

Evolution & Behavior

The berries and the bees: wild bees do it better

by **Gail MaInnis**¹ | PhD student

¹: Faculty of Agricultural & Environmental Sciences, McGill University, Montreal, Quebec, Canada

This Break was edited by Max Caine, *Editor-in-chief* - TheScienceBreaker

ABSTRACT

Many commercial strawberry varieties grow bigger and better when pollinated by bees. However, not all bee species are created equal in terms of strawberry pollination. Our study explored the influence of wild and managed pollination on



Image credits: Gail MaInnis ©

Even though that there are more than 20,000 species of bees worldwide, the word ‘bee’ often invokes images of a hive-dwelling, golden-liquid-generating insect. Although honey bees have been stealing the spotlight for quite some time, most bee species are wild, unmanaged, and do not produce honey or live in hives. Among these wild bee species, there are many better (and more endangered) pollinators than the European honey bee ([Apis mellifera L.](#)), the most widely managed crop pollinator.

To give our wild, unmanaged bees a chance to prove their pollination skills, we decided to test the performance of some of our local species against that of managed honey bees. We decided to use strawberry as the pollination test crop because strawberries are delicious and we knew our

experiment would produce lots of edible results. Also, strawberry is an ideal crop in which to study pollination because you can assess how well a strawberry has been pollinated directly from the fruit. Those little ‘seeds’ you see on the outside of the strawberry are individual little fruits (called [achenes](#)) and all of these achenes need to be fertilized through pollination to produce a fully-formed, marketable strawberry. If a strawberry flower is not pollinated very well, a tiny, malformed berry will be produced.

The vast diversity of sizes, shapes, hairiness, life cycles, and foraging preferences among bee species creates differences in their pollen transport and delivery capabilities. In an investigation of pollinator performance, we have to consider not only the

amount of pollen delivered to a flower, but also the quality of that pollen. Some flowers contain their own pollen and can fertilize themselves (self-pollination). But! Pollen transported to a flower from another plant (cross-pollination), is of higher quality and usually produces fruit or seed that is bigger and better than that of self-pollinated flowers.

To find out which bees transported the most, and the highest-quality pollen to strawberry flowers, we first developed a new way to measure the pollen deposited by each bee that visits a flower. Then we conducted our experiment by going to a strawberry farm and closely monitoring and manipulating the type of bees that visited the flowers. We allowed some flowers to be visited only by honey bees and some only by wild bees. After each bee left a flower we measured the amount of pollen deposited and then covered our flowers with special mesh bags so no other bees could visit them. Once our flowers had developed into strawberries, we assessed pollen quality by the weight and shape of the strawberry.

The flower visits by the wild bees were too diverse to determine exactly which wild species was the best

strawberry pollinator, but we found that strawberries visited by wild bees, in general, were much larger than those visited by honey bees. However, we found that and both wild and honey bees deposited similar amounts of pollen, so pollen quantity was not responsible for differences in berry size. Our results suggest that the wild bee community provided more cross-pollination to strawberry flowers than the managed honey bees on the farm where we conducted our research (Quebec, Canada). Thus, if honey bees are provided in abundance in strawberry fields, they may usurp flowers that could have been more effectively pollinated by wild bees. BUT for growers to take advantage of this bigger-berry pollination, there would need to be abundant wild bee populations on their farms, which not always the case. Maintaining wild bee habitat on agricultural lands, such as bare patches of untilled earth, providing floral resources when the crop is not in bloom, and preserving natural areas around crops may prove beneficial for growers, wild bees, and strawberry consumers alike.