

IRELAND'S BUTTERFLY SERIES

GARDENING for Butterflies

Helping butterflies with native plants



National
Biodiversity
Data Centre
Documenting Ireland's Wildlife



About this guide

Butterflies are an essential part of our biodiversity. They are indicators of a healthy environment; they provide ecosystem services like pollination and pest control; and they form an important part of the food chain, supporting birds, bats, and other insectivorous animals.

Often when we think of conservation, we imagine large open spaces like nature reserves where rare species are protected. But butterflies can thrive in gardens, meaning there is a vast network of potential habitats in Ireland that could be managed to support them. Every garden, big or small, can help these important insects.

The aim of this booklet is to provide evidence-based recommendations on how gardens can be managed to help butterflies. Gardens in homes, schools, businesses, and public spaces can all play a part in making Ireland butterfly friendly.

Every garden can play a role in helping butterflies and biodiversity

It is important to understand that this guide should be read as a 'menu' of options to pick and choose from. Some of the recommendations may work for you, some may not. Every garden is different and should be managed to suit your lifestyle. This booklet will look at the following recommendations:

- 1 Providing butterfly-friendly and caterpillar foodplant plants
- 2 Providing shelter for butterflies
- 3 Creating a wildflower meadow – don't mow, let it grow
- 4 Managing garden boundaries for butterflies
- 5 Eliminating or reducing pesticides and chemicals
- 6 Preventing the spread and introduction of invasive species
- 7 Helping butterflies with climate change
- 8 Monitoring butterflies in your garden
- 9 About the National Biodiversity Data Centre

The National Biodiversity Data Centre works to make biodiversity data and information more freely available in order to better understand and assist the protection of Ireland's biodiversity.

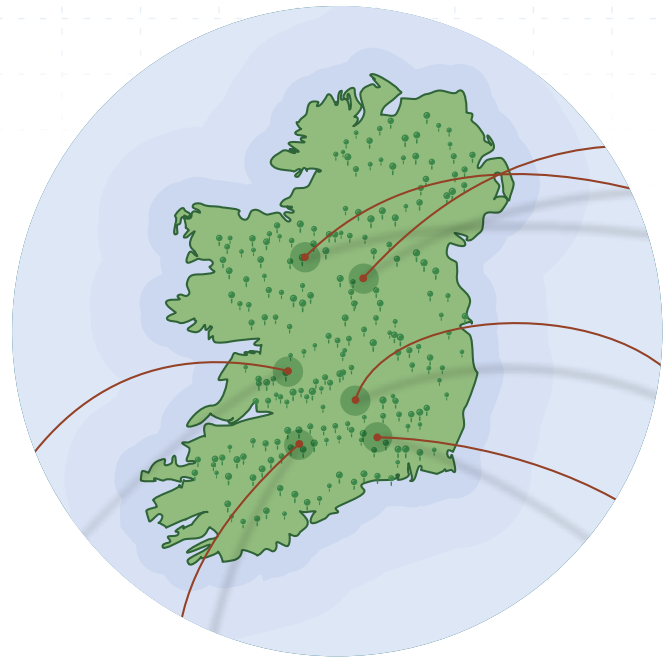
This guide is part of Ireland's Butterfly Series.

Who are Ireland's butterflies?

In Ireland, there are 32 resident and 3 species of migrant butterflies. Well managed gardens Irish may have up to 20 species of butterflies. From the Garden Butterfly Monitoring Scheme, we know that there is a core of around 10 species that visit gardens.

There are several threats to butterflies in Ireland:

- Increased use of fertiliser and loss of semi-natural grassland
- Use of pesticides
- Urbanisation
- Afforestation, (the planting of trees on lands that were not previously forested) specifically of non-native species
- Climate change



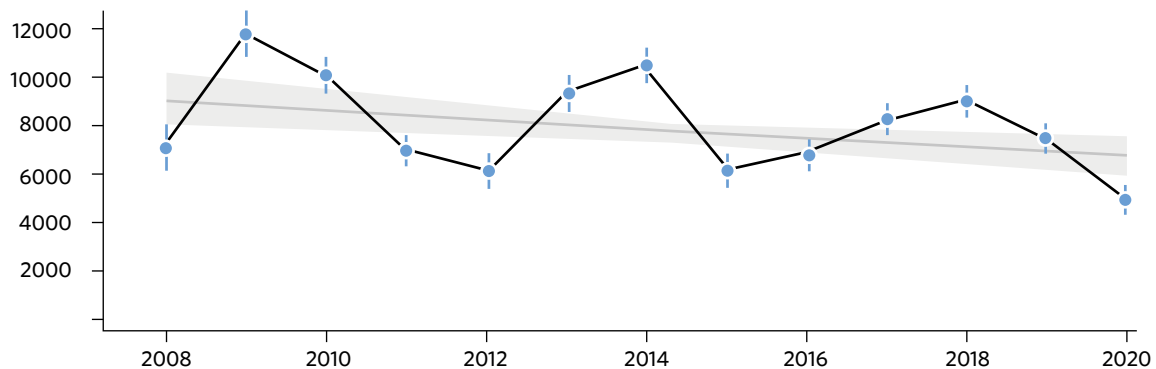
With so many gardens in Ireland, everyone can make a real contribution to making Ireland more butterfly friendly.



Speckled Wood © Edward Delaney

All these threats are projected to increase, putting our butterfly populations and wider biodiversity under more pressure. The Speckled Wood is considered a common butterfly species in Ireland. However, through the Irish Butterfly Monitoring Scheme we know that it has experienced a 12% population decline since 2008. It is becoming more obvious that even our once common species are beginning to decline. The Speckled Wood is one of many butterfly species that would benefit from changes in our gardens.

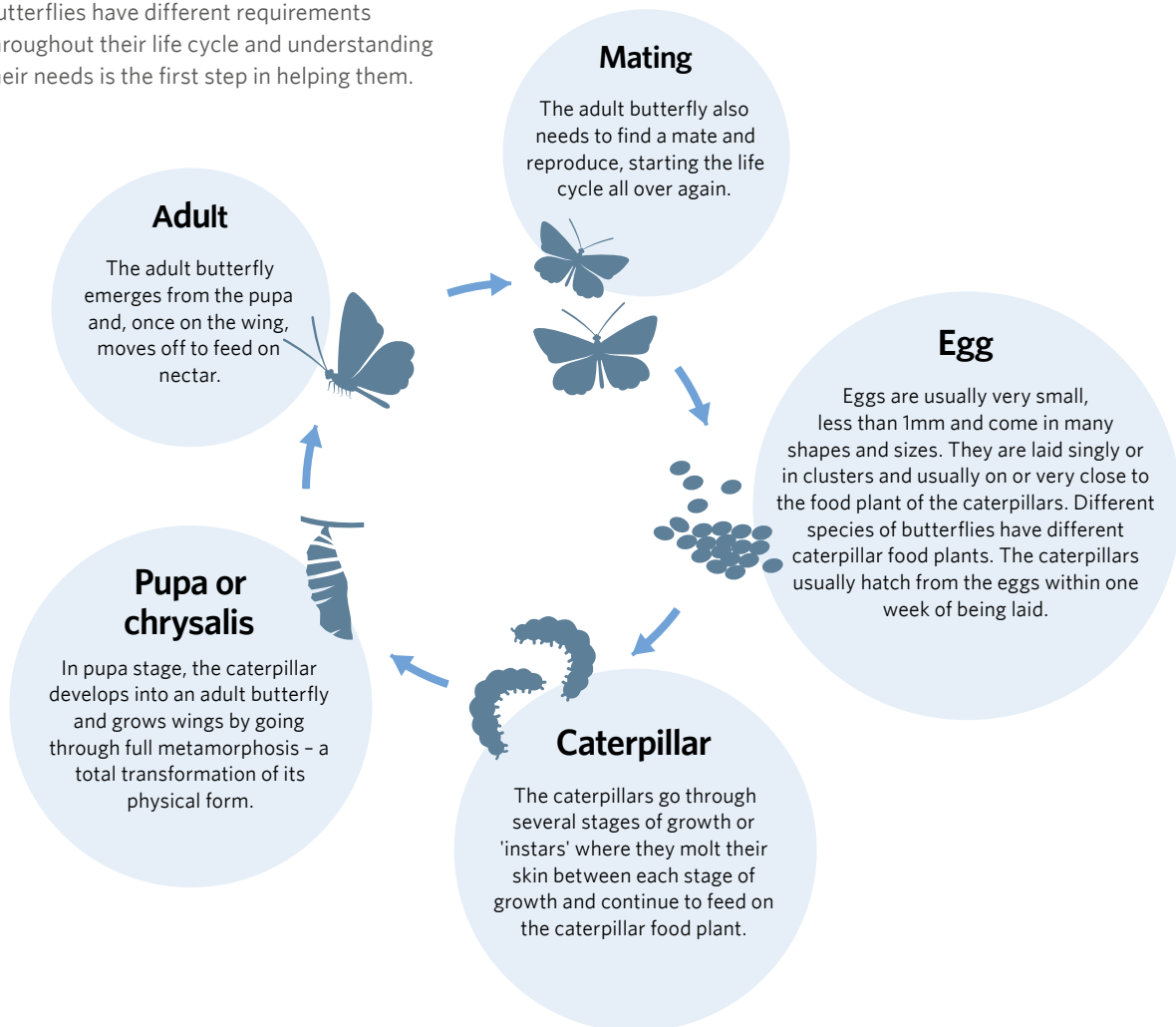
Population trend of the Speckled Wood 2008 - 2020



Source: Irish Butterfly Monitoring Scheme.

Life cycle of butterflies

To improve your garden for butterflies, it is first important to understand their life cycle. Butterflies have different requirements throughout their life cycle and understanding their needs is the first step in helping them.



Butterflies must complete each stage of their life cycle to survive and breed successfully. Gardens that provide conditions to support all life stages will be of most value for butterflies.

1

Providing butterfly-friendly and caterpillar foodplant plants

Nectar supply for adult butterflies

Adult butterflies are generally seen from spring to autumn with a peak in the summer, but some butterflies can be seen on mild winter days. Different butterflies have different flight periods - some are only seen in the spring, such as the Orange-tip, and others are more common in late summer such as the Large White or Peacock.



Orange-tip
© Kevin Murphy

Nectar is essentially sugary water that gives butterflies the energy to fly and find a mate. A nectar supply must be available for adult butterflies throughout the year, particularly in spring and autumn. Spring flowers are vital for butterflies that have just pupated or come out of hibernation. Autumn flowers help butterflies build up their reserves for winter.

A special mention for Ivy

Ivy is an incredible source of nectar for butterflies and other insects in September and October when all other plants are gone to seed.

It is also especially important for butterfly hibernation over the winter which is called 'diapause'. Ivy as an autumn flowering plant is crucial for helping adult butterflies build up fat reserves to enter diapause or complete their migration.

Dense Ivy provides butterflies with a place to roost (rest or sleep) and even overwinter. It is the foodplant of the Holly over a wall creates a small heat trap that helps its development.



Butterflies like the Red Admiral will use Ivy for their migration back to North Africa and continental Europe.



Holly Blue © Liam Lysaght



Ivy © Oisín Duffy

Caterpillar food plants

While adult butterflies aren't fussy about which plants they feed on and will visit both native and non-native plants, caterpillars will only feed on native plants. For that reason, the availability of caterpillar foodplants is more likely to be the limiting factor for butterflies in gardens. So, it is crucial to make sure there are plenty of native plants in your garden to support caterpillars.



Wood White egg laying

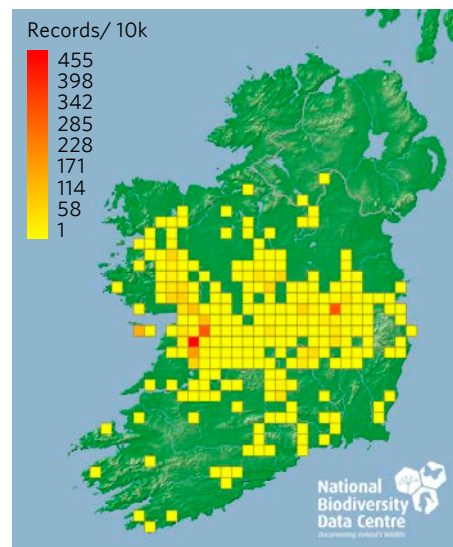


Orange-tip egg on Cuckooflower
© Dorothy Heaphy

It is important for caterpillars to have a good source of food so they can acquire the nutrients they need to go through metamorphosis to become an adult and build the reserves needed to produce eggs.

However, some species are only found in certain areas, and planting their caterpillar food alone won't result in their arrival. For example, planting Buckthorn in northern Donegal won't result in Brimstone butterflies as it is outside the species range.

You can find out which butterflies are found in your area by visiting Biodiversity Maps (maps.biodiversityireland.ie)



Distribution of the number of records of Brimstone recorded within each 10km grid square (ITM). Accessed through Biodiversity Maps

List of the 20 garden butterfly species in Ireland and their caterpillar food plants:

Butterfly	Caterpillar foodplant
Brimstone	Buckthorn (<i>Rhamnus cathartica</i>) and Alder Buckthorn (<i>Frangula alnus</i>)
Clouded Yellow*	Clovers (<i>Trifolium</i> spp.)
Comma	Nettle (<i>Urtica dioica</i>)
Common Blue	Bird's-foot-trefoil (<i>Lotus corniculatus</i>)
Green-veined White	Garlic Mustard (<i>Alliaria petiolate</i>), Cuckooflower (<i>Cardamine pratensis</i>), Water-cress (<i>Rorippa nasturtium aquatica</i>) and other members of the Brassicaceae family
Holly Blue	Holly (<i>Ilex aquifolium</i>) and Ivy (<i>Hedera helix</i>)
Large White	Brassicaceae family
Meadow Brown	Grasses: Fescues (<i>Festuca</i> spp.), Meadow-grasses (<i>Poa</i> spp.) and Bents (<i>Agrostis</i>)
Orange-tip	Cuckooflower (<i>Cardamine pratensis</i>) and Garlic Mustard (<i>Alliaria petiolate</i>)
Painted Lady*	Thistles (<i>Cirsium</i> spp. and <i>Carduus</i> spp.)
Peacock	Nettle (<i>Urtica dioica</i>)
Red Admiral*	Nettle (<i>Urtica dioica</i>)
Ringlet	Grasses: Cock's-foot (<i>Dactylis glomerata</i>), False Brome (<i>Brachypodium sylvaticum</i>), Tufted Hair-grass (<i>Deschampsia cespitosa</i>) and Common Couch (<i>Elymus repens</i>)
Silver-washed Fritillary	Common Dog-violet (<i>Viola riviniana</i>)
Small Copper	Common Sorrel (<i>Rumex acetosa</i>) and Sheep's Sorrel (<i>R. acetosella</i>)
Small Heath	Fine grasses, especially fescues (<i>Festuca</i> spp.), Meadow-grasses (<i>Poa</i> spp.)
Small Tortoiseshell	Nettle (<i>Urtica dioica</i>)
Small White	Brassicaceae family and nasturtiums (<i>Tropaeolum</i>)
Speckled Wood	Feed on a variety of grasses but most commonly on: False Brome (<i>Brachypodium sylvaticum</i>), Cock's-foot (<i>Dactylis glomerata</i>) and Yorkshire Fog (<i>Holcus lanatus</i>)
Wood White	Meadow Vetchling (<i>Lathyrus pratensis</i>), Bitter-vetch (<i>Lathyrus linifolius</i>), Tufted Vetch (<i>Vicia cracca</i>) and Common Bird's-foot-trefoil (<i>Lotus corniculatus</i>)

*Migrant species; populations depend on external conditions to Ireland.

Native flowers and grasses

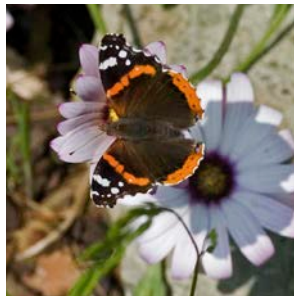
Some caterpillar food plants that deserve a special mention

Nettle

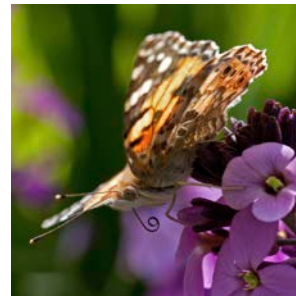
Nettles are one of the most popular plants for caterpillars, and many species feed on them. The Peacock, Red Admiral, Comma, Painted Lady and Small Tortoiseshell all feed on Nettle during their caterpillar stage. Around 18 moth species also feed on nettle in Ireland.



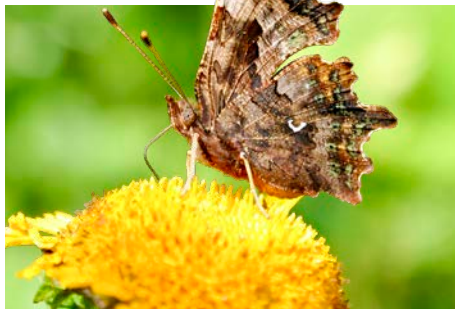
Peacock



Red Admiral © Kevin Murphy



Painted Lady © Kevin Murphy



Comma



Small Tortoiseshell © Oisín Duffy

Butterflies that feed on nettles as caterpillars

Nettles have a bad reputation with some gardeners as they can take over an area. However, caterpillars prefer to feed on their new growth, so we recommend that you cut them back to provide fresh growth and ensure they won't take over your garden. Please wear gardening gloves when cutting back Nettles.

If you don't like the look of Nettles, choose an area that is out of sight. Over time you may come to appreciate Nettles when you see the positive impact they have on butterflies. After cutting them back, put them in your compost heap (more on that later) - they act as a natural activator and speed up the decomposition process.

Nettles only grow in high fertility area and will not grow in areas of low soil fertility such as species-rich meadows. In gardens, you might find Nettles near your compost pile as the decomposition process creates high fertility soils around it. Which also makes it very easy to manage and cut the Nettles and throw into your compost pile!

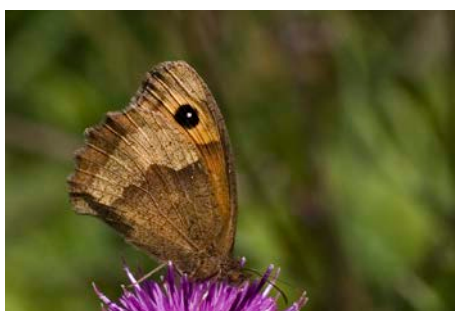


Small Tortoiseshell caterpillar on Nettle

Grasses

The importance of grasses in Ireland is often overlooked. You'd be forgiven for thinking there is only one kind of grass but in fact, there are around 100 species in Ireland. One species tends to dominate: Perennial Rye Grass (*Lolium perenne*). While native to Ireland and widely planted in lawns, farms and parks Perennial Rye Grass provides limited to no support for biodiversity.

There are many species of butterflies in Ireland that feed on grasses during the caterpillar stage. Over-relying on one species, or a narrow range of grasses, will limit butterflies in your garden. Meadow Brown, Ringlet, Small Heath and Speckled Wood all feed on grasses that you might find in your garden.



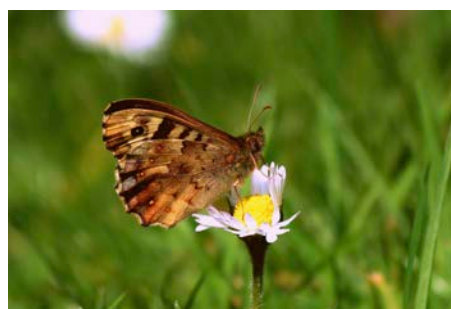
Meadow Brown © Kevin Murphy



Small Heath © Liam Lysaght



Ringlet © Liam Lysaght

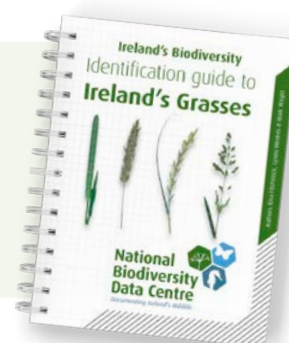


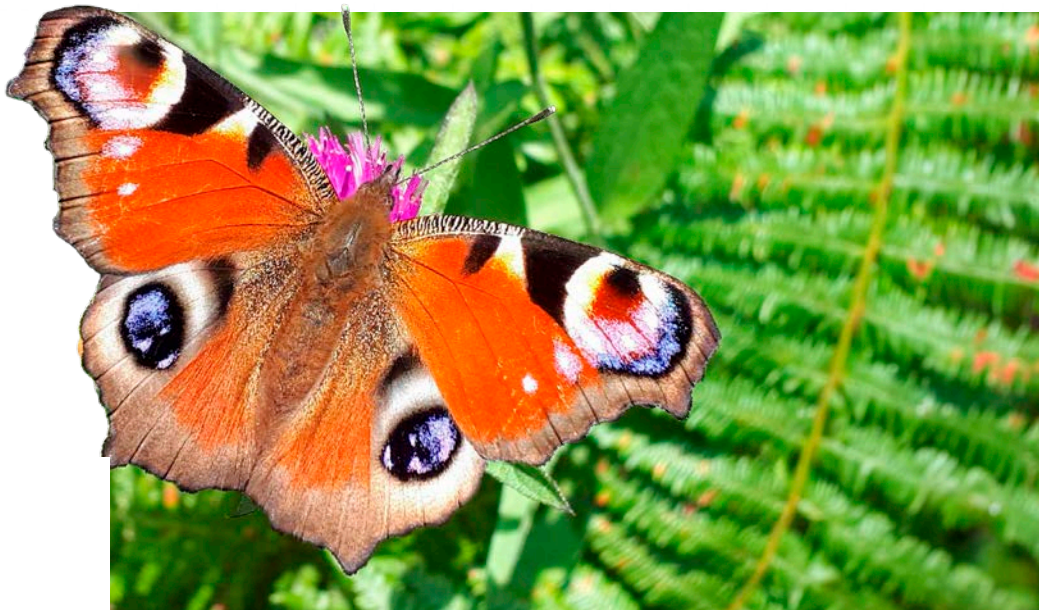
Speckled Wood © Fionn Moore

Butterfly	Caterpillar foodplant
Meadow Brown	Fescues (<i>Festuca</i> spp.), Meadow-grasses (<i>Poa</i> spp.) and Bents (<i>Agrostis</i> spp.)
Ringlet	Cock's-foot (<i>Dactylis glomerata</i>), False Brome (<i>Brachypodium sylvaticum</i>), Tufted Hair-grass (<i>Deschampsia cespitosa</i>) and Common Couch (<i>Elymus repens</i>)
Speckled Wood	Generalist and feed on a variety of grasses but most commonly on: False Brome (<i>Brachypodium sylvaticum</i>), Cock's-foot (<i>Dactylis glomerata</i>) and Yorkshire Fog (<i>Holcus lanatus</i>)
Small Heath	Fine grasses, especially fescues (<i>Festuca</i> spp.), Meadow-grasses (<i>Poa</i> spp.)

Do you want to learn more about grass identification?

The National Biodiversity Data Centre has published a guide to provide an introduction to Ireland's grasses. It can be purchased online at shop.biodiversityireland.ie





Peacock © Liam Lysaght

Should I buy a “butterfly kit” with caterpillars or release adult butterflies I bought to help promote butterflies?

You should not buy butterfly kits with caterpillars or adult butterflies for release.

These kits are often sold as educational materials, but the caterpillars are usually mass-produced and more susceptible to disease. Releasing them into the wild can spread diseases to native populations. Additionally, without the appropriate caterpillar food plant, adult butterflies will not be able to reproduce. Instead of investing in these kits, focus on creating a proper habitat in your garden to support native butterflies. Similarly, commercially raised butterflies advertised for events like weddings or funerals should not be released. They may carry diseases or parasites that can harm wild populations and their release can lead to genetic problems and reduced adaptability in native populations

Butterfly-friendly ornamental plants

We've already learned that caterpillars need certain native plants, but some non-native (ornamental) plants are great sources of nectar for adult butterflies. It is important that you keep these plants to gardens, parks and similar settings, and do not let them escape into the wider landscape.

Here are some ornamental plants butterflies love

Plant type	Latin Name	Common name	Spring	Summer	Autumn	Winter
Climber	<i>Lonicera periclymenum</i> 'Scentsation' or <i>Lonicera</i> 'Graham Thomas'	Honeysuckle		Flower	Flower	
Climber	<i>Rosa</i> spp. <i>Rosa arvensis</i> <i>Rosa canina</i>	Rambling roses Dog rose (wild)		Flower	Flower	
Climber	<i>Clematis</i> 'Bill Mackensie'			Flower		
Herbaceous Perennial	<i>Geranium sanguineum</i>	Hardy geraniums		June July August	Flower	
Herbaceous Perennial	<i>Geranium Roxanne</i>	Hardy geraniums		June July	Aug Sept	
Herbaceous Perennial	<i>Symphytotrichum</i> 'Little Carlow'	Michaelmas daisies		Flower Aug	Flower Sept	Flower Oct
Herbaceous Perennial	<i>Nepeta Walkers Low</i>	Cat mint		June July	Aug Sept	
Herbaceous Perennial	<i>Coreopsis</i>	Tickseed		June July	Aug Sept	Oct
Herbaceous Perennial	<i>Erysimum Bowles's Mauve</i>	Flower	Flower	Flower	Flower	Flower
Herbaceous Perennial	<i>Hylotelephium spectabile</i>	Sedum		Pink form flowers	in Autumn and rich in nectar	
Herbaceous Perennial	<i>Verbena bonariensis</i>			Flower June July	Flower Aug Sept	
Herbaceous Perennial	<i>Eupatorium cannabinum</i>			Flower July	Flower Aug Sept	
Herbaceous Perennial	<i>Hylotelephium spectabile</i>	Sedum			Pink form flowers in Autumn and rich in nectar	
Shrub	<i>Ligustrum ovalifolium</i>	Oval leafed privet		July		
Shrub	<i>Hebe</i> 'Green Globe'	Hebe		Flowers	Aug	
Herb	<i>Lavandula angustifolia</i> 'Hidcote' And/or 'Munstead'	English Lavender		July	Aug Sept	
Herb	<i>Origanum vulgare</i>			Flower July	Flower Aug	
Herb	<i>Salvia</i> spp.	Ornamental Sage		June July	Aug Sept	Oct

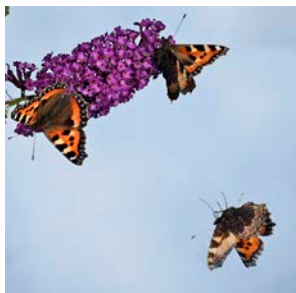
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Providing shelter for butterflies

Roosting habitats for butterflies

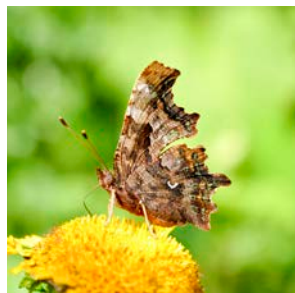
Butterflies roost on the underside of leaves, in long grass, rock crevices or similar sheltered places. Butterflies roost with their wings closed, often their wings camouflage with their background to protect them from predators while they sleep.

Some examples of camouflage used by butterflies:



Small Tortoiseshell

The Small Tortoiseshell, Comma, Peacock, Meadow Brown and Ringlet have a dark underwing used for camouflage among dead leaves and other vegetation.



Comma

The Comma is the only butterfly in Ireland that has scalloped wing edges which helps disguise it among dead leaves.



Brimstone

Brimstones have a distinctive 'leaf-shaped' wing on both the forewing and hindwing. It is the only 'white' butterfly in Ireland with this wingtip.

Overwintering habitats for butterflies

Butterflies can enter diapause (overwinter) in all four stages, but the majority will overwinter in their caterpillar stage. Before diapause, butterflies produce a form of internal antifreeze to protect them from the cold weather. Because diapause is triggered by shorter day lengths and lower temperatures, they generally overwinter outside. Habitats needed for butterflies overwintering in one of their immature stages are:

- Leaf litter
- Thick/uncut vegetation
- Log piles

Leaving an area of uncut grass all year round provides shelter for butterflies in diapause and pupating and food for caterpillars that feed on grass.

Peacock, Small Tortoiseshell, Brimstone and Comma can overwinter as adults. This makes autumn flowering plants like Ivy especially important. They need to build up enough fat reserves to last them all the way through the winter. Adult butterflies will have different preferences on where they overwinter. Brimstones will use patches of Holly, Ivy and Bramble.

Peacocks will spend diapause in sheds and dark crevices. Small Tortoiseshells tend to come into houses. However, houses are not a suitable place for overwintering as the heat will take the butterfly out of diapause. If you find a butterfly overwintering in your house in early Autumn (September - October), and you have not yet turned on the heating for the winter move them gently by carefully catching them in a cardboard box or similar.



Holly © David Fenwick



Small Tortoiseshell overwintering indoors © Liam Lysaght

Wait until the butterfly has calmed down after being woken and move it to a room where the heating will not be turned on (on a wall, ceiling, or in a shed). Make sure this space is not completely sealed as they will need to be able to escape when they wake up in early spring. If you do not have a suitable place, release the butterfly on a day that it is warm enough (11 °C) for them to fly and they will choose a new area to overwinter.

Should I get a butterfly box?

Butterfly boxes are small wooden structures that are sold to provide butterflies with shelter from bad weather, predators and as an overwintering habitat. There is no evidence that they are beneficial to butterflies so there is no need to spend money on them.



Roosting and overwintering habitat for butterflies in gardens

Branches and twigs

Butterflies go through complete metamorphosis during their chrysalis stage, attaching themselves to branches, twigs or other vegetation with a silken pad spun by the caterpillar.

Log pile

Butterflies will take refuge in log piles in multiple life stages.

Rocks

Adults will shelter under rocks during harsh weather.

Uncut area

Leave an area uncut all year round to allow eggs and larvae to overwinter near their host plants. Adults will also use long areas of grass to shelter in.

Dense hedges

Adults will use hedges for shelter.

Shed

Some butterflies might overwinter in unheated sheds. Make sure they have a way to escape when they wake up.

Dense area of Ivy

Ivy can provide a good habitat for both roosting and overwintering if dense enough.

3

Create a wildflower meadow – don't mow, let it grow

One of the biggest threats to butterflies in Ireland and throughout Europe is the loss of species rich grasslands, or native wildflower meadows. Gardens can help restore these important habitats by creating mini-meadows full of naturally occurring wildflowers and grasses. Some examples of camouflage used by butterflies:

Making a mini-meadow

Making a mini-meadow couldn't be simpler. All you need to do is reduce mowing. Even setting aside a strip or small area of your lawn can help. Butterflies are ectotherms which means they rely on the sun to raise their body temperature so they can fly. When choosing an area to create a mini-meadow, pick sunny sheltered spots. For example, if you have a small garden in a housing estate consider leaving the side of your garden that gets the most sun and against a fence or wall to provide shelter and protection from the wind.



Species rich grassland © Niamh Phelan

There are two ways you can create a mini-meadow:

- **Create a short-flowering meadow:** cut and lift every 4-6 weeks starting in mid-April.
- **Create a long-flowering meadow:** cut once a year in September, giving wildflowers a chance to drop their seeds in August. This can take a few years to fully establish and can look a bit messy at times, but over time as the soil fertility reduces, a rich variety of plants will appear.
- When cutting at the end of September, leave some patches uncut as they will provide refuge for caterpillars and eggs.

In both cases, it is important to remove grass cuttings when you mow to reduce the soil fertility. If cuttings are left on the ground, their nutrients will be absorbed back into the soil, and it will be too fertile for wildflowers to grow.

The National Biodiversity Data Centre recommends reducing mowing instead of using wildflower seed mixes or 'seed ball' type products. This is for a few reasons:

- Reducing mowing allows finer grasses to grow which are not usually found in wildflower seed mixes. Some butterflies depend on these grasses during their caterpillar stage.
- Wildflower seed mixes often contain colourful annuals that are designed to look pretty for people, but not necessarily provide the best support for insects. They will not result in species-rich grassland, which contains a mixture of native, naturally occurring grasses and wildflowers. Reducing mowing will give you a richer variety of plants, and greater biodiversity.
- Studies have shown that the seeds in many wildflower seed mixes are not native, despite what the packet might say. There is a huge risk of accidentally bringing in invasive species like Black grass that, if spread, would be devastating to the Irish agricultural industry.
- Even if you buy wildflower seed mixes with species that are native to Ireland, it is unlikely that the seed is of Irish origin. Irish plants are genetically different to those evolved in other countries and Irish plants are better adapted to support the insects that they evolved alongside.
- Wildflower seed mixes often contain annuals which require sowing every year. This can be expensive, especially in large areas.
- Wildflowers need nutrient-poor soil to grow. They won't thrive straight away in grassy areas that are used to plenty of mowing as the soil will be too fertile. Reducing mowing will decrease soil fertility over time, allowing wildflowers to emerge naturally. No seeds needed!

If you do decide to use wildflower seed mixes, make sure you keep them to your garden and don't let them escape into the wider landscape.



Ringlets feeds on grass species during its caterpillar stage

For more advice on creating meadows by reducing your mowing, see

<https://pollinators.ie/wp-content/uploads/2023/04/Meadow-Guideline-2023-WEB.pdf>



Common Blue - Underwing
© Oisín Duffy

No lawn to create a mini-meadow?

If you don't have a lawn and have access to a balcony or patio, planting flowers in pots can help butterflies and other insects. If you're ever in doubt while you're in a garden centre, stand back from the plants and observe which flowers attract butterflies.

When placing your pots in the garden, keep an eye on them throughout the year and make sure they are kept in the sun. Plants that are suitable for pots are:

- ✓ Wild Marjoram
- ✓ Mint
- ✓ Sage
- ✓ English Lavender

Rented property

If you are renting your property, check your lease to see who is responsible for managing your garden. If your landlord or property manager is responsible for managing your garden, you can speak to them to explain the importance of managing it for butterflies and biodiversity:

- Butterflies are under threat due to habitat loss and climate change.
- Reducing mowing will save time and money.

Feel free to use any the suggestions throughout the guide. The actions below might be most relevant to rented properties:

- Reducing mowing on your lawn
- Creating a mini-meadow
- Using potted plants
- Limiting chemicals (herbicides, fertilisers and pesticides)



White clover © Una Fitzpatrick

4

Managing garden boundaries for butterflies

When managed properly, garden boundaries (hedges, fences, and walls) can provide habitats for butterflies and biodiversity. They often act as wildlife 'corridors', connecting different habitats and providing safe passage for biodiversity through our landscape.

Hedgerows

Properly managed hedgerows are wonderful habitats for butterflies, providing flowers to feed on and places to roost and overwinter. South-facing hedgerows provide wonderful areas for butterflies to bask and soak up enough heat to help them fly. Similar to caterpillars preference to native plants adult butterflies prefer native Irish hedgerow species. These include:

- ✓ Hawthorn
- ✓ Blackthorn
- ✓ Buckthorn
- ✓ Holly
- ✓ Ivy

You should avoid planting just one species (monocultures). A monoculture hedge (for example a full hedge of Hawthorn) will not attract as many butterfly species as a hedge with a variety of native species (such as Blackthorn, Alder, Buckthorn and Holly). Long overhanging flowering hawthorn hedges, with a mixture of trees and ivy are wonderful for biodiversity.

There are many non-native hedging plants such as Leylandii and Beech that should be avoided if you are improving your garden for butterflies as they provide no support to them either in the form of flowers or caterpillar foodplants.



Garden Hedge

Managing hedgerows for butterflies

Here are our top tips on managing hedgerows for butterflies and other biodiversity.

- Cut hedgerows as little as possible: Flowers only form on wood that is at least two years old, so if you cut every year your hedge will not provide food for butterflies and other insects.
- Allow your hedgerows to grow as tall as possible: There may be situations where hedgerows need to be cut annually (for example on a road where it impacts drivers' vision and safety). In these situations, cut in an A-shape rather than a box shape. This allows them to become dense, which benefits birds.

Walls and fences

Gardens that have walled or fenced gardens can maximise the available area for biodiversity and butterflies by encouraging climbing plants. Please refer to this list of native plant species that can be trained to a wall or fence that will encourage butterflies in your garden:

- ✓ Dog Rose
- ✓ Ivy
- ✓ Honeysuckle*



Honeysuckle (*Lonicera periclymenum*)

© David Fenwick

*There are many species of Honeysuckle, however only *Lonicera periclymenum* is native to Ireland and should be encouraged over non-native species.

5 Eliminating or reducing pesticides and chemicals

Pesticides (herbicides, insecticides and fungicides) and chemicals such as fertilisers are used by many gardeners. But they can cause huge damage to butterflies, other insects, and the plants they feed on. One of the best things you can do to help butterflies and biodiversity is avoid using them.

Insecticides

Spraying insecticides to kill 'harmful' insects will also negatively impact butterfly populations. The most common reason gardeners use insecticides to protect plants and vegetables. But these potent chemical cocktails kill both the target species and other beneficial insects.

By using insecticides, you may not only directly harm butterflies but indirectly harm them through damaging relationships they have with other insects. Ants are beneficial to butterfly species as they protect some caterpillars. Caterpillars produce a sugary secretion that ants feed on and in turn the ants protect the butterflies from parasites. So having ants in your garden positively influences some butterflies.



Rose aphid (*Macrosiphum rosae*) © Kevin Murphy

Aphids can be a pest of vegetables and other plants. Where possible, it is better to tolerate rather than kill with pesticides. You can encourage aphid predators such as ladybirds, ground beetles, hoverflies and earwigs by managing your garden in a biodiversity-friendly way. Be aware that it may take some time for aphid predators to build up in sufficient numbers to give good population control.

We know Nettles are beneficial for caterpillars. But did you know you can also use Nettles a 'sacrificial plant' for aphids? Aphids love Nettles, ladybirds often lay their eggs on Nettles knowing that their young will have plenty of aphids to feed on when they hatch.



Nettle © Liam Lysaght

Herbicides

People can be tempted to use herbicides on their lawns to improve grass growth and the 'look' of their lawn. There is no biodiversity value to this. By spraying herbicides on your lawn, you are removing important wildflowers like, Clovers and Birds-foot Trefoil which butterflies, and other insects depend on for food.

Fertilisers

Fertilisers are used to increase the fertility of soil and promote grass growth. Aggressive grasses that have prolific growth rates outcompeting our native wildflowers and grasses. Keeping the fertility of your soil low reduces vigorous grass growth and increases the number of wildflowers and finer grasses in your garden (see how to create a mini-meadow).

Fruit and vegetable gardens

Growing your own fruit and vegetables is a brilliant past time. However, it is not without its challenges, which is why some gardeners use pesticides to prevent hungry caterpillars.

The 'Cabbage White Butterfly' is a broad term that is used to refer to several species of white butterflies that feed on cabbages and other Brassicas. You can prevent butterflies laying eggs on your vegetables and other plants by netting your plants and making sure there are plenty of 'sacrificial plants' for them to lay their eggs on. Here are five sacrificial plants to help keep 'Cabbage White Butterflies' away from your produce:

- ✓ Nasturtiums
- ✓ Garlic Mustard
- ✓ Cuckoo Flower
- ✓ Water-cress
- ✓ Vetches

In the autumn, leave a few over ripe fruits (apples and pears) from your fruit and vegetable on the ground for butterflies to feed on.



© Liam Lysaght

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Preventing the spread and introduction of invasive species



Our gardens are often full of a diverse mix of native and non-native plants. A proportion of the non-native ('alien') plants we grow are classed as 'invasive' as they can cause significant harm to our native wildlife and biodiversity. These impacts can extend to our extremely important and increasingly vulnerable insect populations.



Unfortunately, where invasive alien plants are established, they can come to dominate space, leaving little room for other plants to grow. Worse still is their ability to spread beyond our gardens into the wider landscape, where they can have serious and irreversible impacts on our ecosystems and the biodiversity they support.



Invasive alien species can gradually replace our native plants with dense monocultures. It's not surprising that they have been identified as one of the

greatest threats facing biodiversity globally.

We can help discourage the spread of invasive alien species in our garden by encouraging native species to flourish, supporting vast armies of caterpillars and vibrant kaleidoscopes of butterflies!

Invasive alien plants and pollinators

The interactions between invasive alien plants and our native pollinators are numerous and complex. While some can support pollinators (e.g. *Buddleja davidii*) others possess toxic compounds that can harm insects and contribute to their declining populations (e.g. *Rhododendron ponticum*). At best, invasive and non-native species in Ireland only support a single stage of the butterflies life cycle (i.e. their adult stage). Native plants, however, support the entire life cycle of our butterfly species, providing adults with a place to lay their eggs, a food source for both emerging caterpillars and adult butterflies.

Know what you grow and Be Plant Wise!

It is important to become familiar with the plants we have growing in and near our gardens. This can help us to be alert to potential invasive alien plants that arrive and be aware of those which might pose a threat. While many non-native garden plants can have spectacular floral displays that attract butterflies, some of these species can be invasive and cause a cascade of harmful impacts to biodiversity.

If you are purchasing plants to support butterflies in your garden be sure to do some research beforehand to check if they are native, non-native or invasive. Never collect plant cuttings or seeds from invasive alien plants or plants you are unfamiliar with in the wild.

Invasive alien plants can be extremely difficult to remove from your garden once established. Many have high numbers of seeds that can remain in the soil for years or even decades. They often have complex root systems and can grow from the smallest fragments.

If you find any invasive alien plants growing in the wild near your garden report your sightings to www.invasives.ie so appropriate action can be taken. As you begin to plant be wise, keep an eye out for the appearance of any invasive saplings that may self-seed from neighboring gardens or wild populations.

Here are some commonly grown invasive alien garden plants that can escape and establish populations in the wild (Booy *et al.* 2015):



While invasive plants like Butterfly bush can provide a food source for adult butterflies they can easily spread from gardens and impact native plants.

Himalayan balsam - *Impatiens glandulifera*

This species is a garden escapee that now grows in dense stands along riverbanks and watercourses. Exploding seed capsules can disperse seeds up to 6 metres away. This species grows rapidly forming dense monocultures that displace and prevent the growth of native plants.



© Colette O'Flynn

American skunk cabbage - *Lysichiton americanus*

This species has a distinctive foul smell with large bright green, oval shaped leathery leaves. Its flowers consist of a large yellow hood around a single green spike. It thrives in muddy and wet woodland areas, grows fast (up to 1.5m high) over summer months, crowding out other woodland plants. Its rhizomes can grow down to 30 cm deep. Where new plants establish, seed production begins after 3 - 5 years. Each plant can produce approx. 500 seeds.



© Jan Robert Baars

Rhododendron - *Rhododendron ponticum*

Distinctive, up to 5m tall dense shrub with thick twisted woody stems. Originally introduced as an ornamental plant in parks and woodlands, it is often planted in gardens. The species has spread to highly sensitive habitats including heath, broad-leaved woodland, and dunes, where dense growth can considerably alter wildlife habitats .



© Colette O'Flynn

Japanese knotweed - *Fallopia japonica*

This notorious plant grows rapidly and densely in summertime, outcompeting native species for light and space. The horizontal spread of its long rhizome systems can cause problems to the integrity of built structures, and it can be very costly to remove. Commonly found along riverbanks, roadsides, urban areas, train lines, and waste grounds. This species can displace natives and exacerbate flooding.



© H. Oerwin (pixabay.com)

Cherry laurel - *Prunus laurocerasus*

Planted as hedging in gardens and field boundaries. This species grows up to 10 metres high and spreads vegetatively through layering (i.e. branches that come into contact with the ground develop roots and establish a new plant) and suckering or seed dispersal facilitated by birds. It is commonly found in woodland and along roadways. Dense thickets shade out native ground flora, hindering the regeneration of native tree species.



© GB NNS

Keep an eye out for this invasive garden pest!

New Zealand Flatworm - *Arthurdendyus triangulatus*

This widespread flatworm species preys on native earthworms and can negatively impact the condition of soils. It has a flattened body with pointed ends ranging in colour from grey, black to chocolate brown with a contrasting pale buff edge. Be careful and wear gloves when inspecting species as the mucus which covers its body may irritate the skin and cause allergic reactions.



© The Food and Environment Agency FERA



Montbretia is another common invasive plant that can spread from gardens. Here it dominates a stretch of road in south-west Donegal replacing important native pollinator plant species © Jesmond Harding.

Where invasive species are already present in your garden you can take steps to reduce the risk of these species spreading into the natural environment. Invasive alien plants can spread from your garden through seed dispersal, cuttings or parts of the plant coming loose (fragmentation), creeping roots or rhizomes. Birds and other animals can also facilitate their spread by ingesting and depositing seeds in other locations. They can be carried on contaminated garden tools, footwear, clothing, soil, cuttings, seed sharing or simply by growing over fences, walls, or other garden boundaries.

To reduce the risk of invasive alien species spreading beyond your garden, you can:

- Seek professional advice and assistance when attempting to remove hazardous invasive alien species from your garden (e.g. Japanese knotweed, Giant Hogweed).
- Carefully cut invasive alien plants back in the winter or during reproductively inactive periods, removing any loose fragments and dispose of with care (see next section for more details).
- Carefully deadhead seed pods or seed heads and dispose of appropriately to reduce the risk of wind dispersal.
- Place a tarp under the plant before cutting or deadheading to ensure that fragments are collected and removed.
- Remove any invasive plant saplings that self-seed or opportunistically establish as you rewild your garden.
- Clean soil and plant material from your garden tools and footwear before using elsewhere.
- Ensure that hazardous plant material is collected by licensed waste collectors.
- Never give cuttings or seeds of invasive alien plants to friends or family.

Disposal of invasive alien plant material














Careful and appropriate disposal of invasive alien plant material is crucial to ensure that we don't inadvertently cause their spread beyond our gardens. Even when composted, many invasive alien plants can grow and establish from the smallest fragments or seeds (including those that may appear to be dead).

The method for disposal of invasive alien plants depends on the species, and the part of the plant being disposed of. Some invasive alien plants must be disposed of at a licensed waste facility, others can be composted in your garden, go directly into your brown bin (depending on terms and conditions of your waste collection provider) or be buried appropriately in compliance with relevant legislation.


Plant material and soil containing seeds/components of some of the most harmful invasive alien species are considered 'controlled waste' and require careful and appropriate disposal by professional removal companies and suitably licensed waste disposal facilities. Moving the regulated species off-site requires a licence from the National Parks and Wildlife Service. Some parts of invasive plants that cannot reproduce or grow can be safely composted (Wade *et al.* 2019; IFI 2013). Details on how to dispose of invasive alien plants are provided in the table below. If the plant material has been continually treated with herbicides, it is classified as hazardous waste and must be disposed of in a hazardous waste facility. For details on registered waste carriers and licensed waste management facilities contact your local authority or National Waste Collection Permit Office.

	 Green vegetation	 Flowers	 Seeds, bulbs & soil	 Roots/Rhizomes	 Woody material
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Plant species

Himalayan balsam <i>Impatiens glandulifera</i>   	If stems are cut and crushed, they can be left to dry out and decompose in your garden (wrap in a tarp, if possible).	Flowers hold explosive seed capsules they cannot be composted.	Seeds from this plant and soil containing seed are classed as controlled waste and must be transported by a registered waste -carrier and disposed of at a suitably licensed waste-disposal facility.	Roots can be left to dry out and decompose away from the ground, to prevent re-rooting (wrap in a tarp, if possible).	n/a
American skunk cabbage <i>Lysichiton americanus</i>   	Leaves can be left to decompose in your garden or composted.	Flowering spikes containing seeds and cannot be composted.	Plants with seed pods and soil contaminated with seeds are classed as controlled waste and can be buried at 1m depth otherwise it must be transported by a registered waste -carrier and disposed of at a suitably licensed waste-disposal facility.	Root system should not be composted.	n/a
Rhododendron <i>Rhododendron ponticum</i>   	Should be disposed of at a suitably licensed waste disposal facility.	Flowers contain seeds and cannot be composted.	Seeds and soil containing seeds are classed as controlled waste and should be disposed of at a suitably licensed waste-disposal facility.	Roots should not be composted.	Woody materials can be mulched and left on site.
Japanese knotweed <i>Fallopia japonica</i>    	No part of this plant can be composted. Consult specialist for onsite disposal options.	Flowers may contain seeds and cannot be composted.	Plants and soil containing seed are classed as non-hazardous controlled waste, it should be transported by a registered waste carrier, and disposed of at a suitably licensed waste-disposal facility.	Roots systems should not be composted.	Woody materials should not be composted.
Cherry laurel <i>Prunus laurocerasus</i>   	Can be left to dry out and can be composted.	Flowers contain seeds and cannot be composted.	Seeds and soil containing seeds should not be composted. Disposal of seeds and soil containing seed should be brought to a licensed landfill site.	Roots systems should not be composted.	Woody materials can be mulched and left on site.


Key: Invasive alien plant disposal symbols

 **Some Restrictions**

Subject to restrictions under EU Communities Birds and Habitat regulations and/or EU Regulation on Invasive Alien Species 1143/2014

 **Licence Required**

Licence required to move the invasive species or viable parts in vector material off-site. Only a licensed waste carrier can legally transport the waste to an appropriate waste facility.

 **Professional Advice**

Seek advice from qualified waste management professional for treatment and removal.

 **Don't Compost**

Not suitable for composting.

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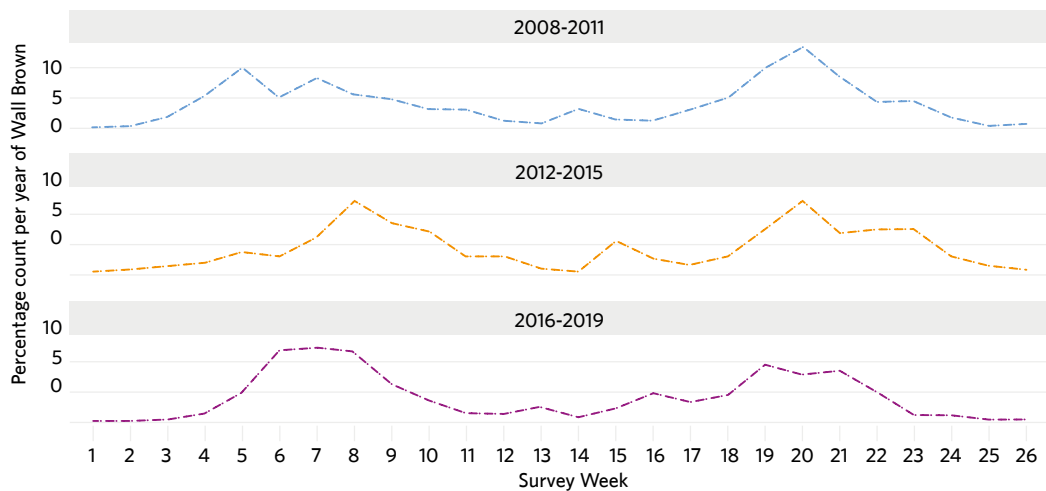
Helping butterflies with climate change

Our climate is changing due to a global rise in temperature. This will affect people and biodiversity. For butterflies, it will have an impact on their development, behaviour, ecology, and reproductive success.

We may see the distribution of butterflies change as certain areas become unsuitable for their needs. There may also be changes in their phenology (flight patterns). The life cycle of a butterfly is sensitive to temperature – as temperatures change, it will affect the timing of each stage of their life cycle.

Exactly how butterflies respond to climate change will depend on their species, but in general, we are already seeing butterflies flying earlier in the year.

Through the Irish Butterfly Monitoring Scheme, we can detect the changes in the phenology (annual cycle) of butterflies and use it as a proxy of how butterflies are responding to climate change.



Climate change is a global issue and requires multiple solutions to reduce our greenhouse gas emissions. This requires effort from every person and industry. You, in your own garden, can make a difference.

Peatlands



Raised bog restoration - Ronan Casey

Peatlands act as an important long-term carbon stores. In Ireland, peatlands in are estimated to store 1085 Mega tonnes (Mt) of carbon (53% of all soil carbon stored in the island of Ireland on just 16% of the land area).

Most gardeners buy compost for their gardens; however, many composts contain peat. By harvesting peat, we are reducing the amount of carbon stored by peatlands and therefore accelerating climate change, impacting butterflies and biodiversity more generally.

When you are buying compost for garden, please consider choosing peat-free compost to protect our climate and our butterflies. Bord Na Móna

has ended all harvesting of peat in Ireland which will help Ireland meet its climate goals. However, peat is still being imported from other countries, so it is important to check if your compost is peat free.

There is still research to be done into peat-free alternatives at the commercial level. Currently, the best replacement is Coco Coir, a natural waste product of the coconut-growing industry. Coco Coir has an ideal pH level and antifungal properties. However, there are still some issues, including the carbon footprint of importing it to Ireland from Sri Lanka, and the large amount of water required to wash it, which puts pressure on regions that are already struggling with water demand.

Another option is to make your own compost using grass, garden clippings, twigs and cardboard. This can be done using a compost bin or compost pile. Going peat-free and having your own compost heap will benefit all the insects that are a part of the decomposition process and those that are not. For example, bumblebees love nesting in compost heaps.

Other insects that can be found in compost heaps:

- ✓ Springtails
- ✓ Woodlice
- ✓ Earthworms
- ✓ Millipedes
- ✓ Centipedes
- ✓ Beetles

This of course has a positive knock effect for all the insectivorous animals like birds and bats in our gardens. Composting at home not only saves money and helps

combat climate change, potentially limiting its effect on butterflies, you are also providing an excellent habitat in your garden for many other creatures.

An Taisce have produced a booklet on the importance of Irish peatlands and how to make your own compost at home.

Compost for Nature - An Taisce



Helping butterflies during extreme weather

Unfortunately, with climate change extreme weather will become more frequent. This will result in higher temperatures, periods of drought, and periods of increased rain. These conditions will present butterflies with significant challenges. There are simple steps you can take in your garden to protect butterflies during the different periods of extreme weather.

Periods of drought

Climate change will lead to more periods of drought. Watering your plants during hot weather will increase the nectar content of flowers, providing much-needed food for butterflies.

Make sure butterflies have plenty to drink by spraying water on the soil (this also releases extra minerals). Or fill a bucket of sand with enough water for them to drink from.

Hosepipe bans may become more common as droughts increase. Plan ahead by installing a rainwater collection drum to water your plants. When removing unwanted vegetation, leave it on the ground to dry rather than putting it straight into your compost bin. This allows any moisture to release into the soil.

When rain finally comes, your lawn and its root system will need time to recover from the stress. When mowing, keep the blades at a higher setting than usual.

Periods of very hot and cold weather

Butterflies are ectotherms and rely on their environment to heat up their body. Butterflies adapt to intense heat by angling their body away from the sun. They also use 'micro-climate selection' to choose areas of your garden that can help them heat up or cool down. Micro-climates are small areas that have a difference in temperature to the surrounding area. To heat up, butterflies bask by resting with their wings open to increase their body surface exposed to the sun. South facing hedges provide a nice basking area for butterflies. Rocks also offer a warm micro-climate perfect for basking.

In intense sunshine, butterflies will visit shady areas and long grass to cool down. If you are looking for ideas of what to plant in shady areas think about woodland plants that tolerate low levels of light:

- ✓ Primrose
- ✓ Common Dog Violet
- ✓ Devil's-bit Scabious
- ✓ Red Campion
- ✓ Wood Anemone



Dog violet © Liam Lysaght

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Monitoring butterflies in your garden

Monitoring butterflies helps us track changes in their populations and gives us detailed insights into how insect populations are being impacted by land-use and climate change.

The Garden Butterfly Monitoring Scheme helps us keep track of which butterflies regularly use gardens, and how numbers vary across the country year on year. Participants make regular 15-minute counts of the 20 most common butterflies found in Ireland. No expert knowledge is required, and it's perfect for beginners.

This recording scheme is a great way of finding out which butterflies are visiting your garden, and how you can support them.

The National Biodiversity Data Centre have developed a free online course for the Garden Butterfly Monitoring Scheme. By going through this eCourse you will learn:

1. How to identify the 20 most common garden butterfly species
2. How to take part in the Garden Butterfly Monitoring Scheme
3. How to register your garden on the National Sampling Framework
4. How to submit your data

If you would like to get involved, please email us at butterflies@biodiversityireland.ie

Taking a landscape approach for butterflies

Gardens can play a big role in helping butterflies, but to fully support them, we need a variety of healthy habitats across Ireland. Some butterfly species have very specific needs in particular types of habitat. Some conservation measures need to be focused on specific areas or plants. For example, Kidney Vetch is the caterpillar foodplant of the Small Blue and its occurrence is very much dependent on the availability of Kidney. Kidney Vetch is generally found in coastal areas with lots of bare soil for it to germinate. The Pearl-bordered Fritillary and Marsh Fritillary are associated with a mixture of sward heights generally from low intensity grazing by livestock

To find out more, visit <https://biodiversityireland.ie/publications-category/other-data-centre-publications/>



About the National Biodiversity Data Centre

The National Biodiversity Data Centre is a national centre that collects and manages data to document Ireland's wildlife resource, and to track how it is changing. Find out what biodiversity has already been recorded in your local area on Biodiversity Maps <https://maps.biodiversityireland.ie/>

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Ireland's Butterfly Series

