



HABITAT CREATION and MANAGEMENT for POLLINATORS leaflet

INTRODUCTION

Insect pollinators are vital for supporting food production and biodiversity, but they face ever-growing pressures from habitat loss, climate change and exposure to pesticides and disease. The National Pollinator Strategy calls us to help pollinators by managing land to increase their food resources and nesting sites. To achieve this, farmers and land managers will need clear and practical guidance.

Following the success of the book, **Habitat creation and management for pollinators**, we have produced this summary leaflet containing new and detailed information on important plant species for a wide range of native bee species typically found on farmland.

This brings together seven years of detailed field observations by Marek Nowakowski and Mike Edwards, and provides unique insights into the different flowers visited by a wide range of native bee species throughout the year. Based on over 14,000 observations of bees visiting flowers, we hope that

this new ‘calendar of flower resources’ will help you make the right decisions on which species to sow and encourage on your farm.

We would like to thank the following for their support: Cotswold seeds, Emorsgate seeds, Syngenta, the late John Deeley, Heather Harris, Rowan Edwards and William Wolmer. We are especially grateful to Tony Hopkins and Chris Shields for permission to reproduce their wonderful artwork.

***Marek Nowakowski, Mike Edwards
& Richard Pywell, June 2020***

Footnotes:

1: Production of this leaflet was supported by research programme NE/N018125/1 LTS-M ASSIST - Achieving Sustainable Agricultural Systems, funded by NERC and BBSRC.

2: Citation Nowakowski, M., Edwards, M. & Pywell, R.F. (2020) Habitat Creation and Management for Pollinators Leaflet, UK Centre for Ecology & Hydrology, Wallingford, UK. First published in 2020.

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Illustration courtesy of Chris Shields. www.illustratewildlife.com



UK Centre for Ecology & Hydrology



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BEE BIOLOGY

There is one species of honeybee and, in the UK, 26 species of bumblebee and over 200 solitary bee species. Honeybees and bumblebees live in colonies comprising workers controlled by a queen. These workers forage for food and protect the nest. Most solitary bees rely on a single female to build and provision the nest for her offspring.

These differences in biology mean the three types of bee have markedly different requirements to complete their life cycles. Honeybees are managed

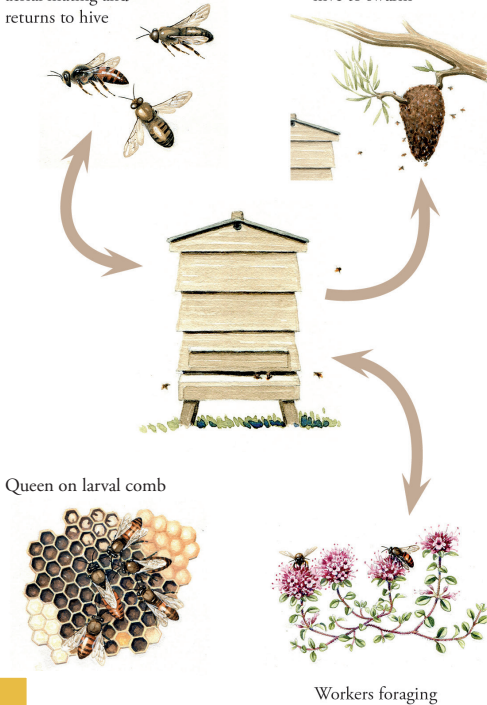
by beekeepers, live in portable hives that can be moved to suitable flower resources and are fed with sugar during the winter. Wild bumble and solitary bees, on the other hand, are entirely reliant on their surround landscape to provide nesting sites and food throughout the year. Queen bumblebees and some solitary bee species establish their nests in the spring. This means they are dependent on “wild” and hedgerow flowers, as sown flowers do not emerge until much later in the season. It is therefore vitally important we manage habitats to provide these early season resources.

Honeybee life cycle

Perennial colony

New queen leaves for aerial mating and returns to hive

Old queen leaves hive to swarm

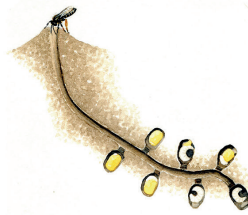


Solitary bee life cycle

Annual, with one or sometimes two generations a year



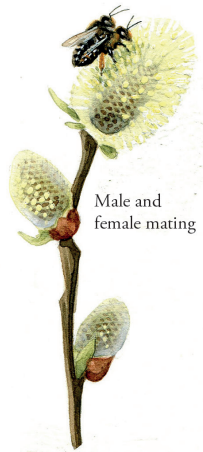
Pupae, in cavity nest of leaf cutter bee



Mining bee burrow



Female foraging
Spring or Summer



Male and female mating

POLLINATION AND FLOWER RESOURCES

Bees and other insects provide a vital ‘pollination service’ estimated to be worth around £630 million a year to the economy. Without pollinators, many of our flowering plants would disappear and there would be serious food shortages.

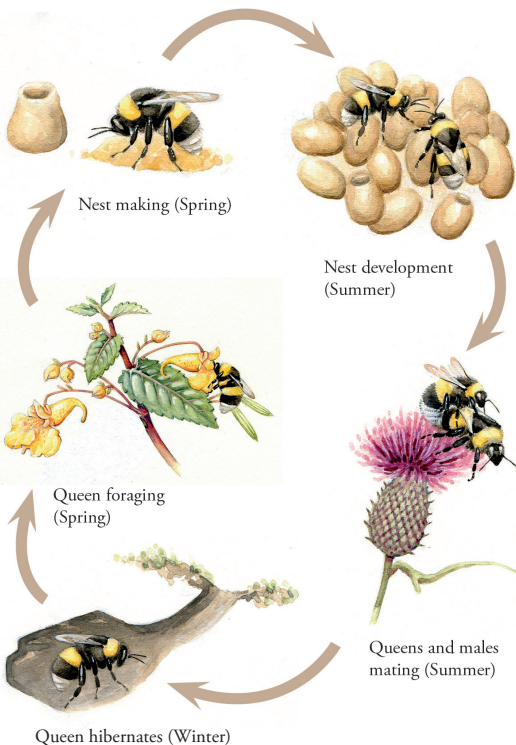
All bees need to visit flowers to collect nectar to provide energy for flying, and pollen as a protein source for their larvae. In return for providing these rewards, the flower is often cross-

fertilised by the bee, enabling seed production. The type of flower a bee visits is controlled by factors such as colour, shape and scent. The length of a bee’s tongue determines the ability to gain access to nectar rewards.

How bees collect and transport their pollen will influence how efficient they are as pollinators. Honeybees and bumblebees clean pollen from their hairy bodies, form it into a moistened ball and place it in special pollen baskets on their hind legs. Solitary bees collect dry pollen and push this onto brushes on their bodies. This means they are generally covered in dry pollen grains - possibly making them more efficient pollinators than bumblebees and honeybees.

Bumblebee life cycle

Annual, with one or two generations a year



Honeybee - ‘wet’ pollen in pollen baskets

Photo - Shutterstock



Leaf cutter bee - ‘dry’ pollen under abdomen

Photo - Brigit Strawbridge



HABITAT CREATION FOR POLLINATORS

Farmers can help bees by creating high quality habitats containing pollen and nectar rich flowers. Flowering trees in hedgerows and naturally occurring flowers are some of the earliest and undervalued resources for bees. Appropriate management of these habitats is vital.

In order to sustain a wide diversity of pollinators in the countryside it is vitally important to provide a range of flower resources throughout their active period – March to September. This new Calendar of Flower Resources for Bees shows the importance of different plant species to bees throughout the season and highlights the value of hedgerow species and “wildflowers” to a wide range of early pollinators.

Spring flowers (Mar to May) are vitally important for nest founding bees - the pollinator ‘hungry gap’. Many species have just come out of hibernation and need pollen and nectar to build up

energy reserves. Providing early season flowers is the greatest challenge faced in the delivery of habitats for pollinators. Trees like Goat and Grey Willow, and naturally occurring flowers like Red Dead Nettle provide abundant early season flowers. Commercial wildflower seed mixes are good for providing flowers in mid-summer (mid May to Jul) to support large, productive pollinator populations. Finally, flowers like Field Scabious provide resources in late summer (late Jul to end Sep) for new queen bumblebees to increase overwinter survival.

Growing wildlife habitats is no different to growing crops - they need good management:

When to sow?

Mid-March to late April or
Mid-July to late August.

Where to sow?

A sunny, sheltered location avoiding shade is best.

How to sow?

Broadcast onto the surface of a firm fine seedbed and ring roll.

How to manage?

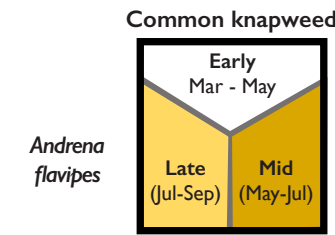
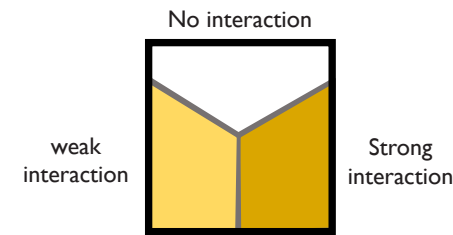
Cutting to control weedy species is vital to success in the first year. Good management in the following years will increase the number of flowers and will help prolong the life of the habitat.



A CALENDAR OF FLOWER RESOURCES FOR BEES

The chart summarises detailed observations of bees and the flowers they visit in a range of typical farmland habitats. A total of 78 flowering plants were visited by 39 common bee species. These comprised 11 plant species found in hedgerows, 36 commercially available wildflower species and 31 other flowering plants commonly found on farmland.

For each Each bee species visiting a plant the three divisions of the square indicate three recording periods – early, mid and late season. The intensity of colour for each divisions indicates the number of visits recorded in that period – the strength of the bee-plant interaction.



Some bee species may use a plant over more than one recording period. This may be because they have two broods in a year, (*Andrena flavipes*) or have several broods of workers (*Bombus lapidarius*).

