



moths and butterflies of the Scottish uplands

Butterfly Conservation is a UK charity of 12,500 members, over 600 of whom live in Scotland.

In Scotland, Butterfly Conservation advises landowners on habitat management for butterflies and moths; collaborates with others on landscape-scale nature conservation projects; carries out surveys and monitoring on our most threatened species; trains volunteers to enable them to take action for butterflies and moths; makes recommendations to the Scottish Government on its environmental policies; and encourages everyone to cherish their butterflies and moths - in their gardens, parks, crofts, farms and businesses.

You can join online at www.butterfly-conservation.org

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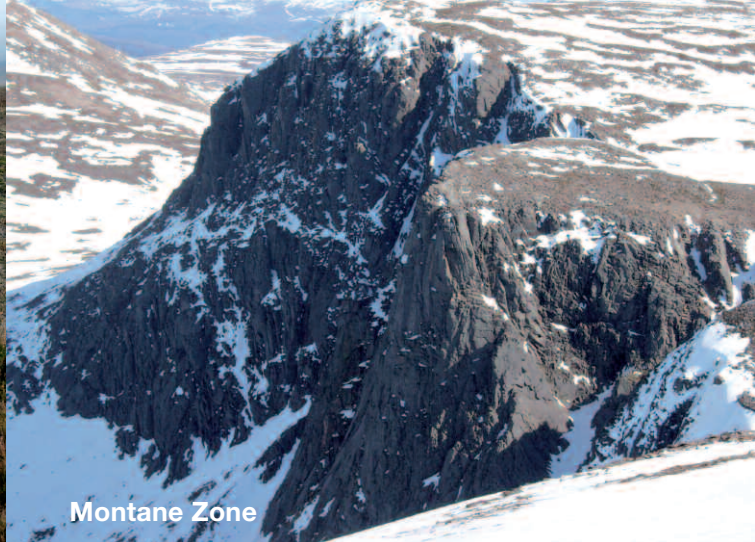
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This leaflet describes some of our beautiful and fascinating upland and montane moths and butterflies, and the special habitats and landscapes they occupy.



Upland Moors



Montane Zone

We can divide Scotland's high ground into two zones; high ground or uplands - land above enclosed farmland, and the montane zone - land above the tree-line. Butterflies and moths live in different conditions within each zone.

The Cairngorms National Park

Almost a third of UK land over 600m, by far the largest area of montane habitat in Britain, is within the Cairngorms National Park.

THE UPLANDS

Uplands are mostly moorland, grassland, woodland, scrub and blanket bog. They are often a mixture of all these, a "habitat mosaic", and some species need more than one type of habitat to complete their life cycle.

Much of the uplands is moorland, dominated by ling heather (*Calluna*), but if you look a little more closely you can see a patchwork of other dwarf shrubs. In some areas, such as those with richer soils or steeper slopes, there are more grasses. The wettest areas, usually flat or gently sloping ground, form blanket bogs.

Woodlands and scrub are less common, mainly because deer, cattle and sheep have been nibbling at any saplings that have grown for centuries.

MONTANE HABITATS

Above the tree line, it is cold, windswept and inhospitable for much of the year, and the growing season is very short. Only lichens, mosses, sedges, rushes and low-growing shrubs can grow in the thin soils between the areas of bare rock.

The moths and butterflies that live here are well adapted to this hostile environment. For example, many moths take two years to complete their life-cycle (see page 14).

The remoteness of the high mountain environment and the unpredictable and inclement weather makes surveying and monitoring difficult. As a result, little is known about the distribution and life cycle of many of our montane species - which is why we need your help!

In the Cairngorms the upland zone starts at around 300m, and the montane zone starts at around 800m. But if you go north or west the zones start lower down, approaching sea-level in the Western Isles, Sutherland, Orkney and Shetland. So, you could find a butterfly or moth at sea level in Shetland that could only be seen on the high tops in the Cairngorms.

The high rolling plateau is characterised by late-lying snow, boulder fields, scree slopes, steep corrie walls, vast distances and thin soils making it a special and fragile home for the plants and animals surviving there.

The area is incredibly important for upland and montane species. All of the species described in this leaflet occur there.





Emperor Moth (female)



Northern Eggar

Upland Moths

Emperor Moth

Saturnia pavonia

Wingspan 55 - 85mm

One of the most spectacular of our moorland species, the day-flying Emperor Moth is characterised by giant eye spots on both pairs of wings. The fully grown caterpillar is unmistakable with its bright pink or yellow spots!

DISTRIBUTION AND CATERPILLAR FOODPLANT

This is a common moth, found in the uplands throughout Scotland, and also on lowland heathland. It's caterpillars feed mainly on heathers, but also on other woody plants and bramble.

LIFE CYCLE AND ADAPTATIONS

The adults fly in April and May and caterpillars can be seen from June to August. They overwinter as pupae in brown, pear-shaped cocoons, with openings like lobster pots with outward-pointing spikes. The newly emerged moth can get out but predators can't get in.

Northern Eggar

Lasiocampa quercus callunae

Wingspan 68 - 96mm

Male Northern Eggar moths can be seen during the day flying fast and erratically over moorland scouting for females. The broad pale band of colour on the forewings is easily seen in flight. The female is paler and much larger and than the male - she carries a heavy load of eggs and needs bigger wings to fly.

DISTRIBUTION AND CATERPILLAR FOODPLANT

This is a common species, found on moorland throughout Scotland. Its caterpillars feed on heather and blaeberry.

LIFE CYCLE AND ADAPTATIONS

The adults fly in May and June and the caterpillars can be seen from July onwards. In Scotland and northern England the moth has a two year life cycle, overwintering once as a small caterpillar then spending a second winter as a pupa.



Common Heath



True Lover's Knot

Common Heath

Ematurga atomaria

Wingspan 22 - 34mm

The Common Heath is sometimes abundant, and to see dozens of them flying over the moors in the sunshine can be a memorable sight on a fine day. The males can be distinguished by their large feathery antennae, used to detect the female's pheromones from hundreds of metres away.

DISTRIBUTION AND CATERPILLAR FOODPLANT

It is a very common species found throughout Scotland on lowland heathland and moorland, its caterpillars feeding on heather.

LIFE CYCLE AND ADAPTATIONS

The adults are active during the day in May and June, especially in bright sunshine. The caterpillars are found in mid to late summer, and the moth spends the winter as a pupa.

True Lover's Knot

Lycophotia porphyrea

Wingspan 26 - 34mm

With an unforgettable name, the True Lover's Knot can be distinguished by its rich reddish brown colour and Celtic knot-like pattern on the forewings, which gives us the clue as to how its name was derived.

DISTRIBUTION AND CATERPILLAR FOODPLANT

Another heather-feeder, this is also a common species on heathland and moorland throughout Scotland.

LIFE CYCLE AND ADAPTATIONS

The adults can be active on bright days, but also fly at night and readily come to light. The adults fly from June to August, and it overwinters as a caterpillar.



Netted Mountain Moth



Small Dark Yellow Underwing

Netted Mountain Moth

Macaria carbonaria

Wingspan 23 - 25mm

The day-flying Netted Mountain Moth is a rare and declining species. The Cairngorms National Park is it's UK stronghold. This small moth, characterised by wavy black bands across its grey wings, can be confused with the female Common Heath. However, it flies faster and is smaller and darker.

DISTRIBUTION AND CATERPILLAR FOODPLANT

The Netted Mountain Moth may be more widespread in Scotland than records would suggest, due to under-recording. The sole caterpillar foodplant is bearberry (*Arctostaphylos*), and colonies can thrive where this is abundant, in areas often called "Arctostaphylos heath" (see the section on habitat management) The Netted Mountain Moth is also present in Highland Perthshire, Moray and Easter Ross.

LIFE CYCLE AND ADAPTATIONS

The adults are day-flying from April through to early June although dates vary with altitude - the higher colonies can emerge much later in the season. The caterpillars are found in late May to early July and it overwinters as a pupa.

Listed in both the UK Biodiversity Action Plan (UKBAP) and the Cairngorms Local Biodiversity Action Plan (LBAP). See over.

Small Dark Yellow Underwing

Anarta cordigera

Wingspan averages 24 - 28mm

The Small Dark Yellow Underwing is a UKBAP and Cairngorms LBAP species. It is a small moth, characterised by large white kidney-shaped spots on the dark forewings, and dark bands on the yellow underwings, although these are hidden when at rest.

DISTRIBUTION AND CATERPILLAR FOODPLANT

The Cairngorms National Park is a stronghold for this moth, but there are also records from Highland Perthshire and Moray. Like the Netted Mountain Moth, the caterpillar's sole foodplant is bearberry. It may occur in the montane zone as well as the upland zone.

LIFE CYCLE AND ADAPTATIONS

The adults fly by day from late April into June. In the sunshine they have a fast, buzzing bee-like flight and can often be seen nectaring on flowers, especially those of bearberry. They may sometimes be found resting on rocks or posts. The Small Dark Yellow Underwing is a caterpillar from June to July, and it overwinters as a pupa.



A training day for the tourism industry, supported by the Cairngorms LBAP



Broad-bordered White Underwing

Biodiversity Action Plans

The UK Biodiversity Action Plan (UKBAP) highlights the UK's most threatened species and habitats, and outlines ways their conservation should be co-ordinated.

Local Biodiversity Action Plans (LBAPs) identify regional and local priorities for conservation. They usually include additional species and habitats as well as all of the UKBAP species that occur in the area.

LBAP's are partnerships of local authorities, statutory agencies, voluntary conservation bodies and individuals who are working together to promote conservation in their area. Most LBAPs put on training events and run projects to help everyone get involved in promoting and conserving local wildlife.

For more information on the LBAPs in your area, visit www.biodiversityscotland.gov.uk

Montane Moths

Broad-bordered White Underwing

Anarta melanopa

Wingspan 26 - 32mm

The Broad-bordered White Underwing is listed on both the Cairngorms and Dumfries & Galloway LBAPs, and can be identified by its greyish brown forewing and white underwing with a dark border and dark crescent.

DISTRIBUTION AND CATERPILLAR FOODPLANT

Restricted to Scotland, it is a mountain specialist occurring on high moorland, summits and ridges, and is rarely seen below the tree-line. It's UK stronghold is probably the Cairngorms National Park, but it has also been recorded in Wester Ross, Caithness, Argyll and Galloway. The caterpillars only feed during the short mid to late summer nights, on a range of dwarf shrubs such as bearberry, crowberry, blaeberry and cowberry.

LIFE CYCLE AND ADAPTATIONS

The adults are day-flying from mid May to June, and are active in bright sunshine and also on warm, cloudy days. They fly in a bee-like fashion just a few centimetres above the ground, perhaps keeping low to avoid the windy conditions of the high tops.



Black Mountain Moth



Mountain Burnet

Black Mountain Moth

Glacies coracina

Wingspan 21 - 28mm

The Black Mountain Moth's very rounded wing tips give it an unusual shape. It is also distinguished by its dull black colouration and the black spots on its forewings.

DISTRIBUTION AND CATERPILLAR FOODPLANT

In the UK it is confined to Scotland, but is widespread in the Cairngorms and has also been recorded in Ross-shire, Sutherland and Perthshire. The moth is rarely found below the tree-line, and the caterpillar is thought to mainly feed on crowberry.

LIFE CYCLE AND ADAPTATIONS

The adults fly in June and July in sunshine, but may be found crawling spider-like on the ground when it is too cold or windy to fly. Their dark colour allows them to more readily absorb heat while basking. Numbers of adults seem to be greater in odd-numbered years e.g. 2007, and it is thought that the caterpillars have a two-year life cycle, overwintering twice in order to reach maturity.

Mountain (or Scotch) Burnet

Zygaena exulans subchracea

Wingspan 24 - 34mm

The burnets are a group of spectacular day-flying moths and include some of the rarest insects in the country. With black club-like antennae and conspicuous red markings on their glossy black wings, they are sometimes mistaken for butterflies.

DISTRIBUTION AND CATERPILLAR FOODPLANT

The entire UK population of this moth is confined to a couple of sites in the eastern Cairngorms, on south-facing dry grassy heath between 700 - 850m.

The caterpillars feed on mainly crowberry, but will also eat cowberry, blaeberry and heather.

LIFE CYCLE AND ADAPTATIONS

The adults fly from late June into July flying in spells of warm sunshine. They may overwinter as caterpillars once or twice depending on the conditions.

The Mountain Burnet is the only montane burnet in Britain, and is listed on the Cairngorms LBAP.



Larvae grow slowly in the harsh environment



Northern Dart

The advantages of a two year life-cycle

Many montane species have adapted to a two year life cycle due to the short growing season and lack of feeding time.

The record breaker is a species of Greenland moth that takes fifteen years to complete its lifecycle!

If the flight period is hampered by poor weather, and few adults survive to breed successfully, there is at least a chance that the overwintering larvae and pupae will survive to hatch the following year and be more successful. This may also prevent excessive build up of parasites - flies and wasps - whose grubs feed inside the caterpillars and kill them!

Northern Dart

Xestia alpicola alpina

Wingspan 34 - 40mm

The Northern Dart is a UKBAP and Cairngorms LBAP species. With black or dark brown on the forewings and red and grey markings, this moth is beautifully coloured and camouflaged on rocks. There are no similar species found in the same habitat.

DISTRIBUTION AND CATERPILLAR FOODPLANT

The moth occurs above tree-line at various sites in the Cairngorms, Highland Perthshire, and the Southern Uplands, where the caterpillars feed on crowberry.

The Northern Dart also occurs near to sea level on Harris, Lewis, Orkney and Shetland.

LIFE CYCLE AND ADAPTATIONS

The adults are on the wing from June to August. They fly at night and are rarely seen during the day. The moth overwinters twice as a larva and, unlike the Black Mountain Moth, the adults appear to be more common in even-numbered years, e.g. 2006.



Udea uliginosalis

Udea uliginosalis

A 'micro-moth'

Wingspan 25 - 31mm

There are many species of so-called 'micro-moths'. *Udea uliginosalis* has no common name and is a type of micro-moth called a 'pyralid'. Many micro-moths are difficult to distinguish, but this is one of the larger species and is fairly distinctive with its pale colour and relatively long wings.

DISTRIBUTION AND CATERPILLAR FOODPLANT

Its UK distribution is restricted to the upland moors and mountains of Scotland, and it has been recorded in the Cairngorm and on Orkney and Rum.

It is usually seen in grassy areas beside streams, but little is known about its ecology. The caterpillars are thought to feed on grasses and herbaceous plants.

LIFE CYCLE AND ADAPTATIONS

The adults fly through June into August.



Large Heath



Small Tortoiseshell



Scotch Argus

Upland and Montane Butterflies

Lots of different butterflies live in the uplands, and you can often see them in the montane zone. But there is only one true montane butterfly in the UK... The Mountain Ringlet.

It's always a bit of a surprise to see butterflies in the hills, but most years we receive records of migrating Painted Ladies and even Small Tortoiseshells, a butterfly you normally think of as living in gardens! You won't see many butterflies on exposed moorlands, but there will be more in sheltered places. You will see them especially along burns where the soils are often richer, which means more caterpillar food plants and nectar plants for the adults.

The Scotch Argus can be seen as high as 650m in the Cairngorms, but can also occur at sea level. It flies over damp, grassy moorland, especially areas dominated by purple-moor grass (*Molinia*), one of its main caterpillar foodplants, although it can feed on other grasses.

Wetter, boggy areas support the Large Heath, whose caterpillars feed on cotton-grasses. Adults are reluctant to take to the wing except on the sunniest days, and spend much time nectaring on cross-leaved heath.

The caterpillar of only one Scottish species feeds on heather, that of the beautifully iridescent Green Hairstreak. It can also feed on whin (gorse) and blaeberry, the latter probably being its main foodplant in Scotland. The adults fly in May and June, but are much more commonly found on the lower slopes.

Other butterfly's you might find in sheltered, species-rich, flowery habitats in the uplands include Green-veined White, Common Blue, Small Copper, Meadow Brown and Small Heath.



Mountain Ringlet



Good muirburn favours bearberry

Mountain Ringlet

Erebia epiphron

Wingspan 28 - 38mm

The Mountain Ringlet is the only butterfly to breed in the montane zone. The Mountain Ringlet is a medium-sized, dark brown butterfly with an orange band and black spots. It may be confused with the larger and more common Scotch Argus, but this usually occurs at lower altitudes, and has prominent white eyespots. The Mountain Ringlet is a UKBAP species, and is also listed in the Stirling, Highlands and Cairngorms LBAPs.

DISTRIBUTION AND CATERPILLAR FOODPLANT

The distribution of the Mountain Ringlet is centred on the Breadalbane Hills and the west central Highlands, where it is found between 450 and 800m. The best places to see it are on the Creag Meagaidh and Ben Lawers NNRs.

Further west it can be found as low as 250m at Glasdrum NNR, and it also occurs on Ben Lomond. It is rare in the Cairngorms, only occurring in Glen Doll area.

It breeds mainly on gentle south-facing slopes supporting species-rich grassland. The adults are often seen nectaring on thyme, and the caterpillars probably feed on a range of grasses.

LIFE CYCLE AND ADAPTATIONS

Mountain Ringlet adults fly from late June into August, but usually only in sunshine. The caterpillars over-winter, and are thought to only feed at night, but little is known of their ecology.

Conservation Habitat management

Centuries of management by grazing and burning have produced Scotland's unique heather moorland, and the wildlife living there. Since the 1940s, large areas of heather moorland have been lost to forestry, while changes in grazing patterns have resulted in the spread of bracken and other areas of heather-dominated moorland becoming grassland.

"*Arctostaphylos heath*", dominated by bearberry (*Arctostaphylos uva-ursi*) is a particularly rare and threatened habitat, and is very important for two UKBAP species, Nettle Mountain Moth and Small Dark Yellow Underwing.

Bearberry cannot compete well with ling (*Calluna vulgaris*), so it occurs on heather moorland where the ling is kept in check by the soil conditions, topography, grazing or burning.

Too little muirburn can allow ling to shade out the bearberry, and good muirburn practice that creates a patchwork of small burns is beneficial.

In areas without burning, grazing allows bearberry to survive by keeping the heather down, but too much relaxation of the grazing pressure can lead to the loss of the bearberry.



Montane species are retreating uphill



Recording training day supported by Cairngorms and Stirling LBAPs

Climate change

The distribution of many butterflies and moths is changing significantly in response to the warmer weather we have been experiencing. Several species have colonised Scotland from the south, while others are being recorded at higher altitudes.

We are concerned about our specialist upland and montane species however, as cool and humid habitats could disappear or become more fragmented.

Researchers at York University have shown that in Scotland and Cumbria, the Mountain Ringlet has shifted its range upwards in recent years, probably in response to the warmer weather. But obviously, our montane species can only move so far upwards until they run out of mountain!

The effects that a warming climate may have on our upland and montane species are unknown, but by learning more about their ecology and distribution, we will have more chance of conserving them.

Unfortunately we know relatively little about the ecology and habitat requirements of many upland and montane moths.

How you can help We need to know more

A greater understanding of the distribution and habitat requirements is needed to conserve our upland and montane species. You can help us by sending us your butterfly and moth sightings.

THE INFORMATION WE NEED INCLUDES:

- Date
- Species name
- A six-figure (ideally) grid reference
- Name of the area or nearest village, town or mountain
- Your name and contact details (we may need to verify the record and can provide feedback)

We may be able to identify what you have seen from good digital photographs. You may also like to visit www.ukmoths.org.uk

For more information on montane and other species, or to find out where to send your records, please contact us at:

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