CENTRAL COAST BEEKEEPERS NEWSLETTER

Apr., 2025

NEXT MEETING Apr 17, 2025

Important Notice: Our meetings are now the third Thursday of the month, usually at the Newport OSU Extension Office. Please see the schedule on page 4 for dates and locations.

PRESIDENT'S MESSAGE

By Jeremy Egolf

Spring has clearly sprung here on the Central Coast. Blackberries have leafed out and are pressing up fresh canes. Rhododendrons are blooming. Gardeners blindsided by the early suspension of our cliched overcast and rainy weather are scrambling to start their seedlings. As for us, we're preparing to mow down the acre or so of invasive Scotch broom once they start blooming, probably at the end of April (we're a couple weeks behind the actual coast, where the brooms are already in flower). Annie Marion of the USDA Natural Resources Conservation Service (who spoke to our group last summer) and a couple of her colleagues from the Land and Water

Conservation Service gave us the favor of a site visit and we eagerly await their proposals for potential project on our property, particularly restoring native plants demanding the assistance of the live pollinators, both native and domesticated. Our part-time resident flock of barn swallows showed up early this year - they have for the past few years arrived on April 15, but the first came on April 7, and there are now five - the flock was twenty only two years ago, declining to twelve in 2024, so we hope that more will arrive soon. It's a matter of some concern.

We remind you again that we've arranged for Henry Storch to provide bees for paid members this spring. The deadline to place orders is the April 17th meeting. We're tentatively targeting May 7 for packages and May 16 for nucs, depending on the usual vagaries of weather and…

We note the Oregon legislature is considering an amendment to HB 2679, restricting use of neonicotinoids (as of this writing, it is still in committee). The amendment would stop sales at garden and home stores but not require persons applying the neonicotinoids to be licensed (and therefore trained) for proper application.

We look forward to seeing you at our next meeting of the year, Thursday, April 17.

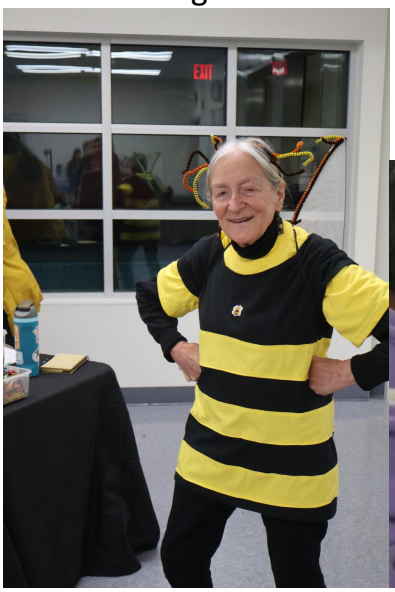
And we thank Stan Scotton for this report:

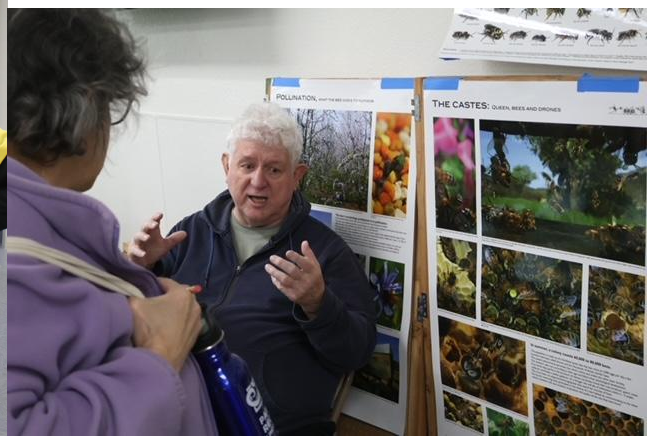
On Saturday, March 29, 2025, Lincoln City Parks and Recreation sponsored a "Propagation Celebration" at the Lincoln City Community Center. This was the second year of the celebration and also the second year that Central Coast Beekeepers Association (CCBA) staffed an information table. Again this year, like last year, our table was manned by Association President Jeremy Egolf and his wife Becky and Association Lifetime Member Stan Scotton and his wife Brenda.

Our table was focused mostly on the issues honeybees are facing and what individuals can do to support honeybees. We displayed a variety of information posters, Brenda dressed up in her bee costume, and we had a deep with one frame of mostly undrawn comb and one frame of capped honey. We had coloring supplies for the children and bee pencils for take home. The Recreation and Parks staff said they had about one hundred and seventy attendees. I personally talked with a wide variety of people from third graders (she was really smart) to people older than

myself. I talked with one former member of CCBA and young couple getting their first bees this spring.

I am never sure what to stress at these events. At this event I stressed responsible pesticide (and all the other cides) use, plant more flowers and as a resource regarding honeybees. We had several people sign up for more information on CCBA and I gave out several OMB pamphlets to people who were interested in the program and learning more about honeybees.





CCBA's Queens for 2025:

At last year's OSBA conference, we purchased at auction a set of five queens from Russell Heitkam. The queens are planned for delivery in 2025, so we expect to have them on hand to replace weak or otherwise failing queens as we do our spring colony checks. Russell is a second generation beekeeper & Northern California (Orland) queen producer, and is on the Project Apis m Board of Directors.

The Year's Program -

Meetings are 1:30 p.m. Thursdays, usually at the OSU Extension office in Newport, except the June meeting, planned for the Waldport OSU Extension Office.

March 20 - Charlie Vanden Heuvel, "Bee Nutrition"

April 17 - Carolyn Breece, "Bee Diseases"

May 15 - Dewey Caron, "Swarming and Supering"

June 19 - Lincoln County Master Beekeepers, "Pollinator Gardening" (Waldport Extension Office)

July 17 - To be arranged

August - Summer break, no meeting

Sept-Oct. - To be arranged.

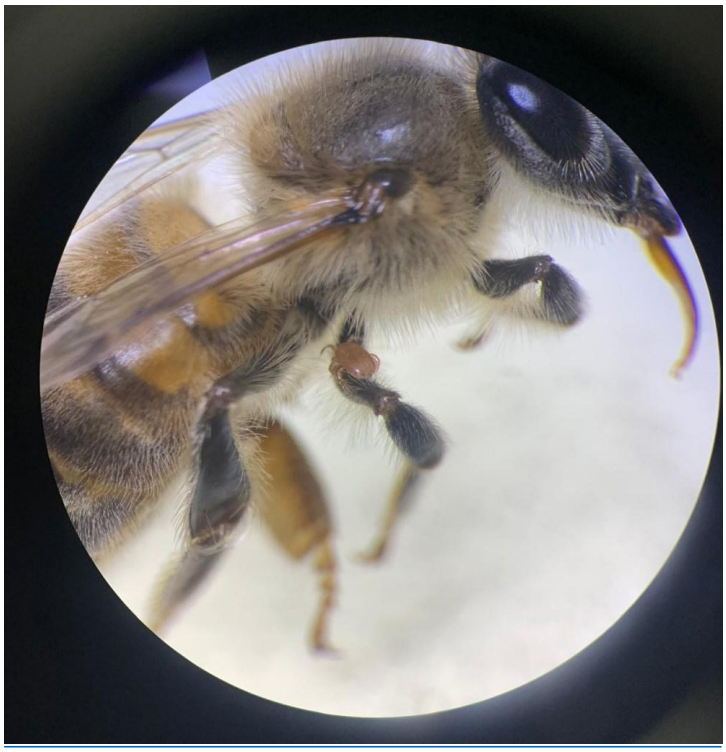
November 20 - Officer Elections, Plans for 2026

Andony Melathopoulos, "Nectar and Pollen Plants of Oregon"

Fighting Tropilaelaps:

Hitching a Ride: Why a New Mite Might Vex U.S. Beekeepers

April 3, 2025 Research News 1



The mite *Tropilaelaps mercedesae* is an emerging pest of concern for honey bees, and a new study shows for the first time that the mites can hitch rides on adult bees—as seen here on this bee's mid-leg—and thereby spread to other colonies. The mites feed exclusively on larvae and pupae in the colony, but the study shows the mites can attach to adult bees for dispersal. (Photo by Dan Aurell, Ph.D.)

By Ed Ricciuti

If it's not one mite plaguing beekeepers, it's another. Reeling from the spread of colony-killing *Varroa destructor* mites, introduced in North America half a century ago, beekeepers are edgy about another unwelcome mite from Asia that could arrive on our shores and parasitize bees here with potentially devastating impact.

Like the *Varroa* mite, the bee-killing *Tropilaelaps mercedesae* can spread by hitchhiking on adult bees, including, as a study published in January in the Journal of

Economic Entomology reports, the western honey bee (*Apis mellifera*). The most common of honey bees and pollinators in general, the western honey bee lives on all continents except Antarctica and is supremely important to agriculture and apiculture.

The mite was found by researchers on western honey bees that were trapped while leaving experimental colonies at Chiang Mai University in Thailand to forage. It was the first evidence that the mites, which parasitize only immature bees, hitch rides on adults that could spread them while drifting to other colonies or entering them to steal honey. Carried by air, the mites could spread much faster than they could when transferred by beekeepers on materials such as brood frames, which is assumed to be a route by which the mites disperse.

Having swept across Asia in only 50 years, *T. mercedesae* showed up last year in the country of Georgia and nearby areas of Russia. Given the vast distribution of the western honey bee, the fact that it can provide a vehicle for dispersal of *T. mercedesae* puts beekeepers in Europe and even here in the U.S. on the alert. The U.S. Department of Agriculture's Animal Plant Health Inspection Service (APHIS) has its guard up and monitors for the mite, which "is a relatively understudied parasitic threat to honey bees," says Auburn University doctoral student Rogan Tokach, lead author on the study.

The Auburn and Chang Mai researchers collected bees from six experimental colonies in funnel traps in July and August of 2023 and January and February last year. The bees were obtained from a beekeeper near Chang Mai. The fact that the mite was found on adults freely flying out of and away from the colony demonstrates that it potentially could be spread by bees from one colony to the next.

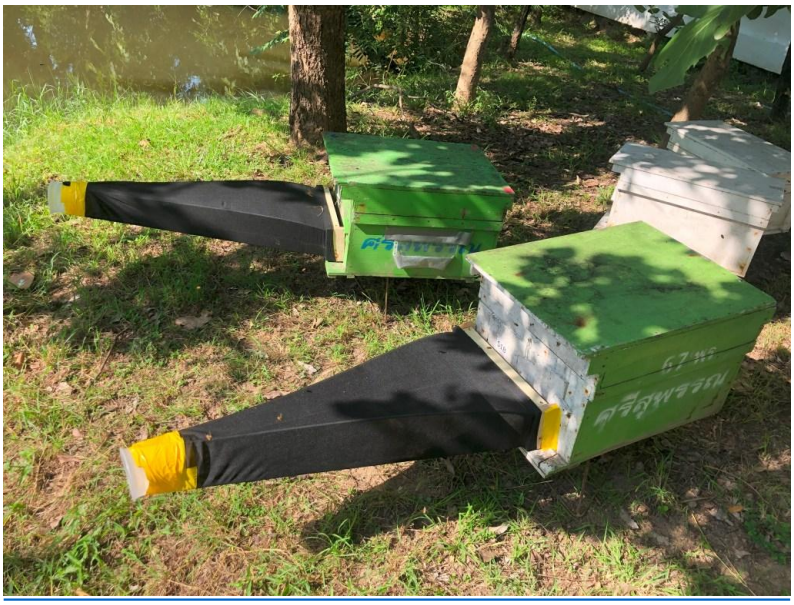
The process by which one organism attaches itself to a host solely for moving about is called phoresy. A well-known example of phoresy is that used by ticks. Originally, *T. mercedesae* used the *Apis dorsata*, often known as the giant honey bee, as a host for phoresy. Its shift to the western honey bees vastly increases its destructive potential.

That's all scary news for beekeepers. *Tropilaelaps mercedesae* has the ability to do even more damage to bee colonies the dreaded *Varroa* mite, which is now the top cause of colony losses.

A key finding of the research was that mites attach to exiting adults only when brood infestations are high. No mites were detected on adults from colonies with

infestations below 2.5 percent per 100 brood cells. This suggests that high infestation rates—which use up the brood that is the mites' food source—force them to attach to adults.

"*Tropilaelap*s can be found attached to adult honey bees in the colony. The research suggested that the mite is more likely to be found on adults when there is limited brood available. Even though the mite cannot feed on the adult honey bee, it will climb on and attach as a potential source of dispersal," says Tokach.



To study how *Tropilaelaps mercedesae* mites might spread among honey bee (Apis mellifera) colonies, researchers used funnel traps, shown here, to collect adult bees leaving the hive. (Photo courtesy of Rogan Tokach)

The mites invade bee brood cells and mate inside them just before capping; then they feed on the larvae. Females lay eggs during the bee pupal stage. Interestingly, the research team found only female mites on their trapped bees. Successful dispersal to a new colony occurs when it is reached by either a single gravid female or males and females together, although the chances of mating at the new colony are slim, says Tokach.

"Males only live for five days compared to 50 for females, so the likelihood of a male and unmated female mite attaching and drifting to the same colony is not very high," he says. "If a mated female attaches to an adult bee, then she could begin laying in a new colony if that bee were to drift into an uninfested colony."

The mite *Tropilaelaps mercedesae* (right) is an emerging pest of concern for honey bees, and a new study shows for the first time that the mites can indeed hitch rides on adult bees and thereby spread to other colonies—much like *Varroa destructor* mites (left), currently a leading threat to western honey bees in North America. (Image courtesy of Rogan Tokach)

Confirmation that the mite can be spread on bees is a key to stopping its spread, which requires a rapid response once a colony is infested.

"This research helps illustrate that these mites are capable of dispersing in multiple ways, whether it be beekeeper-mediated or through their own devices," says Tokach. "This information is important when considering how *Tropilaelaps* may be able to be eradicated if introduced to a new area or region. This research helps improve action plans for how to deal with this parasitic mite as it continues to spread into new geographical areas."

Read More:

"Observation of Tropilaelaps mercedesae (Mesostigmata: Laelapidae) on Western honey bees (Apis mellifera) exiting colonies"

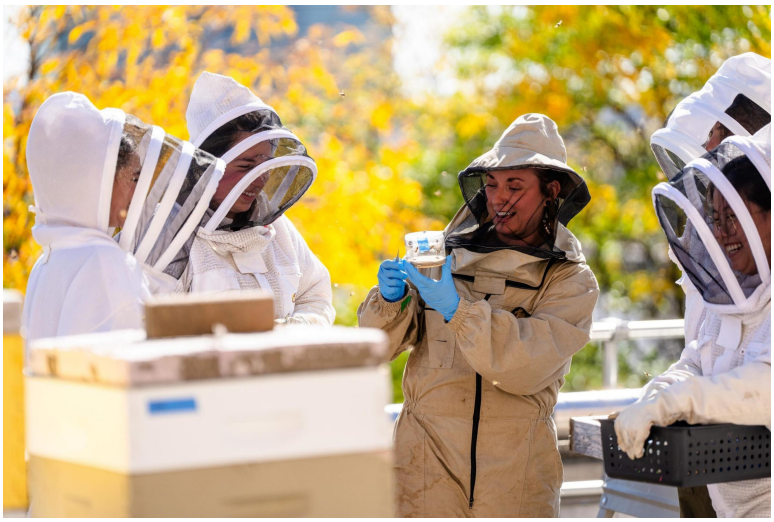
Journal of Economic Entomology

Ed Ricciuti *is a journalist, author, and naturalist who has been writing for more than a half century. His most recent book is called* Bears in the Backyard: Big Animals, Sprawling Suburbs, and the New Urban Jungle (Countryman Press, June 2014). *His assignments have taken him around the world. He specializes in nature, science, conservation issues, and law enforcement. A former curator at the New York Zoological Society, and now at the Wildlife Conservation Society, he may be the only man ever bitten by a coatimundi on Manhattan's 57th Street.*

https://www.apimondia.org/mites-webinar.html

Marquette researchers find common agricultural antibiotic disrupts honeybee teamwork, raising concerns for pollinator health

April 1, 2025



Marquette University researchers have found that Oxytetracycline, a common antibiotic used in agriculture, disrupts a critical social behavior in honeybees. Honeybees treated with the antibiotic moved faster but reduced participation in fanning the hive, a critical social behavior necessary to keep their colony cool when it gets hot during the summer. The findings were published by Dr. Chelsea Cook, assistant professor of biology, and Justine Nguyen, graduate researcher in the Cook Bee Research Lab, on March 19, in Proceedings of the Royal Society B: Biological Sciences.

Like humans, bees can get bacterial infections and are prescribed antibiotics. Medication can often have side effects that impact how animals feel. Oxytetracycline

is commonly used to treat and prevent infections in many farm animals, including honeybees, which are important agricultural pollinators.

“When we treat honeybees with antibiotics, we know that some parts of their health are affected, but very few studies have looked at whether antibiotics mess with their ability to work together as a result of these side effects, which is very important to test because honeybees rely on teamwork to survive,” Nguyen said. To look at this behavior, Nguyen treated bees for either one day or five days to mimic a short-term or a long-term treatment. When bees were treated with antibiotics for five days, they didn’t fan as much as bees that were not treated, meaning that they weren’t able to do the job properly.

“If bees are sick, they need treatment – we don’t want to dissuade the use of antibiotics when needed – but we do want to understand the impacts that medications may have on the bees, just like we want to know the side effects to our medications,” Cook said.

To discover why this happened, the team video recorded the bees as they experienced hot temperatures and evaluated how much or how fast they moved and how they interacted. The team found the antibiotic-treated bees moved faster but interacted less with the other bees. This might indicate that the antibiotics were impacting how the bees moved and interacted with each other, which impaired their ability to work together to fan.

“Honeybees are an excellent model system for social behavior and are so important for our agricultural system – they pollinate many crops that we eat and export,” Cook said. “This work helps us to understand how common treatments that beekeepers use might impact their ability to work together and keep themselves healthy.”

Honeybees work together to do all the jobs in their colony, such as collecting all the food for the colony and maintaining the colony conditions, like temperature. With social behaviors critical for colony maintenance, when a honeybee has a side effect from a medication, that might impact the ability for the entire colony to function. The Cook Bee Research Lab studies fanning behavior. This work helps scientists understand how these important pollinators work together to keep their societies functioning, and what impacts we may have on them as we manage their colonies.

Read more about Cook and Nguyen’s work in the Cook Lab in Marquette Today*.*

Honey bee colony declines grow as WSU researchers work to fight losses

March 25, 2025

By Scott Weybright, College of Agricultural, Human, and Natural Resource Sciences

Commercial honey bee colony losses in the U.S. could reach 60 to 70% in 2025, according to entomologists at Washington State University. Over the past decade, annual losses have typically ranged between 40 and 50%. While it's too early in the season to know exactly why colony losses are higher this year, Priya Chakrabarti Basu, an assistant professor of pollinator health and apiculture at WSU, suspects a combination of stressors including nutrition deficiencies, mite infestations, viral diseases, and possible pesticide exposure during the previous pollinating season.

"Losses have been increasing steadily," she said. "Pollination demands haven't gone down, so beekeepers face tremendous pressure to keep the same number of colonies to meet those needs."

Basu joined WSU this winter after working at other institutions around the country. She hopes to partner with beekeepers on developing more sustainable practices to help reduce losses and create databases to better understand how bee nutrition works. She is one of several WSU scientists who are leading or collaborating in programs that help improve the standing of honey bees across the country, both through applied science and new research that may help beekeepers.

For example, Brandon Hopkins, WSU's P.F. Thurber Endowed Distinguished Professor of Pollinator Ecology, is involved with varroa mite control, commercial management practices, and new research on bee nutrition that he hopes will help beekeepers have better access to healthy food for their colonies. He explains that varroa destructor mites feed on pupae in the hive, often killing them and reducing the numbers of future generations. The mites also transmit viral diseases and feed on adult honey bees, weakening them and increasing their susceptibility to diseases.

One upside is that beekeepers likely aren't surprised by the losses. "I've heard since last August that this was going to be a terrible year," Hopkins said. "That seems to have come true." Fruit growers may be directly impacted, he said. California almonds are the biggest crop for honey bee pollination, which happens in February and March. Almonds are the seeds of almond trees and not nuts. "The almond industry frequently asks for strong colonies," Hopkins said. "But this year, growers are desperate. Anything with live bees in a box is in demand because the industry is short on supply. I haven't heard of that since the early days of colony collapse around 2008."

Finding methods to sustainably keep bees alive will be key, Basu said. About 35% of the world's food depends on pollinators, according to the USDA National Institute of Food and Agriculture. "If we see increasing colony losses, we could see a drop-off in honey production and an increase in the rent growers pay beekeepers to bring pollinators in," Basu said. "We may just see some beekeepers cease operations completely because it's too expensive to continue as a business."

Honey bees had a production value of nearly $350 million in 2023, according to the USDA. Fewer bees mean higher costs for farmers who depend on them and increased hassle in making sure growers have bees when they're needed. "I don't want to be a fearmonger, but this level of national loss could mean increased bankruptcies amongst beekeepers," Hopkins said. "Growers of crops downstream from almonds may need to scramble if the beekeeper they've relied on to pollinate their apple trees, for example, isn't in business anymore."

Virginia Tech study reveals that honeybee dance ‘styles’ sway food foraging success

Researchers in the Department of Entomology found that the secret to the bees’ success in food gathering is all in the "waggle."

By James Mason 24 Feb 2025

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A honeybee doing the waggle dance to entice her sisters to a tasty food source. Photo by Roger Schürch for Virginia Tech.

As far as animals go, honeybees are world-class dancers. While not as deep and complex as a Super Bowl half-time show, the bees' moves, known as the “waggle" dance, convey very specific food foraging instructions to their nestmates. The direction the dancer moves explains to other bees which way to go, and the duration of the waggle dance, or the “run,” shows how far to go. Once other bees have been convinced to follow the directions, they are “recruited.” After receiving the instructions, these recruits leave the hive to find the food their sisters were so excited about.

Unfortunately, many of these recruited bees do not always successfully find the food they seek. Margaret Couvillon, associate professor in the Department of Entomology

in the College of Agriculture and Life Sciences, and her former Ph.D. student Laura McHenry wanted to find out why.

Trying to understand why waggle dances fail

Honeybees have had millions of years to perfect the waggle dance, so it may be surprising to learn that it doesn't often work. Even though it was first described by scientists over 80 years ago, there is still a lot about the waggle dance that we don't understand.

Couvillon has learned several interesting patterns related to this form of communication. One such observation was that bees have consistent, unique ways of dancing, meaning each bee has its own "style" that it adds to the communication. Could the success of the waggle dance be related to this uniqueness? Would bees that communicated similarly yield more successful recruits? Or is there some other factor at play? This study reveals the waggle to be a diverse form of communication that helps improve the likelihood that one bee can tell another where food can be found. The findings were recently published in Current Biology.

"Although the waggle dance itself is fascinating, my lab has additionally been intrigued about waggle dance miscommunication, or the hows and whys behind the failure of the dance recruitment," Couvillon said.

To answer these questions, the Couvillon Lab devised an experiment utilizing clear-walled hives, video cameras, and a method of tagging bees so they could be tracked as individuals when they foraged and danced. Each hive included foragers who had been taught the location of an artificial food source. These trained foragers performed a waggle dance to teach others where this food was, effectively training a new set of recruits. If successful in locating the food, these recruits returned to teach other bees what they learned. Couvillon and her team hypothesized that bees with similar dance styles would more often successfully teach others how to find the food and communication that differed between bees would be less successful.

Whenever a new, tagged bee was observed at the food source, video of the hive was reviewed to determine which dancer had recruited that successful forager. This pattern of data collection allowed the researchers to track the dance the bees used, with each bee learning where the food was located from a slightly different telling. These successful dances were then compiled, and the run of each dance was

measured and compared to the earlier dances. The pattern that emerged was not what the researchers expected.

A Virginia Tech entomologist marking an individual honeybee so that researchers can match when the bee visits a feeder to the corresponding waggle dance it does for its nestmates. Photo by Roger Schürch for Virginia Tech.

The power of individuality

Based on the data from these dances, Couvillon and McHenry found that similar dance communication did not actually result in the most successful foraging, which was their original hypothesis. Dances that had a longer run, effectively telling the recruits to overshoot the food source, were more successful than dances describing similar, more accurate, distances. This pattern suggested that the “overshooting” instructions may have led to additional opportunities to find the food, once on the way past the food source and again on the way back to the hive. They theorized that the foragers having a second chance to find the food source increased the chance that they find it at all.

What does this mean for understanding the honeybee waggle dance? One takeaway is the importance of these unique communication styles, where individual dance mannerisms enhance communication success. If every bee communicated the same, the likelihood of foragers reaching the food would decrease as compared to having a diverse set of styles. This study adds effective dance moves to the list of known benefits of individuality, showing that a diverse set of communication skills helps improve the likelihood that one bee can tell another where food can be found, all through dance

Observation hive with hundreds of individually marked bees. Photo by Laura McHenry for Virginia Tech.

“We’ve known for a while that behavioral and genetic diversity benefit honeybees, allowing for superior thermoregulation, disease resistance, growth, and foraging,” said Couvillon. “Now we have also seen that diverse communication enhances recruitment success.”

The paper, “Individuality impacts communication success in honey bees,” was published in Current Biology. Couvillon’s research was supported by the National Institute of Food and Agriculture, the Foundation for Food and Agriculture Research, and the Department of Entomology at Virginia Tech.

As honeybees die off again, some bee enthusiasts want to give mason bees a chance

By Martha Ann Overland Updated April 6, 20254:28 PM ET Heard on NPR Weekend Edition Saturday

A mason bee is pictured. The bees are known as good pollinators.

Honeybees, which are tasked with pollinating many of the agricultural crops in the United States, are dying off in record numbers. Commercial beekeepers are reporting losses this year ranging between 60 and 100%, Washington State University's Honey Bees and Pollinators Program reported in March.

Bee losses are not new — previous years have seen losses between 40 and 50%. Researchers know that honeybees are under pressure from pesticide use, habitat loss and mite infestations, but they can't yet explain why 2025 has been such a lethal year.

But the honeybee is not the only bee that can work in the fields. Today, most farmers use honeybees to pollinate their crops, even though they are, in fact, terrible

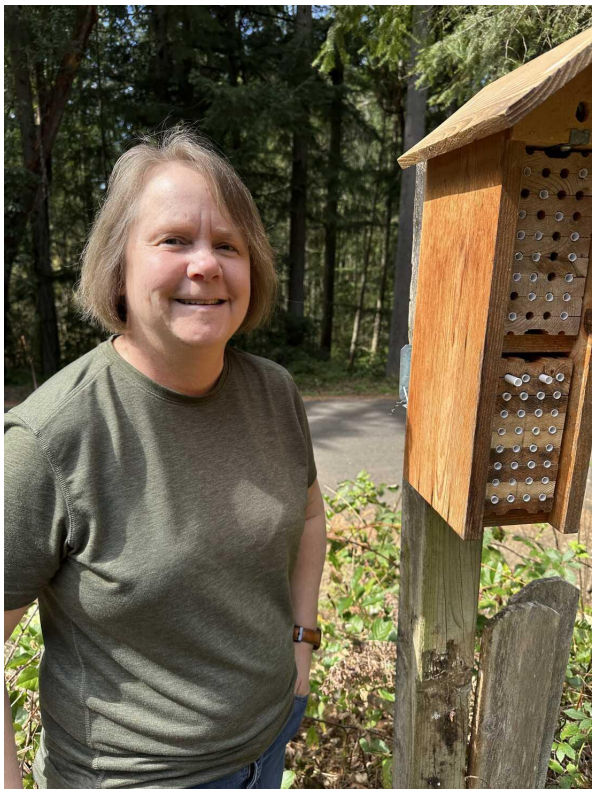
at pollinating, says David Hunter, CEO of Crown Bees in Woodinville, Wash., who sells a different type of bee.

Instead of spreading pollen from flower to flower, the honeybee carries most of the pollen back to the hive. But behold the humble mason bee! Also called the blue orchard bee, it inelegantly "belly flops" onto a flower, Hunter says. It flings pollen everywhere. Covered in pollen, the hairy mason bee then goes to the next flower and bellyflops again, which gives it a higher pollination success rate. This is well-known in the bee world and backed up by the U.S. Department of Agriculture research. (In fact, the USDA named the mason bee a "pollinator-of-the-month.")

But farmers still rely on the honeybee, in part because these bees live in large hives that can be picked up and moved to different fields. Hunter says there is also an "only one bee mentality, and this is helping create the pollination mess we find ourselves in today."

Mason bees are among the 4,000 types of bees native to the U.S. The honeybee isn't one of them — they were brought to the U.S. from Europe in the 1600s. Mason bees don't live in hives and they don't make honey. There is no queen bee and there are no worker bees. "All females are queens," says Hunter. Female mason bees lay their eggs in cavities or tubes, and then seal the entrance with mud to protect them from predators. Because they build chambers inside the tubes, they were given the name mason bees. "It's an interesting life cycle," says Hunter. "Through the summer, they become big larvae, spin a cocoon, and metamorphose to an adult. And in the fall, it's an adult bee in a cocoon that just hibernates through the winter."

Hunter, who is on the board of directors of the Planet Bee Foundation, is an evangelist for the mason and the leafcutter bee, which also nests in cavities. He is trying to spread the word about native bees because, like the honeybee, they are under pressure. Hunter started his company, Crown Bees, which builds and sells bee hotels, to get more native species into backyards as well as onto commercial farms. Today, he sells and ships bees and bee hotels all over the country.



Beth Cummings of Gig Harbor, Wash., stands in front of her bee hotel, which homes the mason bees that pollinate her fruit trees. Martha Ann Overland/NPR

Beth Cummings, a retired college professor in Gig Harbor, Wash., first tried mason bees after her fruit trees burst into bloom in the spring, but they actually produced only a few pieces of fruit. "We were obviously missing some pollinators," says Cummings, who now orders bees in their cocoon stage to arrive in the mail each spring, which then hatch as temperatures warm. "You give them a place to live, a way to make mud since they don't hive, and you never really see them. It's a pretty hands-off sort of deal."

Mason bees are a shy bee and rarely sting. That means the garden isn't dangerous for Cummings' elderly father, who is allergic to bees. And when summer is over? After a bit of work scraping out the cocoons, they can be stored in the refrigerator. But Cummings prefers to mail the slender tubes back to Crown Bees, which will care for them over the winter. Next spring, her bees will be mailed back to her, and she'll slide them back into place in her bee hotel. The results, says Cummings, have been "very fruitful."

How a young beekeeper's initiative brought hope and profit to Sierra Leone communities

Sonam Lama Hyolmo 31 Mar 2025

- *Near Sierra Leone's Tiwai Island, Aruna Bangura, a young beekeeper, started a beekeeping initiative using modern hives after observing a decline in bees and increased deforestation in the region.*
- *The initiative began with less than 20 frame hives and has now expanded to 400 beekeepers from eight communities who have built more than 300 modern hives.*
- *The modern hives attract more bees compared to the traditional ones and generate money for locals so they can reduce their dependence on logging to sell charcoal, which, in turn, can help reduce pressure on the forests that the bees depend on.*
- *Bangura faced challenges in the initial phases of the project but has since won money from the Iris Project's Stem Prize to kick off the project with plans to expand it.*

In 2022, little did Aruna Bangura know that observing the changing environment and land use practices around his community would make him start beekeeping. The area just outside Tiwai Island, a protected wildlife sanctuary spread across 1,200 hectares (2,900 acres) in Sierra Leone, had a dearth of bees, he found. "I observed that the bee population was declining, and starting a beekeeping initiative was the only alternative in sight," says Bangura, a 24-year-old from the Boma community.

He founded Bangs Circular, a local organization for sustainable beekeeping practices across eight communities surrounding the island in the Eastern and Southern provinces. They began the Tiwai Honey Project, which builds hand-made beehives for the native Western African honey bee (*Apis mellifera adansonii*). These hives that closely monitor bees and their behavior help attract more bees compared to the traditional method, generating more honey and profit for locals so they can reduce their dependence on logging to make and sell charcoal. The effort also engages

community people in restoring natural habitats through reforestation around the wildlife sanctuary. The aim is to then reduce deforestation and degradation in order to increase the bee population, which could also increase honey harvesting.

Aruna and the Tiwai Honey Initiative beekeepers. Image © Ezekiel Kargbo for The Iris Project.

The impacts of the project are yet to be independently assessed, but so far it won the Iris Project's Stem Prize — awarded for innovations by youth — in 2024, which gave them $10,000 to kick off the project and build new hives.

Borbor Koroma, a local beekeeper from the Kambama community, says the initiative is unique since it's led by someone so young. "Most of the time, the elderly people don't create space for youth to execute their ideas and initiatives," he tells Mongabay. Amid a group of community elders who were mostly familiar with traditional beekeeping, locals say, Bangura carved an unordinary path by leading what he saw as an improved approach to traditional beekeeping.

Kamba Village on Tiwai Island; a beneficiary of the Tiwai Honey Initiative. Image © Ezekiel Kargbo for The Iris Project.

The Tiwai Honey Project has so far trained more than 400 local beekeepers and engaged more than 1,000 people to build new hives that can earn them some money on the side.

There are no independent studies on bee decline in the region. However, tree cover in Eastern Province has receded, showing a 37% decrease since 2000, and in Southern Province, there's been a 45% decrease since 2000. In this region of Sierra Leone, bees face pressure from deforestation, expansion for agricultural land, use of pesticides, and crop failures due to extreme weather changes. "Starting the initiative was a whole challenge in itself as there were limited resources with not much participation from community members," Bangura tells Mongabay.

More honey, more money?

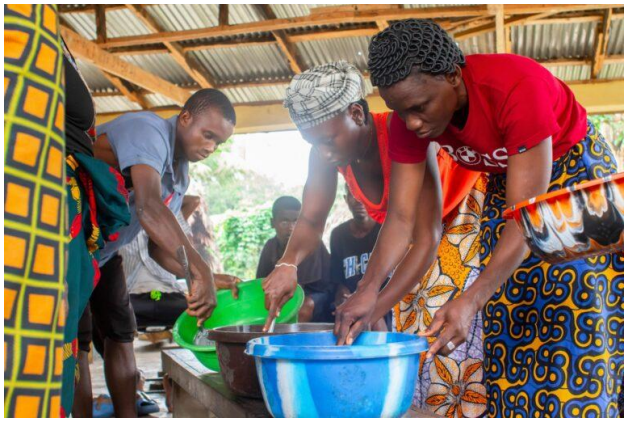
Local communities largely depend on the aggressive Western African bee, also known as killer bees locally, for honey harvesting. People on the island are subsistence farmers who practice traditional beekeeping. But Bangura says this is challenging given that the natural hives are located on trees, making them difficult for harvests. Traditional beekeeping uses hollow logs to build natural beehives with fixed honeycombs and limited bee management. This can lead to lower yields.

Bangura sought to build new hives like Langstroth and Zandar vertical frame hives that are movable and allow easy inspection and management of bees for better yields. With the modern ones, they can manage the colony and selective breeding of bees that aim to enhance resistance to diseases and parasites. The modern hives also make splitting of bee colonies easier, maximizing honey production.

Tree planting. Image © Ezekiel Kargbo for The Iris Project.

One study from Tanzania, published in *Tropical Conservation Science*, found that modern hives can produce as much as 20 kilograms (44 pounds) per hive, while traditional ones can make as little as 5 kg (11 lbs). However, the introduction of modern beehives is not always popular among traditional beekeepers in every region. In Tanzania, according to the study, beekeepers preferred the traditional logs as they are cheaper and fit cultural norms better. But Bangura says he tries to find a middle ground.

"We combine traditional knowledge focused on knowledge passed down through generations and understanding bee behavior to enhance efficiency and bee habitats," says Bangura. "We use some traditional hive management because we currently don't have the tools and knowledge to practice modern beekeeping." With the locally built hives, locals say they can monitor the hives easily and double their honey production.



Community beekeeping workshop. Image © Ezekiel Kargbo for The Iris Project.

"Checking the hive monthly helps improve bee health and increase honey production," says Massah Koroma, a woman beekeeper from the Boma community. "I feed my family with the honey made organically by the local people, and the income I generate selling honey goes for my children's school fees."

The beekeeping season starts in January and, once they harvest the honey by May, it is bottled in 500 grams (1.1 lbs) and 1 kg (2.2 lbs) portions that are sold for $1.2 and $2.5 each. Since the beginning of the project, Bangura says, community members in Boma, Sahun and Kambama have earned the equivalent of $156 from multiple honey harvests and, on good days, they can earn around $25 per day. Meanwhile, the average income per month in Sierra Leone is $40.

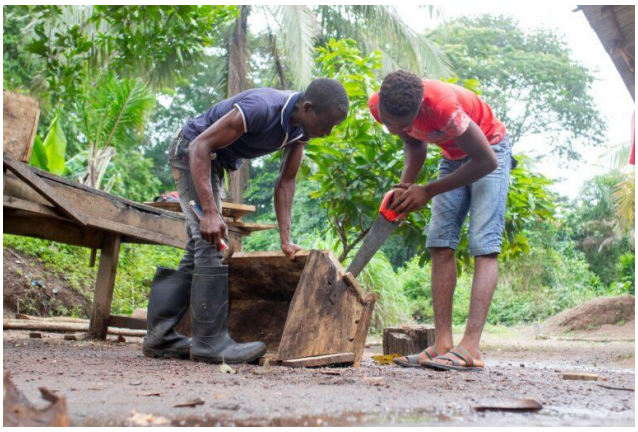
The initiative started with less than 20 beehives in eight Indigenous Mende communities. It has so far built over 300 beehives, each capable of hosting up to 60,000 bees including the queen, drones and worker bees. Members of the community say they have become more aware through training and workshops that the initiative has provided on the impacts of deforestation and the use of pesticides on the bee population.

Tiwai Honey Initiative product picture. Image © Ezekiel Kargbo for The Iris Project.

Ensuring a direct supply chain

Borbor says Bangs Circular agreed that once the beekeepers are trained under the project, they have ownership over the beekeeping and honey harvesting. When the honey is harvested, the beekeepers work with Bangura and his team members to sell the product in the market.

While these are local businesses selling at a small scale, the product gets to consumers directly from the suppliers with no middlemen included. Most of the products are directly sold to nearby supermarkets and wholesalers. The remaining honey has good demand from tourists that visit the island, says Bangura. “We have tied up with 10 different supermarkets and 15 wholesalers that are interested in buying the local honey,” Bangura tells Mongabay.



Building a beehive. Image © Ezekiel Kargbo for The Iris Project.

Locals say that, so far, the project has reduced the pressure on *baji* trees (*Terminalia ivorensis*), which they cut down for charcoal to sell in the market — though they still depend on the charcoal for their own energy needs. There are no independent studies yet confirming a reduction in deforestation, but the initiative has so far planted 5,000 trees including baji and silk-cotton trees (*Ceiba pentandra*) on community lands.

“We have plans to scale up,” says Bangura. “But in order to make it possible we need to continue preserving native bees realizing the enormous value these species have in ecosystem restoration and our entire food system.”

Study finds best plants for bee health and conservation in North America

Liz Kimbrough 5 Jul 2024

- *A new study analyzed pollen from 57 North American plant species, identifying those most nutritionally beneficial for bees, which could inform conservation efforts and wildflower restoration projects.*
- *Based on their findings, the researchers recommend emphasizing roses (Rosa sp.), clovers (Trifolium sp.), red raspberry (Rubus idaeus), tall buttercup (Ranunculus acris), and Tara vine (Actinidia arguta) in wildflower restoration*

projects, citing their ideal protein-to-lipid ratios in pollen for wild bee nutrition.

- *The research found that bees require a diverse diet from multiple plant sources to obtain a balanced intake of fatty acids and essential amino acids, as no single plant species provides the optimal nutrition.*
- *With many bee species facing significant threats, the researchers say they hope these findings can inform conservation efforts from policy changes to individual actions like planting native flowers and reducing pesticide use.*

What's on the menu for a healthy bee? A team of researchers has delved into the world of bee nutrition, analyzing pollen to identify the best food sources for these vital pollinators. Their findings could have implications for bee conservation efforts and pollinator-friendly landscaping. The research, published in *Frontiers in Sustainable Food Systems*, analyzed the nutritional content of pollen collected from 57 plant species native to North America. The study team, led by Sandra Rehan of York University in Canada, examined levels of essential fatty acids, amino acids and other key nutrients in the pollen samples.

"Despite public interest and a rise in pollinator plantings, little is known about which plant species are best suited for bee health," Rehan said. "This study aimed to better understand the nutritional value of plant species." Based on their findings, the researchers recommend emphasizing roses (*Rosa* sp.), clovers (*Trifolium* sp.), red raspberry (*Rubus idaeus*), tall buttercup (*Ranunculus acris*), and Tara vine (*Actinidia arguta*) in wildflower restoration projects, citing their ideal protein-to-lipid ratios in pollen for wild bee nutrition.

They found that tall buttercup (*Ranunculus acris*) was the most aligned with honey bee dietary requirements, closely followed by hardy kiwi (*Actinidia arguta*), bird's-foot trefoil (*Lotus corniculatus*), red osier dogwood (*Cornus sericea*), multiflora rose (*Rosa multiflora*), red raspberry (*Rubus idaeus*), Virginia rose (*Rosa virginiana*), rose of Sharon (*Hibiscus syriacus*), staghorn sumac (*Rhus typhina*), and European cranberrybush (*Viburnum opulus*).

When comparing native and introduced plant species, the study found no significant differences in the overall nutritional content of their pollen. This suggests that both native and nonnative plants can potentially provide valuable nutritional resources for bee populations.

A lawn of clover. Clover can be a bee-friendly alternative to grass. Public Domain.

Bees rely on two primary food sources: nectar and pollen. While nectar provides bees with carbohydrates and water, pollen is their main source of protein, lipids, vitamins and minerals. Adult bees consume both nectar and pollen, but pollen plays a crucial role in larval development. When foraging, bees collect pollen using specialized structures on their bodies, such as pollen baskets (known as corbiculae) on their hind legs, or scopal hairs on their abdomen or legs, depending on the species. They then bring this pollen back to the hive or nest.

In social bees like honey bees, worker bees mix the pollen with nectar and their own glandular secretions to create “bee bread,” which is used to feed developing larvae. For solitary bees, females provide each brood cell with a mixture of pollen and nectar before laying an egg. This pollen is the sole food source for the developing larva until it emerges as an adult. Therefore, pollen’s nutritional quality directly impacts the health, development and survival of bee populations.

Bees require a diet rich in specific nutrients, particularly omega-6 and omega-3 fatty acids. These compounds are essential for the bees’ longevity, immune function and ability to handle environmental stress. However, the balance of these fatty acids is crucial. Too much or too little can impair their cognitive abilities. Additionally, bees need essential amino acids for brain health and reproduction. But there’s a catch: consuming excessive amounts of these amino acids may increase their susceptibility to certain parasites. Therefore, a well-balanced diet is critical for maintaining bee health and vitality.

The study found that bees require a diverse diet from multiple plant sources to obtain a balanced intake of fatty acids and essential amino acids. No single plant species provided pollen with an optimal nutritional profile. “There is a potential tradeoff between fatty acid and amino acid content within pollen, suggesting that a diverse floral diet may benefit bees more than a single pollen source,” Rehan said. “No one plant species is optimal for generalist wild bee health.”

A metallic bee (*Augochloropsis fulgida*) collected in West Virginia, US. There are more than 20,000 species of bees in the world.

Photo byUSGS Bee Inventory and Monitoring Lab via Flickr. Public Domain.

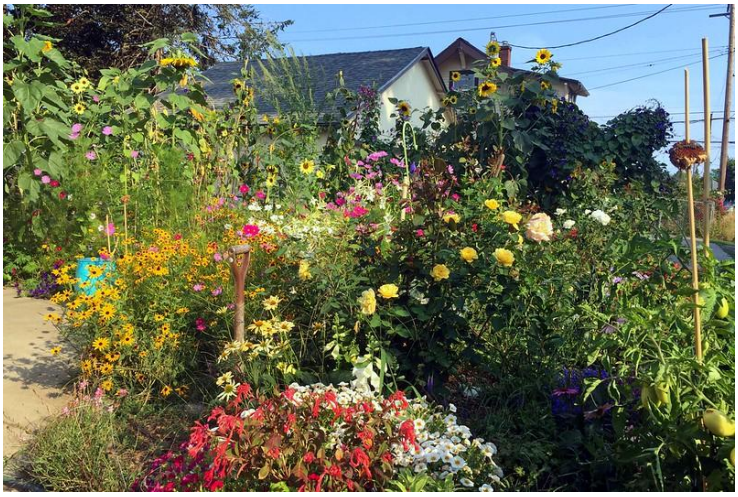
For amino acid content, the study found that almost all plant species contained the ten essential amino acids required by bees in their pollen. However, levels varied considerably between species. Interestingly, pollen from plants in the Asteraceae family (which includes daisies and sunflowers) stood out as particularly rich in essential amino acids. Seven Asteraceae species had essential amino acid levels exceeding 20% of their total pollen content.

The researchers also examined protein-to-lipid ratios and omega-6 to omega-3 fatty acid ratios in the pollen samples, as these are considered important factors in bee nutrition. They found wide variation between species, even within the same plant genus. “This diversity of pollen nutritional profiles likely enables bees, especially specialist species, to selectively forage on the resources that best meet their unique dietary requirements,” the study authors noted.

The study’s findings are particularly relevant given the alarming decline in bee populations worldwide. With more than 3,600 species in the U.S. and Canada, bees

represent a remarkably diverse group of pollinators. However, many bee species are facing significant threats. “Approximately 16% of vertebrate pollinators, such as birds and bats, and 40% of invertebrate pollinators, such as bees and butterflies, are at risk of extinction,” according to a comprehensive review published in May in *CABI Reviews*.

Habitat loss and fragmentation; pathogens and disease; pesticides, insecticides such as the neonicotinoids, herbicides and fungicides used in agriculture and landscaping; invasive species; climate change; and competition between honeybees and native bees are some of the reported causes of pollinator declines. The loss of preferred host plants is a contributing factor to the decline of some bee populations. Additionally, the spread of pests and pathogens poses a serious threat to both wild and managed bee species, with the transportation of managed bee colonies for commercial pollination often exacerbating this problem.



A pollinator garden in bloom. Photo by Sara “Asher” Morris via Flickr (CC BY-NC 2.0)

Bee conservation efforts are multifaceted, involving both large-scale policy changes and individual actions. At the policy level, initiatives include protecting key habitats, regulating pesticide use, and supporting research on bee health. Organizations like the Xerces Society have successfully advocated for federal and state protections for several bee species. They also work with farmers and land managers to implement bee-friendly practices.

Individuals can also play a crucial role in bee conservation. Planting native flowers, reducing pesticide use, and creating nesting habitats are all effective ways to support local bee populations. Even small actions, like converting part of a lawn into a

wildflower meadow or leaving bare patches of soil for ground-nesting bees, can make a significant difference.

Rehan and her colleagues say they hope their findings will help inform the selection of plant species for pollinator gardens and habitat restoration efforts. However, they caution that the analysis only looked at 57 plant species out of thousands that exist. “We hope this work will help inform flowering plant selections for pollinator gardens,” Rehan said. “But here we examined only 57 plant species, and there are thousands to examine to understand nutritional profiles. We hope this will inspire future similar research as well as follow-up studies on the preference and survival of bees on different diets.”

Liz Kimbrough *is a staff writer for Mongabay and holds a Ph.D. in ecology and evolutionary biology from Tulane University, where she studied the microbiomes of trees. View more of her reporting* here.

Citations:

Stephen, K. W., Chau, K. D., & Rehan, S. M. (2024). Dietary foundations for pollinators: Nutritional profiling of plants for bee health. *Frontiers in Sustainable Food Systems*, *8*, 1411410. doi:10.3389/fsufs.2024.1411410

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[Published on https://news.mongabay.com/features/, which carries stories on environmental issues in various parts of the world]

Sensing Sickness: Study Supports New Method for Boosting Bee Health

Environment - April 2, 2025 - By Kristen Munson

Honey bees are dying at an unsustainable rate. A new test could help beekeepers flag more disease resistant colonies.

Beekeepers in the United States lost more than 55 percent of managed colonies last year—the highest loss rate since the Apiary Inspectors of America began determining them in 2011. A new study from University of Vermont scientists and international collaborators supports a novel method for testing hygienic behavior in honey bees that could promote breeding more disease resistant colonies in the future.

“Beekeepers are losing bees at a rate that they say is unsustainable,” says Samantha Alger, director of the Vermont Bee Lab at the UVM and lead author of the study. “In the ‘80s, beekeepers lost colonies 10-12 percent of the time … but now it's like 30-50 percent. Imagine that happening to someone who's a cattle farmer or a pig farmer every year.”

Honey bee populations remain relatively steady despite heavy losses because beekeepers are good at breeding new bees, she explains. But that comes at the expense of time and resources for beekeepers, as well as risk for native pollinators. Pathogens in managed honey bees can spill over into wild bee populations. Alger’s lab works with beekeepers to breed hardy, disease resistant honey bee colonies which they can sell to hobbyists and professional beekeepers. Helping beekeepers identify hygienic behavior—the ability to identify unhealthy brood— is part of this process.

“It's definitely more desirable for a beekeeper to have bees that are better adapted at taking care of their diseases themselves rather than using chemical treatments and interventions to try to reduce these pathogen loads, which of course may have negative impacts on the bees,” she says. “Now the trick is how does a beekeeper identify a colony that is really hygienic? And there's various tests that you can perform for that and this UBeeO is sort of a novel way of testing for it.”

Alger’s team recently studied a screening tool developed by scientists at the University of North Carolina at Greensboro that tests colonies for hygienic behavior by mimicking the pheromones emitted by sick or dying bees. The researchers found the UBeeO test can identify colonies resistant to several pests and pathogens that can decimate bee populations such as *Vairimorpha* (known to many beekeepers as Nosema) and fungal infections including chalkbrood. They published their findings today in Frontiers in Bee Science.

“UBeeO has been known to identify colonies that are able to better resist Varroa mites, but it had not been used to look at other pest or pathogens,” Alger says. “We

found this new assay could be used to identify colonies that are resistant to these other stressors."

How it works

Picture a honey bee colony. Inside the boxed hive are frames with hexagonal holes where a queen bee lays one egg inside each cell. As the eggs hatch, nurse bees feed the developing larvae and eventually cap over the cells with wax to protect them as they mature into adults. When nurse bees detect a developing bee is sick or dead, they will uncap the cell and remove the pupa to protect the rest of the hive. This is called hygienic behavior and pheromones play an important role in this process.

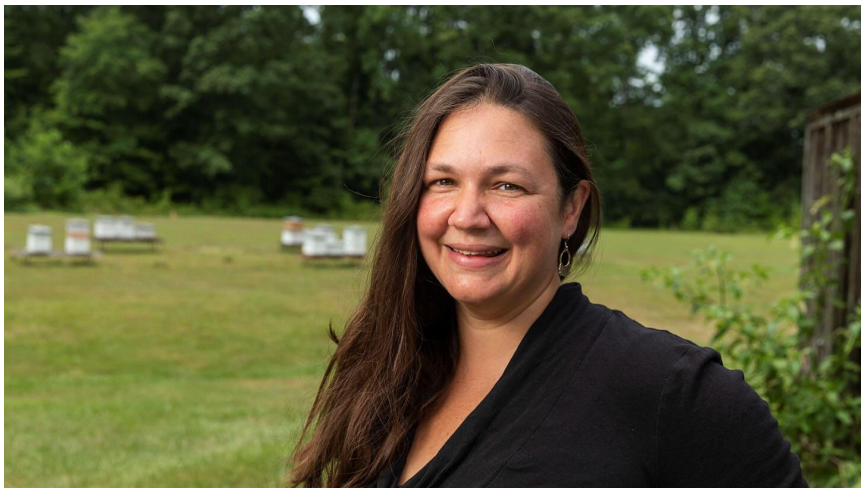
"Other folks have identified death pheromones, these compounds that are associated with death," says Kaira Wagoner, a research scientist at UNC Greensboro and co-author of the study. "The famous biologist E.O. Wilson was one of the first to do this. He found oleic acid was emitted from dead ants. The same thing has been found with bees, and it's just likely a stronger signal—it's growing as the dead brood is basically decomposing in the cell. The signals that are coming out of unhealthy brood are different and very likely more subtle than those death pheromones."

Previous hygiene tests for beekeepers were based off the idea of testing the bees' ability to detect dead brood. One of the most common methods, the freeze brood assay, involves pouring liquid nitrogen over a section of capped cells and waiting 24 hours to see if the bees start removing the dead. The UBeeO test is different."Rather than using liquid nitrogen to kill the developing pupae or larvae, you are using a blend of synthetic pheromones that mimics the same chemicals that are emitted by dying or diseased brood," Alger explains. "So rather than testing the bees' ability to identify dead brood, you are testing the bees' ability to identify diseased brood, which means that this test is a little bit more selective and realistic to what bees experience."

Wagoner co-developed UBeeO during her doctoral studies after she identified chemical compounds associated with unhealthy brood odors. She co-founded Optera, (named for Hymenoptera, the order of the honeybee), to bring UBeeO to beekeepers in the field. It became publicly available in 2024. "It's a really young technology," Wagoner says. "We've now tested it in over 10 different countries, and there are breeding programs in at least 5 now so there's a lot more data to come."

Strength of the investigation

The study focuses on UBeeO tests performed in three geographic regions—Vermont, North Carolina, and Australia—to examine its effectiveness at recognizing colonies resistant to pathogens and disease. The UBeeO test involves spraying a section of capped cells with synthetic pheromones and then waiting two hours to see if nurse bees have started to inspect the developing bees for problems. The percentage of disturbed cells is the UBeeO score. The researchers found that higher UBeeO scores were associated with lower levels of disease load. The findings also showed various thresholds to disease resistance for common honey bee pathogens.

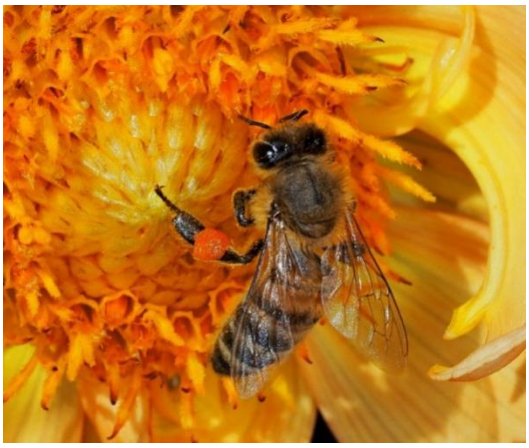


Kaira Wagoner, a research scientist at UNC Greensboro, co-developed UBeeO during her doctoral studies after she identified chemical compounds associated with unhealthy brood odors.

“What we found, at least with this Australian dataset, is they only needed to achieve a 13 percent response on the UBeeO test to be really pretty resistant to chalkbrood. In contrast, colonies need to achieve a response of 55 or 60% on the UBeeO test to be resistant to mites, Wagoner explains. “The honey bee responsiveness largely depends on how virulent or how harmful the specific disease is to the brood. Chalkbrood kills the brood, so the bees don't have to be as sensitive to detect it.”

Varroa mite infection is trickier. These tiny parasitic mites were introduced about four decades ago in the United States and are vectors of disease to bee populations. They pose a significant threat to colonies and reproduce by laying eggs inside the capped over cells and feed off the developing pupa. If nurse bees don’t detect a problem, Varroa mites will be released into the hive when the young honey bee emerges. That is where hygienic behavior becomes critical since uncapping the cells disrupts the mites’ life cycle.

The study also revealed the UBeeO test could identify colonies with resistance to *Vairimorpha* (previously Nosema), a disease that affects adult bees and not the developing brood. That finding has prompted new research into how hygienic behavior works to keep these *Vairimorpha* levels down. "In the case of *Vairimorpha*, what they're doing is kind of the mystery," Alger says. "… There might be other behaviors that hygienic colonies are performing aside of what we know."



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