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Separate questionnaires are available for small-scale and commercial beekeepers.

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POPULAR SCIENCE

Beehives are the honeypot for a city's

microbial secrets

What pathogens are lurking on city streets? Follow the honeybee's trail to find out.

By Jocelyn Solis-Moreira | Published Mar 31, 2023 4:36 PM EDT



The waste honeybees discard in their hives could hold valuable insight into the public health of our cities. In a study published this week in <u>the journal Environmental Microbiome</u>, scientists shared a new method for collecting microbial information from the environment using honeybee debris. Identifying germs in a city gives researchers a snapshot of the diversity of <u>a</u> <u>city's microbiome</u>, which could lead to better health outcomes. The technique might also help in surveilling illness-causing bacteria and viruses among bees and humans.

While we can't see microorganisms, they play a critical behind-the-scenes role in shaping our survival. For example, microbes in the human gut support digestion, help keep our immune system healthy, and are the first line of defense from "bad" bacteria that cause food poisoning and other infections. Typically, the more diverse a person microbiome, the greater their health and well-being. One way to increase said variety is interacting with outside surroundings.

"A lot of [microbes] are beneficial to human health," says lead study author <u>Elizabeth Hénaff</u>, an assistant professor at the center for urban science and progress at New York University. "The goal of this study is understanding the whole breadth of diversity of microbiomes and the ones we're interacting with in urban environments."

Hénaff and her colleagues knew they wanted to create microbial maps of different cities to get a better sense of the diversity in each area. However, they weren't sure what was the best way to move forward. One idea was swabbing noses, but it would be impractical to swab everyone in a broad and diverse area. The urban microbiomes might also differ from block to block, requiring extensive swabbing. Another option was <u>wastewater surveillance</u>, but the researchers wanted to look at everything urbanites came into contact with—not just what they digested. Then came the aha moment: they could study bee hives.

Because honeybees constantly interact with the environment when they forage for nectar, and they often carry back some bacteria, fungi, and other microorganisms from their travels when they return to the hive. "As bees are foraging, they're traversing all of these microbial clouds related to other aspects of the built environment," explains Hénaff. "They've traversed the microbial cloud of a pond, a body of water, and groups of human beings if they happen to be in the same park where they're going."

The scientists used a technique called <u>metagenomic sequencing</u> to study all the genes found in a single environmental sample. This allowed them to match genes to different microbial species related to hive health and, in turn, learn the health status of the bees. But first they had to figure out what sample should be collected from the hive.

In a pilot project in Brooklyn, New York, the scientists worked with local beekeepers. They took swab samples of honey, propolis (a resin-like material used to cover the inside of hives), debris, and bee carcasses—anything that could provide the most information on microorganisms.

Subsequently, they discovered that the microbes found in honey and propolis were similar across hives. "Bees are really good at controlling the microbial environment of their own beehives," adds Hénaff. The only material that differed from hive to hive was the debris left at the bottom of the hive, and this became the source they collected in the next set of experiments.

To profile urban microbiomes, the team took samples of debris from 17 tended hives from four cities across the world: Sydney and Melbourne in Australia, Tokyo, and Venice. The DNA extracted from the bee debris contained material from different sources, including plants, mammals, insects, bacteria, and fungi in the area.

Each city carried a unique microbial profile that gave a snapshot of how life is like there. The single Venice hive used in the study was filled with wood-rotting fungi. Hénaff says the findings makes sense since most buildings are built on submerged wood pilings. In Australia, the two Melbourne hives had large amounts of eucalyptus DNA, while Sydney's revealed high levels of a bacterium called Gordonia polyisoprenivorans, that breaks down rubber. Tokyo's dozen hives displayed genetic hints of lotus and wild soybean—a common plant found in Eastern Asia. There were also high levels of <u>a soy sauce fermenting yeast</u> called Zygosaccharomyces rouxii.

"Most interesting to me was that [the results] didn't feel like a disjoint metric from all the other things we know about these cities and their culture, but it actually felt like a puzzle piece we didn't know existed that fit into our general understanding of these cities," says Hénaff. The debris were also helpful in identifying microbes involved in bee health. The team found three honeybee crop microbial species—Lactobacillus kunkeii, Saccharibacter sp. AM169, and Frishella perrara—along with five species related to the insects' gut health. Three honeybee pathogens were also identified across cities.

Next, the study identified the human pathogens bees could pick up when venturing outside. The researchers focused on the hive information collected in Tokyo because it had more hives than the other cities, and so had more data for DNA sequencing. They detected two bacteria: one that could cause bacillary dysentery and another involved in cat scratch fever. They then took the pathogen behind cat scratch fever, Rickettsia felis, and reconstructed the genome. Doing so allowed them to not only confirm the species was in the city, but that it had the bacteria-associated molecules to allow it to spread disease.

Jay Evans, a research entomologist at the US Department of Agriculture who was not involved in the study, says the new approach is "fine" and can help in identifying at least the microorganisms found in urban floral environments. However, he expressed reservations about overvaluing some results. Evans notes that one of the species genome-mapping algorithms used in the study is known to be "a bit greedy," matching the best microorganism available at the moment. This suggests some genetic matchups to bacteria may not actually be the right fit, and that further tests would be needed to confirm their presence. Because bees can pick up non-living hitchhikers like pesticides, Evans also says it would be nice for the researchers to contrast these biological results with <u>pesticide-specific studies</u> and how that affects hive microbiomes.

https://www.popsci.com/environment/honey-bee-hives-city-microbiome/

copa cogeca european farmers Ref. COMM(23)01788[1] 23/03/2023 Press Release

The EU market is flooded with syrupbased "honey": finally putting a figure on foul play!

Today, the European Commission published two joint reports1 2 on fraudulent practices in imports of honey into the EU. According to investigations, 46% of the collected samples were suspected of being adulterated with added syrups. This dramatic situation has been denounced by Copa and Cogeca for years now. Yet solutions are known and unanimously supported by the sector: it is high time for the EU to act!

Thanks to joint work by DG Sante, JRC and OLAF, the Commission has quantified an alarming reality: of the 320 samples received from competent national authorities, 147 (46%) were suspected of non-compliance with the requirements of the EU Honey Directive. Almost 74% of the Chinese, 93% of the Turkish and 100% of the British honey samples were considered "suspicious"!

1 <u>https://food.ec.europa.eu/safety/eu-agri-food-fraud-network/eu-coordinated-actions/honey-2021-2022_en</u> 2https://joint-research-centre.ec.europa.eu/jrc-news/food-fraud-how-genuine-your-honey-2023-03-23_en https://anti-fraud.ec.europa.eu/media-corner/news/no-sugar-my-honey-olaf-investigates-honey-fraud-2023-03-23_en



Figure 4. Geographical origin of suspicious honey consignments

Source: EU Coordinated action to deter certain fraudulent practices in the honey sector, JRC Technical report

Commenting on the JRC's report, Stanislav Jaš, Chairman of the Copa and Cogeca Honey Working Party said, "The survey clearly shows where problems come from. If almost every second honey product imported into the European Union is adulterated, this means that 20% of all "honey" consumed in the EU is adulterated! If we throw into the mix the fact that "fake honeys" are entering the EU at a cost as low as 1,5€/kg from a relatively small number of countries, one can understand why we are going through a real agricultural disaster in the EU."

The second report by DG Sante contains important conclusions too. The Commission "confirms that a significant part of honey imported from non-EU countries and placed on the EU market is suspected of not complying with the provisions of the EU Honey Directive but goes undetected". The report further outlines that "improved, harmonised and generally accepted analytical methods are still needed to increase the capability of official control laboratories to detect honey adulterated with sugar syrups".



"When will consumers finally know what's really on their spoon? To make this happen, three matters should be resolved at EU level as a priority. Firstly, better labelling of honey blends with an obligation to mention the respective countries of origin with percentage shares in descending order. Secondly, the European Union must update the official methods available to national control authorities for the detection of honey fraud and establish a community reference centre to continuously improve these methods. Lastly, Member States must reinforce controls and systematically check imported honey batches based on those improved methods combined with proof of traceability from hive to pot." added Etienne Bruneau, Vice-Chair of the Working Party.

EU decision makers must act now to avoid the wrecking of the profession, which could lead to a substantial decline of honeybees on the continent. Copa and Cogeca call on DG AGRI for an in-depth revision of the EU Honey Directive in the coming months.

About us - Copa and Cogeca are the united voice of farmers and agri-cooperatives in the EU. Together, we ensure that EU agriculture is sustainable, innovative and competitive, while guaranteeing food security for 500 million people throughout Europe. >>> More information www.copa-cogeca.eu

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ScienceDaily®

Indoor 'queen banking' could help beekeepers deal with changing climate

Keeping queen bees chilled in indoor refrigeration units can make storing them more stable and less labor-intensive

February 27, 2023 Source: Washington State University

Summary: Keeping queen bees chilled in indoor refrigeration units can make the practice of 'queen banking' -- storing excess queens in the spring to supplement hives in the fall -- more stable and less labor-intensive, a study found. It may also help strengthen honey bee survival in the face of a changing climate. In a paper published in the Journal of Apicultural Research, researchers compared queen banks stored in refrigerated units to those stored in the conventional way outdoors and an 'unbanked' control group. They found that the queens stored at cooler temperatures had a higher survival rate and required less maintenance than those stored outdoors.

Keeping queen bees chilled in indoor refrigeration units can make the practice of "queen banking" -- storing excess queens in the spring to supplement hives in the fall -- more stable and less labor-intensive, a Washington State University study found. It may also help strengthen honey bee survival in the face of a changing climate.

In a paper published in the Journal of Apicultural Research, researchers compared queen banks stored in refrigerated units to those stored in the conventional way outdoors and an "unbanked" control group. They found that the queens stored at cooler temperatures had a higher survival rate and required less maintenance than those stored outdoors.

This study, and future potential refinement, could be another piece in the ultimate puzzle of reducing the loss of bee colonies each year, said senior author Brandon Hopkins, an assistant research professor in WSU's Department of Entomology.

"A lot of honey bee losses are queen-quality issues," Hopkins said. "If we have a method that increases the number of queens available or the stability of queens from year to year, then that helps with the number of colonies that survive winter in a healthy state."

In the beekeeping industry, queen producers often "bank" queens over the summer by storing them in small cages. Those small cages are then put into a large colony with many workers to care for the caged queens, with as many as 200 queens per bank. A bank of 100 queens has a value of more than \$5,000, and producers may have 10 to 20 banks on hand.

For this study, the team prepared 18 banks with 50, 100 and 198 queens per bank. The refrigerated banks matched survival of the outside groups, and in the banks of 100, survival was higher, with 78% of queens surviving the six weeks of storage compared to 62% in the outdoor group. The queens in both groups were of the same quality, showing similar good health. The cooled queen banks also needed less maintenance.

Beekeepers need honey bee queens to sustain colonies that pollinate crops, and there's a huge spike in demand for queens in the spring. That's when beekeepers replace their losses from the previous year.

Once queen producers meet that demand, they can't just turn off queen production. Producers

can bank excess queens to help meet the future needs of beekeepers, who often replenish their queen supplies after the summer.

Queens can't be produced in hot temperatures, Hopkins said. Banking keeps an inventory on hand for when demand returns in the fall.

Keeping a supply of queens available for beekeepers to purchase is growing increasingly difficult. The vast majority of U.S. queen producers are based in California, where rising temperatures and wildfires are becoming more common.

"We heard queen producers in California are having a difficult time banking queens when temperatures are over 100 degrees in the summer," said Hopkins. "It's a little scary to be banking 80% of the country's queen supply in a location prone to wildfires, smoke and high temperatures."

Hopkins was surprised by how well the experiment worked, considering the challenges of queen banking.

"It's an art," he said. "There's a significant amount of maintenance, skill and care required: managing, feeding and moving resources around."

The team found that in the refrigeration units, the bees fared well with just food and no human interference.

Hopkins worked on the study with WSU colleagues Anna Webb, Stephen Onayemi, Rae Olsson and Kelly Kulhanek. This project was supported with funding from Project Apis m.

Story Source:

<u>Materials</u> provided by <u>Washington State University</u>. Original written by Scott Weybright. Note: Content may be edited for style and length.

Journal Reference:

1. Anna Webb, Stephen O. Onayemi, Rae L. Olsson, Kelly Kulhanek, Brandon K. Hopkins. **Summer indoor queen banking as an** alternative to outdoor queen banking practices. *Journal of Apicultural Research*, 2023; 1 DOI: <u>10.1080/00218839.2023.2165747</u>

https://www.sciencedaily.com/releases/2023/02/230227132612.htm





Raw Honey from Argentina, Brazil, India, and Vietnam Injures U.S. Industry, Says USITC

May 11, 2022 News Release 22-058 Inv. No. 731-TA-1560-1562 and 731-TA-1564 (Final) Contact: Jennifer Andberg, 202-205-1819

Raw Honey from Argentina, Brazil, India, and Vietnam Injures U.S. Industry, Says USITC

The United States International Trade Commission (USITC) today determined that a U.S. industry is materially injured by reason of imports of raw honey from Argentina, Brazil, India, and Vietnam that the U.S. Department of Commerce (Commerce) has determined are sold in the United States at less than fair value.

Chair Jason E. Kearns, Vice Chair Randolph J. Stayin, and Commissioners David S. Johanson, Rhonda K. Schmidtlein, and Amy A. Karpel voted in the affirmative.

As a result of the Commission's affirmative determinations, Commerce will issue antidumping duty orders on imports of this product from Argentina, Brazil, India, and Vietnam.

The Commission made a negative critical circumstances finding with regard to imports of this product from Argentina. The Commission made an affirmative critical circumstances finding with regard to imports of this product from Vietnam.

The Commission's public report *Raw Honey from Argentina, Brazil, India, and Vietnam* (Inv. Nos. 731-TA-1560-1562 and 731-TA-1564 (Final), USITC Publication 5327, May 2022) will contain the views of the Commission and information developed during the investigations.

The report will be available by June 20, 2022; when available, it may be accessed on the USITC website at: <u>http://pubapps.usitc.gov/applications/publogs/qry_publication_loglist.asp</u>.

UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, DC 20436

FACTUAL HIGHLIGHTS

Raw Honey from Argentina, Brazil, India, and Vietnam Investigation Nos.: 731-TA-1560-1562, 1564 (Final)

Product Description: Honey is a sweet, viscous fluid produced from the nectar of plants and flowers which is collected by honeybees, transformed, and combined with substances of their own, and stored and left in honeycombs to mature and ripen. Raw honey is honey as it exists in the beehive or as obtained by extraction, settling and skimming, or straining.

Status of Proceedings:

- 1. Type of investigation: Final antidumping duty investigations.
- 2. Petitioners: American Honey Producers Association ("AHPA"), Bruce, South Dakota; and Sioux Honey Association ("SHA"), Sioux City, Iowa.
- 3. USITC Institution Date: Wednesday, April 21, 2021.
- 4. USITC Hearing Date: Tuesday, April 12, 2022.

- 5. USITC Vote Date: Wednesday, May 11, 2022.
- 6. USITC Notification to Commerce Date: Tuesday, May 31, 2022.

U.S. Industry in 2020:

- 1. Number of U.S. producers: approximately 30,000 to 60,000.
- 2. Location of producers' plants: North Dakota, South Dakota, California, Texas, Montana, Florida, Minnesota, and Michigan
- 3. Production and related workers: 1,360.
- 4. U.S. producers' U.S. shipments: \$302 million.
- 5. Apparent U.S. consumption: \$690 million.
- 6. Ratio of subject imports to apparent U.S. consumption: 42.8 percent.

U.S. Imports in 2020:

- 1. Subject imports: \$296 million.
- 2. Nonsubject imports: \$93 million.
- 3. Leading import sources: Argentina, Brazil, India, Vietnam.

https://www.usitc.gov/press_room/news_release/2022/er0511ll1935.htm

What does this mean for beekeepers?

The decision will be transmitted to the Commerce Department, which will issue antidumping duty orders shortly. In addition, the Commission reached an affirmative critical circumstances determination against Vietnam. This means that U.S. Customs will collect antidumping duties on entries going back an additional 90 days prior to the preliminary antidumping duty determination—from August 28, 2020, forward. This is an important additional finding, and one that the Commission rarely makes.

These results should continue to ensure that the American honey producer gets the fair prices they deserve.

We truly appreciate all of the donations that we have received to cover legal fees.

The good fight isn't over yet, however, and we still need your support.

To donate to the Antidumping Fund, please contact Cassie Cox: cassie@ahpanet.com 281-900-9740

Or donate on our secure website: https://www.ahpanet.com/donations-1



AHPA App

As AHPA continues to work on behalf of all beekeepers, one of our initiatives is advocating with the FDA in Washington D.C. to update honey labeling guidelines. As part of this effort, we need your help to collect pictures of honey labels from around the United States. Our goal is primarily to find honey that is mislabeled according to current FDA guidelines. Secondarily, we need examples of any labels which misrepresent country of origin or are purposefully confusing to consumers so that we can advocate for positive changes and updates.

Search the App Store or Google Play for "AHPA app". We need to collect as many pictures from honey on the store shelf as possible. Please take a few minutes to help collect this data.

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