



DISCOVERING THE BUTTERFLY WORLD

Butterfly Identification: families and resources

Differences between butterflies and moths

In culture and taxonomy, two main categories of Lepidoptera are distinguished:

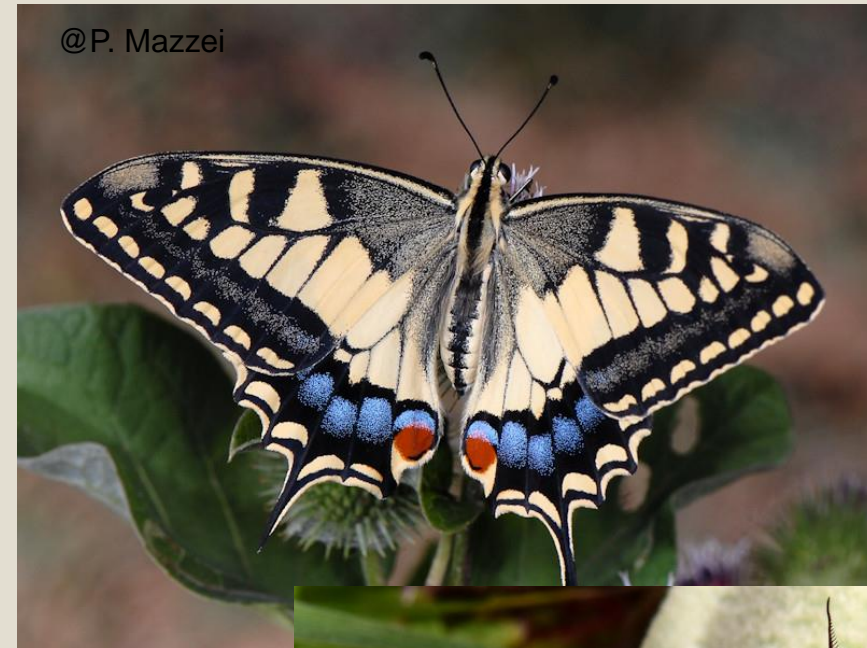
mariposa – polilla

farfalle – falene

butterfly – moth

schmetterling – motte

πεταλούδα – σκώρος





@P. Mazzei



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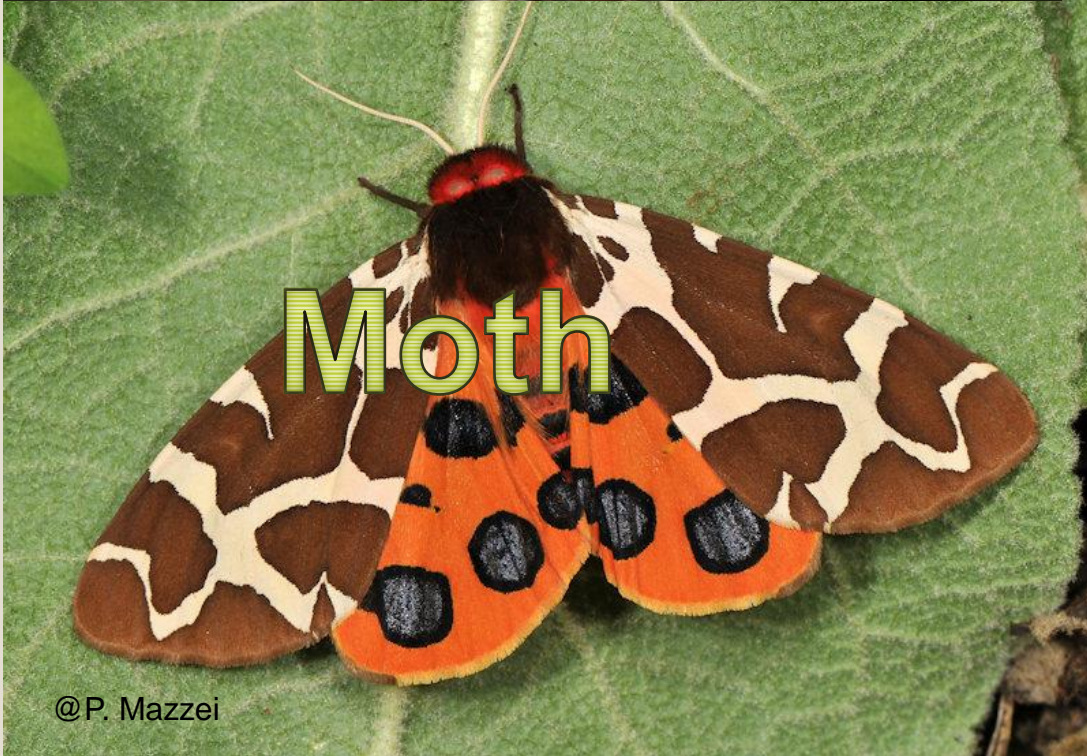
Butterfly

@P. Mazzei



Moth

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Moth

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Moth

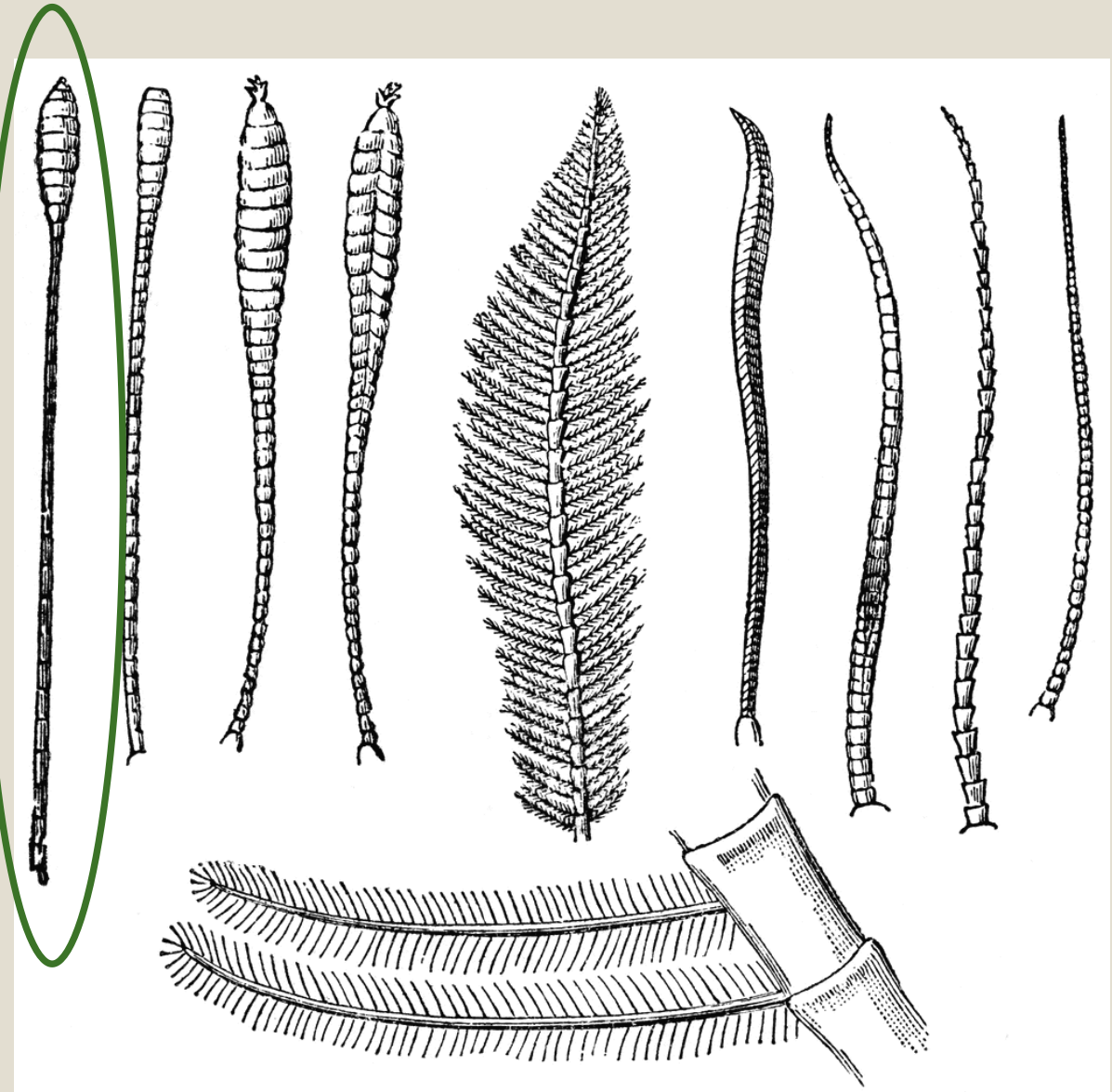
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Butterflies and Moths

Taxonomists have been searching for decades for an unique character that can distinguish butterflies and moths.

The only character that has been recognized was the shape of the antennae, which only in butterflies show a typically elongated shape ending in a mace, while in moths the antennae take many other shapes, except for this one. For this reason, Lepidoptera had been divided into:

- **Rhopalocera/Butterflies** (antennae with mace)
- **Heterocera/Moths** (antennae with other shapes)





Those colorful individuals are moths

Butterflies and Moths

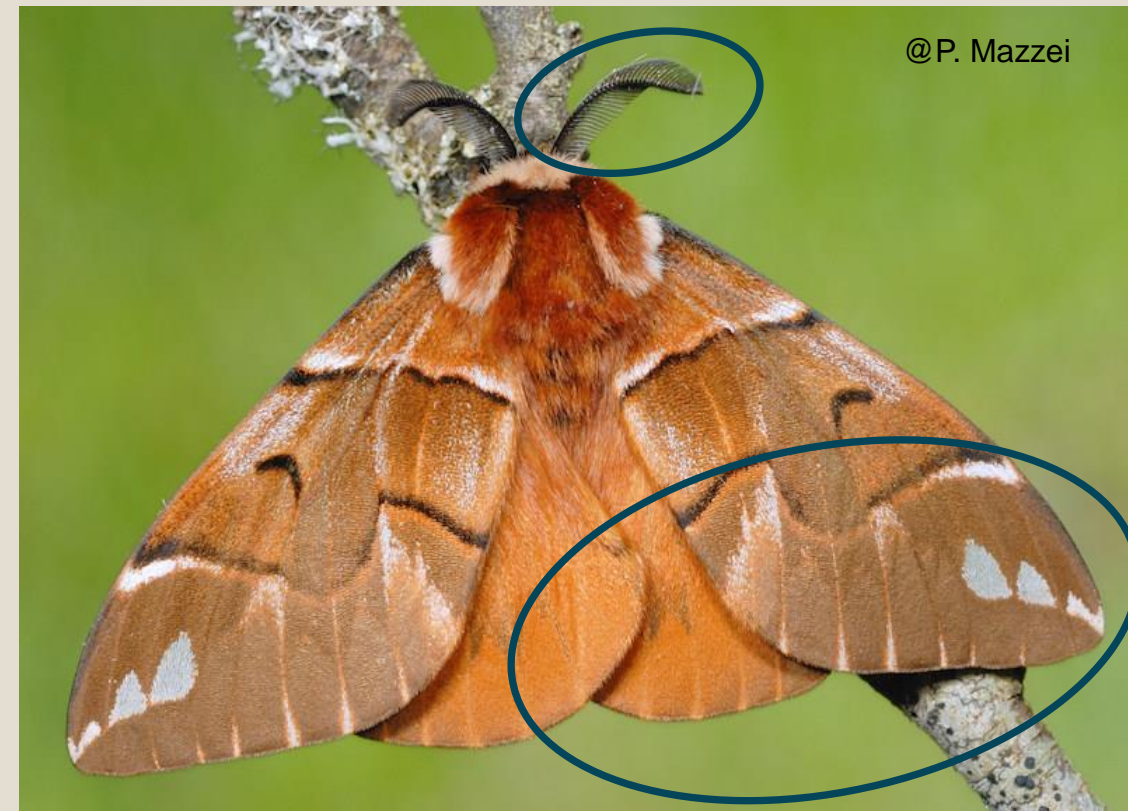


The great majority of moths belongs to the microlepidoptera group

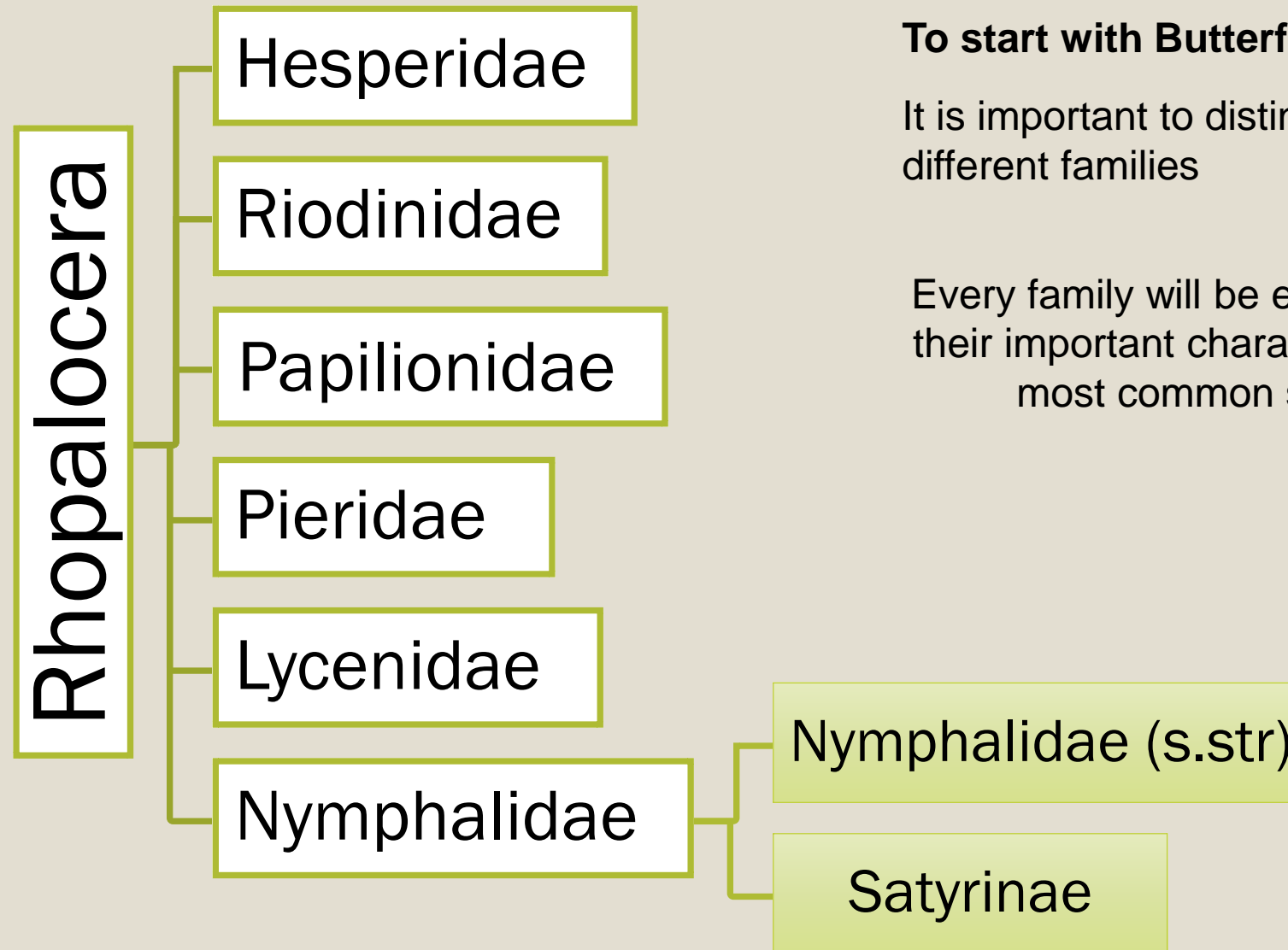


Butterflies and Moths

- **Butterflies:** slender filamentous antennae which are club-shaped at the end. Wings spread in resting posture or folded about their backs
- **Moths:** comb-like or feathery antennae and triangular shape wings in resting posture



Butterfly Families



To start with Butterfly identification:

It is important to distinguish the different families

Every family will be explained with their important characteristics and most common species

1. Butterfly families

Skippers - Hesperidae



Papilionidae



Whites - Pieridae



Riodinidae



Lycaenidae



Nymphalidae



1. Butterfly families

1.1 Skippers – Hesperiidae



Erynnis tages – dingy skipper

- Small body, 'stocky'
- Large, broad head
- Thick, massive thorax
- Relatively small wing area
- Tip of the antenna is curved
- Antennae stem far from each other on the head

1. Butterfly families

1.1 Family Pieridae

Hesperiinae

Heteropterinae

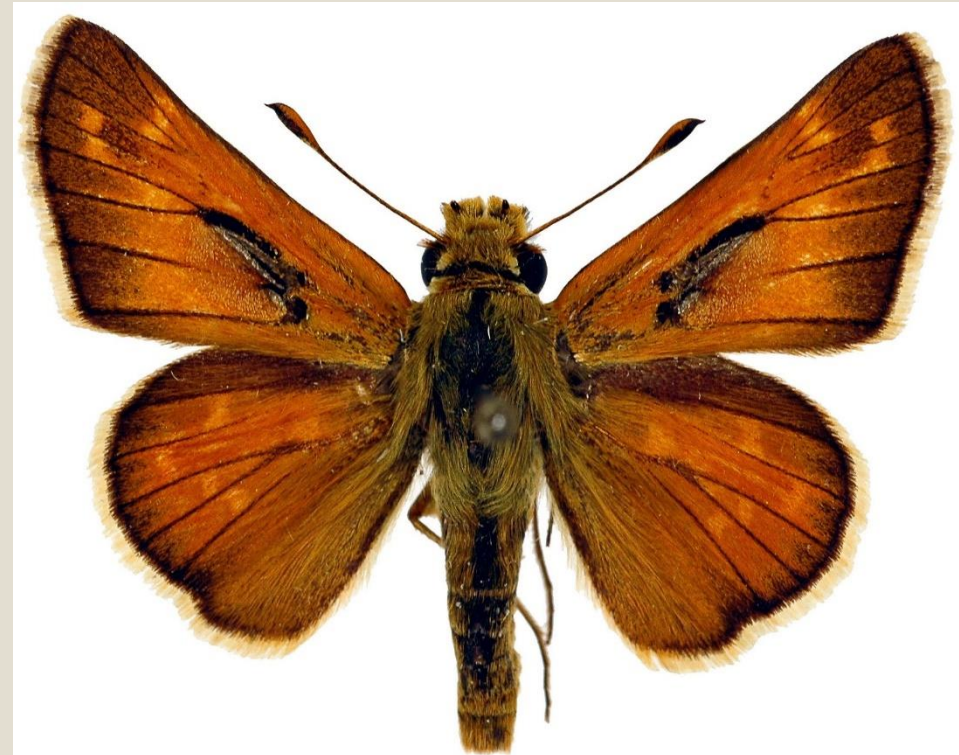
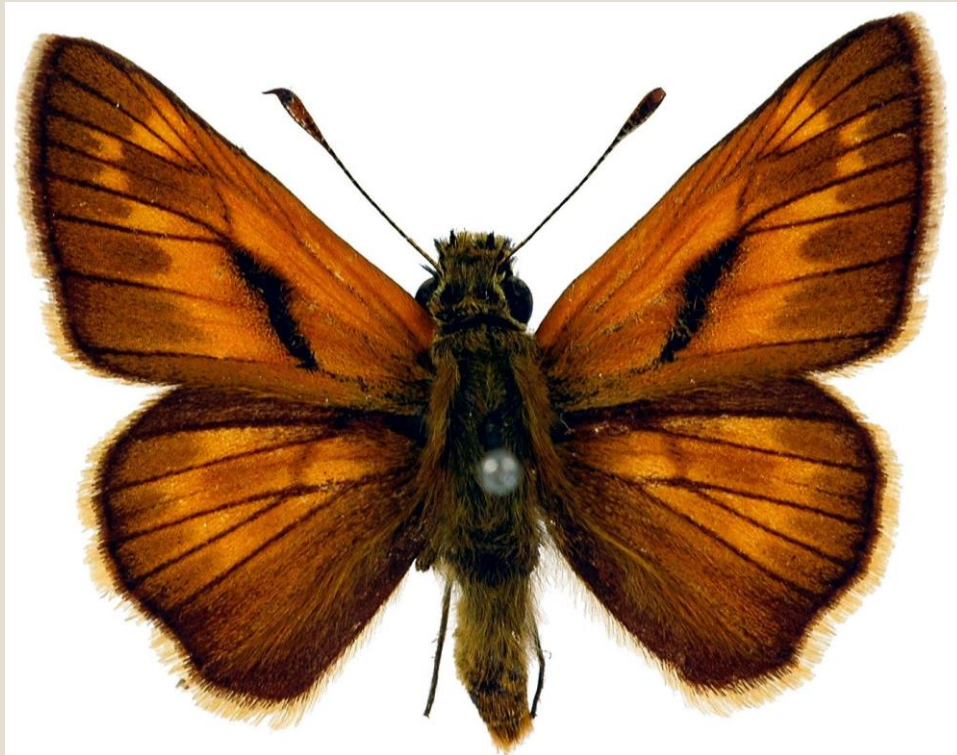
Pyrginae



Hesperiinae



These are two different species. Which photos belong to the same species? What are the differences?



Hesperiinae



*How many species
can you distinguish?*



Hesperiinae



Clear, conspicuous white spots

Dull, yellowish spots



2 species

Hesperiinae



© G3r 1d1m



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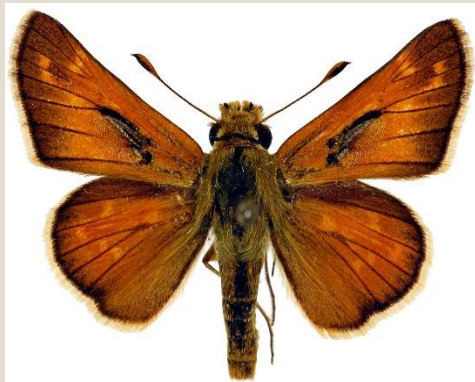
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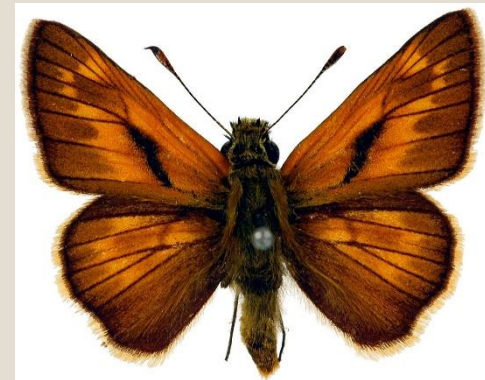


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Hesperia comma

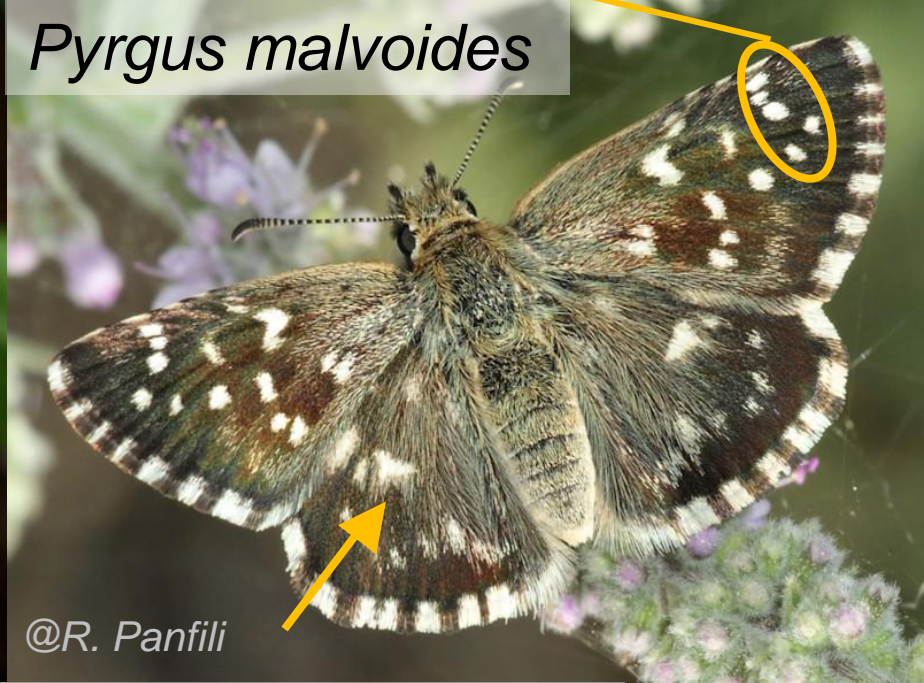
The important key features are often on the underside of the wings!



Ochlodes sylvanus

Pyrginae

Pyrgus sp.



1. Butterfly families

1.2 Papilionidae



© Górádám

Iphiclides podalirius



© Erk Dallmeyer

Papilio machaon



© Nestor Tamás

Zerynthia polyxena



© Nestor Tamás

Parnassius mnemosyne

- Large body, large wings
- Hindwing often scalloped, or has a tail (Papilioninae)
- Forewing edge is transparent, without scales (Parnassiinae)
- Some caterpillars have an 'osmaterium'



© 2011 Marvin Smith

1. Butterfly families

1.3 Whites - Pieridae

- Variable body size (small-medium)
- White, yellow and orange ground color
- Often strong sexual dimorphism
- Modified habitat by humans
- Preferred plants: leguminous & crucifers (pests)
- Green eyes



Family Pieridae

Pierinae



@R. Panfili

Whites

Dismorphinae



@P. Mazzei

Leptidea sinapis

White, rounded wing shape
and slow flight

Coliadinae



@P. Mazzei

Yellowish

1.3 Whites - Pieridae



How many species are on these photos?



1.3 Whites - Pieridae



Gonepteryx rhamni



Leptidea sinapis/juvernica

- Answer: 8 species
- *P. mnemosyne*: NOT in this family! (It was a prank)



Anthocharis cardamines



Parnassius mnemosyne



Aporia crataegi



Anthocharis cardamines



Colias hyale



Pieris brassicae



Pieris rapae



Pieris brassicae

1.3 Whites - Pieridae

Example of confusing species



Mickey Mouse



Pontia edusa/daplidice

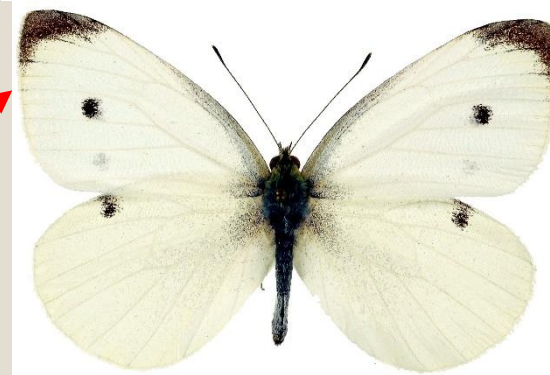
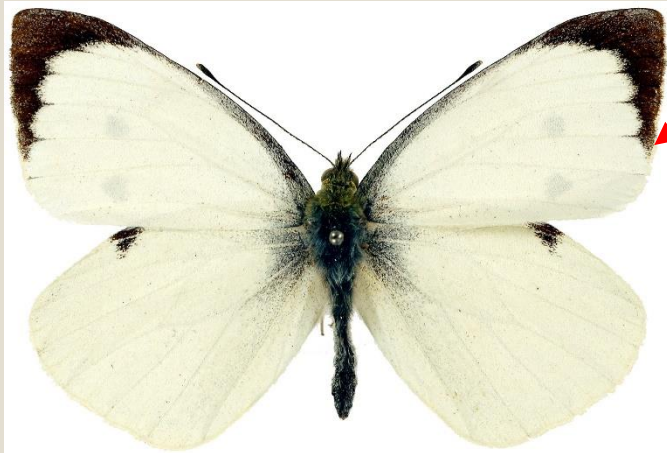
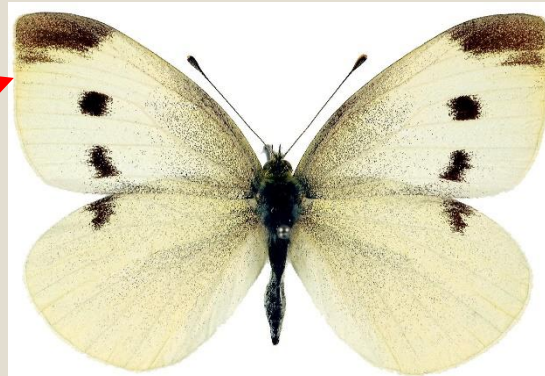
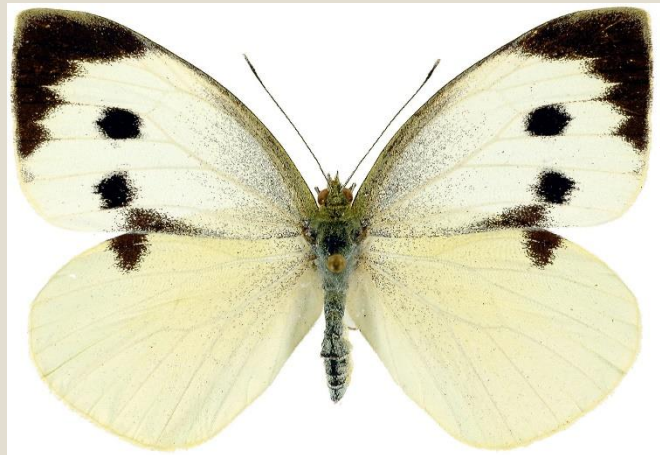
On the underside, there is more green than white, green patches are large



Anthocharis cardamines

On the underside, there is more white than green, green patches are smaller and the pattern is fragmented

1.3 Whites - Pieridae



Pieris brassicae

Important to check the apical spot (red arrow) how long and diffuse it is in Pieris species



Pieris rapae



Pieris napi

Pierinae

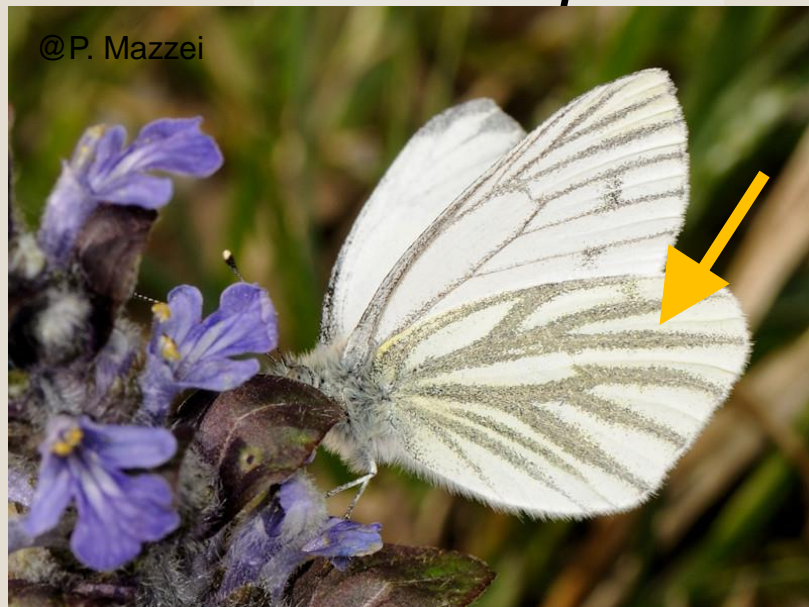
Pieris brassicae



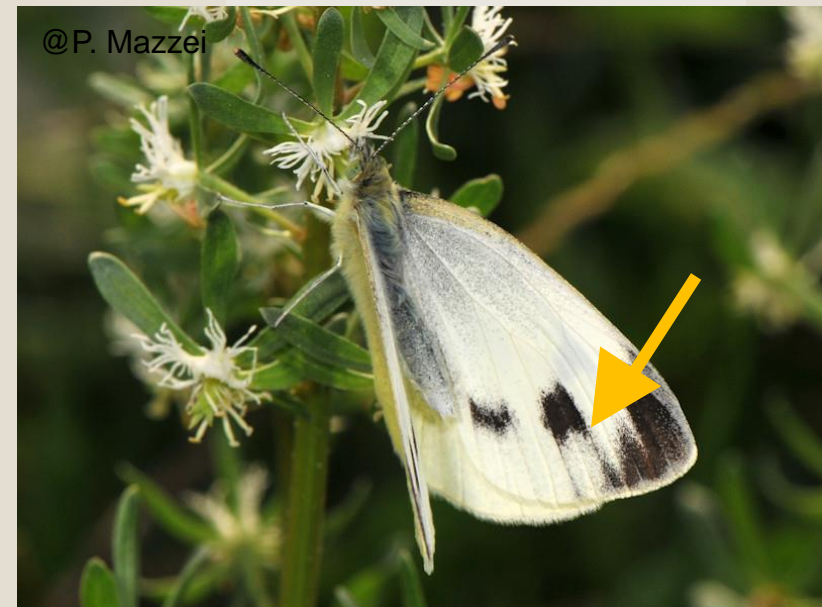
Pieris rapae



Pieris napi



Pieris mannii



1. Butterfly families

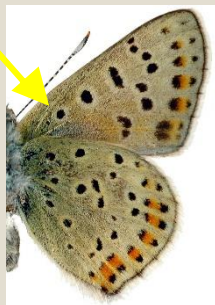
1.4 Lycaenidae

- Small or medium body size
- Sexual dimorphism
- Myrmecophily (ant relationship)
- Labial palps usually protrude forward
- Rapid flight



1.4 Family Lycaenidae

Lycaeninae



- Violet, orange or brown ground color
- Forewing underside: black spot in the basal area

Theclinae



- Brownish ground color
- Small tail
- White streak on the hindwing underside

Polyommatainae



- Blue male – brown female (not always)
- Orange spots at the edge of the underside and/or conspicuous black spots



© Nestor Tamás

- Skyblue (azure)
- Black lines in the white edge at the end of the veins

Polyommatus bellargus



© Kurucz Lajos

- Orange band extended on both wings
 - Metallic blue dots
- Plebejus argyrognomon*



© Szombathelyi Ervin

- Forewing underside: line of black spots is J-shaped

Maculineaalcon



© Górádám

- Orange band on forewing reduced
- Metallic blue dots

Plebejusargus



© Káldi József

- Forewing underside: line of black spots is curved, but does not turn back

Maculinea teleius



© Górádám

- Black spot in the forewing cell
- No metallic blue dots

Polyommatus icarus

Examples of identification keys to pay attention

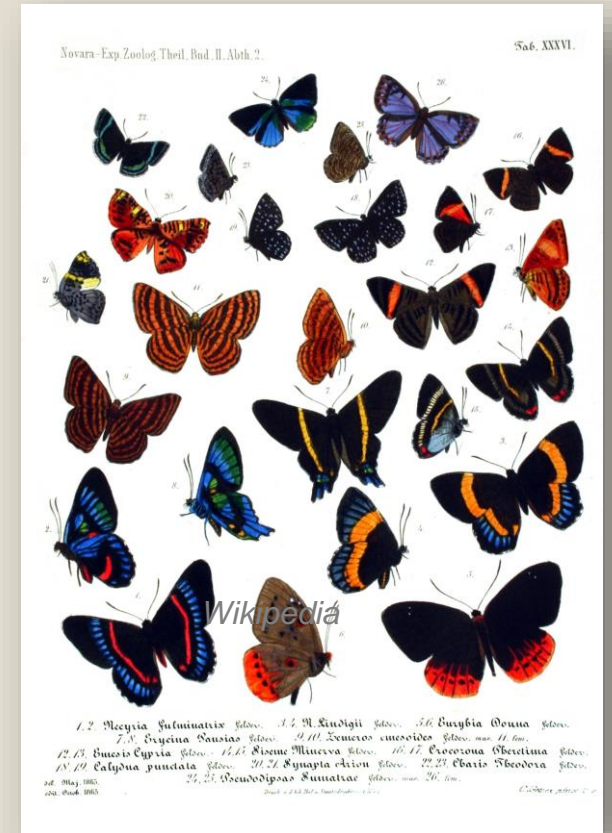
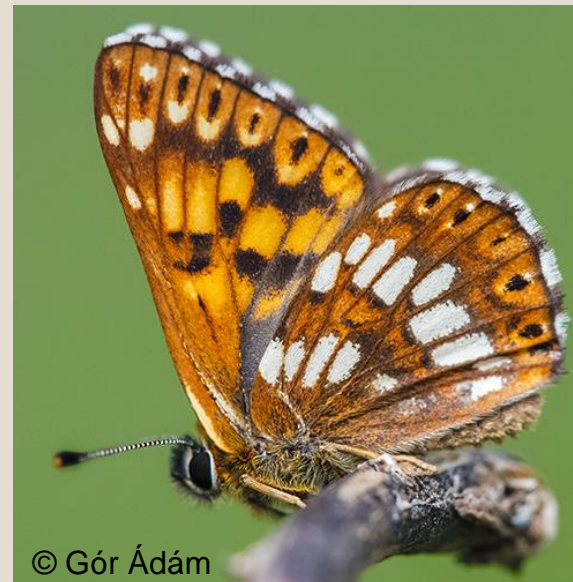
1. Butterfly families

1.5 Riodinidae

- A subfamily from the tropics – Metalmarks butterflies
- Diverse family: **a single species in Europe**
- Between Nymphalidae and Lycaenidae



Duke of Burgundy – *Hamearis lucina*



Reise der 3sterreichischen
Fregatte Novara um die Erde (1861–1876)

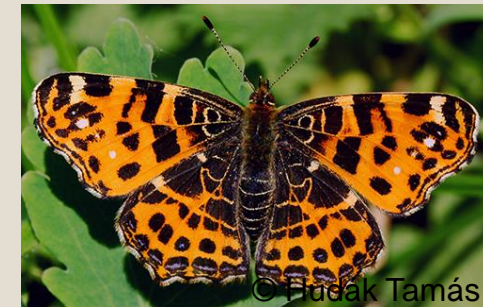
1. Butterfly families

1.6 Nymphalidae

- First pair of legs is vestigial, you see 'four-legged'
- Very diverse: size, shape, color (frequent orange & red), life history
- They can feed on rotten fruits (not only nectar)

Subfamilies:

- Libytheinae
- Limenitinae
- Heliconiinae
- Apaturinae
- Nymphalinae
- Satyrinae



1.6 Nymphalidae

1.6.1 Libytheinae

Unique species in Europe - *Lybithea celtis*



Palpi are long extended ahead and hibernate as an adult

1.6.2 Limenitinae

- Dark brown or black ground color
- Medium or large body
- White bands

Limenitis camilla



Limenitis reducta



1.6.3 Heliconiinae



Argynnis paphia



© Hudák Tamás

- Orange ground color, black pattern
- Pearl-like spots or bands on the underside



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Brenthis ino



© Górád Ádám

Better to check the underside for identification



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Issoria lathonia



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1.6.4 Apaturinae

- Blackish, brownish wing
- Medium-large body size
- Blue-violet iridescence



Apaturia ilia

1.6.5 Nymphalinae

- Very diverse group
- Hindwing scalloped or forewing elongated
- Black/brown ground color and orange spots and bands



Polygonia c-album



Euphydryas maturna



Melitaea cinxia



Inachis io



Vanessa atalanta



Vanessa cardui

1.6.6 Satyrinae

- Eye-spots (single or chain)
- Mostly brownish ground-color
- Caterpillars feed mostly on grasses



Melanargia galathea



Coenonympha pamphilus



Maniola jurtina



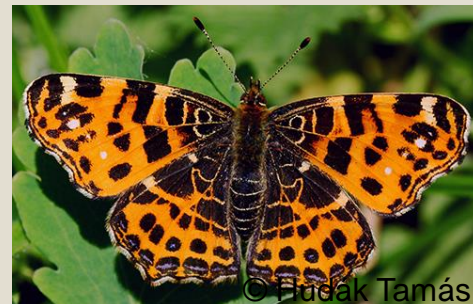
Lasiommata megera



Lopinga achine



Which butterflies do NOT belong to Nymphalinae?





© Nestor Tamás

Lycaena tityrus (female)
Lycaenidae!



© Górád

Melitaea aurelia



© Hudák Tamás

Melitaea diamina



© Górád

Melitaea athalia



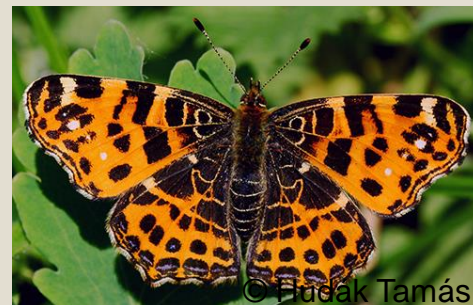
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Hamearis lucina **Riodinidae!**



© Hudák Tamás

Melitaea britomartis



© Hudák Tamás

Araschnia levana



© Hudák Tamás

Hamearis lucina **Riodinidae!**



Two species are shown on these 10 pictures. Which specimens belong to each species? What might be the keys?



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Coenonympha glycerion

- Hindwing:
- Thin orange edge
 - Eye-spot row, variable white spot ahead of it
- Forewing:
- No eye-spot or very reduced



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Coenonympha pamphilus

- Hindwing:
- No orange edge
 - No eye-spots, max. tiny dots; no white spot
- Forewing:
- One big eye-spot

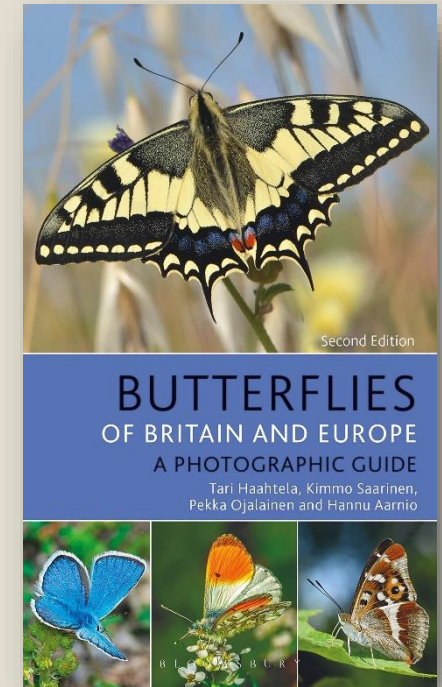
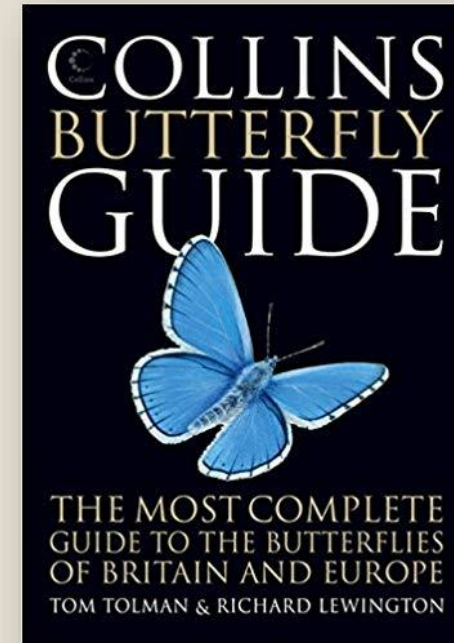


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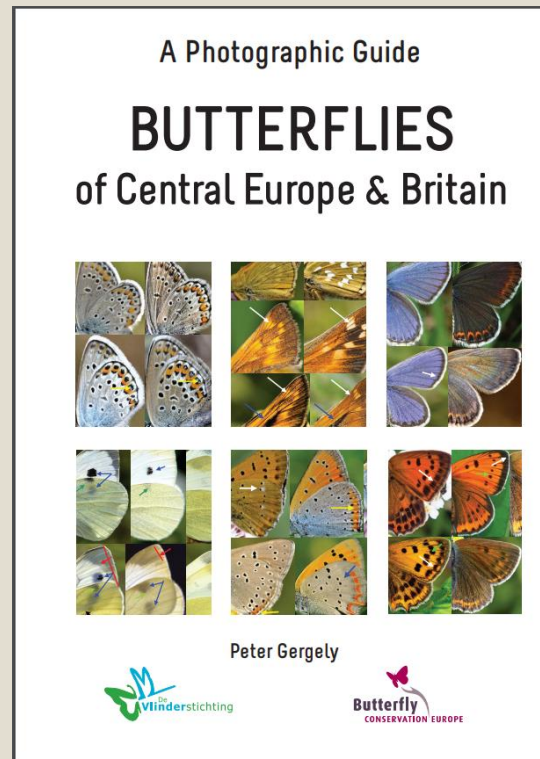
2. Guides and help

Books:

- All European species (Collins Butterfly Guide)
- Butterflies of Britain and Europe. A Photographic Guide



For better identification, check national or local books for butterflies of your surroundings



- A Photographic Guide. Butterflies of Central Europe & Britain. *Peter Gergely*
You can download the [Pdf here](#)

2. Guides and help

Websites:

- European Butterfly Group
<http://www.european-butterflies.org.uk/>
 With pdfs of Butterfly Identification Guides for different butterflies groups

Butterfly Conservation European Butterflies Group

Home About EBG Countries Events Holidays News Requests **Species** Contacts & Links

Identification Guides Identification Service European Species List

Butterfly Identification Guides

The following guides provide help with the identification of European butterfly species and are free to download as pdf's.

Brimstones
 A guide to help distinguish between the following species: Brimstone [*Gonepteryx rhamni*], Powdered Brimstone [*Gonepteryx farinosa*], and Cleopatra [*Gonepteryx cleopatra*] ~ [Download \(3mb\)](#)

Large and Medium Fritillaries
 This guide helps to separate the Large and Medium Fritillaries from the Small Fritillaries (*Boloria*, *Euphydryas* and *Melitaea*). The following species are described in detail: Cardinal [*Argynnis pandora*], Silver-washed Fritillary [*Argynnis paphia*], Dark Green Fritillary [*Speyeria aglaja*], High Brown Fritillary [*Fabriciana adippe*], Niobe Fritillary [*Fabriciana niobe*], Queen of Spain Fritillary [*Issoria lathonia*], Marbled Fritillary [*Brenthis daphne*], Lesser Marbled Fritillary [*Brenthis ino*], Twin-spot Fritillary [*Brenthis hecate*], Corsican Fritillary [*Fabriciana elisa*], Pallas's Fritillary [*Argynnis laodice*] ~ Download : [high resolution \(large file size - 16mb\)](#) or [low resolution \(small file size - 4mb\)](#)

Small Fritillaries
 This guide to *Boloria* is the first of three covering the Small Fritillaries. All fifteen species of *Boloria* are covered with an identification sequence taking you through a process of elimination and determination by habitat and distribution. Potentially difficult comparisons like Shepherd's Fritillary [*Boloria pales*] and Mountain Fritillary [*Boloria napaea*] are dealt with in detail. ~ Download : [high resolution \(large file size - 22mb\)](#) or [low resolution \(small file size - 6mb\)](#)

Identification Guide: Small Fritillaries - Boloria

Distinguishing Boloria by size

Identifying fritillaries* in Europe is difficult due to there being over 40 superficially similar species. As a starting point they are usually roughly divided by size into: 'large' fritillaries [Argynnis, Fabriciana, Speyeria], 'medium-sized' fritillaries [Brenthis, Issoria], and 'small' fritillaries [Boloria, Euphydryas, Melitaea]. The eleven large and medium sized are described in a separate guide. Future guides will cover the other small fritillaries, i.e. Euphydryas and Melitaea.

Estimating size is a useful way to begin the identification process. Argynnis, Fabriciana and Speyeria species, for example, are usually noticeably larger (see diagram opposite), whilst the medium sized Brenthis and Issoria species are intermediates with *Brenthis daphne* sometimes similar in size to the large species and *Brenthis ino* and *Brenthis hecate* comparable to the 'small' fritillaries.

A comparison of approximate average sizes*

Distinguishing Boloria from the other 'small' fritillaries

To help separate the 15 Boloria species from the other 'small' fritillaries we can compare the general appearance of their uppersides. From the photos opposite it is noticeable that Euphydryas and Melitaea species usually have uppersides resembling a grid or net-like pattern, whereas Boloria species have an open pattern of marks and rounded spots. Also, Euphydryas tend to be more colourful and Melitaea duller than Boloria. Most are therefore unlikely to be confused with any of the species in this guide. See page 5 for more guidance. * This is an arbitrary grouping, see note on page 6.

Distinguishing Boloria from the 'large' and 'medium-sized' fritillaries

Boloria are usually noticeably smaller than all the 'large' fritillaries making identification relatively straightforward. However, the 'medium-sized' fritillaries, Brenthis and Issoria, can be a similar size to Boloria. Use the guidance below to help identify Boloria.

Upperside Boloria species have similar uppersides to the 'large' and 'medium-sized' fritillaries, all having an open pattern of marks and rounded spots. To differentiate look for:
 A prominent round black spot here. This is distinctive and found on the species of Boloria that are fairly widespread in Europe. This spot is not present on all the 'large' and 'medium-sized' fritillaries.
Note: This spot is also not visible on most of the more localized Boloria

Underside A detailed comparison of the underside hind-wing will readily distinguish Boloria from the four 'medium-sized' fritillaries. Most Boloria have some distinct white marks whilst the Brenthis species have none. *Issoria lathonia* has silver marks but these are unmistakably large and bright. See the comparison photos below.

Identification Guide: Pieris

Firstly, use these diagnostic features to determine if it is a Pieris. Page 3 shows similar species and second broods which may confuse.

FEMALE Pieris fore-wing upperside
 All females usually have dark wing-tips and two black-grey spots on the fore-wing.
[Note: Krueper's Small White has only one spot]

MALE Pieris fore-wing upperside
 All males usually have dark wing-tips and one or no black-grey spots on fore-wing

MALE & FEMALE Pieris underside
 Fore-wings usually have yellowish wing-tips
 Hind-wings are creamy-white or have streaks/ blotches of greenish grey.

Next, establish if it is one of the three very common species of Pieris below which are found THROUGHOUT MAINLAND EUROPE. If unsure, then follow notes to the numbered species on the next page which are mainly found LOCALLY IN SOUTHERN EUROPE.

1. Large White [*Pieris brassicae*]
 Size is main indicator, usually significantly larger than all other species of Pieris

2. Small White [*Pieris rapae*]
 Usually significantly smaller than Large White

3. Green-veined White [*Pieris napi*]
 Similar in size to Small White

MALE & FEMALE upperside
 Wing-tip marking fainter than Large White. Usually ends around here, well above the vein marked [a]. If mark goes further down, compare with 4

MALE & FEMALE upperside
 This spot is rounded. Compare with 4
 If wing-tip marking has black triangles like this go to 6

MALE & FEMALE upperside
 Wing-tip markings variable but veins usually lined greyish unlike Small and Large White.
[Note: Around the Arctic Circle females may be much darker, similar to 7]

MALE & FEMALE underside
 Wing-tip marking of roughly equal length along edges [a] and [b]. The marking is usually more extensive and blacker than other species of Pieris. Compare with Small White

MALE & FEMALE underside
 Dense grey dusting below this vein is distinctive
 If dusting appears equally dense above and below compare with 4

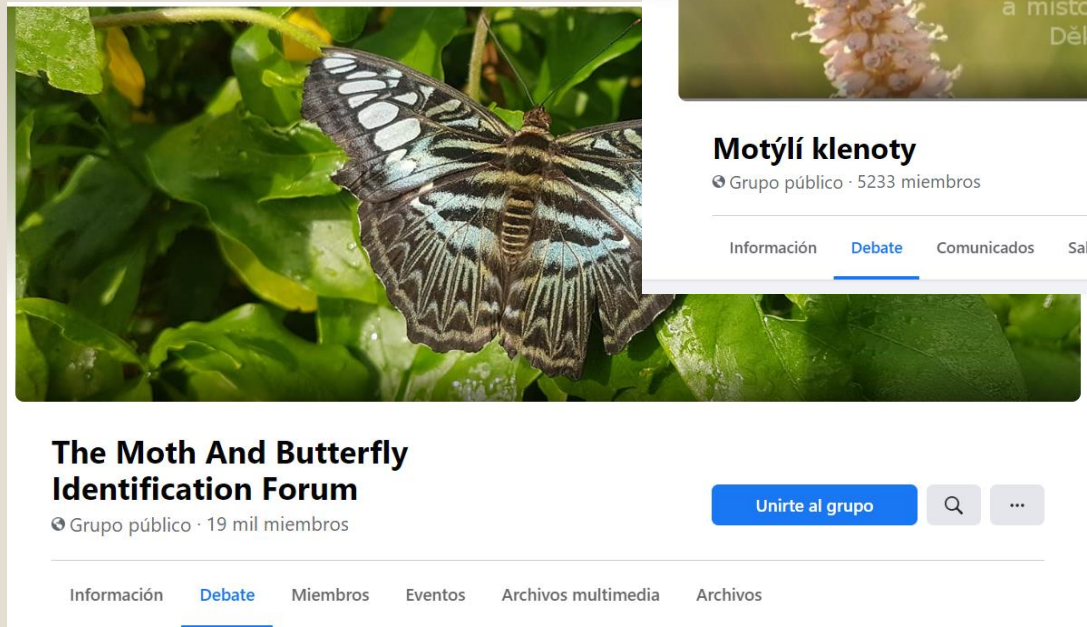
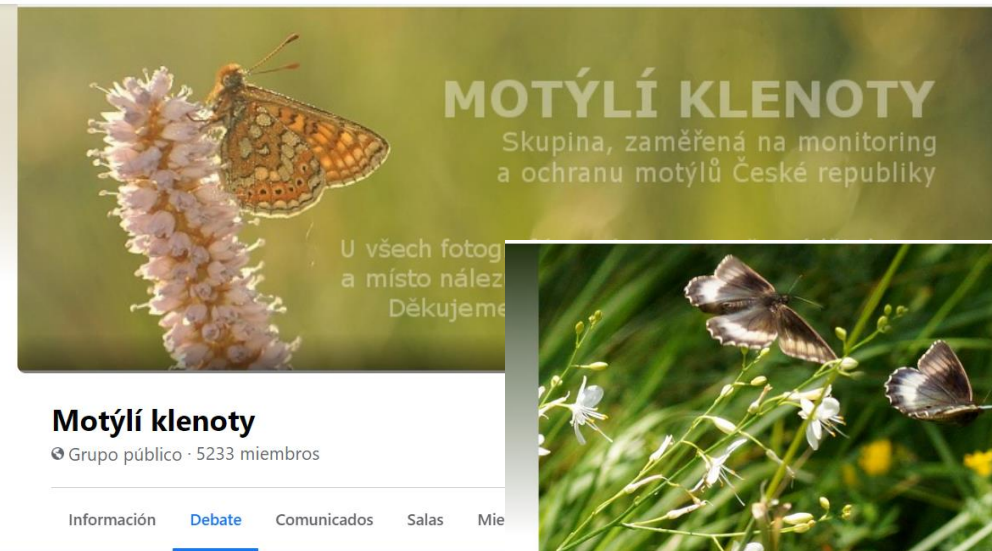
MALE & FEMALE underside
 Prominent greenish grey veins on hind-wing are distinctive and easily distinguished from Small and Large White

2. Guides and help

Facebook Groups:

Social media helps in butterfly identification and create a butterfly community

- National groups
- Local pages



Acknowledgement

Photos of mounted museum specimens were made by Gábor Ronkay and the Hungarian Natural History Museum is the copyright owner. Otherwise copyright owners' name is shown on the nature photos.



Authors: Adam Korosi for the creation of this material and Cristina G. Sevilleja



European Butterfly
Monitoring Scheme



Assessing Butterflies
in Europe

