

# Science for Environment Policy

## Wild bees boost apple harvest

**Orchards pollinated by a wide range of wild bee species** grow more apples than those pollinated by fewer species, finds a new US study. Its authors suggest that farmers could consider investing in wild bee conservation to improve crop yield.

**Many farmers around the world** hire or manage hives of honeybees to help pollinate crops including fruit and nuts. However, demand for pollinator-dependent crops is increasing, which means that honeybees may not be able to meet all pollination needs in future. Furthermore, the cost of renting honeybees is rising in both Europe and the US.

This study, conducted in Wisconsin, therefore explored wild bee pollination. While it is already well-known that wild bees play a major role in pollination, and are in fact better than honeybees at pollinating many crops, farmers can be reluctant to rely on them. At present, wild bee numbers can be unpredictable from year-to-year, and across regions.

The researchers counted the percentage of apple blossoms (on 10 trees per orchard) that developed into fruit, as an indicator of pollination, in 21 orchards over three years (2011–2013). Some of these orchards were studied in all three years, others in only one or two years, depending on their use of honeybees (*Apis mellifera*). Of the 47 total samples, 26 were from orchards that used honeybees in that particular year, and 21 from orchards that did not.

They trapped bees in each orchard during apple bloom to identify which species were present, and they also observed the bees' foraging patterns. Honeybees were found at just two (6%) of the orchards that did not hire or manage them; they were presumably from nearby hives or wild colonies. All orchards had wild bees during apple bloom.

Across all the orchards and years of study, there was no significant difference between fruit numbers in orchards with and without honeybees. On average, 12.5% of flowers developed into apples in orchards with honeybees, and 13.8% in those without.

Growers typically aim for 10% of all flowers to develop into fruit. The effects of wild bees alone were enough, on average, to achieve this during these three years. Honeybees brought no additional advantage to the farmers in this region, in terms of fruit numbers, the researchers suggest.

Importantly, the number of apples increased when there were more different bee species present during bloom. For each additional wild bee species, 0.8% more blossoms developed into fruit. Between five and 23 wild bee species were trapped per orchard.

The total number of bees — regardless of species — found in the orchards during bloom made no apparent difference to the number of fruit that developed. However, the researchers do point out that other studies have found that bee abundance does have an impact, and suggest that the effect of bee abundance depends on crop and region.

There are various reasons why wild bees may be better at pollinating apples than honeybees. For instance, honeybees carry less pollen on their bodies compared with some wild bees. In this study, honeybees also tended to focus on the trees with the most blossoms, meaning that they did not visit as many different trees as wild bees did.

The study highlights the critical role that wild pollinators play in agriculture and its authors say that using wild bees for pollination could bring economic benefits to farmers. On farms with enough wild bees, farmers could redirect the costs of renting or managing honeybees towards conservation, for example, by creating wild bee habitats on their land, they suggest.



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**Source:** Mallinger, R. E., & Gratton, C. (2014). Species richness of wild bees, but not the use of managed honeybees, increases fruit set of a pollinator-dependent crop. *Journal of Applied Ecology*.  
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