CENTRAL COAST BEEKEEPERS NEWSLETTER

September 2020

ISSUE NUMBER 53

NEXT MEETING SEPYEMBER 23, 2020

Please join us for the September Zoom meeting of the Central Coast Beekeepers at 6 pm on September 23rd. We will be joined by Ellen Topitzhofer from the OSU Bee Lab who will be sharing the latest information on brood diseases. Zoom sign in information is below:

Topic: Central Coast Beekeepers Zoom Meeting

Time: Sep 23, 2020 06:00 PM Pacific Time (US and Canada)

Join Zoom Meeting

https://us02web.zoom.us/j/87524700805?pwd=ajEvdXBLOUtqMVcwbUZRcGhMQXJQdz09

Meeting ID: 875 2470 0805

Passcode: 636935

One tap mobile

+16699006833,,87524700805#,,,,,,0#,,636935# US (San Jose)

+12532158782,,87524700805#,,,,,,0#,,636935# US (Tacoma)

Dial by your location

+1 669 900 6833 US (San Jose)

+1 253 215 8782 US (Tacoma)

Meeting ID: 875 2470 0805

Passcode: 636935

Find your local number: https://us02web.zoom.us/u/kcZoi3uzFS

PRESIDENT'S MESSAGE

By Becca Fain

Well our bees must be getting pretty tired of all the smoke. I wonder if they think we've gone crazy with our smokers or if they sense something larger at play. I noticed that they seemed to be flying more once the air began to clear a bit in the Florence area. Have my fingers crossed for a good rain to both clear out the smoke from the air as well as to help with fire suppression.

As you can see from the above notice, we have an excellent session scheduled for September. With all the issues regarding foulbrood in Oregon this year, it is important that we are aware of what it is, what it looks like and what we can do if our hives get infected. There are also several other brood diseases that can effect the success of our hives and this session will provide the opportunity for you to get ahead of the game and help you to prepare for a strong spring.

Our own club member, Kathy Cope, has designed a club patch which you can proudly wear on your bee suit, hat or a jacket. It looks like this:

The 2 inch by 3 inch patch is $10 and if you are interested in owning one (or more), please respond to the club's email address to place your order – centralcoastbeekeepers@gmail.com.

You will see a proposed agenda for this year's planned on-line Oregon State Beekeepers conference. Clearly an in-person meeting in Florence isn't possible this year, but will hopefully happen in 2021. As you can see, there are some excellent presentations planned and the conference is spread over several days so you will not get too fatigued watching on-line. As soon as registration information is available, we will forward it to you.

Bee Reading

By John Sumpter

I have 3 books available to the club members. "Queenspotting" by Hilary Kearney is a great way to hone your skills for finding queens in our hives. There are 48-fold-out pages ranging from easy to hard to practice locating the queen. I like the way the lady thinks and I'm sure others will enjoy her book also.

"The Sacred Queen" by Hilda Ransome is a tale of how the honey bee was viewed and revered in ancient times. This treatise describes the history and lore surrounding beekeeping with requisite observations and the strange conclusions propagated as fact.

"Beekeeping at Buckfast Abby" by Brother Adam gives a view of the operation and processes used to make the Buckfast bee famous. The text was compiled and written during and after the invasion of the "The Isle of Wight disease" that hit the English bee colonies.

CCBA members: Let me know which book you want and we'll make arrangements to get it to you- mail or something else. Respond to this email with the word ”Books” in the title.

August Meeting

In August, we had our first masked, in-person, and physically distanced meeting of 2020. Jim Parrish gave an informative demonstration on honey extraction and Rick Olson gave an in-hive assessment focused on preparing for fall/winter. We all learned a lot and a big thank you to Stu Willason and Britte Kirsch for hosting the meeting and sharing a tour of their lovely garden and apiary.

Jim showing Becca the extractor.

OSBA 2020 Fall Conference Tentative Agenda

*Plan now to attend the first-ever **online** OSBA Fall Conference!*

We are all finding new ways of doing things as we continue to learn about honey bees and other pollinators—and how we are able to support them. Approaching 100 years of service in research and education, OSBA joins the movement of conferences throughout the country into the virtual realm in 2020. As events are finalized, we will provide complete **instructions** for signing on as well as hold a **practice session** ahead of time to familiarize us all with the process. Joe Maresh and the conference committee continue to work out details, yet the overall structure for the substance of the meeting appears in the **tentative agenda** that follows. Additional **information** and **updates** will be posted at orsba.org as they become available, and OSBA members with an email address will receive a notification when **registration** opens. Tentative times listed for presentations indicate the approximate start time; please note that presentations will vary in length. Forthcoming materials will provide clarification as well as relay specifics about the **silent auction**, the **honey show** with its photo contests this year, and the **OSU Honey Bee Lab**.

Saturday, October 24

8:45 AM Opening Announcements | Silent Auction Begins

9:00 AM A Tough Nut To Crack: Pollination Requirements of Self-Fertile Almond Varieties
Elina L. Niño, University of California, Davis

10:00 AM Sugar Water Is Not Honey: Making a Better Bee Feed.
Nick Naeger, Washington State University

11:00 AM *Demonstration*: Encaustic Painting
George Hansen, Foothills Honey Company

NOON *Break*

1 PM OSBA General Membership Meeting

Sunday, October 25

9:00 AM Pollen Trapping: What You Should Be Thinking About Before You Start
Shelley Hoover, University of Lethbridge, Alberta, Canada

10:00 AM Life of a Canadian Beekeeper
Ian Steppler, Steppler Farms Ltd

1100 AM Updates on Bee Nutrition Research from the OSU Honey Bee Lab
Priyadarshini Chakrabarti Basu, Oregon State University

NOON *Break*

1:00 PM *Demonstration*: TBA

Wednesday, October 28

7:00 PM Update from UC Davis E. L. Niño Bee Lab
Elina L. Niño, University of California, Davis

8:00 PM Promoting a Sweet Industry through the American Honey Queen Program and ABF
Mary Reisinger, 2020 American Honey Queen

8:30 PM *Demonstration*: Honey Show Judging
Marjie Ehry, Happy Bee

Wednesday, November 4

7:00 PM Are Honey Bees Like Chickens and Bumble Bees Like Polar Bears?
Andony Melathopoulos, Oregon State University

8:00 PM Report on Current Research Funded by Project Apis m.
George Hansen, Foothills Honey Company

9:00 PM *Demonstration*: TBA

Wednesday, November 11

7:00 PM Raising Quality Queens in Pollination
Shelley Hoover, University of Lethbridge, Alberta, Canada

8:00 PM Pesticide Exposure in Context
Emily Carlson, Oregon State University

8:30 PM Evaluating Altruistic Behaviors in Honey Bees (*Apis mellifera* L.) Infected with Gut Microsporidian *Nosema ceranae*
Ellie Chapkin, Oregon State University

9:00 PM *Demonstration*: TBA

Saturday, November 14

9:00 AM Varroa and Pesticides Research Update from OSU Honey Bee Lab | Ramesh Sagili, Oregon State University

10:00 AM Using Fungal Spores To Kill Varroa
Nick Naeger, Washington State University

11:00 AM *Panel*: Current & Future Outlook on Varroa Mite Control | Ellen Topitzhofer, Oregon State University
Todd Balsiger, Hood To Coast Honey
Matt Hansen, Foothills Honey Company
Jan Lohman, Vazza Farms, Inc (retired)
Ramesh Sagili, Oregon State University

NOON Donations To OSU Honey Bee Lab, Announcements, and Closing

Ready. Set. ***Save the Dates.***

We look forward to seeing you online—and hope to meet in person again in 2021!

Best Sugar for Bees

by Dr. Dewey M. Caron

To feed bees or not to feed bees? If you read Jeremy Barnes' letter to the editor in the September 2020 American Bee Journal, you might wish to hit the pause button. Jeremy summarizes studies involving feeding sugar syrup to bees confined in cages in the lab. Worker-bees fed sugar syrup do not live as long as compared to bees fed honey. The different pH in sugar may disrupt the normal gut microflora and the pure sugar diet might overwhelm body functions evolved for nectar. Also, the bees fed sugar syrup may have different genes activated or not activated when fed sugar syrup compared to bees fed honey. Whew - those could be significant changes!

However, we need toask the question “how much do studies of bees in cages in labs necessarily tell us about the bees we maintain in our colonies? “
Is it necessarily harmful for beekeepers to supplement the bee diet with a processed food?

Bees only eat processed food. Bees depend on sugar for energy. The nectar bees collect is a complex mixture of the sugar sucrose, smaller amounts of other plant sugars along with even smaller amounts of vitamins, minerals, plant polysterols, enzymes, colorants, and chemicals unique to the plant. Sugar and nectar must be broken into the two simple sugars of glucose and fructose by the enzyme sucrase before use. This is the processed food honey. By definition “ honey is flower nectar or the secretions of living parts of plants or honeydew (excretions of plantsucking insects) that is deposited, dehydrated and stored in honeycomb.” [Language of proposed Food Chemicals Codex Identity Standard]. At the cellular level sugar source is immate rial. When we husband animals or keep animals as pets we need to be prepared to properly care for them, even those that range freely. We feed sugar syrup to stimulate and to allow continued growth during dearth or changing environmentalconditions and now most of us are feeding heavy sugar syrup to promote successful overwintering. We have a long history of feeding our bees sugar with no apparent ill effects. Though some may disagree, feeding sugar is reasonable bee stewardship. We have to be extremelycautious feeding bees incomplet ely processed sugars, or those with significant additions. The sugar substitutes are potentially toxic and not sweet to bees. However, we also have to be sure the sugars with fructose have not been improperly heated or stored because of the possibility of the buildup of hydroxymeth ylfurfural (HMF), a sugar toxic to bees and humans. Bees and our diet can only tolerate small amounts of HMF. White granulated table sugar is probably the purest, cleanest food in your home! It is completely digestible by honey beeswith no residue, an important factor when we feed it during the winter. Sucrose is stable; it does not decompose. Kept dry it will last for cou ntless years. When we mix it with water its breakdown by sucrase creates water as by product, meaning if we feed it during winter we might add to colony moisture stress. To avoid this we can feed the granulated(crystalized) sugar as a solid on top of the inner cover or in a top feeder. Better yet, we can solidify it into a sugar candy.A quick recipe is 10 pounds of white granulated sugar to 8 ounces of water. Let it dry overnight in a container to harden and

then put over the colony. Warm moist metabolic water that escapes the winter cluster makes a slurry of the candy so bees can feed on it. Invert sugar, used by commercial bakeries, is made via acid hydrolysis or enzymatically. Beekeepers make invert sugar, called fon dant, by boiling a solution of sucrose and water. Recipes are available from numerous sources.

Bakers Drivert sugar fed dry is a good winter choice. It has been further milled to a finer crustal size. The small amount of fructose keeps it from caking but is not enough to lead to buildup of HMF. It is harder to obtain since only some 3% of the total sugar market is drivert. This is the sugar bakeries use for fillings and frostings. Honey does contain fructose, but as stored in the hive by the bees contains little HMF. Tropical honey has higher HMF content. However, repeated heating or storing at high temperatures increases the amount of HMF. Leftat room temperature for a very long time HMF will increase. but still remain low. The very small amounts of color and flavor compounds in nectar are not in toxic qu antities in the finished honey.

Recently deceased Bee Culture columnist, Ann Harman, stated in one of her articles that

“A wellfed bee is a happy, hardworking bee.,,. Feed if necessary. Your bees will appreciate that attention”. We will miss her solid advice each month in Bee Culture. May she Rest in Peace.

A Honeybee's Tongue Is More Swiss Army Knife Than Ladle

Once again, insects prove to be more complicated than scientists thought they were.

Researchers found that bees' tongues are so sensitive to the viscosity of nectar that "they switch at the exact point you would expect, to get the best reward for the energy invested."Credit...Jiangkun Wei

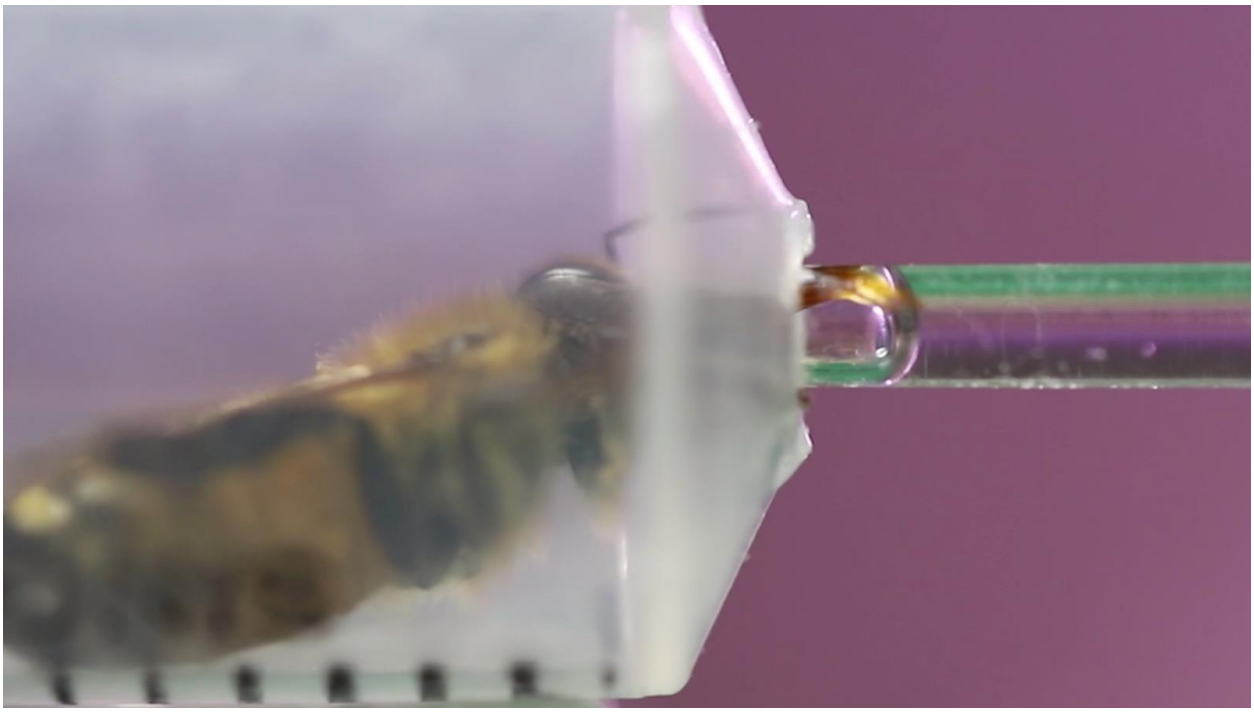
By James Gorman

- Aug. 11, 2020

For a century, scientists have known how honeybees drink nectar. They lap it up.

They don't lap like cats or dogs, videos of whose mesmerizing drinking habits have been one of the great rewards of high speed video. But they do dip their hairy tongues rapidly in and out of syrupy nectar to draw it up into their mouth. For the last century or so, scientists have been convinced that this is the only way they drink nectar.

Video



A honeybee laps a solution with 50 percent nectar. Video by Wu et al.

Scientists have now discovered bees can also suck nectar, which is more efficient when the sugar content is lower and the nectar is less viscous. High-speed video of bees drinking a nectar substitute in a lab shows that not only do honeybees have this unexpected ability, they can go back and forth from one drinking mode to another. Jianing Wu, an engineering and biophysics specialist, at Sun Yat-sen University in Guangzhou, China, and the senior researcher on the experiment, said that while honeybees excel at feeding on highly concentrated nectar, "we find that they can also flexibly switch the feeding strategy from lapping to suction." He and his colleagues reported the results on Wednesday in the journal Biology Letters.

Video

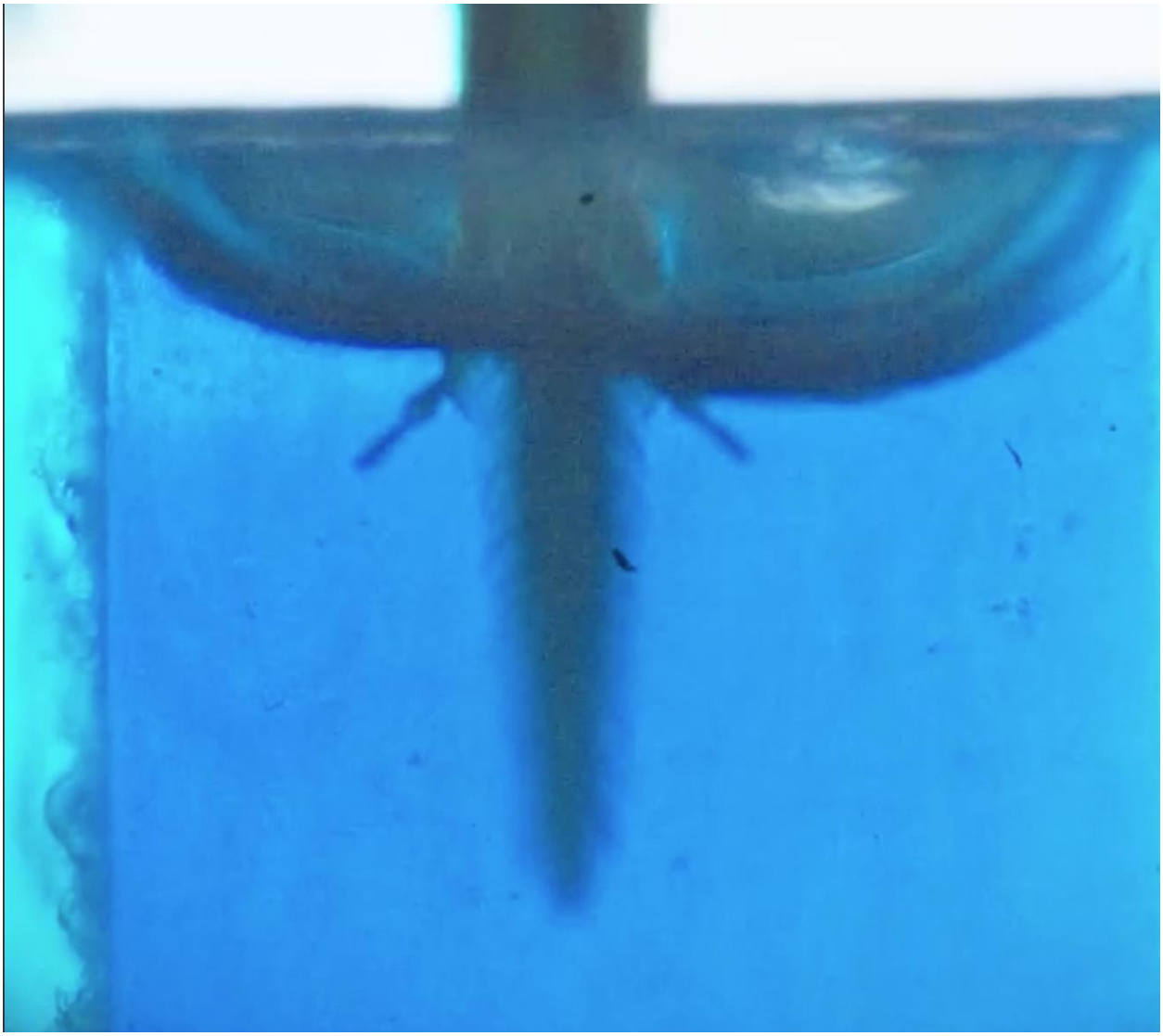
David Hu, a professor at the Georgia Institute of Technology, who supervised some of Dr. Wu's earlier research but was not involved in this experiment, said: "We thought that insects' mouths were like tools in your kitchen drawer (straw, fork, spoon), e.g., with single uses."

"Wu showed that honeybee tongues are like a Swiss army knife, able to efficiently drink many type of nectar," Dr. Hu said.

Alejandro Rico-Guevara, who runs the Behavioral Ecophysics Lab at the University of Washington, Seattle and studies nectar feeding in birds, also worked on the project. He said this flexibility in nectar drinking behavior means that although bees prefer the more syrupy nectars, they can efficiently feed from flowers whose nectar is more watery.

“This has implications at many different scales, from pollination, for our food, all the way to the role they have in natural ecosystems,” he said.

What Dr. Rico-Guevara found most interesting was that the bees are so sensitive to the viscosity of the nectar that “they switch at the exact point you would expect, to get the best reward for the energy invested.”
The honeybee tongue is adapted perfectly to lapping syrupy nectars. Once the tongue is dipped into thick nectars, Dr. Wu explained, “approximately 10,000 bristles covering the tongue erect simultaneously at a certain angle for trapping the nectar.” The bee then pulls its tongue back into its proboscis, which is really a part of its mouth, and a pumping mechanism in the head sucks the nectar off the tongue.
Video



A slowed-down video shows how the bee tongue deploys its bristles as it laps up nectar. Video by Wu et al.

When the viscosity changes so that the nectar is less thick, the bees let their tongues stay in the nectar and sucked it up into their mouths, apparently using the same pumping mechanism.

Dr. Hu said, “The result makes perfect sense because honeybees are already known as generalists.” They are not limited to feeding on only one type of flower like some other species of bee.

The bees have been flexible all along. It was the scientists who were stuck on one idea.

Mel Gibson Threatened to Sue

A single mother in Chile began selling organic honey from home during quarantine, using the actor’s name as a play on words. His lawyer was not amused.

By Ernesto Londoño

Published Aug. 17, 2020Updated Aug. 18, 2020, 9:27 a.m. ET

It was a venture born of desperation.

Four months into quarantine, Yohana Agurto, an unemployed teacher in Chile, was scrolling through social media to take her mind off her dwindling savings and the four children she had to feed.

Inspiration struck when she and her boyfriend came across a post with a photo of the American actor Mel Gibson.

Ms. Agurto remembered she had a large stash of organic honey in the pantry. Mel sounds quite similar to the Spanish word for honey, miel. So on a whim, Ms. Agurto had a graphic designer friend sketch out a logo with an iconic scene from the movie “Braveheart,” printed a handful at home and glued them onto glass jars.

That was the origin of Miel Gibson, the tiniest and scrappiest of businesses, which catered, according to the label, “Only to the brave.”

She advertised on social media and by word of mouth, picking up enough orders to keep her reasonably busy and the family’s bills paid. Then last week a most unwelcome email popped into Ms. Agurto’s inbox with the subject line: “Cease and Desist/Miel Gibson.”

“We are counsel to Mel Gibson,” said the letter, which was sent by a Los Angeles attorney whose firm represents several celebrities. “It has come to my attention that you are illegally using Mr. Gibson’s name and/or likeness and/or biography to market or sell honey products.”

At first Ms. Agurto entertained the possibility the whole thing could be a cruel joke, but when it became clear it was a real legal threat, she panicked.

“I realized I was up against Goliath,” she said in an interview.

Some friends told Ms. Agurto she should ignore the letter, arguing that no American lawyer would waste time shutting down a woman selling honey from her home in Chile’s capital during a pandemic.

But others warned her that Americans are tremendously litigious, Ms. Agurto said, which led her to delete the email account she had created for the business, hoping the whole thing would go away.

“I was terribly anguished,” Ms. Agurto, 40, said in an interview. “I thought I could end up facing fines. What would happen to my family, to my finances? I’m a single mother of four and they depend on me.”

Chile’s quarantine has been among the longest and strictest in the world, and the country is still reeling from one of the highest per capita rates of infection. The government recently authorized Chileans to dip into their pension plans early to provide a lifeline to millions who are struggling to make ends meet as several sectors of the economy remain paralyzed.

After a couple sleepless nights, Ms. Agurto decided she had invested too much time and effort in her artisanal honey brand to simply shut it down. She reflected on how much she admired William Wallace, the Scottish warrior Mel Gibson played in “Braveheart,” and decided to go public about the legal threat.

Her plight got plenty of sympathetic press coverage in Chile and beyond, free legal advice and a torrent of new orders. On Monday, Ms. Agurto said messages from would-be customers were streaming in by text message and on her social media accounts faster than she could read them.

The bulk sellers where she gets her honey are nearly out of stock.

“I’m sleeping three hours a night,” she said. “I have hundreds of messages I haven’t responded to.”

María José Arancibia, a lawyer in Chile who represents Ms. Agurto, said she had reached out to the actor’s attorney, hoping to negotiate a compromise. Ms. Arancibia said Miel Gibson intends to keep its name but plans to lose the actor’s image from the label.

Businesses and celebrities routinely send cease-and-desist letters to people who are profiting from copyrighted images, names and logos without authorization. Mr. Gibson’s lawyer, Leigh Brecheen, said that her client is not seeking to put Ms. Agurto out of business.

“None of this is meant to prevent anyone from earning an income or creating a business,” she said in an emailed statement. “But there are proper channels to contact and clearances you need to go through to make sure you have the approval for such usage.”

Regardless of how the matter gets resolved, Ms. Agurto said she would love to send a courtesy sample of Miel Gibson to Mel Gibson. She wants him to know, she added, that the ordeal has not made her any less of a fan.

“My motivation was not to profit by using the image of a famous person,” she said. “I was selling honey to survive.”

Scientists at UBC are unravelling the mysteries behind a persistent problem in commercial beekeeping that is one of the leading causes of colony mortality -- queen bee failure.

This occurs when the queen fails to produce enough fertilized eggs to maintain the hive, and is regularly cited by the Canadian Association of Professional Apiarists as one of the top causes of colony mortality.

In recent research outlined in BMC Genomics, University of British Columbia and North Carolina State University researchers identified specific proteins that are activated in queen bees under different stressful conditions: extreme heat, extreme cold, and pesticide exposure -- conditions that can affect the viability of the sperm stored in the honey bee queen's body. If the queen does not have enough live sperm to produce enough fertilized eggs to maintain its population of worker bees, the colony will eventually die out.

Scientists then measured the levels of these markers in a collection of queens in B.C. that had failed in the field, and found that they had higher levels of heat-shock and pesticide protein markers compared to healthy queens. The results pave the way for a future diagnostic test to help beekeepers understand, and prevent, queen bee failure in the future.

"Currently, there isn't any method to actually figure out why the queen has failed in a colony, and that's important because there are quite a few different ways that that could happen," said lead author Alison McAfee, a biochemist at the Michael Smith Labs at UBC and postdoctoral fellow at NC State. "This is a very understudied area."

Previous research conducted by McAfee and her colleagues determined that queens are safest when kept between 15 and 38 degrees Celsius, and identified five protein markers associated with heat-shock in queens. Now, McAfee has confirmed the two most identifiable biomarkers for heat-shock, along with two protein markers useful for detecting cold-shock, and two associated with sublethal levels of pesticides. The findings open the door to testing that will provide beekeepers with information needed to ensure the long-term viability of their hives.

"We want to develop a diagnostic test that we can do on a failed queen, which can provide the beekeeper with information on what happened to her in the past that made her fail now," explained McAfee. "If we can do that reliably, then then the beekeeper could do more to try to prevent that from happening in the future."

Currently, beekeepers simply toss away a failed queen. In the future, said McAfee, "they could ship her to a lab, which would measure the abundance of all these different markers and send a report with information on the likelihood of her being stressed by cause X, Y and Z."

When it came to failed queens from the field in B.C., the researchers were surprised to find elevated markers associated with heat stress and, to a lesser extent, pesticide exposure.

"We didn't have any reason to believe that these queens were heat shocked," said McAfee. "A substantial number of them had elevated levels of those particular markers, which could mean that there is a lot more temperature stress going on out there than we would expect. It could also be that those markers also become elevated due to other kinds of stresses that we haven't looked at yet."

The effect of extreme temperatures on queen bees is a large concern for Canadian beekeepers who import 250,000 queen bees every year, primarily from Australia, New Zealand, and the U.S. Hours spent in the cargo holds of airplanes and warehouses can subject the queens to large fluctuations in temperature during their journey -- something McAfee has investigated in past work.

"Every time we put temperature loggers in queen shipments, we have at least some of the shipments coming back is being outside of that Goldilocks zone between 15 and 38 degrees, so I think that happens more frequently than we have been aware of," she said. "There are no rules for shipping queens, such as including temperature loggers in their shipments. Producers just ship them via whatever courier they choose, and beekeepers are at the mercy of the shipper for handling the package properly."

Story Source:

Materials provided by **University of British Columbia**. Note: Content may be edited for style and length.

A Molecule in Honeybee Venom Destroys Breast Cancer Cells in The Lab, Study Shows

TESSA KOUMOUNDOUROS

2 SEPTEMBER 2020

While many of us have experienced painful encounters with the pointy end of a honeybee, their weapons could be more than just a nuisance. A new lab study shows that a molecule found in bee venom can suppress the growth of particularly nasty cancer cells.

The study focussed on certain subtypes of breast cancer, including triple-negative breast cancer (TNBC), which is an extremely aggressive condition with limited treatment options.

TNBC accounts for up to 15 percent of all breast cancers. In many cases, its cells produce more of a molecule called EGFR than seen in normal cells. Previous attempts to develop treatments that specifically target this molecule have not worked, because they would also negatively affect healthy cells.

Honeybee (Apis mellifera) venom has shown potential in other medical therapies such as treating eczema, and has been known to have anti-tumour properties for some time now, including melanoma. But how it works against tumours at a molecular level isn't fully understood. Now, we've taken a huge step closer to the answer.

Bees actually use melittin - the molecule that makes up half of their venom and makes their stings really hecking painful - to fight off their own pathogens. The insects produce this peptide not just in their venom, but in other tissues too, where it's expressed in response to infections.

With their sights on this powerful molecule, researchers subjected lab-grown cancer cells and normal cells to honeybee venom from Ireland, England, and Australia, and to bumblebee (Bombus terrestris) venom from England.

They found bumblebee venom - which doesn't contain melittin, but has other potential cell-killers - had little effect on breast cancer cells, but the honeybee venom from all locations did make a difference.

"The venom was extremely potent," said medical researcher Ciara Duffy from The Harry Perkins Institute of Medical Research. "We found that melittin can completely destroy cancer cell membranes within 60 minutes."

When melittin was blocked with an antibody, the cancer cells exposed to the bee venom survived - showing that melittin was indeed the venom component responsible for the results in the earlier trials.

The best part: melittin had little impact on normal cells, specifically targeting cells that produced a lot of EGFR and HER2 (another molecule excessively produced by some breast cancer types); it even messed with the cancer cells' ability to replicate.

"This study demonstrates how melittin interferes with signalling pathways within breast cancer cells to reduce cell replication," said Western Australia's Chief Scientist Peter Klinken, who was not involved in this study.

Taking their conclusions even further, the research team also produced a synthetic version of melittin, to see how it would perform compared to the real deal.

"We found that the synthetic product mirrored the majority of the anti-cancer effects of honeybee venom," Duffy said.

Duffy and her team then tested the action of melittin paired with chemotherapy drugs in mice. The experimental treatment reduced the levels of a molecule the cancer cells use to evade detection by the immune system.

"We found that melittin can be used with small molecules or chemotherapies, such as docetaxel, to treat highly aggressive types of breast cancer," Duffy explained. "The combination of melittin and docetaxel was extremely efficient in reducing tumour growth in mice."

Over-expression of EGFR and HER2 is also seen in other types of cancers, like lung cancer, and these results suggest they might be potential targets for melittin, too.

Of course, plenty of things can kill a cancer cell in a petri dish, and the researchers caution that there's still a long way to go before this bee venom molecule could potentially be used as a treatment in humans.

"Future studies to formally assess toxicities and maximum tolerated doses of these peptides will be required prior to human trials," they wrote in their paper.

But this formidable insect weapon provides another incredible example of chemicals found in nature that could turn out to be useful for human diseases as well. However, we must remember that - like so many other creatures - honeybees are facing significant health threats of their own.

This research was published in *Nature Precision Oncology*.

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