

Land management for butterflies

Summary

- **Butterflies have four main requirements;**
 - 1. Food for the caterpillars – for many species this can often be a specific plant**
 - 2. Sugar in the form of nectar from flowers for the adult**
 - 3. Sunny sheltered habitat in which to live (including the caterpillars)**
 - 4. Somewhere to over winter**
- **There are 33 different species of butterfly in Scotland, each has a slightly different life-cycle, i.e. with differences in distribution, micro-climate, flight period, larval food-plant and habitat requirements, though some of these differences may be subtle.**
- **Knowledge of a species life-cycle is essential before sympathetic management is deployed. Most species are fairly sedentary therefore most sites have to cater for the species requirements in all four of its life-cycle stages.**
- **Semi-natural grasslands particularly rough, species rich, coastal and damp grasslands are very important butterfly habitats. General management includes light grazing to allow species to flower and prevent the establishment of excessive rank vegetation and scrub.**
- **Many types of habitats can be important particularly if they are sunny and sheltered. Retain and manage field margins and track sides, retain open clearings within the wood and plant new hedgerows running east to west to create south facing sheltered areas.**
- **The main factors that influence butterfly populations are habitat management, climate change and the weather.**

Introduction

There are around 72 species of butterflies in Britain, 33 in Scotland. Their distribution is influenced by a variety of factors including topography, geology, rainfall and temperature. They are also influenced by land management both present and historical.

Butterfly populations can be extremely dynamic, some species being very common in some years but very scarce in others.

This Technical Note provides guidance on best practice land management to support and encourage butterflies and their habitats.

Life cycle

All butterflies and moths share the same distinctive four stage life cycle

1. Egg or ova
2. Caterpillar or larva
3. Chrysalis or pupa
4. Adult or imago

Once the females have mated they lay eggs, which hatch into caterpillars. Most species lay their eggs on or beside the larval food plant – so the females have to be good botanists! The caterpillars eat the leaves (and in some species the flowers and seeds) of their food plants. They grow until their skin is too tight to stretch further, the skin then splits to reveal a new bigger and baggier skin. Following normally five changes of skin (moult) the caterpillar then turns into a chrysalis from which the adult emerges in due course. The adult phase usually occurs during the summer months and lasts a few weeks before they die. However, two common species, the Small Tortoiseshell and Peacock over-winter as adults, and survive as adults for over six months from the end of August until the following spring.

Most butterflies and moths in Scotland take a full year to complete their life cycle although some species (eg Green-veined White and Small Copper) have 2 cycles in a year whilst others (e.g. Common Blue) only have two cycles in “good” years.

Most butterflies in Scotland over-winter as a caterpillar although some do so as a chrysalis e.g. the “Whites” and Green Hairstreak, but only one as an egg - Purple Hairstreak



Marsh Fritillary Caterpillars protected in their web

Threats

Distributions of butterflies and moths have changed significantly over the last 100 years, some species have increased e.g. Orange-tip and Peacock, some fluctuated but many have declined e.g. Marsh Fritillary, Pearl-bordered Fritillary and Dingy Skipper.

The current threats influencing this decline include:

Changing habitat management – Habitat stability is important to most species as they have very specific ecological requirements. Changes in agricultural practice and intensification, afforestation and urban and industrial development have fragmented habitats and therefore isolated butterfly populations, making them more threatened. Once a butterfly is lost from an area it may not be able to recolonise even if the habitat becomes suitable again as the nearest populations are simply too far away.

Climate change – Butterflies seem to be extremely sensitive to changes in temperature. While the impact of climate change is very difficult to predict butterflies seem to be already reacting to this with many species already increasing their range northwards e.g. Peacock, Ringlet, Speckled Wood. While this may seem to be good news there are concerns for our northern species that prefer cooler conditions e.g. Scotch Argus, Northern Brown Argus and Mountain Ringlet.

Other, more sedentary species may be too slow to move resulting in fragmented and isolated populations.



Peacock

Butterfly requirements

Butterflies have four main requirements;

1. Food for the caterpillars – for many species this can often be a specific plant
2. Sugar in the form of nectar from flowers for the adult
3. Sunny sheltered habitat for butterflies and caterpillars to live
4. Somewhere to over winter

Some butterfly species can fly considerable distances (e.g. Painted Ladies and Red Admirals are migrants that reach Scotland from northern Africa and southern Europe), whilst others are far more sedentary and spend their whole life-cycle in discrete colonies moving less than 200m.

Butterfly populations are more viable if they exist within a network of connected colonies. Fragmentation of habitat and the resulting isolation of colonies can be very detrimental.

Arable fields for butterflies



Common Blue

Arable farms can provide good habitat for butterflies and moths particularly those with species rich field margins. Margins of arable fields are suitable for butterflies particularly in sheltered areas such as the south facing hedge boundaries. Encourage the following range of habitats on the farm – hedge verges, field margins, grassy farm tracks, beetle banks, conservation headlands and uncultivated areas. Avoid the use of pesticides and fertilisers in such habitats. Pay particular

attention to these habitats where they are sunny and sheltered and try to encourage a range of flowering plants in these areas. Butterflies that may be found in these types of areas include Meadow Brown, Small Tortoiseshell, Small and Large White and Ringlet.



Marsh Fritillary

Grassland for butterflies

Any grassland that contains native grasses along with wildflowers has potential for butterflies. Grassland is the main habitat for a large number of butterflies and moths on the farm including Orange tip, Meadow Brown, Marsh Fritillary, Small Heath and Ringlet.

Grassland habitat can be split into two main types

1. Uncultivated grassland in field corners, or along hedgerows, ditches and tracks. To provide the best habitat for butterflies leave the grassland uncut until after flowering in mid summer, this provides plenty of vegetation for the caterpillar to feed on and allows the wildflowers to flower and seed. Some of this grassland could also be left uncut during the winter months to provide habitat for over-wintering caterpillars. Avoid the use of pesticides and fertilisers. Retain patches of nettles in sunny sites for Peacock and Small Tortoiseshell caterpillars.



Small Pearl Bordered

2. Unimproved semi-natural grassland which would include species rich, coastal and damp grassland, bogs and wetlands. This type of grassland is vital for many species of butterfly and the management will vary depending species present.

In general light grazing, sometimes with a summer break to allow flowering, works well. If scrub starts to develop or the grassland starts to become rank then the grazing break is too long. Often grazing with cattle produces the best habitat due to the way cattle graze producing a more varied grassland structure. Sheep in particular are more selective grazers and often selectively graze caterpillar food plants thus reducing their number and distribution.

South facing slopes with some shelter provided by small amounts of bracken and/or scrub are often ideal butterfly sites. Avoid the use of pesticides and fertilisers except for spot treatment of problem weeds.

It is always useful to get a butterfly survey of species rich grasslands so that management can be targeted towards the requirements of the species present. If an important or rare species is present advice should always be sought from a conservation consultant or Butterfly Conservation to tailor management for that species. Butterflies attracted to this type of habitat are many and may include Scotland's four Fritillaries (Marsh, Dark Green, Small Pearl-bordered and Pearl-bordered) Common Blue and Northern Brown Argus.



Dark Green Fritillary

Woodland and scrub for butterflies



Speckled wood

Woodlands and more importantly woodland clearings and rides provide important habitat for a number of common and specialised butterflies. Trees and scrub provide important shelter around species rich clearings for species such as Speckled Wood, Pearl-bordered Fritillary and Chequered Skipper.

One species in Scotland, Purple Hairstreak, breeds on the trees themselves, the caterpillars feeding on the leaves of oaks. In addition nectar from flowering willow is an important food source for spring butterflies especially Small Tortoiseshell and Peacocks and other invertebrates.



Purple Hairstreak

Most species require open areas within the wood which should be large enough to provide plenty of sunlight, yet not too big that shelter is compromised. Light grazing by cattle and/or sheep will often retain clearings within a wood or cyclical scrub cutting to retain open areas. Cutting of rides should take place in late summer or autumn. East-west rides are preferable to north-south ones due to their south facing edge

Hedgerow and hedge verges for butterflies

Hedges can provide rich breeding, feeding and over wintering areas for butterflies. A hedge of mixed species with different flowering times is best. Cut during February/March on rotation every second or third year to provide a variety of structure.

Hedge verges offer good habitat for caterpillars especially for the "Browns". The hedge provides shelter and warmth if on the south side. Do not cut all hedge verges as many butterflies have stages that overwinter in tall or tussocky vegetation. Sun and shelter are important requirements for most species both in the adult and caterpillar stages.

Provision/management of suitable habitat on south facing slopes, hedgerows and dykes will be more beneficial than in north facing situations. Therefore, hedges running east-west with a south facing edge will be more beneficial than those running north-south.

Habitat creation for butterflies

In some situations, if existing quality habitat is not present, it may be beneficial to create habitats suitable for butterflies.

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Consider some of the following suggestions

Create species rich grassland suitable for butterflies by choosing a seed mix that provides plenty of nectar rich species and if possible suitable caterpillar food plants.

When hedge planting leave a wide margin at the base of the hedge particularly on the south side and encourage this area to be rich in native species.

Grants for managing or restoring species-rich grasslands

The SRDP (Scottish Rural Development Programme) Rural Priorities scheme provides payments for a variety of habitats that may be beneficial to butterflies. These include species rich grasslands, damp grasslands that may be included in wetlands, and hedgerow payments. Also a mosaic of these habitats often with scrub is often excellent for butterflies.

At the time of writing the rates are as follows:-

£111ha/yr - Management of Species-rich Grassland.

£223.57ha/yr - Creation and Management of Species rich grassland

£90ha/yr - Management of wetlands.

£104ha/yr - Management of habitat mosaic

£94ha/yr – Management of Scrub and tall herb

£473.76ha/yr – Grass margins and beetle banks

There are also payments for bracken control, scrub control, hedgerow management and fencing.

Further information

Further advice and information on butterflies and moths can be obtained from:

Scottish Agricultural College (SAC) Conservation Services.

Scottish Natural Heritage (SNH).

Butterfly Conservation Scotland

There is also information on the Butterfly Conservation website

www.butterfly-conservation.org/scotland

where guides to key species and management advice can be downloaded.

http://www.butterfly-conservation.org/downloads/93/habitat_species_leaflets.html

References

JNCC Peter Kirby (1992)

Habitat Management for Invertebrates.

Asher, Warren, Fox, Harding, Jeffcoate, Jeffcoate (2001)

The Millennium Atlas of Butterflies in Britain and Ireland

Table showing flight period, food plant and habitat by species

Species	Flight period	Food plant	Habitat
Chequered Skipper	Mid-May - late June	Purple moor-grass	Sheltered but sunny grassland
Marsh Fritillary	Mid-May - mid-July	Devils bit scabious	Damp, tussocky grassland and moorland edges where food plant grows
Pearl-Bordered Fritillary	Early/mid May - mid/late June	Violet spp. Especially common dog-violet	South-facing woodland edges and glades with bracken, often grazed
Northern Brown Argus	Mid-June - early August	Common rock-rose	Sheltered and well-drained hillsides, on basic rock, where its food plant grows commonly.
Large Heath	Mid-June - early August	Hare's tail cotton grass	Raised bogs, blanket bogs and acidic moorland, usually below 500m
Mountain Ringlet	Early June - early August	Mat grass	Damp species-rich mountain grassland, , 250 - 900m
Small Blue	Early June - early July	Kidney vetch	Sheltered grassland where food plant grows in abundance, mixture of short turf and scrub.
Dingy Skipper	Early May - End June	Birds-foot trefoil (also greater birds-foot trefoil)	Open, sunny habitats including track sides, riverbanks, coastal dunes, disused quarries and forest tracks
Small Pearl-bordered Fritillary	Late June - end of July	Violet spp. - common dog-violet and marsh violet.	Sheep- or deer-grazed, open wood-pasture, and damp grassland, usually with patches of bracken and scrub.
Large Skipper	Late May - August	Cocks foot	Variety of habitats including verges, hedgerows, wet heath with long grass.
Large White, Small White	April - August	Cabbage, Brussel sprouts and wild brassicas	Very mobile species found especially in gardens
Orange-tip	Mid April – mid June	Cuckoo flower and garlic mustard	Damp grassy places including meadows , verges and water margins
Green Hairstreak	May - June	Bilberry, broom, heather and gorse	Grassland, woodland and heaths strongly associated with scrub.
Purple Hairstreak	July - September	Oak	Woodland with oak
Small Copper	June- July	Common and sheep's sorrel	Wide variety of habitats including grassland moorland and coastal.
Common Blue	June - September	Bird's-foot trefoil	Grassy places, sunny and sheltered where its food plant grows
Small Tortoiseshell and Peacock	June - July	Nettle	Any habitat
Dark Green Fritillary	June - August	Common dog violet	Flower rich grasslands and dunes often with scrub
Speckled Wood	May - August	False brome, Cocks foot, Yorkshire fog	Only in woodland habitats
Scotch Argus	July - September	Purple moor grass and other grasses	Montane grassland, sheltered bogs and woodland clearings
Grayling	July - September	Fine leaved grasses including sheeps fescue and red fescue	Coastal particularly dunes, saltmarsh and heathland, always dry stony sites.
Meadow Brown	June - September	Wide range of grasses such as fescues and bents	Open grassland, heathland, coastal, verges and woodland rides
Ringlet	June - August	Coarse grasses such as cocks- foot	Tall grassland mainly in damp situations with shade.
Small Heath	July - August	Fine grasses such as fescues	Dry well drained grassland.
Green veined white	April - August	Wild crucifers such as Garlic mustard.	Hedgerows, ditches and banks.