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Plan Bee: As Honeybees Die Out, Will Other Species Take Their Place?

In a race against time, researchers propagate native solitary bees as an alternative to our most important pollinators

By Christopher Mims

Honeybees have been dying in record numbers in the U.S. for at least the past two years. Experts attribute the mass deaths to a catchall condition known as colony collapse disorder (CCD), although both a cure and the culprit remain elusive. Despite as much as a 35 percent loss of bees per year, we remain almost entirely dependent on what until recently was a self-renewing annual population of billions of honeybees to pollinate over 130 kinds of fruit and nut crops.

"We can't rely on the honeybee forever," says Blair Sampson, an entomologist with the U.S. Department of Agriculture (USDA). That's a problem, given that entomologists have yet to come up with a viable alternative. But researchers report that another bee known as the blue orchard, or *Osmia lignaria*, holds out promise of filling in the void.

The blue orchard bee, also known as the orchard mason bee, is one of 3,000 bee species native to the U.S. and is currently the subject of intensive study by the USDA's Pollinating Insect Biology, Management and Systematics Research Unit at Utah State University in Logan.

James Cane, an entomologist at the Logan bee lab, has been working for 10 years to increase the availability of these bees and he says there are now a million blue orchards pollinating crops in California.

The reason these bees are considered the best potential honeybee stand-ins, Cane says, is that unlike some specialist native species, blue orchard bees, like honeybees, can pollinate a variety of crops—including almonds, peaches, plums, cherries, apples and others.

In just about every other respect, however, these bees are totally unlike their European brethren. For one, they tend to live alone. In the wild, rather than hives, they inhabit boreholes drilled by beetles into the trunks and branches of dead trees. When cultivated, they will happily occupy holes drilled into lumber or even Styrofoam blocks.

The blue orchard bees also do not produce honey, rarely sting and, owing to their solitary nature, do not swarm. They are incredibly efficient pollinators of many tree fruit crops—on a typical acre, 2,000 blue orchard bees can do the work of more than 100,000 honeybees. Their biggest drawback is that beekeepers can only increase their populations by a factor of three to eight each year. (Honey bees can grow from a small colony consisting of a queen and a few dozen workers to a population of 20,000 foragers in a few months.)

"We're still in the development stage of applying all the research that has been done" by USDA's Agricultural Research Service, says David Moreland, CEO of AgPollen, the world's leading producer of blue orchard bees for the California almond industry.

Of the nearly 700,000 acres (285,000 hectares) of almonds cultivated in California this growing season, as many as 300 acres (120 hectares) were pollinated by blue orchards, according to Moreland. Growers'

inspiration for trying the new pollinator is simple economics—last season they were paying up to $300 an acre to rent honeybees, 10 times what they paid a decade ago.* This trend has made blue orchard bees cost-competitive with honeybees, but only barely.

"It's not clear we can [raise blue orchard bees on a commercial scale] in a cost-effective way," says Karen Strickler, an entomologist at the University of Idaho from 1993-2000 who has worked with solitary bees and who currently distributes them to beekeepers and hobbyists through the bee dealership *PollinatorParadise.com*, located in New Mexico.

Another solitary bee, known as the leaf-cutter, is the success story on which scientists and beekeepers hope to model the trajectory of the blue orchard bee.

"Ninety percent of all alfalfa seed in the U.S. is grown using the alfalfa leaf-cutter bee for pollination," Moreland says. "That's huge—that's an industry that over the past 25 years went from zero to the preferred bee. So there's a model there that says: 'This has happened before, it can happen again.'"

Cane, described by his peers as one of the world experts on orchard bees, cautions that these bees currently can only supplement—and not supplant—honeybees.

"The sheer number of bees you would need—at least 500 per acre (0.4 hectare)—it will never replace honeybees," says Cane. "That's an outrageous number if you think about it."

AgPollen's Moreland is more optimistic. "If we got to the point that we could not maintain populations [of honeybees]," he says, "this is one way to ensure that the largest dollar specialty crop in California for export—the almond—doesn't lose its pollinator."

**Correction (4/13/09): This sentence has been changed since posting. It originally stated the cost of renting honeybees was $300 per hive.*