



Operation Pollinator margin established in the UK

Project Details

COMPANY

Syngenta

COUNTRY

Global

AUTHOR

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Operation Pollinator – Enhancing Biodiversity in Agricultural Landscapes

See Also: *Syngenta CaseStudy Multifunctional Field Margins*

CONTEXT

Syngenta is a leading agriculture company helping to improve global food security by enabling millions of farmers to make better use of available resources. Through world class science and innovative crop solutions, our 28,000 people in over 90 countries are working to transform how crops are grown. We are committed to rescuing land from degradation, enhancing biodiversity and revitalizing rural communities. To learn more visit www.syngenta.com and www.goodgrowthplan.com. Crop pollination by bees and other pollinators is essential to the agricultural system. Domesticated honeybees and a diverse group of wild insect pollinators from wild bee species to hoverflies, butterflies, beetles, ants, and other flying species contribute significant monetary value—the value of insect pollination to the global ecosystem is estimated to be about €153 billion a year.

It is a major concern then that habitat loss, disease, and changes in agricultural practices have led to declines in such critical species. The lack of floral resources in modern intensively farmed landscapes is a key driver of this decline. It has been identified as one of the main threats to bee abundance and diversity. In non-flowering crops, flowering weeds are kept below a threshold level of economic damage to the crops as part of good agricultural practice. More importantly, uncropped areas, such as field margins and field boundaries no longer contain a mixture of flowering species. Instead, they are often kept free of vegetation or sown to grass. This can also have impacts on flowering crops, since declines in the diversity and abundance of pollinators means these crops will not be pollinated as effectively. For intensive agriculture to be sustainable, populations of pollinators must be supported and enhanced by agricultural practices, such as growing annual herbaceous plants to provide nectar and pollen resources in uncropped areas that are often less productive.

To address this issue and help farmers provide healthy, safe, affordable food in an environmentally sustainable way, Syngenta has developed a program that works to halt or even reverse these losses by creating areas of natural habitat around cropped land. The program has been instituted in 18 European countries, the United States, Canada, and South Korea.

Since 2000, Syngenta has worked with a wide range of stakeholders (universities, government bodies, farmer organizations, NGOs, and food chain partners) to improve bee habitat. These improvements support and enhance wild pollinator populations and increase

pollination services provided by wild pollinators on farms. Operation Pollinator was founded on a project initiated in 2000 called The Buzz Project - a scientific project conducted by the Centre for Ecology and Hydrology (CEH) and Farmed Environment Company (FEC) with funding from Syngenta, Unilever, and Defra (Department for Environment, Food and Rural Affairs).

OBJECTIVE AND PROJECT OVERVIEW

Operation Pollinator is a part of Syngenta's biodiversity program that aims to provide essential habitat to boost numbers of pollinating insects on farmland by protecting and enhancing overall biodiversity, improving crop yields, and securing sustainable farming and environmental balance. By creating areas of natural feeding and breeding habitat around cropped land on commercial farms, Operation Pollinator aims to increase the numbers of pollinating insects such as bees, hoverflies, and butterflies. Such landscapes often lack the diversity and abundance of flowers that pollinators need: once a crop has stopped flowering, these monoculture areas become "green deserts" for the insects that rely on the pollen. Creating habitat in crop-free areas such as field margins, corners, and buffer zones addresses this problem by providing pollen and nectar. For example, with more than half the land in Europe managed by farmers, this represents a significant opportunity to help pollinating insect populations recover: adding even just 1 percent of dedicated habitat can make a big difference. Indeed, the proactive management of crop-free areas on commercial farms is one of the most important environmental benefits agriculture can provide.

At the same time, it is clear that such methods must be compatible with profitable agriculture. Biodiversity must be delivered while farming sustainably and intensively. And this is what Syngenta has done: the principles of the program are practical and efficient, ensuring habitats can be grown and managed using existing equipment and farming techniques. Because the habitats are established on otherwise crop-free land, growers can keep farming efficiently and profitably on the most productive parts of the field, balancing economic food production with the protection of natural resources.

THE BUSINESS CASE

The value of pollination is estimated to be around €153 billion per year for worldwide agricultural production (€14.2 billion for Europe). Therefore, protecting and enhancing pollinators' ability to provide this ecosystem service is paramount. The research and monitoring conducted over the last 15 years shows that Operation Pollinator delivers real environmental benefits on marginal and less productive farmland, allowing the grower to continue farming efficiently and profitably on the most productive land.

A recovery in pollinator numbers is just one of the many benefits. Over a 3-year period, bumblebee numbers increased sixfold, butterfly numbers twelvefold, and those of other insects tenfold. Particular success has been seen in the *Bombus* and *Andrena* species. The program has also increased populations of beneficial insects, which can be used as part of integrated pest management; an example is the increase in the lacewings that control olive moths.

The Operation Pollinator project promotes sustainable use of land and other resources by assisting growers through the delivery of education and training, agronomic research and advice. Our focus is on assisting farmers on three core elements: establishment and management of field margins to facilitate natural pollination for crop production, support in-field adoption of best management practices and encourage value chain engagements.

One of the core components of our engagement with growers is education and awareness raising. For instance, educating growers about good agricultural practices that enhance food production, reduce soil erosion, improve pollination, etc. produces widespread social benefits. Our engagement with growers could also bring in economic benefits through the conversion of the natural resource into financial resources.

The natural habitats additionally provide good environments and food supplies for small mammals and field birds, as well as ecosystem services such as the enhancement of soil and water quality by mitigating runoff and protecting against soil erosion. By introducing vegetation cover into otherwise non-cropped farmland, works to limit soil erosion, absorb excess nitrogen, improve soil structure and compaction, and reduce surface water runoff. Some of the plants also fix atmospheric nitrogen into their biomass, improving soil fertility. Hedgerows and field borders can improve water quality by reducing the runoff of surface water that may contain pesticide or fertilizer residues. Likewise, research has shown that buffer strips made up of permanent non-cropped vegetables can remove as much as 97 percent of soil sediment and reduce the amount of nitrogen in runoff.

The wide-ranging ecological consequences of Operation Pollinator are highly beneficial and other positive aspects benefit farmers directly. Improved levels of insect pollination are linked to an increase in crop yield and quality; for example, higher levels of fruit production and more homogeneous development, meaning the entire crop is ripe and ready to be picked at the same time. In addition, there have been early indications of improved oil content in oil seeds. Operation Pollinator demonstrates that commercial farming and positive environmental management can coexist—it also proves they can be mutually beneficial.

In Europe, farmers engaged in Operation Pollinator may also stand to benefit from CAP2013. These proposed European incentives offer farmers payment for implementing greening measures. The focuses are creating ecological focus areas, diversifying crops, and maintaining permanent pastures. These three measures will represent a third of future direct payments to farmers, and Operation Pollinator helps growers implement them. Furthermore, with environmental management high on the agenda for retailers and consumers as well as for politicians, involvement in Operation Pollinator also represents an opportunity to improve perceptions of the farming industry: adopting the initiative demonstrates that growers and retailers care for the environment.

DECISION MAKING PROCESS

Syngenta's Department of European Environmental Stewardship, which oversees sustainability for Syngenta in Europe, is leading on this project. High level support was obtained through the project's on-the-ground success in terms of pollination and soil conservation benefits. The project involved local universities and NGOs on implementation (establishing pollinating margins) monitoring and reporting of results; therefore, these stakeholders also support the internal decision-making processes.

PROJECT DETAILS

The project creates natural feeding and breeding ecosystems for pollinator species around cropped land on commercial farms. This helps restore the populations of pollinator species and provides ecosystem services including limiting soil erosion, absorbing excess nitrogen, improving soil structure and compaction, and reducing surface water runoff. Some of the plants also fix atmospheric nitrogen into their biomass, improving soil fertility. Hedgerows and field borders can improve water quality by reducing the runoff of surface water that may contain pesticide or fertilizer residues.

The impact of the project has been the subject of extensive studies. The initial research was conducted in the Buzz Project for 5 years, covering six farms spread across England (Carvell et al., 2007; Defra, 2007). The effectiveness of six field margins was investigated, including existing and new agri-environment schemes, aimed at attracting and enhancing a broad range of invertebrate species. The creation of mixtures of wildflowers

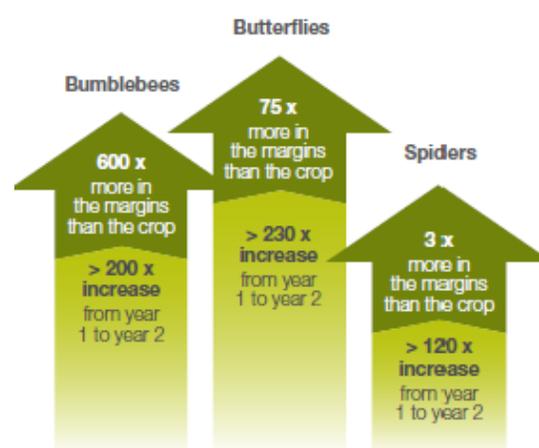


Figure 1. The effect of targeted field margins on bumblebees, butterflies and spiders populations

targeted at specific types of invertebrates resulted in significant effects for the widest range of taxa and functions above and below ground. For the first 3 years, bumblebee abundance and richness were significantly higher in the wildflower margins than the crop margins left to natural regeneration or sown to grass. Three rare bee species - *Bombus muscorum*, *Bombus ruderarius*, and *Bombus ruderatus* - were recorded, with the majority occurring in the wildflower margins. These results indicate the importance of mixtures of wildflowers targeted to providing nectar and pollen to support bumblebees and butterflies on arable land.

The peer-reviewed article from Carvell et al. (2007) was selected as one of the 100 most influential papers published in 100 years of *British Ecological Society Journals*.

Based on this solid research foundation, wildflower margins were implemented in the UK from 2004, and then in the UK and internationally from 2009. Eighteen European countries, the United States, Canada, and South Korea are now involved in Operation Pollinator, which is supported by a wide range of stakeholders, from universities to governmental bodies, farmer organizations, NGOs, and food chain partners. Seed mixtures have been specifically selected and adapted to local conditions in each country according to the soil type, climate, crops, and farming system.

Over the last 15 years, more than 5,000 hectares of field margins have been implemented. Through 2014, more than 2,500 farmers have been trained by agronomists to manage and ensure the successful implementation of Operation Pollinator field margins.

On average, to establish a field margin, it cost \$100 USD per hectare to the company to develop. This includes the cost of seed mixes, growers training, communication, data collection, and reporting. In most cases, field margin establishment cost is borne by the company and maintenance/management of established margins is left with the growers. Syngenta has monitoring tools to assess environmental impacts of established margins.

LESSONS LEARNED

Built on a strong research foundation, Operation Pollinator has developed into a successful project over many years for enhancing biodiversity in the farmed landscape. Moreover, the scientific principles can be adapted to local conditions in many parts of the world, particularly where its implementation is supported by enabling legislation, the food chain, and other stakeholders.

The project has proved that its initial goals of protecting biodiversity, improving crop yield and quality, and securing sustainable farming are achievable. Continuing the process with multifunctional field margins will further increase resource efficiency and make a significant contribution towards more sustainable farming in the future.

Some key challenges faced during the project include:

- Persuading growers to establish field margins (setting aside a part of their farmland for pollination margins) and subsequently managing their expectations.
- Knowledge transfer to growers:
 - To make them understand how to manage margins, like they manage crop fields
 - Managing the initial margin, particularly for the first 2 years (for perennial mixture)
 - The use of farm equipment for margin management
- Cost: The cost/benefit of seed mixture. Nice seed mixtures have been developed, which if sown will support local biodiversity, but they are not feasible for growers. So finding the right balance between the best seed mixture and cost is the key to encourage growers to adopt this practice.

Areas for improvement include:

- Maintain frequent dialogues and engagements with local stakeholders (universities, farmers, cooperatives, value chain partners, etc.) to better understand local needs and opportunities.
- Develop strong benefits case for managed field margins in each territory where the team operates and engage with lead farmers to showcase these benefits and disseminate knowledge to other farmers.
- Align with local and regional governments to seek policy support for Operation Pollinator.
- Train internal staff (local sales teams) to effectively roll out this project.
- Leverage the [Good Growth Plan](#) – Biodiversity Commitment.

FUTURE IMPLEMENTATION AND NEXT STEPS

The program success, which proves that proactively managing field margins delivers many benefits, has led to expanding it over the last 3 years, geographically and into different terrains. It has also provided the basis for an increased focus on multifunctional landscapes.

The concept of multifunctional landscapes—landscapes that integrate the protection of natural resources for productivity and the enhancement of ecosystem services—serves to help move the discussion on biodiversity from single-function measures to those that provide these multiple and integrated benefits. To this end, Syngenta is developing practical tools to be adapted to local conditions and cropping systems. Diagnostic tools assess farm status and solve multifunctional landscape issues, agronomic protocols help farmers improve environmental performance and maintain farm profitability, and agronomic management practices and monitoring help ensure quality and efficacy. Syngenta now has corresponding pilot projects across Europe in oilseed rape, sunflower, apples, pears, melons, vines, and olives.

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Master thesis	2011	Reis, C.	Insectos polinizadores e seu efeito na produção de Pereira 'Rocha' na Região Oeste	Portugal
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PhD thesis	2014	Campbell, A.	Functional Agri-Biodiversity: Improving pest control and pollination services by means of multi-functional flower strips in cider-apple orchards	UK
Poster	2013	Kati et al.	Ground cover management in olive grove and vineyard orchards to support pollinating &	Greece

Type	Year	Authors	Title	Country
			beneficial arthropods	
Poster	2013	Reis, Figueiredo, Mexia and Franco	Biodiversidade, infra-estruturas ecológicas e o fomento dos polinizadores em pomares de pereira 'Rocha'	Portugal
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Report	2013	Karamaouna, F. and Kati, V.	The impact of mixtures of flowering plants used as ground cover in olive groves or crop margins in vineyards on populations of bee pollinators and natural enemies (Part 2. Grapevine)	Greece
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