

Science for Environment Policy

Patches of flowers boost pollinator diversity and lead to higher crop yields

Falling levels of insect pollination are causing declining yields of important agricultural crops. However, new research from South Africa now indicates that planting small patches of native flowers in agricultural fields can be a profitable and sustainable method of increasing pollination and yield.

Insect pollination is a vital ecosystem service as animal-pollinated crops form an essential part of the human diet. However, yields of crops that are dependent on insect pollination have been falling as a result of declining numbers of pollinators and the isolation of crops from natural insect habitats. This can lead to destruction of natural habitat as more land is needed to produce the same amount of food.

In this study, researchers examined the effects of planting small plots of native flowers to encourage pollination of crops, using mango orchards as a case study. Four mango farms in north-east South Africa were chosen, all of a similar size and with similar management practices. On each farm, a 25 m² flower plot was planted in an orchard margin to ensure they did not use viable agricultural land, or interfere with management. Two species of native flowering plants were used: the spotted aloe (*Aloe greatheadii*) and the bush violet (*Barleria obtuse*).

During the mango flowering season, surveys of insect pollinators were carried out within the flower plots and in orchards. Effects on ultimate crop yield were assessed by recording the total kilograms of ripe fruit per tree. The researchers also recorded the distance of orchards from natural habitat.

The results demonstrated that increased distance from natural habitat reduced both crop production and the abundance and diversity of flying pollinators. However, the presence of flower plots substantially reduced this negative effect. For example, orchards without flower plots at 300m from natural habitats suffered a reduction of pollinator diversity of 47% compared to orchards nearer natural habitat. Those with flower plots, however, showed a reduction of only 7%. This effect also translated into crop production. Orchards that had no natural habitat nearby, but did have flower plots, produced 1.5kg of ripe fruit per tree more than those without flower plots.

Importantly, the rise in yields more than compensated for the cost of the flower plots. After accounting for the initial investment, analysis showed profits of €213-237 per hectare. Profit could be increased still further, say researchers, by growing flowers from seed rather than buying adult plants as in this study.

Researchers stress that this study used only two species of flowering plant and further studies are required to identify the optimum mix of species and size of plot. However, they conclude that combining native flower plots with areas of natural habitat can boost pollination and yields, while at the same time, helping to prevent loss of natural habitats to agriculture.



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