775)

Caterpillars have been found on *Cirsium arvense* L. and *C. eriophorum* L. in Macedonia, from sea level to 1500 m, always in mesic or damp habitats. Photos sent by Lazaros Pamperis also show that they locally feed on *Centaurea* sp.

Melitaea ornata Christoph, 1893

Larvae have been found many times on the basal leaves on knapweeds: *Centaurea salomitana* Vis. in central Greece, *C. achaia* Boiss. & Heldr. and *C. raphanina* subsp. *mixta* DC. in the northern Peloponnese. A final instar caterpillar was observed eating a basal leaf of *Onopordum bracteatum* Boiss. & Heldr. in the latter area. Two batches laid in the wild had between 50 and 60 eggs. From the latter batch of eggs, only six eggs were still alive 10 days later; the others had been eaten and only two larvae hatched. The pupal stage lasts 18–20 days.

Melitaea didyma (Esper, [1778])

Main host-plant is *Plantago lanceolata* L. (Peloponnese, central Greece, Epirus, Macedonia), but larvae have also been seen eating the leaves of *Linaria genistifolia* L. in Epirus and *Scrophularia canina* L. in western Macedonia. A grown caterpillar has been found at 2150 m on the path to the top of Mt Taygetos (southern Peloponnese). A mummified caterpillar found at Kalavrita (northern Peloponnese) in May 2010 produced a scarce parasitoid: *Benjaminiia fumigator* Aubert (Hymenoptera, Ichneumonidae).

Melitaea trivia ([Denis & Schiffermüller], 1775)

Though it breeds on *Verbascum*, a large and very widespread genus in Greece with more than 70 species, this butterfly is often local. Larvae were found on *V. sinuatum* L. (Macedonia and Thrace), *V. undulatum* Lam. (northern Peloponnese), *V. pulverulentum* Vill., *V. phlomoides* L., *V. longifolium* Ten. (Macedonia) and at 2200 m on *V. epixanthium* Boiss. & Heldr. (Mt Taygetos in the southern Peloponnese). The pupal stage lasts 12–15 days.

Euphydryas aurinia (Rottemburg, 1775)

Large numbers of caterpillars have been found on *Scabiosa columbaria* subsp. *ochroleuca* L. at 1700–1800 m in north-western Macedonia.

Argynnis paphia (Linnaeus, 1758)

Egg-laying has been observed several times in shaded places on the ground, at the bottom of boulders, on ivy and on mossy rocks up to 2.5 m above the ground, also once on my son's hair. In some cases, the female obviously checked for the presence of *Viola* in the vicinity. Caterpillars were found eating *Viola odorata* L. in the northern Peloponnese.

Argynnis pandora ([Denis & Schiffermüller], 1775)

A female, followed for almost an hour in October 2002, laid several eggs on various dry parts of plants, on the ground, in fallow land, in a vineyard and in an olive grove. This was in the northern Peloponnese where many *Viola kitaibeliana* Schult. (and no other *Viola*) appear every year in March. In the following spring, eaten leaves with droppings were found, but the caterpillars were impossible to locate in the vegetation.

Argynnis aglaja (Linnaeus, 1758)

A mature larva was found near plants of *Viola aetolica* Boiss. & Heldr. at 1700 m in the northern Peloponnese. It avidly ate the leaves of this pansy when placed with it in a box.

Argynnis niobe (Linnaeus, 1758)

The eggs are laid singly on dry substrates on the ground. Caterpillars have been found eating *Viola eximia* Form. at 1800 m in north-western Macedonia and *V. odorata* L. at 1000 m in central Greece. All the butterflies seen in Greece belong to f. *eris* Meigen.

Issoria lathonia (Linnaeus, 1758)

This attractive butterfly lives in Greece on various pansies. Eggs are laid on the underside of the leaves or on various substrates near the host-plant. Egg-laying and larvae have been observed on *Viola aetolica* Boiss. & Heldr., *V. phitosiana* Erben and *V. kitaibeliana* Schult. in the northern Peloponnese, ornamental *V. × wittrockiana* in a pot at the entrance of a hotel in Epirus, *V. macedonica* Boiss. & Heldr., *V. eximia* Form. and *V. dacica* Borb. in Macedonia. The pupal stage lasts six days in summer.

Brenthis daphne ([Denis & Schiffermüller], 1775)

Egg-laying was noted on the upperside of the leaves of *Rubus canescens* DC. in north-eastern Macedonia and grown larvae were found feeding on *R. tomentosus* Borck. in central Greece. Butterflies often do not fly far from bramble stands, resting on the leaves and nectaring on the flowers.

Boloria graeca (Staudinger, 1870)

Caterpillars have been found on *Viola eximia* Form. at 1800 m on Mt Varnous and by my daughter Claire on *V. perimensis* W. Beck. at 2000 m on Mt Phalakron (Macedonia). On Mt Rila (south-western Bulgaria), a female was seen laying an egg on the leaf of a thistle growing very close to several *V. dacica* Borb.

Boloria euphrosyne (Linnaeus, 1758)

A grown caterpillar was found eating *Viola eximia* Form. at 1800 m in north-western Macedonia.

Kirinia roxelana (Cramer, [1777])

A female laid an egg on a small clover growing at the bottom of *Brachypodium sylvaticum* Huds. Egg-laying was also observed in the bark crevices of the trunk of *Prunus domestica* subsp. *insititia* L. at 1.2 m above the ground in a hedge between two meadows and at 2 m high on the

bark of *Platanus orientalis* L. along a stream (Epirus). Caterpillars have been found at night on a broad-leaved Poaceae, along a woodland margin in Thrace. Pupal stage lasts 16 days.

Pararge aegeria (Linnaeus, 1758)

It flies throughout year at low levels in southern Greece. In winter, females laid eggs in my small garden on the leaves of *Brachypodium sylvaticum* Huds., and in spring on *Avena sterilis* L. Caterpillars refrain from feeding only when the weather is cold, and grow slowly in winter.

Lasiommata megera (Linnaeus, 1767)

Females have been observed laying eggs on small plants very close to *Piptatherum miliaceum* L. and *Cynodon dactylon* L., on which the larvae fed.

Lasiommata maera (Linnaeus, 1758)

Three caterpillars were found on *Brachypodium pinnatum* L. growing at the bottom of a boulder. All three were parasitized by *Agrypon delarvatum* (Gravenhorst) (Hymenoptera, Ichneumonidae).

Caterpillars of *Hyponephele lupina* (Costa, [1836]), *Pseudochazara anthelea* (Hübner, [1824]) and *Chazara briseis* (Linnaeus, 1764) were found eating the leaves of small *Festuca* sp. Females of these three species lay eggs on dry substrates on the ground or just above it in dry grazed grasslands.

Erebia ottomana Herrich-Schäffer, [1847]

A female laid an egg on a dry leaf of *Poa cf. thessala* Boiss. & Orph. in central Greece.

Protorebia afra (Fabricius, 1787)

Females sit on a small *Festuca* sp. and eject one or two large eggs on the ground in the middle of the tuft. The following satyrines also eject their eggs when sitting in the grass: *Melanargia larissa* (Geyer, [1828]) and *Arethusana arethusa* ([Denis & Schiffermüller], 1775) on small *Festuca* sp., *Brintesia circe* (Fabricius, 1775) on *Brachypodium pinnatum* L., *Erebia oeme* (Hübner, [1804]) and *Maniola jurtina* (Linnaeus, 1758). The last mentioned also glue them on various dry substrates on or very close to the ground. A caterpillar of *jurtina* found by day on a shrub in the northern Peloponnese produced a female of *Alcima orbitale* (Gravenhorst) (Hymenoptera, Ichneumonidae).

Satyrus ferula (Fabricius, 1793)

A grown caterpillar was found eating by day, in overcast weather, on *Stipa pennata* L. on Mt Orvilos (northern Macedonia).

Hipparchia senthes (Fruhstorfer, 1908)

Butterflies hatch in May at low level, rarely at the end of April. They mate in May and June and females go into aestivation until late September. They glue their eggs singly on dry substrates on or close to the ground in dry grasslands until the end of October. The life-cycle of similar-looking *Hipparchia volgensis* (Mazochin-Porshnyakov, 1952) is different: butterflies hatch in June and mate in August. They live mostly in woodlands and rest on tree trunks. Females certainly lay eggs without delay, as the last butterflies are seen in early September.

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Fig. 1. Diakopto, northern Peloponnese.



Fig. 2. Konitsa basin, Epirus.

excursions all over Greece were made with my family and both my children Antoine and Claire took an active part in the search of early stages. They also helped rear caterpillars every time I had to leave home.

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