SCIENCE

TO BEE OR NOT TO BEE

The United States has more crops in need of pollination than it has honeybees to do the job. Now what? By Heather Smith

It's been almost two years since the widespread outbreak of what is now called colony collapse disorder (CCD). After a flurry of "Honeybees and Our Food Supply in Danger!" stories, media coverage waned, and when the Apiary Inspectors of America announced that hive losses this year have been on par with those of last year, the information barely made the news. Mysterious epidemics are only interesting as long as there's hope of finding a cure, and it's tough to cure something whose cause is unknown.

In this case, that cause is hard to pinpoint amid the honeybee's preexisting problems: parasites, overcrowding, pesticides, numerous diseases, the loss of fallow land to housing, and the unprecedented rise in monoculture. Diagnosing CCD has been tricky: Many cases are reported by the beekeepers themselves, and only a handful of states still have full-time bee inspectors. That said, CCD research is now being heavily funded, and entomologists have used their newfound status to underwrite such ongoing projects as breeding hardier honeybees, mapping the genomes of the bees and their parasites, and attempting to quantify the effects of pesticides on them.

For all the talk about our threatened food supply, however, very little of that money has gone into studying the estimated 200,000 other species of insects worldwide that also pollinate. Relying on a single ailing species is bad agricultural policy, especially when that species is not really the ideal pollinator to begin with. What made the honeybee, one of 20,000 bee species, stand out to humans was its ability to produce huge quantities of honey and wax with astonishing efficiency. But what's good for the hive isn't necessarily good for plants. In the case of watermelon, for instance, the honeybee can't transport much pollen; where strawberries are concerned, the pollination pattern can result in misshapen fruit at harvest.

And then there's the issue of flight constancy: A honeybee tends to take a similar flight path across a field every time. But in actual fact, the honeybee becomes much better at its job when its trajectory is disrupted by more chaotic pollinators such as butterflies, moths, syrphid flies, beetles, midges, thrips, ants, wasps, and other bee species. Some of these are showy, like the bumblebee, the ultimate pollinator. (Big. Hairy. Lots of pollen sticks to an insect like that.) But most of the others are smudgy, black, and so tiny that you can barely see them as they zoom from plant to plant. All these different insect agendas result in pollen getting spread far and wide and single flowers being visited more often.

Claire Kremen, a conservation biologist at the University of California, Berkeley, and the winner of a MacArthur "genius" grant, is fascinated by the prospect of returning other insect pollinators to conventional agriculture, including one of the largest and most profitable monocultures in the world: the 530,000 acres of almond orchards that run down the center of her state. In various studies she's conducted, she's found that farms with the greatest diversity of pollinating insects didn't need to use honeybees. These included organic farms planted with a variety of crops, to be sure, but also conventional farms near fallow land overgrown with weeds and random scruffy plants—food for insects, in other words, rather than humans.

Kremen is now working with conventional row-crop farmers to engineer a certain degree of diversity and chaos back into their fields. Areas that are less suitable for cultivation are left unmowed, for example, or planted with chaparral or seeded with wildflowers to lure native insects from other areas. To encourage them to stay, wooden blocks are mounted on posts and drilled with holes of various sizes, approximating the hollow twigs and crevices that would exist if the fields weren't so scrupulously groomed.

One day we may see insects in the same way that we do water. The people who planned New York City, for example, knew that the sheer density of its human population would require a certain amount of wilderness to keep its water pure. Perhaps farmland could be striped and dotted with patches left deliberately wild because they're necessary to our food supply. How much land might that be? In an ideal world, it would be as much as 30 percent, but that figure could decrease dramatically with the use of crop rotation and the introduction of a greater variety of crops. It's an odd and interesting future to contemplate: one in which we apply our intelligence not only to feeding ourselves but to nourishing the creatures whose labor makes our food possible.

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