Great habitats, more flowers, better protection

LEAF’s guide to pollinating insects for farmers
Foreword

Pollinating insects are a vital component in ecological networks and provide significant social and economic benefits to humans through crop pollination and maintaining the character of the landscape. About 80% of British plant species, including many agricultural crops, depend on insects including honeybees, bumblebees, butterflies and moths to transfer pollen between flowers, producing seeds and fruits. Without pollinating insects these plants would reproduce less well, or not at all.

Pollination is an essential ecosystem service which maintains biodiversity and supports other vital ecosystem functions, including soil protection, flood control and carbon sequestration. Furthermore, pollination services are a public good, and many pollinators are charismatic insects that generate strong public interest.

Pollinating insects are vulnerable to pests, disease and environmental change - threats that have increased over the last five to ten years. The steady decline of these insects over recent years raises significant concern about our ability to feed a growing population set to reach 9 billion by 2050.

The interactions between pollinators and agriculture are extremely complex and have generated considerable recent research interest. This has been stimulated by increasing recognition of the importance of insect pollination in maintaining yields of some crops, coupled with evidence that many species of pollinating insects have declined substantially.

Agriculture, horticulture and farm management practices can have a huge influence on the number and behaviour of pollinator species over wide areas. In particular, through the adoption of Integrated Farm Management, it is possible to support and value a healthy population of pollinators alongside the production of safe, quality and responsibly produced food.

This guide sets out some practical and cost effective ways for farmers to increase the number of pollinating insects on their land. This could be through minimising the use of pesticides, providing food sources and habitats, hosting bee hives and, where possible, accommodating wasp nests. We hope it will inspire farmers to take action on the ground and help them recognise the crucial role they play in helping to reverse the decline of these precious insects.

Caroline Drummond, MBE
LEAF CHIEF EXECUTIVE

This guide is referenced in the LEAF Marque standard and is available free of charge for LEAF members. We believe that by using this guide, LEAF members can increase populations of pollinating insects on their farms. If you are not LEAF Marque certified, take a look at www.leafmarque.com or get in touch with us for more information. LEAF Marque certification is the best way for you to demonstrate your commitment to more sustainable farming practices.

www.leafmarque.com
Types of Pollinating Insects

The main groups of insects that visit flowers are honey bees, bumblebees, solitary bees, hoverflies, other flies, beetles, butterflies and moths. Here we cover the main groups of pollinating insects, but it is worth being aware that in some parts of the world, pollen can also be transferred by larger animals, such as mice, bats, birds or even lizards.

Honey Bees

Honey bees live in perennial colonies comprising a single queen and 40,000 or more daughter workers. They represent a tiny fraction of the approximately 20,000 known species of bee. Only one honey bee species, Apis mellifera, is native to Europe, Africa and the Near East. It is the most important commercial insect pollinator, and has been distributed worldwide because of its important role in agriculture and honey production. Some other closely related bee species (other species in the genus Apis) produce and store honey in the tropics.

Bumblebees

Bumblebees are large, furry bees in the genus Bombus. There are over 250 known species and they are primarily found in the Northern Hemisphere, often at high altitude or latitude. Like honey bees, bumblebees are also social insects. Most species produce an annual colony comprising a single queen and 50 to 500 or more female workers.

Solitary Bees

These make up the majority of the world’s bee species. They come in a range of sizes and colours and different species are distributed around the world. Solitary bees are generally rather seasonal, appearing either in spring, summer or autumn, depending on the species. Spring solitary bees are important pollinators of spring flowering tree crops such as apple. There are no worker bees in these species and solitary bees typically produce neither honey nor beeswax. Female solitary bees gather pollen and nectar to stock their own individual nests - often in the ground or in hollow stems - with food for their brood. They are immune from acarine and Varroa mites, but have their own unique parasites, pests and diseases.

Hoverflies

Hoverflies, called flower flies in America, are a particular family of flies - the Syrphidae. They feed exclusively on flowers as adults. Female hoverflies need to eat a meal of pollen before their eggs can mature. As larvae, the hoverflies feed on a range of things depending on the species. Some contribute to pest control by eating aphids. There are 256 species of hoverfly in the UK. Some very common species, such as the drone fly Eristalis tenax and its close relatives can be important pollinators in some contexts.

Other Pollinating Insects

Many other types of insect visit flowers to drink nectar, frequently or occasionally. They include blowflies, wasps, moths, butterflies and beetles. These insects can pollinate, but not usually as effectively as bees because they do not tend to move rapidly from flower to flower and they have no specialised structures for gathering or carrying pollen.
Advice for Farmers

LEAF (Linking Environment And Farming) is the leading organisation delivering more sustainable food and farming. LEAF works with farmers, the food industry, scientists and consumers, to inspire and enable sustainable farming that is prosperous, enriches the environment and engages local communities. We do this through developing and promoting Integrated Farm Management (IFM).

LEAF acknowledges that agriculture, horticulture and land use/management practices can influence pollinator species, numbers and behaviour over wide areas. In particular, through the adoption of Integrated Farm Management, it is possible to support a healthy population of pollinators alongside the production of safe, quality and responsibly produced food. It is therefore important to develop appropriate habitats alongside responsible crop health strategies.

Honey bees can forage over an area of over 16 square miles (41 km^2) and will seek out and target plants with the highest nectar sugar content. This means that farmers and land owners can make an important contribution to maintaining and increasing populations. Advice for farmers broadly falls into three categories:

• More habitats (for flowers and nesting resources),
• More flowers and
• Better protection from pesticides.

However, as there is much overlap between the three categories, we have listed possible suggestions that can help sustain populations of pollinating insects over the following pages.

1. Investigate the possibility of hosting some hives in an appropriate area of your farm

Hosting bee hives can be a rewarding experience and one which can be beneficial to you and your farm business. Some of the benefits include:

• Improved pollination of fruits and vegetables, where relevant
• A crop of honey
• Potential improved yield of pollinator-dependent crops, although this is yet to be demonstrated

Get in touch with the British Bee Keepers Association at www.bbka.org.uk for more information.

2. Minimise the use of Pesticides

A planned and documented Crop Protection Policy will be based on understanding the interactions of a variety of processes and using this understanding to aid crop protection. Integrated Farm Management (IFM) will be a core theme of the policy and incorporate Integrated Pest Management (IPM). You can minimise the need to use pesticides by promoting beneficial predators through the adoption of practices such as rotations, variety choice and the use of buffer zones. Beneficial predators such as lacewings, hoverflies, ladybirds and carabid beetles, can reduce the need for pesticides which will not only make a difference to pollinating insect populations but also a difference to your bank balance.

You should only use an insecticide when it is the only or essential means of control, and ensure you follow all of the relevant guidelines to minimise the impacts on pollinating insects. Where possible, select pesticides that present the least hazard to bees and other non-target species. Do not apply them when crops are in full or partial flower. When applying, avoid drift into any wildlife habitat. For example, you could consider implementing a pesticide-free buffer strip around any planted or managed flower resources or margins. If you spray any product that is a known hazard to bees, you must warn any local beekeepers several days prior to application and only apply at times when bees are not so active. Many local beekeeping associations will have a spray liaison officer. Further information and links can be found at the end of this guide.
3. **Providing Food Sources and Habitat**

Flowers that provide nectar, pollen and habitat availability are key resources for pollinating insect populations. One way to increase them is to plant patches or strips of nectar-rich flowering plants in areas of your farm. This will boost the availability of essential food sources for a range of nectar-feeding insects, including butterflies and all sorts of bees. You can do this in field headlands, field corners, margins, or wherever you can find the space. Make sowing these areas part of your whole farm approach and consider integrating them with other needs on your farm.

When sowing your mixture, ensure there are at least four nectar-rich plants (e.g. red clover, alsike clover, bird’s-foot-trefoil, sainfoin, musk mallow, common knapweed), with no single species making up more than 50% of the mix by weight. Try to include plants that flower early and late in the season (from March to September in the UK) and a variety of flower shapes. This provides an important diversity of plants.

To maximise flowering, cut half the area in mid-June to stimulate a second flowering into the autumn. Then cut the whole area in autumn and, ideally, remove the cuttings. Avoid siting your nectar rich plants in shaded or damp areas; bees prefer flowers with warm nectar and obtain direct physical warmth from the sun in addition to chemical energy from nectar. The area will need to be re-established on a regular basis, for example, once every 3 years. There may also be a need to control grass weeds. You can also consider sowing areas of borage. This plant produces large amounts of nectar and can be self-seeding. Creating tussocky grass margins, ideally with some flowering species such as legume species will provide nesting, foraging areas and hibernation sites for bumble bees. For solitary bees, consider leaving a soil bank free of vegetation for several years, or avoid ploughing bare, open patches next to wildflower strips or meadows to allow them habitat to build their nests.

If you have willow trees, retain these areas as the catkins provide important early pollen (protein) in spring. If you do have trees on your farm, try to retain ivy on trees as this provides a late season nectar source. The ability of hedgerows to provide nectar and pollen can be encouraged by not cutting all hedges annually.

Managing or restoring areas of semi-natural habitat can be a real boost to pollinators too. Scientists working on farmland in many parts of the world have found that the diversity and numbers of wild bees in farmland are consistently higher the closer you are to patches of semi-natural habitat. Species-rich meadows, such as hay meadows, are great because they combine nesting sites and flower resources. For nesting, woodland and scrub are also identified as important habitat types for bees.

4. **Tolerate Wasps’ Nests**

Social wasps visit flowers and can be pollinators, but their most important ecological role is as predators. They are hunters, and love to take caterpillars and flies, which they feed to wasp larvae in the nest. This means they provide a pest control service as well. Wasp nests are not always easily tolerated, but where it is possible to provide suitable habitat, wasps should be accommodated.

5. **Monitoring and Evaluation**

Once you are making changes to your farm practices, you need to ensure that what you are doing is having a positive impact. Consider using the LEAF Green Box (free to LEAF members) and having regular wildlife surveys completed. You can use this data to look for positive changes. If you don’t get the improvement you wanted, think of reasons why this might be, are they out of your control? What can you do to improve the situation? Consider taking part in the national farm Pollinator Survey, taking place on participating farms on Open Farm Sunday - take a look at [www.farmsunday.org](http://www.farmsunday.org)
Case Study
Andrew Hughes, Farm Manager, Trinley Estates

Trinley Estates is a 728 hectare of mixed arable farm. The farm runs a small herd of White Park cattle to graze grassland areas and is heavily involved in protecting and establishing new wildlife habitats through the Higher Level Stewardship Scheme. The farm is managed by Andrew Hughes, who explains how they look after pollinating insects on the farm.

“I’m a strong believer that if we provide our bees with a good variety of plants, populations will be maintained and healthy. We always want to improve the amount and variety of nectar sources with pollen and nectar mixes, wild bird seed mixes, grass strips and we also have a wild flower meadow. Producing greater plant diversity has over time produced stronger and broader food chains and ensured the survival of some of our most endangered insect and bird species.”

Through good woodland management, by carrying out coppicing and thinning, we have encouraged a revival of woodland flora. This is essential to re-establish rare butterfly and moth species and has helped produce a thriving wild bee population in our woodlands.

Andrew has also been working with local natural beekeepers, “The aim is to keep bees in as near natural conditions as possible to promote health and vigour and the ability to cope with pests and pathogens”. And it seems to be working, “Our beekeepers have mentioned that many of the local hives have been experiencing losses over recent periods, whereas the colonies on the estate have been strong and healthy. Providing a continuity of good pollen and nectar sources throughout the foraging year eliminates hungry periods when food stocks can become depleted. We only take honey in good years when stocks are high and this leads to less stress within the hive.”

Andrew has been recording the fauna and flora on the farm through photography on its own dedicated website www.hampshirewildlife.co.uk. “Ultimately, I am interested in monitoring population changes from one year to the next and observing how our farming techniques affect wildlife habitats. We need to make just a little extra room around our field margins and this will result in pollinators thriving in harmony with food production.”

You can find out more information on Andrew and Trinley Estates on the farm’s website, www.trinley.co.uk.

Useful links and acknowledgements

- www.leafuk.org
- www.farmsunday.org
- www.pesticides.gov.uk
- www.naturalengland.org.uk
- www.bumblebeeconservation.org
- www.cfeonline.org.uk
- www.bbka.org.uk

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LEAF (Linking Environment And Farming)

Our vision: a world that is farming, eating and living sustainably.

Our mission: to inspire and enable sustainable farming that is prosperous, enriches the environment and engages local communities.

This guide has been produced exclusively for LEAF members. We would welcome your feedback on this guide, please get in touch with us using the details at the bottom of this page. Alternatively, you can also contact us on twitter, using @LEAF_Farming.

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- The LEAF Green Box
- The LEAF Marque certification scheme
- The Integrated Farm Management Bulletin
- Access to our online Information Centre

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