Beekeepers struggle to keep ag buzzing

Continued honeybee die-offs are caused by a combination of factors, researchers say

By CAROL RYAN DUMAS
Capital Press

GOODING, Idaho — On a cool Idaho morning in late May, the bees are more active than Jed McGuire had expected. The fourth-generation beekeeper doesn't usually wear much in the way of protective gear to work his bees, but today he dons a hat and veil — and gloves, to protect an angry rash of poison ivy on his wrists.

He and his right-hand man in the family business, nephew Tyler Magnelli, are starting their annual ritual of placing bee boxes in one of the 30 bee yards McGuire rents around the Magic Valley in exchange for honey.

They've spent the last four weeks remaking their dead hives after winter losses, adding a new queen to each colony they've rebuilt with a lean supply of existing brood and bees. The brood includes eggs, larvae and pupae.

With smoke cans at the ready, they calmly open each box and meticulously inspect every tray to determine the health of the colony and the viability of the queen. The bees they are placing in a field outside Gooding will be used to pollinate onions grown for seed in Minidoka County.

The bees will be treated for pests and parasites if needed, given a pollen supplement and left to forage flowering plants nearby to nourish the hive. Corn syrup will also be provided in an open-feeding system to ensure the bees are getting the sustenance they need.

But not all of the colonies will be up to the task of pollinating onions about a month from now.

"We have to make sure they're big enough, have enough bees to go to the onions. We'll leave the smaller ones behind and nurse them up for winter," McGuire said.

'Nursing up'

Beekeeping these days demands a lot of "nursing up." McGuire and about 2,000 other commercial beekeepers in the U.S. have been fighting an ongoing battle to keep their colonies thriving for at least the last decade. A commercial beekeeper is classified as one with 300 or more colonies.

In the last year, more than 40 percent of honeybee colonies in the U.S. perished, succumbing to several factors, which in combination have more than doubled the normal losses seen in the past.

Environmental stressors, sub-lethal levels of pesticides and pests and disease have been taking their toll on agriculture's most important pollinators for the last decade, claiming as much as 45 percent and as little as 29 percent of honeybee colonies per year.

The losses are a threat to farmers and production agriculture, considering that honeybee pollination is critical to the success of a vast array of crops — including fruits, vegetables and nuts, as well as the alfalfa fed to cattle to produce milk and beef.

All told, honeybees are responsible for pollinating at least 90 commercially grown crops in North America, accounting for more than $15 billion in crop revenue in the U.S., according to the U.S. Department of Agriculture.

This past year, the commercial beekeepers who keep U.S. agriculture buzzing — as well as part-time beekeepers and backyard enthusiasts — lost 44.1 percent of their colonies, according to the Bee Informed Partnership, a national research collaboration supported by USDA and the National Institute of Food and Agriculture.

"The problem it seems like we're having is it's hard to keep them healthy," McGuire said.

Many stresses

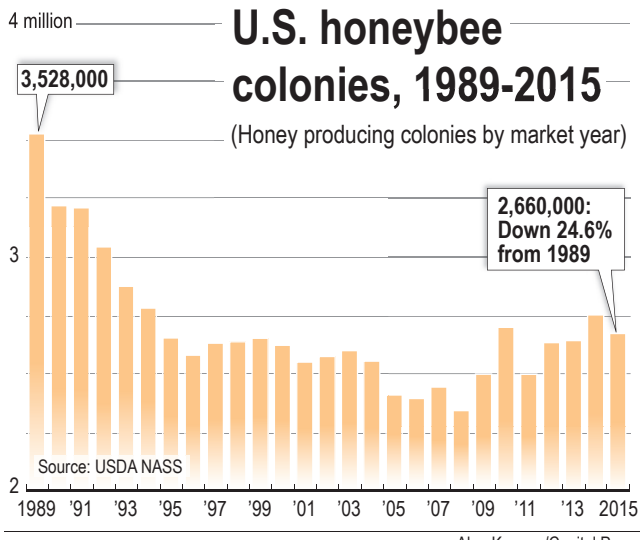
There are many stresses, including a lack of forage, lack of a diversified diet, pesticide exposure and varroa mites, he said.

McGuire's home base is in dairy country, where alfalfa is now cut before bloom for high-quality hay for milk cows. Canal banks that used to bloom with nourishing flowers are now mowed or sprayed barren. And his bees' "working vacation" in California's Central Valley offers only thousands of acres of almond trees that limit their diet.

With the lack of forage variety, "there are now areas where beekeepers have to feed their bees all year," he said.

McGuire feeds his bees heavily in the spring and fall. This year he bought about 150,000 pounds of corn syrup. At $32 per hundredweight, that's a $48,000 expense.

Despite his efforts, he's still experiencing annual losses of 30 percent to 40 percent — compared with 10 percent in a bad year in his early days in the family business.



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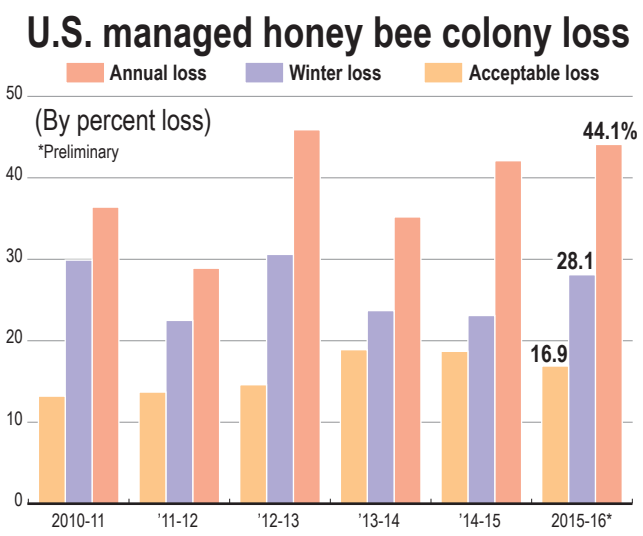

Source: Bee Informed Partnership Carol Ryan Dumas and Alan Kenaga/Capital Press

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Commercial beekeeper Jed McGuire points out a queen bee on a frame in one of his beehives near Gooding, Idaho, in May.

McGuire's 2,800 colonies were down to 1,600 strong enough to take to California in December to get them out of the cold and ready for almond pollination. That left a lot of empty hive boxes at his apiary in Idaho — and more empty boxes would be coming home in April.

The number of bees in a colony varies widely by season, with USDA estimating most at 20,000 to 40,000. Hives of 40,000 to 60,000 at the peak are common but at that population bees typically swarm to split the hive.

These days, McGuire plans on bringing 20 percent of his hive boxes home empty — double what a bad year used to be on the California trek — but he has had losses as high as 45 percent, he said.

Growing threat

Beekeepers have always lost bees, but those losses started accelerating in 2004 — two years before colony collapse disorder captured media attention, said Gene Brandi, a Los Banos, California, commercial beekeeper and president of the American Beekeeping Federation.

Brandi started working in the bee business in the early 1970s and opened his own apiary in 1978. Back then, he considered winter losses of more than 5 percent of his colonies to be a bad year.

Even with the arrival of the varroa mite in the U.S. in the late 1980s, beekeepers weren't experiencing the kind of losses they've seen the past 12 years. The mite gradually grabbed a foothold in the U.S. but with proper controls, it wasn't a big deal, he said.

The mite feeds on both adult bees and developing brood and spreads rapidly from one hive to another, transmitting viruses that cause deformities, paralysis and death. Varroa control consists of both mechanical and chemical methods, as well as the introduction of mite-tolerant stock.

"You'll always have them; you just try to keep them manageable," McGuire said.

But varroa mites have become a major threat that is growing, according to a recent study of multiyear honeybee disease surveys by the University of Maryland and USDA.

Released in April, that study found the varroa mite is far more abundant than previously estimated and is a particularly challenging problem among backyard beekeepers.

"Many backyard beekeepers don't have any varroa control strategies in place. We think this results in colonies collapsing and spreading mites to neighboring colonies that are otherwise well-managed for mites," reported Nathalie Steinhauer, a graduate student in the University of Maryland's Department of Entomology who leads data collection for the National Honey Bee Disease Survey.

"We are seeing more evidence to suggest beekeepers who take the right steps to control mites are losing colonies in this way, through no fault of their own," she said.

'It's important to everybody, not just beekeepers but also the farmers who grow the crops that take pollination and the people that eat the crops.'

Jed McGuire
beekeeper

Pesticides a factor

The varroa mite has become one of the main issues in colony loss, along with some pesticides and insufficient nutrition that compromise bees' immune systems, Brandi said.

But in his opinion, the increasing use of neonicotinoids — a systemic insecticide first registered in the mid-1990s — was a major factor in the accelerated loss of colonies. Other pesticides, including fungicides and insect growth regulators, added to the downfall, he said.

Those other pesticides aren't toxic to adult bees, but they impact the development of brood, he said.

"Anything that disrupts the normal development of brood impacts the sustainability of the colony," he said.

Poor nutrition is another factor, as malnourished bees are more susceptible to disease. The drought in California has certainly impacted nutrition, but the issue is more widespread, he said.

The combination of factors has led to winter losses in some years of more than 35 percent and total annual losses of well over 40 percent, he said.

"We never used to see that," he said.

The critical role of honeybees and their startling losses have drawn more research. But the culprits are varied and their interaction complex.

"Beekeepers are struggling to manage all the things affecting their colonies. It's a whole laundry list," said Jeffery Pettis, a USDA senior entomologist and co-coordinator of the Bee Informed colony loss survey.

In addition to poor nutrition from not getting mixed pollen, a lot more chemicals from pesticides are in the hive than in the past. Pests and parasites are gaining ground, and queens are failing at a high rate, he said.

Historically, queens lived two to three years, but now at least half are failing and must be replaced within six months. It's an issue he and other researchers are exploring.

With queens only lasting a year, "you've lost two years of pollination and honey production and the ability to split the hive for a couple of years," compared with the past, McGuire said.

Struggling with losses

Beekeepers are struggling with both winter and summer losses, with summer rates rivaling winter losses for the second consecutive year in the Bee Informed annual colony loss survey. Both were at 28.1 percent last year.

While summer losses are easier to replace, the increase is concerning because that's when bees should be their healthiest — and those losses still cost beekeepers time and money, USDA's Pettis said.

Summer losses are being replaced at the cost of weakening the colony they're being taken from and limiting beekeepers' supply of bees for pollination, he said.

"The high rate of loss over the entire year means that beekeepers are working overtime to constantly replace their losses," he said.

A new survey on honeybee colony health by USDA's National Agricultural Statistics Service — which uses different methodology than the Bee Informed survey — shows U.S. beekeepers with five or more colonies lost 1.65 million colonies from April 2015 through March.

It also shows they renovated 1.33 million colonies and added 1.31 million over the same period.

"I have to replace colonies every year. If I don't, I'm out of business," Brandi said, adding that he splits his strong colonies after almond pollination.

He and his son Michael operate 2,000 colonies, buying 1,500 to 1,600 queen bees a year. Queens with desirable traits cost $23 to $25 apiece, he said.

McGuire bought 1,250 queens this year and devoted a month of 10-hour days rebuilding 300 dead boxes a week.

Raising bees today takes a lot more time and money than it used to, but most beekeepers have adapted, he said.

"It's definitely harder to keep bees alive, but we've gotten pretty good at replacing and rebuilding," he said.

Growing demand

Honeybee demand for almond pollination has grown significantly over the past 10 years, but the managed bee population hasn't, Brandi said.

Pollinated in February, more than 900,000 acres of bearing almond trees in California — at two colonies per acre — demand 90 percent of the nation's available, viable colonies, he said.

The high losses to beekeepers are certainly concerning but more importantly, the industry needs commercial bees to meet the growing demand for pollination services, Pettis said.

"We urgently need solutions to slow the rate of both winter and summer losses," he said.

Researchers are focused on every aspect of failing colonies, he said.

McGuire said he's glad for third-party research, but it's a slow process and likely needs more funding.

The pesticide factor of the equation is the hardest to handle, and it seems research in that area is mostly coming from the big chemical companies that have a vested interest — and he's not particularly comfortable with that, he said.

Beekeepers tell farmers that bees are bringing pollen with fungicides back to the hive, which is killing larvae. But the chemical companies' field men tell them that's not the case, citing their research on the amount that is lethal to adult bees, he said.

Some farmers are starting to listen to beekeepers — but just like research, education and changing farming practices is a slow process, he said.

Profit margins have also become tight in the beekeeping business, although pollination fees have increased as a function of supply and demand, Pollination fees for almonds range from $150 to $200 per colony, depending on the size of the colony.

Those fees carry McGuire's operation, which gets about half the honey production it did several years ago.

"If we can get a honey crop, it definitely relaxes it (production margins) a bit … but I count it as a bonus; I don't plan on it to begin with," he said.

While beekeepers have become adept at replacing and rebuilding colonies, it's not without consequences.

"It's stressful, just not knowing what's going to happen long term," McGuire said. If you get a high die-off, you lose money, he said.

"Like anything in agriculture, you just don't know what natural disaster might hit — but natural disaster is becoming a little more common in the bee world," he said.

It's important to find solutions to all the factors killing bees, he said.

"It's important to everybody, not just beekeepers but also the farmers who grow the crops that take pollination and the people that eat the crops," he said.