



# Pearl-bordered Fritillary

*Boloria euphrosyne*

## Conservation status

**Priority Species in UK Biodiversity Action Plan.**

The Wildlife and Countryside Act (1981) specifies that a licence is needed for trading in this species.

The Pearl-bordered Fritillary *Boloria euphrosyne* is one of the earliest fritillaries to emerge and can be found as early as April in woodland clearings or rough hillsides with Bracken. It flies low to the ground, stopping regularly to feed on spring flowers such as Bugle. It can be distinguished from the Small Pearl-bordered Fritillary by the two large silver 'pearls' and row of seven outer 'pearls' on the underside hind wing, and also the red (as opposed to black) 'chevrons' around the outer pearls and the small central spot on the hind wing. The butterfly was once very widespread but has undergone a rapid decline of over two-thirds in the last two decades.

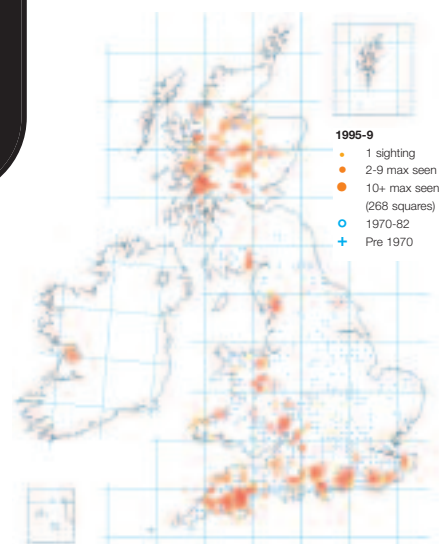
## Life cycle

Adults fly for about six weeks between late April and late June (July in Scotland), with the precise timing varying according to latitude and habitat. There is a partial second brood in the south during August. Eggs are laid singly, usually on dead Bracken or leaf litter near to violets, though a few are laid on the foodplant itself. Larvae hibernate amongst dead leaves or Bracken whilst still quite small and emerge in early spring when they spend much of their time basking on dead litter, interspersed with short bouts of feeding. The selection of warm, dry habitats and the basking behaviour of larvae enable them to develop rapidly even in cool spring weather. Pupae are formed amongst leaf litter and emerge after a few weeks.

## Population structure

Usually forms discrete colonies around suitable breeding areas, often comprising many hundreds of adults, though many habitats are transient. Adults move freely within their colonies and regularly cover 100 m or more. A significant proportion also disperse and individuals can move at least 4.5 km between adjacent colonies. Nearby colonies are thus often linked and the butterfly almost certainly forms metapopulations covering networks of discrete breeding areas.

	J	F	M	A	M	J	J	A	S	O	N	D
Egg												
Caterpillar												
Pupa												
Adult												



## Foodplants

Common Dog-violet *Viola riviniana* is used most widely. The butterfly can also use other violets such as Heath Dog-violet *V. canina* and in the north, Marsh Violet *V. palustris* and Hairy Violet *V. hirta*.

## Habitat

### Three main habitats:

- 1 Well-drained habitats on lower hill land and commons with mosaics of Bracken, grass, and often patchy scrub;
- 2 Woodland rides and clearings, such as recently coppiced or clear-felled woodland, and pylon lines; and
- 3 Open woodland in Scotland. In all habitats it requires abundant foodplants growing in short, sparse vegetation, where there is abundant dead/brown plant material (e.g. dead leaves or dead Bracken).

## Habitat management for the Pearl-bordered Fritillary

### Grass/Bracken/scrub habitats

**Aim to maintain a mosaic of Bracken interspersed with grassy patches and canopy gaps, with abundant violets growing through the Bracken litter and standing trash, where there is a limited cover of grass.**

#### Grazing

Extensive grazing by cattle and ponies is ideal. The trampling action of the animals through Bracken stands, in particular during winter and early spring (usually February to April), is most important to help break up the dense standing trash. This creates a network of paths running through the Bracken, which provides germination sites for violets and opens up the Bracken canopy to allow sunlight in. Some sites may be maintained in suitable condition by sheep grazing, though these animals are not as effective at trampling Bracken and maintaining good densities of violets. Grazing by sheep between April and June should only be light and extensive as these animals can remove nectar sources used by adult butterflies.

#### Burning

Occasional, controlled burning may be helpful and can reduce Bracken litter and scrub and encourage violets, but only when subsequent management is planned as burning stimulates Bracken growth. Only burn on sites with a history of burning and burn in patches comprising less than one-fifth of the breeding habitat per year. Any burning undertaken must be in line with 'The Heather and Grass burning Code'.

#### Spraying

Bracken spraying (e.g. with Asulox) may be a useful way of restoring sites with high Bracken densities and deep litter build-up. However, extensive Bracken spraying can be damaging to existing Pearl-bordered Fritillary breeding habitat as it severely reduces Bracken density and leads to an increase in grass cover. Low dosage spraying of patches or strips may help improve conditions where Bracken has become too dense and violets rare. It could also be used to create grassy patches amongst dense stands to provide some keep for livestock and encourage traffic of grazing animals through denser areas. Spot treatments can be used to control Bracken encroachment problems and to reduce frond density.

#### Scrub edges

Suitable breeding conditions may also be provided around the edges of scrub patches, notably gorse. Such habitats are enhanced by cutting (or burning) the scrub on a rotation of 5-10 years, which should maintain abundant violets growing in short, sparse vegetation.

### Cutting & bruising

Periodic cutting of Bracken may improve breeding conditions on ungrazed or lightly grazed sites, though the effects are complex and poorly understood. Cutting should not be seen as a replacement for grazing, which appears to be the best way to maintain good breeding habitat. If cutting is the only option, cut areas of Bracken (0.5 to 1ha) during late May or early June on a 3 to 10 year rotation, according to local site conditions but ensure no more than one-fifth of the breeding area is cut in any one year. Care must be taken in areas where ground-nesting birds occur. When cutting very dense stands a second cut in July/August may be necessary. Combine this with cutting of paths (0.5 to 1m widths) in June following different routes each year. A swipe cutter is preferable to cutting with a flail as the latter breaks up the Bracken stems too much and causes them to rot down too quickly. If bramble is a problem this should be controlled if it starts to encroach on the cut areas. Cutting on a regular basis (i.e. annually or every other year) should be avoided as this creates a very grassy sward with no standing trash or Bracken litter, which is unsuitable. Bracken-bruising machines may also reduce Bracken densities. Bruising should take place during June when the Bracken stems are sufficiently hard not to snap off, with follow-ups in July and August for maximum control. This technique is best used to create patches or strips of bruised Bracken and to vary structure across a site especially on rocky and uneven ground where cutting is difficult or dangerous. Small-scale raking and disturbance of dense Bracken litter during autumn and winter may help to maintain high densities of violets.

below Grazed Bracken habitat on Dartmoor



### Woodland

**Aim to produce a succession of flower-rich, sunny clearings where adults can feed and larvae can bask in sparse, dry vegetation with abundant brown leaf litter.**

Such clearings are best produced by coppicing or group felling of high forest, but continuity of management is essential and clearings should be connected by broad sunny rides. (Note that many clearings are unsuitable; e.g. those on damp ground, or with a ground flora dominated by plants such as Dog's Mercury, Bluebell and vigorous grasses). Ideally, coppice adjacent woodland plots of 0.5-2ha in succession and encourage standard trees (especially oaks) at less than 20% canopy cover. In high forest, suitable conditions can be provided by a regular sequence of felling and replanting with deciduous trees. Retain potential breeding areas amongst Bracken or areas with abundant leaf litter during the spring provided by oaks or bramble. Boundary banks and ditch edges are especially favoured and should be maintained as sheltered unshaded habitat. Deer control may be needed on sites with high levels of browsing. An alternative is to fence the coppice coupes, though this is expensive and may lead to rapid regrowth that shades the habitat too rapidly.



above Breeding habitat in cut ride-edge



**Butterfly Conservation**

Saving butterflies, moths and their habitats

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