



LEARNING ZONE — CLASSROOM



Biodiversity and the importance of beneficial insects

Pollinating insects are crucial for the success of many natural habitats and the production of several food crops. More than 80% of European crop types are directly dependent upon insects for their pollination.

Populations of pollinating insects have declined significantly across Europe in recent years – some by dramatic levels. The causes of this decline are increasing, mainly the loss of feeding sites and breeding areas.

Bumblebee populations in the UK have been in decline for some time, due to changes in cropping patterns. This has meant a decline in vital pollen and nectar essential as a food resource of the bumblebee and also the loss on nesting sites on a landscape scale.

During the last 40 years there has been a 70% decline in bumblebee numbers on arable farms in the UK. One of the 24 species found in the UK has disappeared altogether with three other species also now on the verge of extinction.

Bees as beneficial insects

When a worker bee visits a flower to gather nectar, pollen from the plant's anther sticks to its hairy body. Because the bee generally visits a number of the same type of flower in a patch, it will rub some of the pollen off onto the stigma of another flower and complete pollination. For many plants this is the only way they can reproduce, so they will do as much as they possibly can to entice bees and other pollinators to their flowers. This is one of the reasons why plants that require this type of pollination have large, brightly coloured flowers, and often smell nice. In contrast, plants that rely on the wind to disperse their seeds are often much more plain. Some flowers, such as orchids, even have elaborate mechanisms to make sure bees are dusted with pollen when they visit.

Bumblebee on cornflower



Bees are particularly important as pollinators - not least because they are so good at it! Whereas pollinators like hummingbirds and bats are primarily interested in the nectar that flowers have to offer, bees actively seek out pollen. The pollen that bees collect which isn't rubbed off on other plants is taken back to the hive. Here it is stored and later used as a source of protein for feeding the developing larvae.

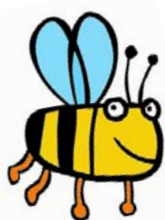




Did you know...?



- Over 25,000 species of bees have been identified in the world
- A honey bee can fly up to 15 miles per hour
- Bees fold their tongue (the 'proboscis') under their head while at rest or flying



Why do bumblebees can sting many times, and honey bees die after their first sting?

The honeybee's sting is barbed. Due to the elasticity of human skin it is impossible for the honey bee to pull the sting out after they have stung you. The bee will tug so hard to get away that the sting, poison sac and part of its abdomen will be pulled out and left hanging. After that, all the bee can do is fly away to die.

In contrast, the bumblebee's sting is smooth and so can easily be pulled out of the skin. Some scientists think that bumblebees used to have barbed stings like the honey bees, but that they adapted in order to survive.

Did you know...?

- The average working honey bee only makes about 1/12 of a teaspoon of honey in their lifetime
- To make 500g of honey, honey bees must tap over 200,000 flowers
- To make 500g of honey, honey bees must collect over 5kg of nectar
- A honey bee visits 50-100 flowers in every collection trip





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Operation Pollinator

What is Operation Pollinator?

Operation Pollinator is a project helping to provide essential habitats, protecting and enhancing overall biodiversity. Its work boosts numbers of pollinating insects on farmland, improves crop yields, and secures a balance between sustainable farming and environmental well being.

The project originated in the United Kingdom and is now being extended to commercial farms in France, Germany, Hungary, Italy, Portugal and Spain. There is additional European interest from countries like Belgium, Austria and Switzerland.

In the United States, Syngenta is exploring a further roll-out Operation Pollinator in North America. This would stretch Operation Pollinator across the northern hemisphere.

Over the next few years, Operation Pollinator aims to create 10,000 additional hectares of field margins dedicated to returning the level of European biodiversity to what it once was. This will be building upon the strong foundation laid by Operation Bumblebee in the UK, which saw 1,100 hectares of such field margins created.

How does it work?

The project works through the cultivation of pollinator crop margins on or near fields on commercial farms. Farmers are provided with seed mixes for sowing in these areas, as well as agricultural advice on how to achieve maximum benefits in terms of biodiversity, while maintaining their own farming efficiency.

Every year, pollinator population numbers are monitored and reported on by an independent scientific auditor.

Over time Operation Pollinator aims to extend the concept of providing and proactively managing dedicated habitats for biodiversity. They aim to go beyond the farm gate, into parks, golf courses, and even motorways!

Bumblebee on chive plant





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Why is Operation Pollinator important?

Pollinating insects are crucial for the success of many natural habitats and the production of many food crops. More than 80% of European crop types are directly dependent upon insects for their pollination. It is estimated that pollinators are worth about €5 billion a year to Europe's farmers whilst their value to the global ecosystem is about € 150 billion a year. Leading experts predict the likely future losses in some pollinators will become increasingly severe unless action is taken to reverse this trend.

Some of these species, including bumblebees, are also important as indicator species. That means that studying changes in bee populations give a good representation of environmental changes in the whole area.

Operation Pollinator offers a number of benefits, including:

- Significantly increasing pollinating insect numbers
- Hugely benefiting butterflies and other insects
- Improving crop yields thanks to better pollination
- Creating habitats for small mammals and farmland birds

Operation Pollinator is showing that it is possible to deliver real environmental results without compromising farming efficiency & profitably in the most productive parts of the field.



Bumblebee - *Bombus pascuorum*

What are the UK results so far?

Over 570 farmers & growers are currently participating in the project in the UK. The project here is now in its 6th year and the results have been remarkable. New habitats tailored to local conditions and pollinating insects have been successfully established and managed, which have been proven to increase bumblebee numbers by up to 600%, butterfly numbers up 12 fold and other insects more than 10 fold.

For more information on the importance of pollinator insects, their decline and Operation Pollinator, visit the website at:

www.operationpollinator.com or visit www.syngenta.co.uk/operationbumblebee

