# CENTRAL COAST BEEKEEPERS NEWSLETTER

June 2021

ISSUE NUMBER 61

NEXT MEETING JUNE 26H 2021

## June 26th In-Person Club Meeting:

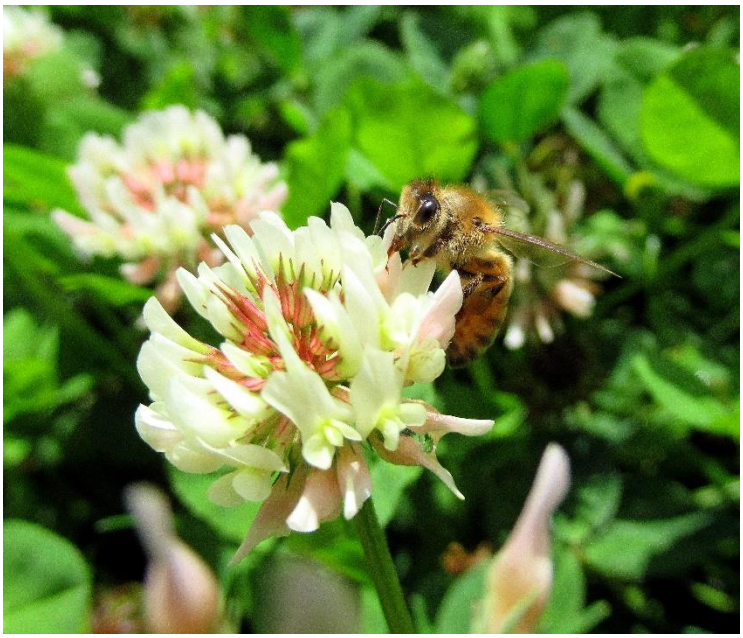
We will be having an in-person meeting at a private residence in Seal Rock near the Brian Booth/Ona State Park on **Saturday June 26 at 3:00PM.**

***Topic: Hands-on session where Becca Fain will show us how to make our own bar of bee inspired soap and Jim Parrish will present a candle making demonstration.*** We will provide most supplies and all you have to bring is a measuring cup (8 oz or greater) and a teaspoon *(and any interested significant other)*. We will also pass out the new CCBA club patches that Jon Sumpter had made last year. They look great and are FREE to all club members who have paid this year's club dues.

As this is a private residence, we are requesting that all attendees be vaccinated for Covid-19. The meeting will be held in well ventilated open areas, so masks are optional. Since we are providing supplies, we need a count of those who plan to attend. **Please RSVP to this email as soon as possible.** Detailed directions and other information will be sent to those who send an email to confirm attendance.

# PRESIDENT'S MESSAGE

**By Stu Willason**



Swarms, flowers, and early summer rain. It is a good time of the year for beekeepers!

The Himalayan blackberries (*Rubus armeniacus)* are starting to blossom just as the trailing/native blackberries (*Rubus ursinus)* are dwindling. Even though we have an abundance of both types of blackberries on our property, our bees seem to prefer the large clover patches that we have planted over the past few years. We planted the hardy and fast growing Alsike Clover (*Trifolium hybridum*) for the "lawn" in front of our house and have patches of this clover growing all around our apiary.

Alsike clover is considered an excellent nectar source for honeybees and can produce up to 500lb honey/acre under the right conditions according to a reference via Wikipedia. It does very well in our climate region and is both winter hardy and summer drought resistant. It produces a large quantity of white-pinkish flowers that bloom from April to October (especially with irrigation) and it is a nitrogen fixer that grows well in acidic soils. We have found that mowing these perennials down to about 3-4" periodically actually encourages more flowering. Alsike clover seems to be the perfect honeybee plant. Hopefully, our planted crops (clover, lavender, borage and nasturtiums) along with ubiquitous wild blackberries will enable our bees to do much of their foraging on our property.

If you have yellow or white flowers on your property you might want to look close and try to spot the shy golden crab spider (*Misumena vatia*). These ambush spiders prey upon honeybees and are camouflaged to blend in with some of the flowers that bees visit. We have found these spiders on our yellow nasturtiums and white fava bean flowers.

This spider has the unusual ability to change color depending on the color of the flower and can go from yellow to white if they move to a white flower from a yellow flower. When a honeybee lands on a flower the spider grabs it with its jaws and injects the bee with a powerful neurotoxin. The bee becomes immobilized and the spider casually eats the bees at its leisure.

Make sure to keep your swarm boxes out and ready. We had a swarm this morning (June 12) and although it is currently clustered on a branch of a Doug Fir tree about 60' off the ground, we are hopeful that the scouts will find our bait boxes within the next couple of days.

If you haven't already done so, you can renew or start a new membership for only $15 per person or $25 per family. ALL PAID MEMBERS WILL RECEIVE A FREE CCBA PATCH. The membership form is on our website CCBA Membership Form .pdf If you are renewing, you can also use PayPal by sending it to the club's email: centralcoastbeekeepers@gmail.com.

We look forward to finally seeing everyone IN-PERSON at our club meeting on June 26th!

# Meet a CCBA Member

Each month we'll be featuring one of the club's members to find out a little about their beekeeping passion. This month we are featuring Patti Johnson who lives in Yachats. Here's Patti's story:

I can honestly say that beekeeping was **not** on my "**want** to do list" when I retired. I was excited to have more time to balance with family, friends, and doing my many landscape and gardening projects. But enrollment in the Lane County Master Gardeners Program and becoming involved with another group called "Sacred Earth Initiative," brought pollinators to the forefront. The more I learned about honey bees/pollinators, the more fascinated I became.

I was then living in Eugene, and a friend told me about the Lane County Beekeepers Association. I started attending the monthly meetings and was overwhelmed with the information presented, even though I had been reading and had attended a few other classes on related beekeeping topics. I thought that I would never get it, but after a year of attending meetings and bee school, I got my first package.

Beekeeping wasn't a natural fit. I had never seen a hive up close, I had to overcome a learned fear of stinging insects, and my biggest obstacle… I am very claustrophobic, but determined. I practiced putting on and wearing my jacket and veil, and laughed at myself for walking around the house at night with it on, while in my pajamas. Finally it became "a safe place". And recently, because I couldn't seem to get mites under control, I learned to be comfortable enough to wear a gas mask and googles under my veil. I knew I had to use oxalic vaporization, or I would lose my hive. The fact is, anyone can become a beekeeper if they have the willingness and desire to learn.

I currently have three hives and recently started a nuc from a swarm cell, and have hopes of overwintering it. I have several beekeeping reference books that I use frequently, but what I enjoy most is receiving my monthly "Bee Culture" and "American Bee Journal" magazines. It's exciting to learn of the many things happening in the realm beekeeping.

My best advice, learn all you can and continue learning. And of utmost importance, find a mentor who can help you with the hands-on experience. I was extremely fortunate to have started out with someone who was patient and let me “experience the bees” at my own pace, and a second mentor (through the OSU Master Beekeeping, Apprentice Program) that helped me refine my skills, boosted my confidence, and is still always available to help me brainstorm through a problem or something new.

And while speaking about mentors and learning, the Central Coast Beekeepers Assoc. was just getting started when I moved to Yachats. I will always be grateful to so many of you that shared stories, experiences and the nuisances of beekeeping on the coast.

In closing, there have been many folks who have helped me along the way, and I try to pay it forward. I often work with kids, talk to seniors in assisted living facilities, and in general, try to be a positive ambassador for our bees and those who keep them.

## Happy Centennial OSBA!

2021 marks the 100th anniversary of the Oregon State Beekeepers Association, and in honor of this significant milestone, we wanted to raise some funds to support the phenomenal work being done by Doctor Ramesh Sigili and his team at the OSU Honey Bee Lab. Currently Dr. Sigili must spend a significant portion of his time writing grants to support his lab and the graduate students and research assistants who are working every day to enhance the health and safety of our honey bees. As a result, he has less time available to engage in the research he loves and spends more and more time attracting the half a million dollars for operating expenses necessary to run the lab each year. Our plan is to raise $500,000 to support the lab and its work for a year and we need your help.

Our efforts will have two parts- a major gifts campaign and an on-line crowdfunding platform. We are starting with the major gifts campaign and have already had significant success but we need your assistance in identifying business/corporations, as well as individuals, who care about and value honey bees who you can connect us with and help us make the ask. These could be relatives, customers, suppliers, friends or acquaintances who we could ask for a gift of $10,000 or more. We hope to raise approximately $300,000 of our goal from this part of the campaigns
Any assistance you can provide will be greatly appreciated. Contact me at rfain18@gmail.com with leads or questions and I will be glad to call you for clarification or to arrange contact with your lead.

Our second push will begin with the roll out of our on-line platform in July. We will send each of you a link when the page goes live and ask that you share it with your network and your social media portals in hopes that we can attract the final $200,000 by September. We would also appreciate any gift that you would like to make to the campaign personally and hope that you will consider honoring Dr Sigili and his work along with us.

Becca Fain
OSBA Fundraising Chair

# Vegetarians or Meat Eaters?

By Paige Embry Scientific American

Ask an entomologist what makes a bee a bee, and you'll likely get some version of "bees are just wasps that went vegetarian." New research shows that isn't true. Bees are actually omnivores, and their meat is microbes. This finding may open a new window on why bees are in trouble: Anything that disrupts the microbial community in a bee's food, whether it is high heat linked to climate change, fungicides or another stressor, could be causing developing bees to starve.

Bees are supreme pollinators because of what their babies eat. Most animals visit flowers to pilfer nectar, and they may or may not brush up against pollen and carry it to the next flower. Female bees, conversely, deliberately collect pollen, along with nectar, to feed their babes. This larval food choice is part of what defines a bee.

Scientists have known for decades that fermenting microbes are present in pollen, but no one had seemed to consider whether they were also an important food for bees. The microbes function as an "external rumen" that breaks down parts of the pollen. It stands to reason that bees might ingest some microbes, but two researchers decided to investigate whether they eat enough to make them omnivores—and if the bees truly need those microbes to thrive.

Prarthana Dharampal of the University of Wisconsin–Madison and Shawn Steffan, who works jointly at the university and the U. S. Department of Agriculture's Agricultural Research Service (ARS), assessed 14 different bee species in six of the seven bee families. They found that bees eat substantial amounts of microbes, enough to change how they fit within food webs. Scientists use a scale to categorize where organisms belong in that web: those that make their own food, such as plants, register at so-called trophic position 1 (TP 1), herbivores register at TP 2 and carnivores do so at TP 3, or even higher if they eat other carnivores. The average TP across all the bees studied was 2.6, putting them squarely in the omnivore spot, halfway between herbivores and carnivores. Interestingly, the trophic position varied among families, ranging from just a bit above herbivores (2.11) to solid carnivores (3.09). Now that the TP is known, Dharampal says she wonders whether bees are really foraging for the pollen, or are foraging for the microbes that are associated with the pollen.

For most people, the idea that microorganisms can qualify as meat is radical. In the past four years, Steffan and his colleagues, including Dharampal, have published a series of papers laying out their evidence that microbes are an important part of a variety of food webs, including those that involve bees. Their findings confirm that fungi, bacteria and other microscopic players can fit anywhere in the food web, upending our vision of predator and prey, carnivore and herbivore—and what makes a bee a bee.

Steffan and his colleagues have also shown that microbial meat is a necessary part of bees' diet. The researchers tested a species of mason bee that lays eggs in aboveground tubes that are easy to access and transport. In each tube, the mason bee lays a series of eggs, each on its own wad of pollen and nectar. The researchers had a Utah beekeeper send them a batch of tubes immediately after the bees filled them. They then took the eggs off the wads and separated males from females and used only the male bee larvae, divided into seven groups of 12. The scientists sterilized half of the pollen and then fed different mixes of sterilized and unsterilized pollen to the groups. As the percentage of sterilized pollen in the food increased, so did the larvae's likelihood of dying. The larvae also weighed less and took longer to mature. "Microbes are a very important source of nutrients for these bees," Dharampal says. "If you take away this critical source, or portion, of their diet, they suffer tremendously."
The idea that bees are vegetarian is entrenched in entomology, and Steffan admits he and his colleagues ran into headwinds when trying to get their papers related to omnivory in bees accepted. Ultimately, they were published in the American Naturalist and Proceedings of the Royal Society B, respectively. Gloria Degrandi-Hoffman, who works for ARS and has investigated the honey bee microbiome but was not part of the work, says that the scientific community is always skeptical. When a new finding goes against a widely held perception, people take some convincing.

The mason bee results suggest that bees could suffer or starve if certain microbes disappear from their diet. Scientists have attributed the declines of both managed and wild bees to various combinations of habitat loss and degradation, pests and pathogens, pesticide exposure and climate change. They have largely focused on how such factors impact bees directly. The next step is to look at whether the stressors may affect the pollen-borne microbes. Steffan says any stressor that

throws the external rumen out of whack could be “an indirect, but no less lethal” way of killing bees.

One such factor is heat from climate change. “It may not be that heat is directly lethal for bee development,” Steffan says. “But it very well could be that high heat knocks out the microbial symbionts in the pollen, and then the bee suffers from the lack of microbes.” Steffan and Dharampal are currently investigating this possibility. Fungicides could be culprits, too. Although more research needs to be done, Steffan says, “we have ample evidence, at this point, that fungicides dramatically alter the microbial community of fermenting pollen.” And, he adds, “agricultural use of fungicides is very likely a primary stressor—the primary stressor—for bee decline.” Of course, failing bee populations can cripple the crops and wild plants they help to pollinate. Around three fourths of the earth’s flowering plants and crops benefit from animal pollinators, including 87 of the 115 leading global food crops. The 20,000 species of bees in the world are not the only animals that pollinate, but they are top pollinators for many staples.
Knowing the role of pollen microbes may eventually help solve conservation challenges by, for example, directing flower choices for habitat restoration. Sandra Rehan of York University in Toronto, who studies microbial life associated with wild bees and was not part of the recent papers, says the findings “will have long-term conservation applications once we do associate the flowers, the landscape and the microbes.” In a 2017 study, she and her co-authors wrote, “Pollinator habitat restoration efforts may need to consider flower plantings that increase the presence of core bacteria that are found in flowers, adults, and pollen provisions, such as Lactobacillus and Saccharibacter. Future work is needed to determine the role of these core bacteria in restoration of healthy pollinator communities.”

The new insight about pollen microbes is just the latest example of how important the microbiome is in all realms of life, which we may have ignored to our peril. “We, as animals and flowering plants have flourished, to the extent that we are able to cooperate, co-opt and commandeer microbial services,” Steffan says. He adds that we view food webs through the lens of vertebrates and mammals, but microbes have been on the planet much longer than animals or plants. Steffan, Dharampal and others call for a radical revision of how we view life on earth. At the end of their American Naturalist paper, they write, “Considering bee-microbe symbioses from the microbial perspective, microbes can be viewed as avid beekeepers, facilitating and assisting their faunal symbionts in the annual pollen harvest.”

# Where do Honeybees Mate?

**Joseph Woodgate**
Postdoctoral Researcher, Queen Mary University of London

Honeybees pollinate a lot of our food crops, they're welcome visitors to our gardens and they are widely kept throughout the world – so much so that some have described them as a domesticated species.

It may come as a bit of a surprise, then, to discover there are big gaps in our knowledge regarding where honeybees mate. The problem is that bees mate in mid-air, possibly up to 50 meters above the ground, where it's almost impossible to observe them.

This is why my colleagues and I spent two years trying to track the flight paths of male honeybees, known as drones. We've published the results in a new study which helps solve the longstanding mystery of where honeybees mate.

Drones are born in summer and have one aim in life – to mate with a virgin queen. New queens make up to six nuptial flights at the start of their lives, during which they mate with six to 24 different drones. They store the sperm, which they use to fertilize all the worker eggs they lay for the rest of their lives – more than 1,000 per day.

## Where do the drones go?

From a few days old until they die, at around three weeks old, drones leave the hive several times a day looking for sex. But where do they go?

The first clue came more than 200 years ago, when the naturalist Gilbert White wrote of hearing a buzzing on his estate in England. Many beekeepers and scientists believe White was hearing the sound of thousands of drones coming together at a place known as a drone congregation area.

Scientists have investigated these supposed congregations by raising a long pole or balloon with either a queen bee in a cage or a "lure" – some cotton wool soaked in the pheromones that queens produce.

A trail of drones will often form downwind, competing to try to mate with the queen. One problem with this technique is, because drones are attracted to the lures, we can't know for sure how they'd behave when the lures aren't there. Some people suspect the congregations might be created by the scientists themselves.

In the early 1990s, scientists in Arizona, US, used a radar to monitor drone movements at a large bee farm. They couldn't track individual bees but their observations seemed to show drones followed shared routes. We wanted to know more, so we set out to use a different type of radar to reveal the movements of individual drones.

Tracking bees. Joseph Woodgate, Author provided

## Tracking bees

To track the bees we attached small pieces of electronic equipment, known as transponders, to their thorax. Our radar rotated once every three seconds, “illuminating” its surroundings with a beam of radio signals. When these hit a transponder, they were converted into an answering signal. The radar constantly scanned for these incoming signals, allowing us to work out the position of the bee.

The first thing we noticed was our drones switched between two forms of flight. They used straight, efficient flights between places but often switched to circling, looping flight. We found these convoluted flights were clustered in four specific areas – even without lures to attract them, drones cluster in congregation areas.

We looked more carefully at the flights in congregation areas and found a pattern. The further they flew from the center of the area, the more strongly they accelerated back toward it. Imagine marbles sloshing around in the bottom of a steep sided bowl, starting to climb the sides only to speed back to the middle. This pattern of accelerations, also seen in swarming midges, simulates a physical force, keeping the bees bound together and maintaining a cohesive swarm.

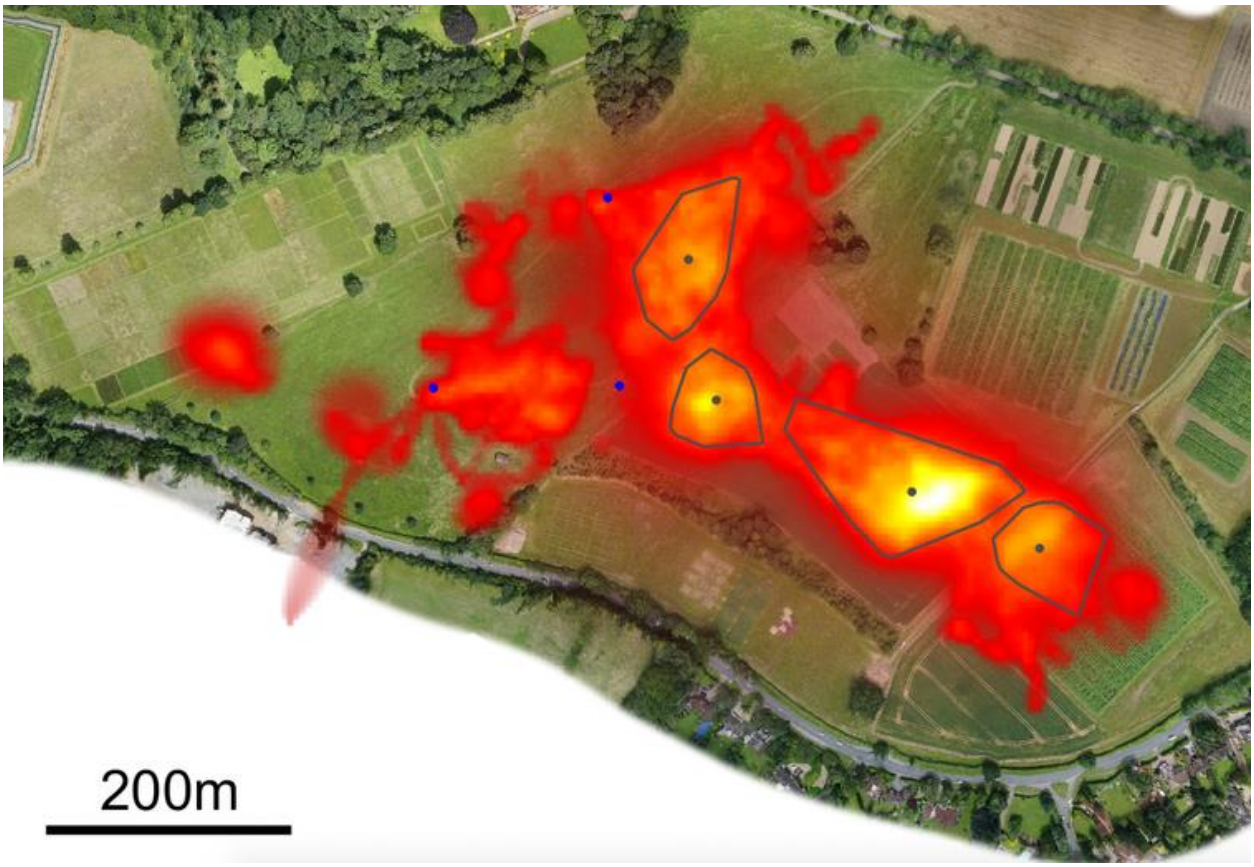
The radar. Joseph Woodgate, Author provided

Why would so many drones come together like this? The most likely explanation is congregations are a form of “lek” – leks are large groups of male animals who gather to attract a mate. They are common among birds and mammals, where males often put on elaborate displays to attract picky females.

There are several possible reasons why leks might have evolved, but the one most likely to apply to bees is that males gather in places that females are likely to visit. This allows males and females to rendezvous without having to search the entire landscape – a tough proposition when you're as small as a bee.

One major difference between bees and other animals was our bees frequently flew between drone congregation areas, staying for only a few minutes at each, whereas lekking animals are typically very faithful to a single location.

The big puzzle is how drones find these areas. Our results showed that congregation areas will attract bees for at least two years, but no individual drone lives long enough to pass on knowledge about how to find them to the next generation.




A heat map showing where the drones flew. Joseph Woodgate, Author provided

We followed some drones from the first time they left the nest, through many subsequent flights. On their first flights, they stayed close to the hive, learning its appearance to find their way home again, but never visited congregations. Some visited congregation areas on their next flights, though, and managed to fly straight there without searching for it.

Whatever signs they use to guide themselves must be obvious from close to the hives and, because drones from different hives visited the same locations, must be observable no matter where they are. We plan to use a 3D model of the entire field site to reconstruct what our drones could see as they flew to the congregations, to find out what they looked to for guidance.

Understanding drones' mating behavior will help beekeepers manage their breeding programs and help us unravel a longstanding mystery about bee behavior. I'm also part of a project taking inspiration from bees to create a new generation of autonomous robots. As we start to understand how bees can accomplish complicated behaviors, we could develop robots that work with less human guidance.

# New Almond Variety to Liberate Growers From Bees

Todd Fitchette | May 21, 2021 Western Farm Press

There seems to be a theme with the naming of a second self-fertile almond variety soon to be available from Dave Wilson Nursery in Modesto, Calif. In each case, the Independence variety, and the new Liberty almond seek to liberate almond growers from the need for honeybees during the late-winter pollination period.

Self-fertile almond trees are all the buzz as almond acreage soars while honeybee availability struggles to keep pace.

The Liberty almond is the latest development by Zaiger's Genetics in Modesto. The trees are marketed exclusively by Dave Wilson Nursery. Sales of the new Liberty variety almond will begin later this year as early testing and trials have shown the success of the self-fertile nut.

Grant Zaiger, the geneticist responsible for the Liberty almond tested the variety earlier this year by erecting a screen house around individual trees to check their ability to pollinate without the help of honeybees.

It worked. For the three-year-old trees in a test orchard in Modesto, the visible difference between trees that had honeybee visits, and those that were screened, are minimal."It does pollinate without bees and right there's the evidence of that," Zaiger said pointing to a tree he said was screened during the bloom period.

# Pollen-sized technology protects bees from deadly insecticides

A Cornell University-developed technology provides beekeepers, consumers and farmers with an antidote for deadly pesticides, which kill wild bees and cause beekeepers to lose around a third of their hives every year on average.

An early version of the technology ¬- which detoxified a widely-used group of insecticides called organophosphates -- is described in a new study, "Pollen-Inspired Enzymatic Microparticles to Reduce Organophosphate Toxicity in Managed Pollinators," published in Nature Food. The antidote delivery method has now been adapted to effectively protect bees from all insecticides, and has inspired a new company, Beemmunity, based in New York state.

Studies show that wax and pollen in 98% of hives in the U.S. are contaminated with an average of six pesticides, which also lower a bee's immunity to devastating varroa mites and pathogens. At the same time, pollinators provide vital services by helping to fertilize crops that lead to production of a third of the food we consume, according to the paper.

"We have a solution whereby beekeepers can feed their bees our microparticle products in pollen patties or in a sugar syrup, and it allows them to detoxify the hive of any pesticides that they might find," said James Webb, a co-author of the paper and CEO of Beemmunity.

First author Jing Chen is a postdoctoral researcher in the lab of senior author Minglin Ma, associate professor in the Department of Biological and Environmental Engineering in the College of Agriculture and Life Sciences (CALS). Scott McArt, assistant professor of entomology in CALS, is also a co-author.

The paper focuses on organophosphate-based insecticides, which account for about a third of the insecticides on the market. A recent worldwide meta-analysis of in-hive pesticide residue

studies found that, under current use patterns, five insecticides posed substantial risks to bees, two of which were organophosphates, McArt said.

The researchers developed a uniform pollen-sized microparticle filled with enzymes that detoxify organophosphate insecticides before they are absorbed and harm the bee. The particle's protective casing allows the enzymes to move past the bee's crop (stomach), which is acidic and breaks down enzymes.

Microparticles can be mixed with pollen patties or sugar water, and once ingested, the safe-guarded enzymes pass through the acidic crop to the midgut, where digestion occurs and where toxins and nutrients are absorbed. There, the enzymes can act to break down and detoxify the organophosphates.

After a series of in vitro experiments, the researchers tested the system on live bees in the lab. They fed a pod of bees malathion, an organophosphate pesticide, in contaminated pollen and also fed them the microparticles with enzyme. A control group was simultaneously fed the toxic pollen, without the enzyme-filled microparticles.

Bees that were fed the microparticles with a high dose of the enzyme had a 100% survival rate after exposure to malathion. Meanwhile, unprotected control bees died in a matter of days.

Beemmunity takes the concept a step further, where instead of filling the microparticles with enzymes that break down an insecticide, the particles have a shell made with insect proteins and are filled with a special absorptive oil, creating a kind of micro-sponge. Many insecticides, including widely-used neonicotinoids, are designed to target insect proteins, so the microparticle shell draws in the insecticide where it is sequestered inert within the casing. Eventually, the bees simply defecate the sequestered toxin.

The company is running colony-scale trials this summer on 240 hives in New Jersey and plans to publicly launch its products starting in February 2022. Products include microparticle sponges in a dry sugar medium that can be added to pollen patties or sugar water, and consumer bee feeders in development.

"This is a low-cost, scalable solution which we hope will be a first step to address the insecticide toxicity issue and contribute to the protection of managed pollinators," Ma said.

**Story Source:**

Materials provided by **Cornell University**. Original written by Krishna Ramanujan. Note: Content may be edited for style and length.

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