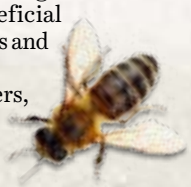
Bees in peril

Working together to find a solution

BY STEPHANIE E. PONDER

DID YOU KNOW that, through pollination, bees play a vital role in roughly one out of three bites of food we take, including nuts, berries, other fruits and vegetables? Nevertheless, these industrious and beneficial insects are being reduced in number and ravaged by pests and other problems.

Here's a look at the issues facing bees and beekeepers, and what's being done to help them.



An ominous sign

According to the not-for-profit group Bee Informed Partnership (*beeinformed.org*), beekeepers lost more than 40 percent of their honeybees between April 2015 and April 2016. It's a trend of loss that has held a steady course since 2006.

Almond growers were among the first to see a decline in the number of bees. It's little surprise considering that, according to the Almond Board of California, almond pollination requires two-thirds of the nation's commercial honeybees. The pollination average for almond orchards is two hives per acre. In the 2015–2016 growing season, California had nearly 900,000 acres of almond trees, translating to a need for almost 2 million hives.

Honeybees pollinate flowers while they're out collecting nectar. Pollen from the flower's stamen sticks to the hairs on the bee's body,

CONTINUED ON PAGE 34

A beekeeper at work.

CONTINUED FROM PAGE 33

and when she—all pollinating honeybees are female—visits the next flower, some of the pollen rubs off, allowing for the fertilization of the plant.

Robert Huckaby, vice president, farm services, for Costco supplier Wonderful Orchards of Shafter, California, tells *The Connection* that back in 2006 the company was having "a difficult time meeting the number of bees that [we] needed in the orchard."

A beekeeper opening a brood comb for signs of Varroa mites.

As almond farmers struggled to source the necessary quantity of bees, they also started talking to beekeepers, who reported a significant loss of bees during the year and didn't have enough for the pollination season, which meant a crop loss.

"That was kind of the [indicator] that there was an issue. It wasn't just something that was a short trend or an anomaly," Huckaby says.

Searching for answers

At the same time that almond growers saw a problem, they found an ally in the nonprofit organization Project Apis m. (PAm; *project apism.org*), whose name was inspired by the scientific name for the European honeybee, *Apis mellifera*. PAm's mission is to fund and direct research to enhance the health and vitality of honeybee colonies while improving crop production.

When PAm joined forces with almond growers in 2006, the biggest issue facing honeybees was colony collapse disorder (CCD), which happens when the worker bees leave the hive, abandoning the queen, young bees and plenty of food.

A decade ago no one was really thinking about bees, and there was little awareness about bees' place in the food chain. But as CCD spread, the plight of bees made headlines across the country.

Danielle Downey, PAm's executive director, says there were also few funds for research in 2006, and there was certainly no real clearinghouse for information. So the almond growers and beekeepers said they'd put up money and support research projects to happen right now, instead of putting out a proposal that might take over a year waiting for funds. Says Downey, "It was really kind of a guerrilla tactic to get some answers, so we've always been working closely with beekeepers, researchers and almond growers."

As for the current research, Downey explains that CCD isn't something they're seeing these days. But bees are still in trouble. "We don't see those same symptoms, and yet beekeepers are losing 40 percent of their hives every year. If you had 100, in that year you will get down to 60 and have to rebuild.

"The single worst thing that has tipped those losses so much higher is the Varroa mite. The Varroa mite arrived from Asia; it jumped from one species to another, and it kills our bees if we don't do anything about it," she continues.

These tiny pests lay eggs that develop within the honeybee brood and grow up to pierce an adult honeybee's exoskeleton and feed off its internal fluid and fat. As if that's not enough, the Varroa mite can also infect bees with deadly viruses.

PAm, with the help of Costco (see "Bee students"), is helping to fund research to combat the problem, including researching honeybees that are resistant to the Varroa mite.

Addressing the issues

Unfortunately, the Varroa mite (pests) is just one of the "four P's" facing honeybees; the other three are pathogens, pesticides and poor nutrition.

While research is ongoing into pathogens and pesticides, when it comes to poor nutrition, almond growers are taking an active role by planting bee-friendly flowers among their rows of almond trees to help facilitate a diverse diet for honeybees.

Martin Pohl, a founder of Costco supplier Hughson Nuts of Hughson, California, compares a honeybee's diet during pollination to that of a human who is given only steak for every meal for weeks on end. It's boring and lacks nutrition. "Almond trees don't have a lot of nectar," says Pohl, who explains that he and his fellow farmers have been planting more flowers and letting weeds and grass grow between their trees. "You have to feed the bees if you want good bees."

It's not just the practice of planting only one crop that limits a honeybee's diet. "Now people spray their yards to get rid of clover, but clover is something that bees love, so it's not only the agricultural side, but it's also on the everyday side that we've eliminated what bees are eating," says Downey.

Bee-ing proactive

Planting wildflowers that all bees enjoy is one action that nonexperts can undertake to help honeybees. But what else can be done to help?

First, it's important to know that buying and consuming honey is good for bees.

It used to be that beekeepers made their money from the sale of honey. These days, beekeepers travel with their bees, following the pollination seasons—including those of almonds, blueberries and cranberries—before getting honey from the bees in the fall.

"Beekeepers need your support," says Downey. "Beekeepers have it harder than ever, trying to keep bees healthy in this country, and having those strong markets makes a big difference in what they're able to do."

Brent Barkman, of Kansas-based Barkman Honey, one of Costco's Kirkland Signature™ Honey suppliers, adds that selling honey helps beekeepers take care of their bees and fund research that helps to keep their bees healthy.

"The beekeeping industry cannot survive on honey production alone anymore," Barkman says. "About half of [beekeepers'] operating income comes from pollination practices—not just almonds, but other foods that pay for pollination."

Installing a beehive in your backyard may not be the best way to help honeybees. Downey makes this comparison: " 'Pandas are in trouble; I'm going to get one.' This makes no sense at all, but people often think that keeping bees is the only way to help them ... unfortunately it's not simple to keep bees alive and thriving, and if the colony is dead a year later, nobody wins. Providing habitat and supporting research are good ways to help."

Lack of proper care can also create a host for pests to grow in; then those pests can move to another bee colony, Barkman says.

Future buzz?

Perhaps you've seen the quote, falsely attributed to Albert Einstein, that if the bees disappear, then so will we. Downey offers a counter version of a bee-less future: "If bees disappear, we will still have food. We won't have the variety. It won't be affordable. It will definitely change our quality of life and change our choices."

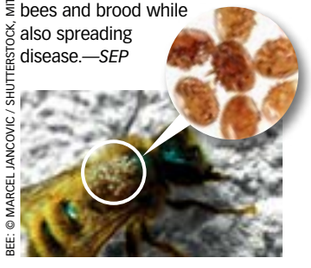
Despite the very real issues facing bees and beekeepers, both Downey and Barkman stand firm that bees and beekeepers will prevail.

"As beekeepers, we're still in business, and we're still continuing. ... We don't see a doomsday. Bees are very resilient, and they proliferate very quickly," says Barkman.

Huckaby, from Wonderful Orchards, adds: "It's kind of mind-boggling just how much bees actually do for us. We know we need the bees, and we rely on them. I think there are a lot of farmers and a lot of people who are behind the research to make sure that we do have bees in the future." C

WHAT IS A VARROA MITE?

A TINY PARASITE, the Varroa mite is the single most harmful stressor contributing to bee colony losses. Varroa mites can only reproduce in a honeybee hive, where they feed on the bees and brood while also spreading disease.—*SEP*



BEE: © MARCEL JANCOVIC / SHUTTERSTOCK. MITES: © KUTTELVASEROVA STUCHELOVA / SHUTTERSTOCK

OUR DIGITAL EDITIONS
Click here for a video of Varroa-resistant bees removing bee pupae that are infested with a Varroa mite. (See page 8 for details.)

PHOTOS LEFT, ABOVE AND BELOW: PROJECT APIS M., BEES: © IRIN-K / SHUTTERSTOCK

Bee colonies in a winter holding yard in central California, waiting to go into almond orchards for pollination.

OUR DIGITAL EDITIONS
Click here for a video about the importance of pollinating insects. (See page 8 for details.)

THE COSTCO CONNECTION
Costco carries Kirkland Signature Honey in all warehouses and on Costco.com.

BEE STUDENTS

FROM THE beginning of the Kirkland Signature honey program, Costco corporate foods buyer Shauna Lopez knew there were issues in the bee and honey industry that needed to be addressed. The Costco buying team set out to find a nonprofit organization that shared their priorities. Enter Project Apis m. (PAm). "PAm stood out as a clear front-runner," says Lopez, who adds that PAm already had deep connections within the industry, along with an international scope, and was already set up to fund research projects.

A honeybee carrying pollen.

Since 2012, Costco has made a contribution to PAm for each Kirkland Signature honey item sold, totaling more than $2.3 million.

Some of the donated funds facilitate stock improvement to help breed honeybees that are resistant to Varroa mites, limiting mite reproduction. There is also a project supporting a repository for bee germplasm—reproductive genetic material—to help increase and preserve honeybee genetic diversity in the U.S.

Money has also helped fund several tech transfer teams who help beekeepers maintain their colonies. The teams perform a lot of work that beekeepers might not be able to do on their own, including collecting disease and pest samples and sampling colonies for stock improvement.

Costco and PAm also award scholarships and fellowships to fund bee research at the Ph.D. level. The current scholarship winner is Morgan Carr-Markell at the University of Minnesota, St. Paul, who is studying the potential benefits of native prairie flowers for honeybees. She's receiving $50,000 for three years.

Rodney Richardson, a student at Ohio State University, will also receive $50,000 for three years to study immune functions in honeybees along with molecular identification of bee-collected pollen.

Cameron Jack, at the University of Florida, received $15,000 for one year to support his studies on methods to rear Varroa mites in vitro, and to facilitate research on integrated pest management.

"There's a lot of misinformation out there about bees and beekeeping, and that's why I like that we're fostering research that can be verified and shared," Lopez tells *The Connection*. "I suggest that people visit PAm's website [*project apism.org*] or the Honey Bee Health Coalition [*honeybeehealthcoalition.org*]. If people want to help, I suggest supporting organizations that understand the crisis and the issues."—*SEP*

BACKGROUND: © SOLARUS / SHUTTERSTOCK. HONEY: COSTCO PHOTO STUDIO / FRANCE FREEMAN