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Living With Environmental Change

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The benefits of managing pollinators for crop production

As demands on food production increase how can land managers, growers and policy makers help to conserve and manage insect pollinators?

Photo by Victoria and Jennifer Wickens

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The Living With Environmental Change Partnership brings together 22 public sector organisations that fund, carry out and use environmental research and observations. They include the UK research councils, government departments with environmental responsibilities, devolved administrations and government agencies. The private sector is represented by a Business Advisory Board.

Insect pollinators are essential for food production, improving the yield and quality of three quarters of UK crops. Multiple pressures threaten pollinator populations and the pollination services they provide, including changing land use, disease, climate change and agrochemicals. This has resulted in declining abundance and species richness in both managed and wild pollinator populations and threatens the stability of crop pollination services. It is therefore essential to conserve and manage insect pollinators as demands on food production increase.

Why are crop pollinators important?

- Pollinators make a significant contribution to crop production in the UK and globally.
- Insect pollinators benefit not only the yield but also the quality of many crops and they are worth at least £691 million to UK food production annually (2011).
- The value of insect pollination is set to increase year on year, in part because the area of insect pollinated crops being grown in the UK, including oilseed rape, continues to rise.
- Insect pollinators benefit the yield and/or quality of 37% of UK food crop species including top fruits like apples and cherries; soft fruits including strawberries and raspberries; and field crops such as beans and oilseed rape. In addition another 37% of UK crops, such as carrots and onions, need insect pollination for seed production.
- The level of dependence on insect pollination is crop and variety specific and the contribution they make to production can vary. For example, 85% of apple production is dependent on insect pollinators but just 15% of oilseed rape.

Which insects pollinate UK crops?

- In the UK we have about 1,500 species of insect pollinators. Only a small proportion of these, mainly bees, are responsible for the majority of crop pollination.
- Different crops rely on different insect pollinators. Some crops depend on specialist pollinators, for example beans are heavily reliant on bumblebees. Other crops like oilseed rape, apples and strawberries are pollinated by many different insects including solitary bees, honeybees, bumblebees, hoverflies and other flies.
- The insects important for pollinating crops can vary from year to year and from place to place and are affected by the climate, weather and local land management. It is necessary to support and maintain a diverse and abundant pollinator community to ensure good pollination every season.
- Honeybees are used widely to supplement wild pollinators and improve crop production, but there are not enough honeybees to pollinate all the crops that require pollination in the UK. Further, honeybees are not the best pollinators for many crops. It is important, therefore, to support both honeybees and wild pollinators.

Hoverfly on oilseed rape
Photo by Louise Truslove

What are the benefits of getting pollination right?

— Pollinators can increase yield and improve the quality of many crops.
— The size and shape of apples, the oil content of rape seed and the marketable shape and shelf life of strawberries are all improved by insect pollination.
— Good pollination can increase the stability of crop production, reducing year to year and place to place variability in yield, by buffering effects of climate change and changing land use.
— If there are not enough appropriate insects available to pollinate crops that need it, then they will not yield to their full potential. A diverse, effective and robust crop pollinator community can reduce the risk of these deficits occurring, especially when demand for pollination services increases or conditions for crop pollination are sub-optimal.
— Many insect pollinated crops are high yielding, nutritious (packed with vitamins and minerals) and of high economic value. All these benefits can be threatened by inadequate pollination.

What needs to be done to maintain or improve crop pollination?

Growers and land managers need to:

— Establish flower-rich field margins and reduce the frequency and intensity of hedgerow cutting on farmland to increase floral and nesting resources for pollinators.
— Reduce the input and improve the targeting of agrochemicals such as insecticides and herbicides to reduce the risk of negative impacts on pollinators and the flowering plants on which they forage.
— Increase the diversity of flowering crops, or rotate beneficial crops such as clover, beans and oilseed, to increase the floral resources available to pollinators in arable landscapes.
— Protect semi-natural habitats such as woodlands, heaths, and meadows, which provide essential nesting and feeding habitats for diverse pollinator communities.
— Establish and/or maintain low-input grasslands which are high quality habitats for a wide range of wild pollinators.
— Consider introducing managed pollinators such as honeybees or bumblebees if the pollination demands of flowering crops are not being met in the short term by wild pollinator populations.

Policymakers can help to secure pollination services by:

— Continuing to provide support for farmers through agri-environment schemes to establish targeted pollinator management strategies.
— Promoting integrated pest management that aims to ensure a healthy crop with the least possible disruption to ecosystems and encourages natural pest control mechanisms, and by providing advice and incentives to help farmers adopt these practices.
— Encouraging effective and sustainable crop rotation systems that will benefit not only pollinators but also pest regulation and soil management.
— Supporting and coordinating habitat management beyond the farm scale to establish ecologically coherent landscapes. It is important to manage pollinators over large areas because their nesting and feeding requirements may not be met within individual farms.
— Providing decision support and training for growers on effective pollinator management, including identifying which pollinators are important for which crops and how to measure current levels of pollination service so appropriate action can be taken to address any pollination deficits.
— Promoting closer collaboration between the agronomy and ecology professions to promote best practice in pollinator management.

Further information

This Policy and Practice Note was written by Simon Potts, Mike Garratt, Deepa Senapathi and Tom Breeze drawing on research from the Sustainable Pollination Services for UK Crops project, part of the Insect Pollinators Initiative. The Insect Pollinators Initiative is funded by the Biotechnology and Biological Sciences Research Council, the Natural Environment Research Council, the Department for Environment, Food and Rural Affairs, the Scottish Government, and the Wellcome Trust under the auspices of the LWEC Partnership.

Useful resources:

Sustainable Pollination Services for UK Crops: www.crop-pollination.co.uk
Status and Trends of European Pollinators: http://www.step-project.net/
The Wildlife Trusts: http://www.wildlifetrusts.org/Bees-needs
Natural England Environmental Stewardship funding information: https://www.gov.uk/environmental-stewardship
Insect Pollinators Initiative: https://wiki.ceh.ac.uk/display/ukipi/Home
What is causing the decline in pollinating insects? LWEC Policy and Practice Note No. 9: http://www.lwec.org.uk/sites/default/files/attachments_biblio/15742%20LWEC%20PP%20Note%2009_web.pdf

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