

Science for Environment Policy

Loss of wild pollinators could substantially reduce soybean yields

Pollination by wild insects and honey bees improves soybean yield by 18%, new research has indicated. This equates to an extra 331.6 kg of seeds per hectare, boosting the value of the global crop by €12.74 billion. Encouraging insect pollination could therefore reduce the destruction of natural ecosystems to make way for soybean cultivation, the researchers say.

The soybean is one of the world's most traded commodities; its many uses include livestock fodder as well as human food and oil, and it is cultivated worldwide. This global demand, which continues to increase, has led to the destruction of natural ecosystems, such as [rainforest](#), to clear space to grow the [crop](#). Improving the productivity of the soybean, if it leads to a reduction of land area used, could therefore help slow the worldwide decline of [biodiversity](#). However, research has so far focused on developing varieties of the plant that can grow in warmer climates, require less fertiliser and are resilient to pests and diseases.

This study investigated the potential of native wild pollinators and the introduction of honey bee colonies to increase soybean productivity in Brazil. Although the soybean can self-pollinate, without the need for pollinators, the researchers hypothesised that insect pollination may increase yields.

To test the theory, they set up three types of soybean plots. In the first type of plot, insect pollinators were excluded using screens and the plants therefore relied on self-pollination. For the second type, plots were open to naturally occurring wild pollinators, and for the third type, plots were open to wild pollinators and honey bee hives were set up nearby.

The plots open to both wild pollinators and honey bees produced a yield 18.1% higher than self-pollinated plots. Plots open to only wild pollinators produced yields that were 6.3% greater than self-pollinated plots. A possible explanation for this is that self-pollination distributes pollen less effectively than insects, resulting in fewer seeds per pod.

The researchers calculated that the loss of wild pollinators would reduce yields by 179.2 kg of seeds per hectare (kg seeds/ha) equating to a loss of US\$6.126 billion (€4.47 billion) over the globally harvested area. While this is a trivial amount in comparison to the vast environmental, economic and social costs that would be incurred with the worldwide loss of wild pollinators, it does illustrate the importance of insect pollination to this globally important crop.

It also highlights the benefits of reducing pesticide use to further encourage pollinators. The researchers note that in this study all plots were treated with pesticides that are toxic to insect pollinators, suggesting that reduced pesticide use could increase yields even further. Farmers can also sustainably increase yields via the introduction of honey bees, which would increase yields by 331.6 kg seeds/ha or 510.8 seeds/ha in the absence of wild pollinators.

The results also emphasise the potential of these techniques to help reduce the destruction of natural habitats. Increased yields mean smaller areas of land needed for the same volume of soybeans. However, it should be noted that effective policy must be in place to ensure that benefits of the improved productivity do lead to a real reduction in the destruction of natural areas.

In conclusion, the researchers recommend that soybean farmers encourage wild pollinators and consider installing honey bee hives to improve the [sustainability](#) of their farming while also increasing their yields and income.



27 March 2014
Issue 367

Subscribe to free
weekly News Alert

Source: Milfont, M.O., Rocha, E.E.M., Lima, A.O.N & Freitas, B.M. (2013). Higher soybean production using honeybee and wild pollinators, a sustainable alternative to pesticides and autopolination. *Environmental Chemistry Letters* 11:335-341 DOI: 10.1007/s10311-013-0412-8.

Contact: freitas@ufc.br

Read more about:
[Agriculture](#),
[Biodiversity](#), [Land use](#)

The contents and views included in Science for Environment Policy are based on independent, peer-reviewed research and do not necessarily reflect the position of the European Commission.

To cite this article/service: "Science for Environment Policy": European Commission DG Environment News Alert Service, edited by SCU, The University of the West of England, Bristol.