CENTRAL COAST BEEKEEPERS NEWSLETTER

August 2021

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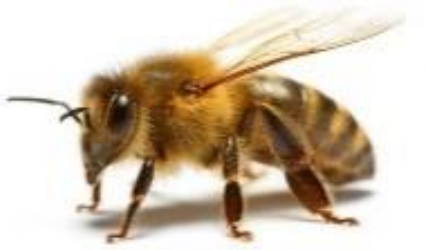
NEXT MEETING SEPTEMBER 2021

August 2021 Summer Break

There will not be a club meeting in August. We have decided to take a summer break and will resume meetings in some form or another in September. Covid-19 has reared its ugly head again and we thought a short summer sabbatical would be the most prudent way to go.



PRESIDENT'S MESSAGE

By Stu Willason

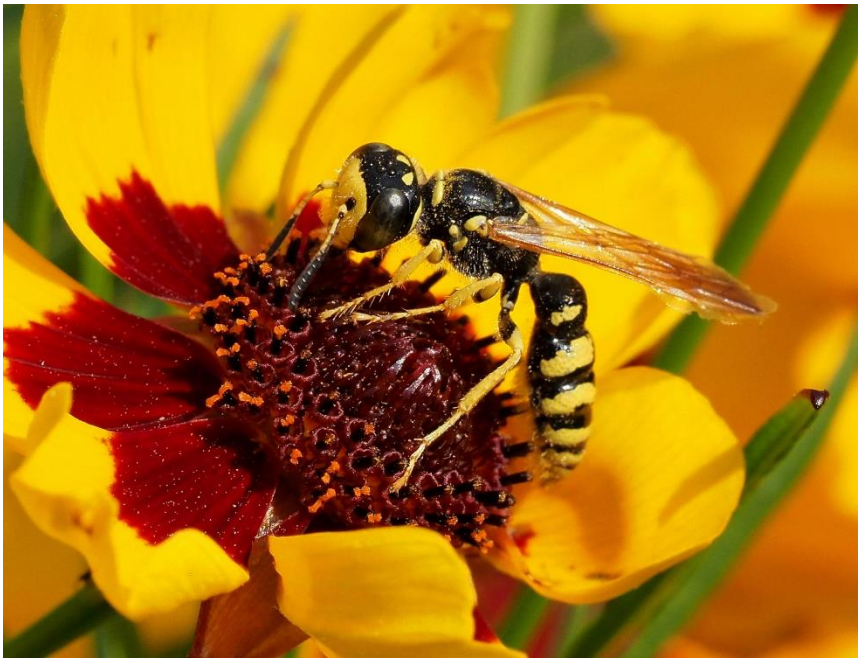
It goes without saying that rain in our area is badly needed. Seems like the entire West Coast is in some level of extreme drought and is experiencing more and more devastating heat waves. As John Jacobs, the President of the Oregon State Beekeepers Association, points out in his

recent President's letter, these systemic changes are now affecting, and will severely affect or even eliminate, many beekeepers in the future. I urge you to read his article in the Beeline even though it probably won't make you feel very good (Message from the President – Oregon State Beekeepers Association (orsba.org). I share John's somewhat dystopian viewpoint, especially his view of the future of pollination – aka the use of robotic bees to combat the declining bee populations. (See last article.)

I am usually a big fan of new technology. However, the justification for the new wave of research into robotic pollinators in order to "solve" the problem of declining natural pollinator populations seems perverse (eg $1M grant will help researchers WSU). By replacing insects with technology do we really solve the problem? I hope as humans we aren't stupid enough to think that everything will be fine when we grow cheap almonds and other crops without the bees and other pollinators. As John points out there are many trickle down impacts that will affect all of us if robotic pollination comes to fruition. Declining insect populations are the proverbial "canary in a coalmine" and we are now getting a clear and present warning. We'd better pay attention because without the little creatures, there will be no big creatures.

Can we as individuals help with the declining pollinator populations? Absolutely. As you know, our club activities and membership dues help support Oregon State University Bee Lab *(Dr Remesh Sagili's)* which is one of the best universities for pollinator research. On an individual basis we can also donate to the Oregon Bee Project https://www.oregonbeeproject.org/ (*Dr Andony Melathopoulos from Oregon State University)*. For a more global approach you can join the Xerces Society for Invertebrate Conservation which supports pollinator habitat and diversity (https://xerces.org/). Also, when you talk to your neighbors/friends about honeybees also talk about overuse of pesticides, climate change, habitat loss and the importance of insects in general.

We have been seeing a few of these solitary wasps on flowers in our garden. Apparently, they are Beewolves (*Philanthus*) that hang out on flowers and consume nectar. At least that is what the adults do. So, are they bad? Unfortunately, the Beewolf larvae are carnivorous so the adult female catches and stings unaware bees *(including honeybees).* But, the sting just paralyzes the bee so it can be taken back to the Beewolf's ground burrow while still alive. The Beewolf then lays her egg on the paralized bees which



provides fresh food for the wasp larvae when they hatch. Real world alien stuff.

The late-summer dirth is here so be cognizant of the honey stores in your hives. Two of our hives ran out of food last winter and we had to do an emergency feeding in January. The best approach is to leave as much honey as you can in your hives with the idea that you may have to supplementally feed your bees in late fall. We will discuss fall and winter feeding strategies at the September club meeting.

Lastly, there are still opportunities to help staff the OSBA booth at the Oregon State Fair in Salem from August 27 to Sept 6. See details at: [2021 Oregon State Fair – Oregon State Beekeepers Association (orsba.org)t]

We look forward to finally seeing everyone again when we reconvene in September.

Got Bees?

If you are looking for bees at a great price, here is a fantastic opportunity:

Beehives for sale. We are selling two 8 frame Langstroth hives complete with bees. Each hive has one deep, one/two supers, feeders, etc. Both hives for $400. Other 8 frame equipment is also available. If interested, give me a call for details – Stu at 435-729-0575.

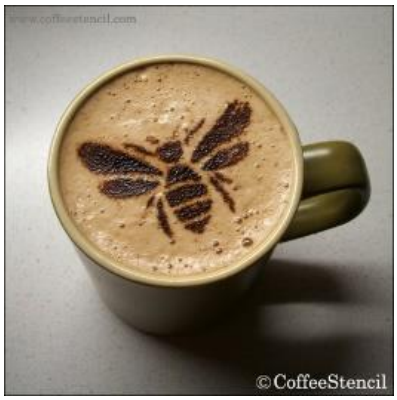
A caffeine buzz helps bees learn to find specific flowers

There's nothing like a shot of espresso when you need to get some studying done -- and now, it seems like bees learn better with a jolt of their favorite caffeine-laced nectar, too. In a paper published July 28 in the journal *Current Biology*, researchers have shown that feeding bumble bees caffeine helps them better remember the smell of a specific flower with nectar inside. While previous studies have shown that bees like caffeine and will more frequently visit caffeinated flowers to get it, this is the first study to show that consuming caffeine in their nest actually helps bees find certain flowers outside of the nest.

"When you give bees caffeine, they don't do anything like fly in loops, but do seem to be more motivated and more efficient," says Sarah Arnold, a researcher at the Natural Resources Institute (NRI) of the University of Greenwich in the UK. "We wanted to see if providing caffeine would help their brains create a positive association between a certain flower odor and a sugar reward."

Choosing the best flower for food isn't as easy as it seems for bees. "It's really quite a challenging environment out there for bumble bees because they don't have extraordinarily sharp vision at long range," Arnold says. "They need to rely on a lot of cues, such as their sense of smell, to find good flowers."

Scientists already know that caffeine, which is found naturally in plants like coffee and citrus, plays a role in converting bees into faithful customers of caffeinated flowers. But previous experiments where bees showed a preference for the smell of flowers with caffeinated nectar have mostly been designed to give bees caffeine at the flower itself. With that setup, it's difficult to pinpoint the role caffeine plays: do caffeinated bees actually have better memories, or do they just crave the caffeine?



To answer this question, Arnold and the team (including researchers from NRI and also NIAB EMR, a horticultural research organization in the UK) decided to instead give the bees caffeine at their nest while they learned to associate a specific smell -- a synthetic odor blend that mimics the scent of a strawberry flower -- with a delicious sugar solution. Importantly, afterwards, when they were sent out to forage for food and chose the strawberry-scented flowers, they would be rewarded with a sugary, but decaffeinated, nectar.

So, postdoctoral researcher Jan-Hendrik Dudenhöffer divided 86 previously untrained bumblebees into three groups. He primed the first group of bees with the strawberry odor and a caffeinated sugar

solution. He gave the second group of bees the strawberry odor and sugar solution -- allowing them to learn the positive association between the two but without the caffeine boost -- and the third group of bees the sugar solution without any linked scent.

Then, he set individual bees loose in a flight arena, where they had to choose between two types of robotic flowers: either flowers with the strawberry odor they were already exposed to, or distractor flowers with another odor.

If they hadn't learned a positive association between the strawberry flower odor and nectar reward, then they'd likely visit the two types of flower equally. However, 70.4% of the caffeinated bees visited the strawberry flowers first -- much higher than chance. In comparison, 60% of the bees given the strawberry odor and sugar but without caffeine, and 44.8% of the bees given only sugar, initially chose the strawberry flowers. This suggests that caffeine did have a noticeable impact in improving the bees' ability to recognize a strawberry flower from its odor and to remember that it has their desired nectar.

However, this preference didn't last long. The caffeinated bees quickly got over their early preference for strawberry flowers and began visiting the other type of flower almost equally too.

"This is something we could have anticipated, because the bees got sugar no matter if they visited the target flower or the distractor flower," says Arnold. "In some ways, they were unlearning just as fast as they were learning."

The researchers also noticed that caffeine had a subtle effect on the bees' "handling speed," or the number of flowers they were visiting in a given amount of time. All bees got faster over time, but the caffeine bees improved the most rapidly, which suggests that caffeine may also improve motor learning skills.

These findings have big implications for agriculture, says Arnold. She points to strawberry farmers, who are likely buying several dozen, or perhaps hundreds, of boxes of commercial bumblebees every year -- many of which may stray toward neighboring wildflowers instead of the intended strawberries. But by teaching the bees to prefer the crop with caffeine, Arnold says, "we leave wildflower resources for the wild bees, and the growers are getting more value for their money spent on the nests. It's a win-win solution for everybody."

Story Source:

Materials provided by **Cell Press**. *Note: Content may be edited for style and length.*

Common insecticide is harmful to bees in any amount

For the average bee, every little bit counts

A new UC Riverside study shows that a type of insecticide made for commercial plant nurseries is harmful to a typical bee even when applied well below the label rate.

The study was published today in the journal Proceedings of the Royal Society B: Biological Sciences.

Chemically similar to nicotine, neonicotinoids are insecticides that protect against plant-consuming insects like aphids, but seriously harm beneficial insects, like bees. They are widely used by commercial growers.

Much research has focused on their use in food crops like canola, in which they are typically applied at low doses. However, this study is one of the few to examine neonicotinoid application in potted ornamental plants, which can represent more potent, acute sources of exposure to the toxin for bees.

"Neonicotinoids are often used on food crops as a seed treatment," explained UCR entomologist and lead study author Jacob Cecala. "But they're usually applied in higher amounts to ornamental plants for aesthetic reasons. The effects are deadly no matter how much the plants are watered."

Cecala said he was surprised by this result, given that neonicotinoids are water soluble. Going into the study, he assumed that more water would dilute the amount of harm they caused the bees. The researchers were also curious whether increased watering could benefit bees despite insecticide exposure by increasing the quantity or quality of nectar offered by the plants.

To test these assumptions, the researchers raised bees on flowering native plants in pots that either received a lot of watering, or a little. Plants were selected based on their popularity at nurseries, drought tolerance to ensure blooming even without much water, and their attractiveness to bees. In addition, half the plants were treated with the insecticide.

Though increased water decreased the pesticide's potency in the nectar of the flowers, the negative effects on bees were still observed.

"Unfortunately, we observed a 90% decrease in the bees' reproduction with both high and low levels of irrigation," Cecala said.

This study is also one of the few to examine neonicotinoid effects via ornamental plants on solitary bees, which make up more than 90% of native bee species in North America, and an even higher percentage in California.

Solitary bees are not bees who have left the hive and are now alone. This is a type of bee that lives alone, does not produce honey, and does not have a queen or live in a hive. Because they do not have a store of honey to protect, they are also not aggressive.

"Solitary bees are more representative of the ecosystem here, and they are potentially more vulnerable to pesticides," said UCR entomologist and study co-author Erin Rankin.

If a worker bee that is social -- like the honeybee -- gets exposed to insecticide and dies, it won't necessarily affect the longevity of the hive. However, if a solitary bee dies, its lineage is cut short.

In this study, the researchers used alfalfa leafcutter bees, which make their nests in tunnels and lay eggs one at a time. They are very similar to California's solitary native bees and are part of a genus that can be found worldwide.

The first time Cecala and Rankin tried this experiment, they used the concentration of insecticide recommended on the product label. All the bees died in a matter of days.

The next time they ran the experiment, they used a third of the recommended dose and still found negative effects on reproduction, the ability of the bees to feed themselves, and overall fitness. "It almost completely wiped them out," Cecala said.

Though this study used a neonicotinoid product formulated for nurseries, formulations of similar products for home gardeners also tend to be highly concentrated.

Plants in nurseries or residential backyards represent a smaller total area than food plant fields like corn or soy. However, high-potency neonicotinoid products can have a big effect even in small areas. In 2013, neonicotinoids applied to flowering trees in a retail parking lot in Oregon caused a massive bumblebee die off, with more than 25,000 found dead.

The researchers recommend that nurseries quantify the amount of pesticides that are making their way into flowers given their watering and pesticide regimes, and consider alternative management practices that reduce harm to bees and the ecosystems dependent on them.

"It's not as simple as 'don't use pesticides' -- sometimes they're necessary," Cecala said. "However, people can look for a different class of insecticide, try to apply them on plants that aren't attractive to bees, or find biological methods of pest control."

Story Source:

Materials provided by **University of California - Riverside**. Original written by Jules Bernstein. Note: Content may be edited for style and length.

City-living bees benefit most from specific types of urban ‘greening’

Study suggests native bees, wasps thrive in large green spaces, flowering prairies

Converting vacant urban lots into greenspaces can reduce blight and improve neighborhoods, and new research shows that certain types of such post-industrial reclamation efforts offer the added bonus of benefiting bees.

Ohio State University researchers studying ways to encourage biodiversity in vacant urban lots found that experimental plots surrounded by 15 or more connected acres of greenspace and flowering prairies containing native plants created conditions most conducive to the conservation of native bees and predatory wasps.

These insects are important for pollination and insect pest control, two ecosystem services that benefit both rural farmland and the growing urban agricultural industry. Estimates suggest Cleveland, Ohio, where the research was conducted, is home to over 200 community farms and gardens.

"Both urban and rural farms require pollinators for efficient crop productivity because bee visitations can enhance crop quality and quantity," said Katie Turo, first author of the study and recent PhD graduate from Ohio State's Department of Entomology.

Optimizing bees' city-living conditions could also help offset threats to their diversity and survival. Bee populations are challenged by a range of stressors -- habitat loss, climate change, pesticides and invasive species -- that "are huge issues that aren't going away anytime soon," said Turo, now a postdoctoral researcher at Rutgers University.

The researchers sought to assess urban "greening" strategies that could support multiple ecosystem services provided by plants and insects, said Mary Gardiner, professor of entomology at Ohio State and senior author of the paper. And the results suggest that while infrequently mowed turf grass used for many urban greening efforts can support insects, some other types of minimally managed greenspaces could offer even more benefits to important native pollinators.

"Even in the middle of the city, bees were using these small patches of habitat," Gardiner said. "This is one of the first times a paper has demonstrated that native bees responded with a reproductive benefit from the establishment of native plantings within a city."

The research is published online in the journal Conservation Biology.

This study of how greenspace quality, size and configuration affected bee and predatory wasp nesting was part of a long-term, large-scale project for which the team designed different vacant lot management styles in eight neighborhoods across Cleveland.

Among 40 of those lots, five greenspace designs were tested for effects on bee and wasp reproduction, with the existing weedy vegetation in lots mowed monthly serving as a control. Experimental treatments included a dense no-mow grass lawn, a flowering lawn of mixed grasses, a prairie of tall native grasses, and a native flowering prairie of grasses and plants.

The researchers assembled a bee and wasp trap nest composed of a series of cardboard straws at each site. Over the three-year study, Turo X-rayed each straw to count the number of larvae inside, and confirmed those counts by observing the emergence of adult bees and wasps in the spring. Of the 17 species identified, 64% were bees.

The analysis showed that a higher abundance of native larvae was associated with the conservation plots surrounded by larger patches of additional urban greenspace -- at least 15 connected acres was ideal -- and more native bee larvae were observed in the flowering prairie.

In addition, native flowering prairies attracted a unique composition of bee and wasp species when compared to the control lots containing natural occurring weedy plants and turf grasses -- a clue that greening urban spaces with native flowering plants could provide an important bee and wasp habitat, Turo said.

The findings could prove useful to the world's estimated 350 "legacy" cities -- former industrial hubs whose landscapes have changed dramatically as a result of lost manufacturing industries and depopulation.

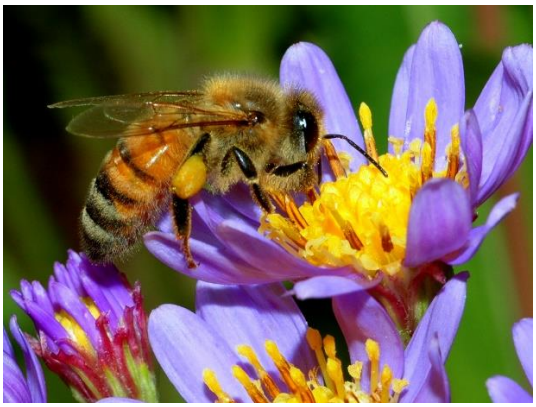
A common solution to these changes has involved demolishing clusters of abandoned buildings and homes and covering over the land left behind with turf grass that needs minimal maintenance. Cleveland, for example, has lost over 50% of its population since the 1950s, leading to demolition of unneeded infrastructure and the creation of almost 4,000 acres of vacant land across 27,000 lots.

There are many community and environmental considerations at play when greening initiatives are proposed in municipalities. Despite the complexities, Gardiner and Turo said their research suggests that thoughtful conservation gives nature a chance to blossom in unexpected settings.

"This work has shown that some proportion of the bees and wasp community will respond to larger patches of greenspace being reinstituted in the landscape, even if they are not the natural habitat that was there pre-development. And I think that's really exciting," Gardiner said.

This work was supported by grants from the National Science Foundation, North Central Sustainable Agriculture Research and Education, and an Ohio State University College of Food, Agricultural and Environmental Sciences SEEDS grant.

*Story source: Materials provided by **Ohio State University**. Original written by Emily Caldwell. Note: Content may be edited for style and length.*



An Israeli company that has created an autonomous pollinating robot has started its first trials in Australia

ABC Rural / By Matt Brann

Real bumblebee on tomato

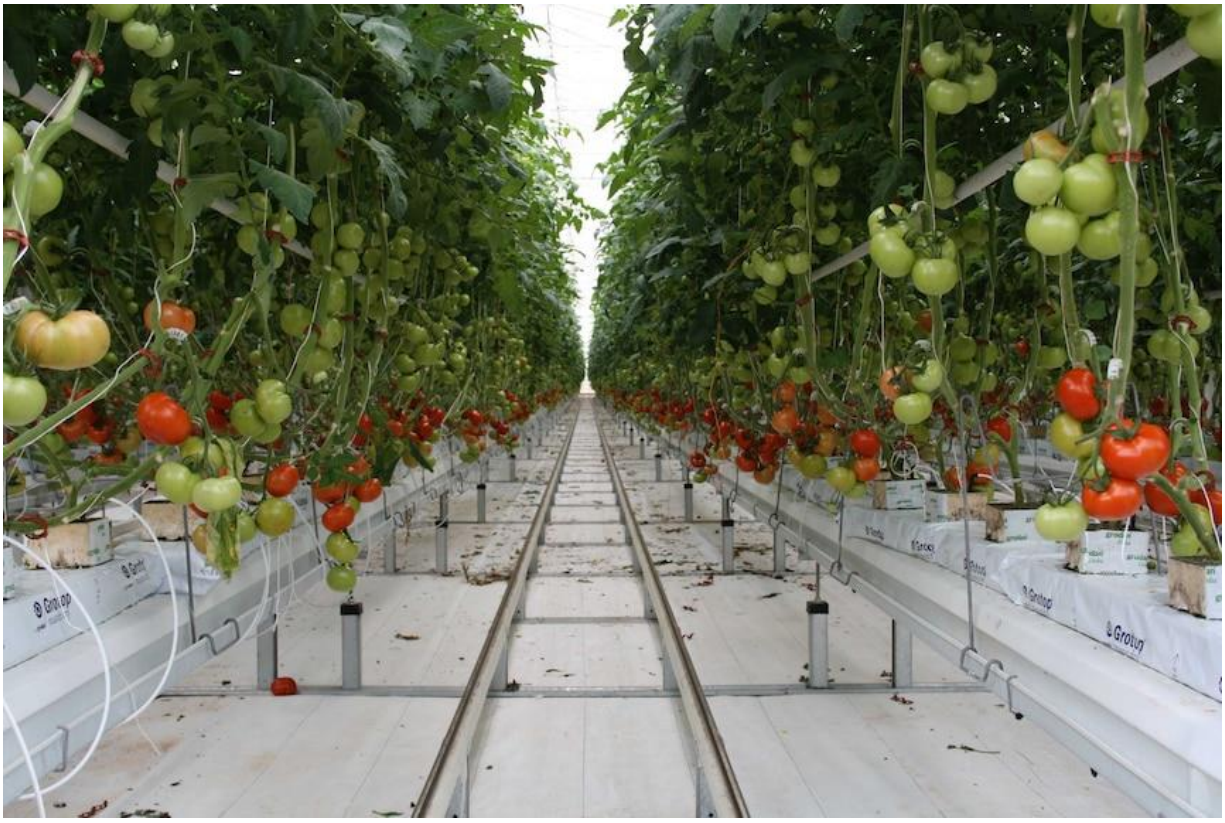
Arugga AI Farming is hoping its technology can transform Australia's greenhouse farming sector, especially greenhouse tomatoes, which are currently pollinated by hand.

Chief executive Iddo Geltner said after successful trials in Israel, the company had targeted Australia because it did not have bumblebees.

"Around the world, pollination in greenhouses is typically performed using commercially produced bumblebee hives, but these bees don't pollinate well in certain conditions, and they're actually banned in Australia," he told ABC Rural.

"So we've managed to design a robot that pollinates greenhouse tomatoes.

"It autonomously drives along the rows, finds flowers that are ready for pollination using artificial intelligence, and sends air pulses to vibrate the flowers in a very specific manner to imitate buzz pollination as performed by bumblebees."



The majority of tomatoes produced in Australia are grown in greenhouses.

Arugga's pollinating robot is being tested at Costa Group's multi-million-dollar greenhouse facility in Guyra, New South Wales.

Mr Geltner said the company would focus initially on pollinating tomatoes but was also looking at opportunities to improve yields for other greenhouse crops.

"The greenhouse sector is huge and growing around the world at a steady pace of more than 5 per cent a year," he said.

"As far as we know, greenhouse farming is the fastest growing [agricultural] sector in Australia, so we've started with Costa in Guyra, but later on will look to work with other growers."

Industry ripe for innovation

Jonathan Eccles from Protected Cropping Australia said the greenhouse tomato industry was worth around $900 million a year in Australia and continued to expand.

He said any innovation to improve pollination would be welcomed by the industry.

"We don't have [bumblebees] in mainland Australia, so we have to use alternative ways and that's by manually pollinating the tomato flowers using a vibrating wand," he said.

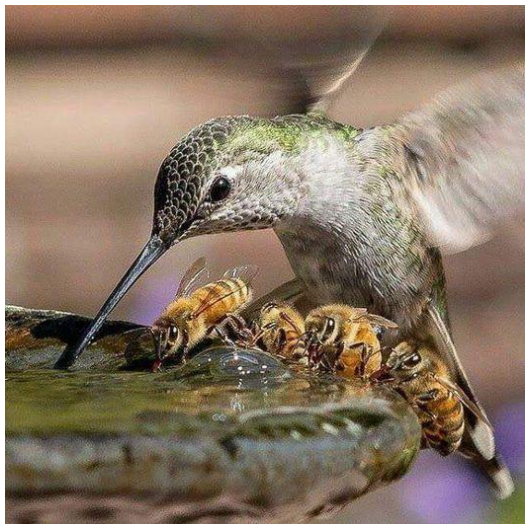
"So someone has to go around every few days and touch the stem of the tomato, vibrate them and shake the pollen onto the stigma of the flower.

"So it's very labour intensive and probably adds about $25,000 a hectare to the production of greenhouse tomatoes."

He said researchers had been investigating the potential of other bees for pollination, particularly native bees, but felt the industry was ripe for some innovation.

"Robotics in greenhouses is certainly an exciting development, because with the high cost of labour in this country, manually pollinating is expensive.

"With the challenges we've got pollinating using the methods we use now through the vibrating wand, if we can find another method, like a robot, that's effective and doesn't do any damage to the flowers, that would be a great innovation."



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