CENTRAL COAST BEEKEEPERS NEWSLETTER

June 2020

ISSUE NUMBER 50

NEXT MEETING JUNE 24, 2020

June 24, 2020 Meeting

Join us for our June Virtual Meeting on Wednesday, June 24th at 6pm to hear about Honey, how it is judged and why you should consider entering your honey at the county and state fair next year. We will have a video from Marjie Ehry – the only certified Honey Judge in the state – followed by Pat Wackford a CCBA club member who entered her honey in the state fair last year for the first time and walked away with a ribbon!

Join Zoom Meeting

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PRESIDENT'S MESSAGE

By Becca Fain

Well I sure wish that the weather would make up it's mind and get summer off and running. This bouncing back and forth between sun and rain is not making the girls happy. With the blackberries in bloom, we are losing some great forage time while the rain falls. The only consolation is that by the end of this week we should be seeing a lot more sun than rain. Not sure about you, but we are seeing an early start of the non-native blackberry bloom and are looking forward to pulling our first honey in early July to get some light colored, mostly blackberry honey and then pulling again in September for a darker, mixed wildflower honey.

Have not heard anything yet from the Newport Library about when we will be able to meet there again, but we are looking at having an in person, socially distanced get together in August for a chance to catch up, do some hands-on demonstrations and share some information. More to come on this as plans develop.

Hope you can join us for next week's zoom meeting!

Becca

Honey Extraction Tips

By Brian McGinley from Lane County Beekeepers

It is finally June, new bees are settling into hives, new queens are filling galleries, and the blackberry nectar flow is starting. A good time to relax, grab a beer or wine and relax through June, right? Well, June is actually a great time to start preparing for the honey extraction you are hoping to get in July to early August. Honey extraction is a messy, time-consuming process; doing good planning now will help make the task flow much better. First step is building your extraction team. Honey extraction is not much fun as a solo endeavor. Your spouse or kids are natural team members, but you also can link up with another beekeeper or curious friends to share the process. Your next step is assembling the necessary tools and selecting a work area. The work area should be secure from vagrant bees and flies attracted to the scent of honey and large enough to fit workers and tools. Most kitchens tend to be too small for this process unless you are processing only one or two honey supers. Beyond the extractor and hot wax knife, extraction will need a sturdy work surface for the uncapping process. Most of the hard work occurs at the uncapping tank where the wax capping is sliced from sealed honey frames with the wax knife. Matching the work surface to your height should make the work go smoothly and minimize sore muscles. Check out on-line extraction videos to understand the ergonomics of this chore and to guide your decision on the best surface height for you and your partners. Uncapping tanks can be purchased or easily created from a shallow storage bin (6”x16”x30”). If you create your own tank, you will need to attach a wooden board (1”x2”) across the middle that has a wood screw protruding up from the center of the board. Honey frames rest on this screw during uncapping. It helps to lean the frame when drawing the wax knife through the cappings with the wax knife so the cappings fall away from the frame and into your tank. A five-gallon bucket also can be used as an uncapping tank, but a 12-inch bucket opening for wax cappings to fall into is small. A scratching fork will also be useful to deal with wax cappings that the wax knife misses due to undulations in the wax surface. Having a shallow baking dish (9”x12”) nearby with warm water to place the wax knife in helps to keep it clean and handy. The ”hot” in hot wax knife cannot be over-emphasized, so be attentive when working the knife. You will also want a bucket with warm water nearby for frequent hand washing. Many folks use rubber gloves during this gooey extraction process. Buckets with secure lids will also be needed to store the sweet delight oozing out of the extractor and to place wax cappings in for later

processing. Depending on how many supers you are processing, the uncapping tank can fill up fast with cappings and will need occasional purging. Buckets for honey should have a gated spigot at the bottom for processing the extracted honey later. Gated buckets can be purchased or created with a purchased gate and standard food-grade bucket. I find donut shops to be great places to get cheap buckets and they more often are three-gallon varieties, which I prefer because they fit better under the extractor gate. They are also less heavy to carry when full. A mesh bag can be placed in your wax cappings bucket. You'll find ample enough honey dripping from these wax cappings to justify the expense. The final processing tool is a honey sieve to fit on top of the honey bucket sitting under the honey extractor. Sieves can be constructed with wire mesh (600, 400 and 200 microns) and food grade buckets with their bottoms removed. Thoroughly straining your honey crop is understood by all beekeepers; but how or when you do the straining is a topic with many voices. Honey flowing through a double-filter sieve is a slow process and the sieve's holding capacity is small. A double-filter sieve quickly becomes a bottleneck in the extraction process, and scheduling/sharing a honey extractor is a time-sensitive factor for most hobby beekeepers. Options for this bottleneck include using multiple double-filter sieves or using a coarser filter during the spinning process. Option one requires more equipment (money) on hand; option two requires further filtering (time) later. A critical processing point is to keep the gate at the bottom of the extractor open while you are spinning honey frames. Doing so avoids putting strain on the extractor and your arm as well as adding air bubbles to the honey. If you need to close the gate because the sieve is full, stop spinning the frames. Now that you have the basic mechanics and tools for extracting honey from harvested frames, let's focus on getting honey frames from the bee yard to the extraction table. Then we can finish talking about storing the harvested frames for next year. First step to removing honey frames from the hive is naturally separating the bees from their honey. Several bee-escape boards (cone, triangle, and porter) are available for passively removing bees from supers. These work by denying bees reentrance into a box once they leave, but it takes time. Both cone and triangle types work well but need to stay in place for at least 24 hours. Drones won't be removed with these methods due to their body size. The porter method can kill bees during hot weather because it eliminates almost all the ventilation in the targeted super. It's best to use the porter method late in the day and remove it early the next morning. Never leave it on the super longer than 24 hours. A direct removal option is a fume board which uses a non-lethal repellent to chase bees

out of honey supers. There are a few types of repellents available: Bee-Quick, Bee-Dun, and Bee-Gone are good choices. The fume board is simply a cloth cover placed on the honey box after the repellent has been applied to the cloth. A final option is to pull individual frames from the honey supers, shake bees off the frame and brush off remaining bees, then quickly place the frame in a sealed tote. My experience is that you rarely get all the bees off the honey frames with this method and additional brushing of bees will be needed before bringing frames into the extraction room. If you are managing less than four colonies with honey supers to harvest, it is best to extract the honey on the same day you remove the supers from the hives. If you don't extract on the same day you pull honey supers, frames will need to be stored in sealed containers in a warm room. Extracting honey takes longer from frames stored in a cool place as the honey will have become viscous. Wax moths also are a concern for honey frames sitting around for more than two days, in which case they should be stored in a freezer and rewarmed on extraction day. Quality honey (maximum 18.2 percent moisture content) comes from honey frames that are mostly capped. A general rule is only extract frames with less than 10 percent opened cells. Honey frames with more open cells should be process separately from capped frames and the honey fed back to the bees that summer. Saving frames with uncapped nectar for springtime requires freezing them to avoid fermentation. Fermented honey is toxic to bees. Allow extracted honey for human consumption to sit for at least 24 hours before bottling. After extraction is complete you can use the bees to help you clean up the frames in preparation for storage. Place processed framed back on the hives, but above the inner cover. Leave them for only a couple of days. Don't put the frames out in the yard for bees to clean up. This will also attract yellow jackets, ants, and mice; and could encourage robbing behavior. Store cleaned up honey frames in plastic totes or honey supers placed inside tightly closed plastic bags for the winter, after freezing them for two days to kill any wax moth eggs. Once frozen, allow the frames to warm to room temperature before storing in bags or tubs, as the frames will sweat and could mold. Another option is to use para-moth, but you will need to remember to air out the frames for a couple days before putting them back on hives in the spring. Make sure to tape over vent holes in any plastic totes you use for storage. I hope this information proves useful for you and you have a successful honey harvest.

GloryBee to close Factory Store in Eugene and focus on online ordering

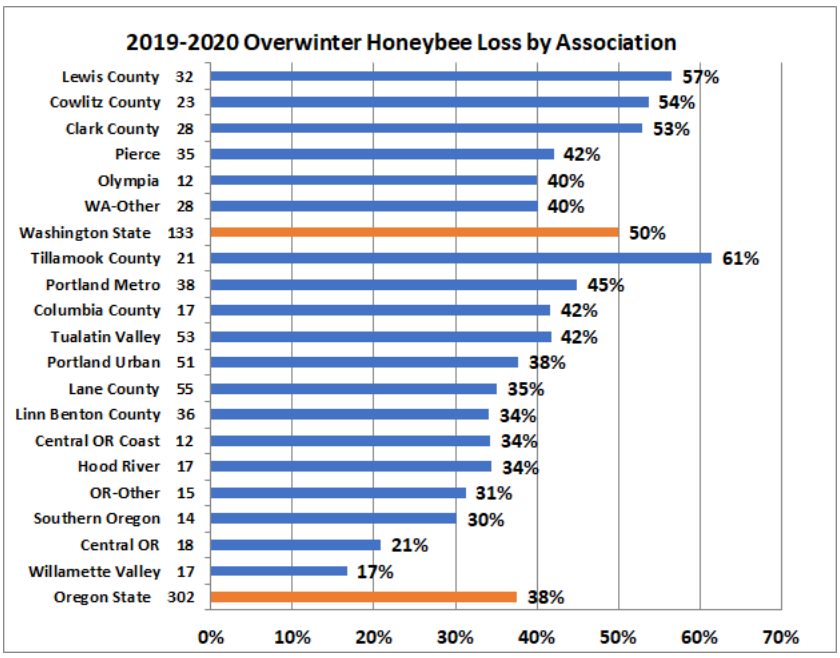
To Our Valued GloryBee Beekeeper Customers: We want to share the news with you that we have made the difficult decision to permanently close the GloryBee Factory Store on Saturday, June 27. This decision was not made lightly. Our founders, Dick and Pat Turanski, first began selling to customers out of their family garage in 1975, and the Factory Store grew and evolved over the years to what it is today. The GloryBee Factory Store has been part of the company's legacy and relationship with our community for more than 45 years. We have had an amazing run serving our community and local beekeepers via our brick-and-mortar store as it evolved, grew and even moved locations over the years. As we celebrate this legacy, we also want to celebrate this as a positive change which allows us to continue to focus on our core business of supplying ingredients to retailers, wholesalers, dealers, bakeries, food & beverage manufacturers. As you may or may not know, you are probably already enjoying high-quality natural and organic ingredients in many of your favorite natural prepared foods and restaurant meals! GloryBee and the Turanski family would like to say thank you, from the boom of our hearts, for your support and genuine relationship with us for so many years. We look forward to fulfilling your beekeeping needs with our local partners and online at glorybee.com.

PRELIMINARY OVERWINTER COLONY LOSS REPORT

Dewey M. Caron and Ramesh Sagili

After the disastrous record-high winter losses a year ago, the Pacific Northwest colony loss survey of backyard beekeepers and the Oregon State University survey of Pacific Northwest larger-scale beekeepers reveal a more normal loss level between October of 2019 and April 2020. Hopefully, more commercial/semi-commercial surveys will be returned in the coming days. As of May 10, Pacific

Northwest commercial beekeepers (10 individuals owning a total of 88,000 colonies) had a colony loss of 20 percent; 12 semi-commercial beekeepers (6 Oregon individuals) with from 50 to 500 colonies (accounting to a total of 2,000 colonies) had a loss of 22 percent. These preliminary data are courtesy of OSU. The Pacific Northwest backyarder electronic survey response rate was lower by about 100 individuals this year. Forty-six individuals with 10–50 colonies (total 878 colonies) had a loss of 38.5 percent, while 396 individuals with from 1 to 9 colonies (1,255 colonies) had a 47.5 percent overwinter loss. As in previous years, Oregon small-scale beekeeper losses (38 percent total) were lower than those of Washington beekeepers (50 percent). The graph presents backyarder losses this past winter by local association representation. Seventy-six percent of returns were from beekeepers in I-5 Corridor (Eugene to Tacoma). There was a 4-fold difference in lowest loss of an association (17 WVBA members – 15 percent) and highest association loss level (21 Tillamook members – 61 percent loss level). We should have preliminary BIP loss levels (also a record high last year) by mid-month. Reports of backyard beekeeper losses for the state and local associations can be viewed at: pnwhoneybeesurvey.com/survey-results. THANK YOU to all the beekeepers who have returned the surveys. If you still have not returned your survey, then please consider sending it in asap for a more complete record. See the April 2020 issue of American Bee Journal (pages 459–463) for a report on 10 years of Pacific Northwest loss surveys.



ASIAN GIANT HORNET UPDATE

Ramesh Sagili

What are Asian Giant Hornets (AGH)? The Asian Giant Hornets (Vespa mandarinia) are native to Asia. They are the world's largest hornet measuring about 2 inches long with a wingspan of 3 inches and distinct large orange-colored heads. They mostly nest underground and sometimes in dead logs. They generally prey on different types of insects (beetles, praying mantis, etc.), but may seek honeybee hives during summer and fall when their protein needs are high to feed their young. Their coordinated attack as a group can be devastating to honeybee colonies, as only a few hornets can decimate an entire honeybee colony in few hours. They are generally not aggressive towards people and do not pursue them but can sting if threatened or if their nest is disturbed.

Should we be concerned about AGH? We should not panic about AGH at this time as they have not been reported to have established in the Pacific Northwest or US, but we should be vigilant. There are no confirmed reports of AGH in Oregon. A couple of hornets were found in two different locations in northwest Washington close to the Canadian border during 2019, but there have been no further reports of AGH sightings in 2020 (as of May 15). As AGH is a potential threat to honeybee colonies, we need to make sure that they are not established in our region/country by active surveillance and eradication measures.

What to do if you think you have indeed seen an AGH or suspect AGH attack on your colony? Since the recent media reports, concerned beekeepers, master gardeners, and citizens have been contacting ODA, OSU, OSBA, and other relevant groups for updates and to report potential AGH suspects. Please keep in mind that there are several confusing look-alikes of AGH in the Pacific Northwest, such as sawflies, cicada killers, and other wasps, and it is easy to panic if you see one of these large hornet look-alikes. **If you are confident that you have seen an AGH or you suspect an AGH attack on a beehive, then please report the sightings/incident to ODA at: oda.fyi/HornetReport or call (503) 986-4636.** If possible, please take a picture of the suspect from a safe distance and upload to the ODA reporting site listed above. You can also report the sightings to us at OSU (Honey Bee Lab or Pollinator Health Extension).

Honeybees that specialize in grooming their nestmates (allogroomers) to ward off pests play a central role in the colony, finds a new UCL and University of Florence study.

Allogroomer bees also appear to have stronger immune systems, possibly enabling them to withstand their higher risk of infection, according to the findings published in Scientific Reports.

Ectoparasites (parasites that live on the outside of a host's body, such as mites) are a growing threat to honeybees worldwide, so the researchers say that supporting allogrooming behavior might be an effective pest control strategy.

Lead author Dr Alessandro Cini, who began the project at the University of Florence before moving over to UCL Centre for Biodiversity & Environment Research, said: "An ectoparasitic mite, Varroa destructor, represents a major global threat to bee colonies. By understanding how allogrooming practices are used to ward off parasites, we may be able to develop strategies to promote allogrooming behavior and increase resilience to the parasites.

"Here, we found worker bees that specialize in allogrooming are highly connected within their colonies, and have developed stronger immune systems.

"We suspect that if more bees engaged in these allogrooming behaviors that ward off parasites, the colony as a whole could have greater immunity."

Among bees, allogrooming consists of a worker using its mouth to remove debris, which may include parasites and other pathogens, from the body of another member of its colony.

In bee colonies, different groups of worker bees conduct different activities -- one such specialization is allogrooming, although it was not previously known how specialized the groomer bees are, and how their physiology may be different.

The current study focused on Apis mellifera, commonly known as the western honeybee, which is the most common species of honeybee and also the world's most-used bee for both honey production and pollination in agriculture.

As allogrooming would likely put the grooming bees at an elevated risk of contracting pathogens and parasites, the researchers tested their immune systems, and found that their hemolymph (like blood, but for insects) could more effectively clear out potentially harmful bacteria than the immune systems of other bees in the colony.

Co-author Dr Rita Cervo from the University of Florence said: "By identifying a striking difference in the immune systems of the allogrooming bees, which are involved in tasks important to colony-wide immunity from pathogens, we have found a link between individual and social immunity."

The researchers found that allogroomer bees occupy a central position in the colony's social network, as they are more connected to bees across the colony than the average bee, enabling their grooming habits to benefit a large number of bees and keep the colony as pest-free as possible.

The researchers found that allogrooming is a relatively weak, transient specialty, as the groomer bees still devoted a similar amount of time to other tasks as the rest of the colony's worker bees. The researchers say this shows that bees can develop physiological differences narrowly tailored to specific tasks, while still maintaining a degree of plasticity enabling them to switch to other tasks as needed.

The researchers did not detect any differences in how well the allogroomer bees could detect when other bees needed grooming, as their antennae were not more finely-tuned to relevant odors. It is possible they can detect who needs grooming in other ways, such as by noticing the 'grooming invitation dance' whereby bees shake their whole body from side-to-side.

The study was supported by Progetti di Rilevante Interesse Nazionale and Unione Nazionale Associazioni Apicoltori Italiani.

Story Source:

Materials provided by **University College London**. Note: Content may be edited for style and length.

Neonicotinoids: What gardeners need to know

The pesticides work on an array of insects — including the good guys.

TOM ODER

May 28, 2020, 11:14 a.m.

Neonicotinoids infect a plant throughout its entire system, including the nectar and pollen that pollinators harvest. (Photo: Adkin Alexandr/Shutterstock)

There has been a lot of buzz in recent years about a group of chemicals known as "neonicotinoids." These pesticides affect the central nervous systems of insects, and are a suspected link to colony collapse disorder in domesticated honeybees as well as the rapid decline of many wild pollinator species.

About 85% of Earth's flowering plants rely on pollination by bees and other pollinators, according to the Xerces Society, a nonprofit that protects wildlife through invertebrate conservation. Bees also pollinate more than 30% of all plants that produce foods and beverages consumed by humans around the world.

"Neonicotinoids are one of the most serious causes of downward negative pressure on pollinators," according to Keith Delaplane, a professor of entomology and director of the Honey Bee Program at the University of Georgia. In fact, he rates neonicotinoids as the second-leading cause of decline in the nation's honeybees, reserving the top spot for the parasitic varroa destructor mite.

What are neonicotinoids?

Pesticides don't have the same impact on pollinators. (Photo: Iakov Filimonov/Shutterstock)

"Neonicotinoids are a broad-spectrum pesticide that get their name from their basic chemistry, because it is close to that of nicotine," said Delaplane, emphasizing that "neonics," as they are often called, are not the same as nicotine. The neonicotinoid family includes specific pesticides such as acetamaprid, imidacloprid, dinotefuran, clothianidin, and thiamethoxam. They gained popularity in agricultural and commercial ornamental production because they are effective against a wide range of insect pests, and are considered less hazardous to humans and other vertebrates than many insecticides.

"The hallmark of neonicotinoids is that they are systemic," Delaplane added. That means they travel throughout a plant via its vascular system and distribute the chemical to all parts of the plant tissue 24/7, including its nectar and pollen.

"Neonicotinoids just hammer insects," Delaplane said. While there are many target insects, such as whitefly, Japanese beetles, emerald ash borer and others, neonicotinoids are used in general to control sucking and chewing insects and beetles. But some of the insects they "hammer" are important pollinators such as honeybees, bumblebees, and solitary bees.

How neonicotinoids became a cause of concern

A European honeybee brings fresh pollen back to the hive. (Photo: Muhammad Mahdi Karim [GNU Free}/Wikimedia Commons)

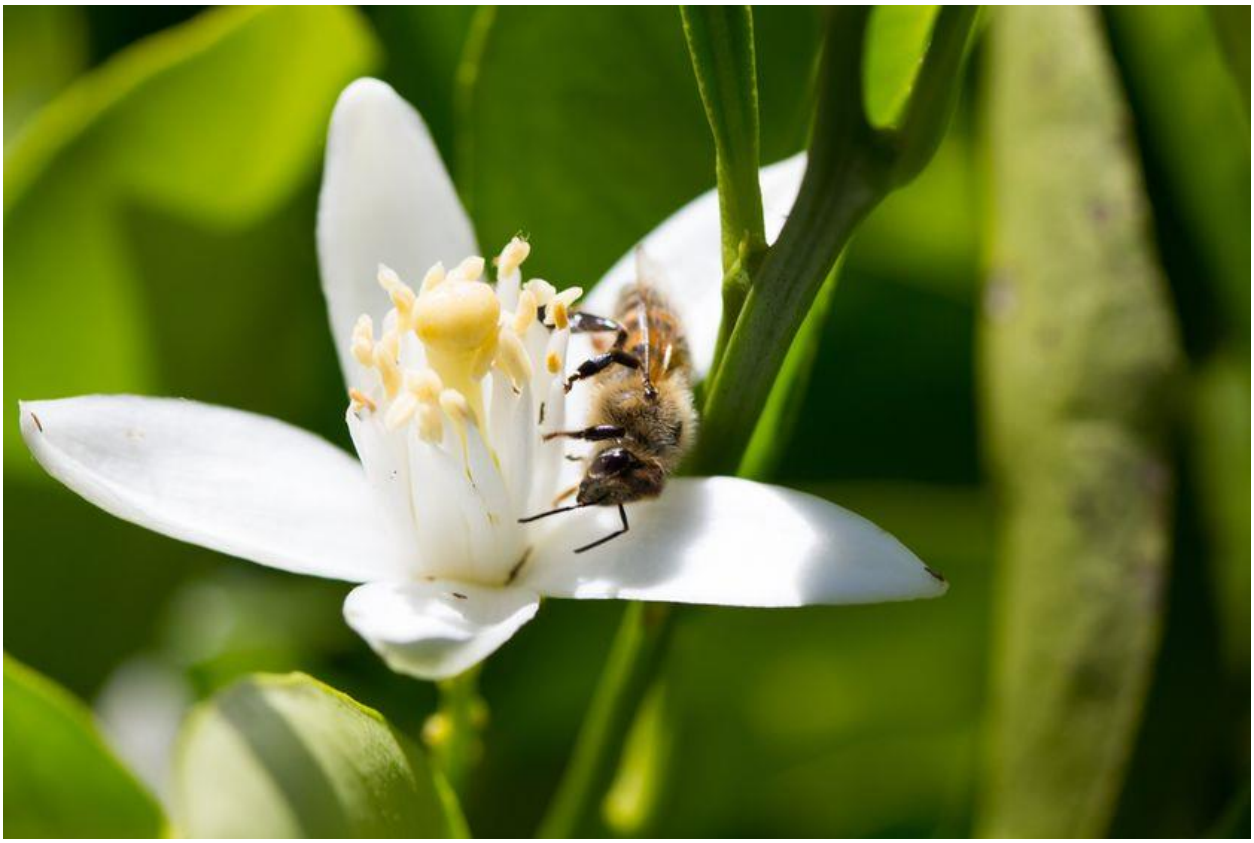
In a 2014 report, David Smitley — a professor of entomology at Michigan State University who works with horticulture industries on solving insect pest problems — included neonics in a timeline tracing the decline of honeybees.

According to Smitley, honeybee decline began in the 1950s and sharply increased when parasitic mites were introduced into the United States around 1987. The

neonicotinoid class of pesticides were introduced in 1994, but the rate of honeybee decline, while continuing, did not immediately get worse.

A turning point for neonicotinoid awareness occurred in June 2013, when 50,000 bees died in the parking lot of a Target store in Wilsonville, Oregon, near the Xerces Society headquarters. Scott Hoffman Black, executive director of the Xerces Society, said he confirmed the bees died from being sprayed with an insecticide that contained the neonicotinoid dinotefuran. He claimed the label instructions weren't followed.

In 2014, a Harvard School of Public Health study linked low doses of neonicotinoids to colony collapse disorder. Additional studies produced mixed results regarding pesticides' impact on bee declines, and also pointed to other factors such as the varroa mite and insufficient food sources.



Citrus plants, like this lemon tree, can contain high levels of imidacloprid residue. (Photo: Larisa Blinova/Shutterstock)

In 2016, the U.S. Environmental Protection Agency (EPA) issued a "preliminary risk assessment" warning that bee colonies could be in danger from imidacloprid, a pesticide the agency had approved 22 years earlier. In hives exposed to more than

25 parts per billion of imidacloprid, the EPA reported a higher chance of "decreases in pollinators as well as less honey produced." A few months later, a study in the journal Nature reported that bees who frequent neonicotinoid-treated crops have suffered worse population declines than species who forage on other plants.

In late May 2019, the EPA pulled a dozen neonicotinoid-based pesticides from the market as part of a legal settlement involving the Center for Food Safety. The products contain the active ingredients clothianidin or thiamethoxam.

Of the 12 pesticides canceled in the U.S., seven were for seed coating products used by farmers, according to Bloomberg Environment. Farmers still have access to other neonic-based products, but environmental groups are pushing the EPA to ban them for all outdoor uses.

“This entire class of active ingredient soon will be up for re-registration by 2022,” George Kimbrell, legal director at the Center for Food Safety, tells Bloomberg Environment. “These first 12 were just an interim step.”

More than honeybees

While domesticated honeybees tend to get more attention, an array of wild native bees may also be at risk from neonics. In a 2017 study, for example, researchers found thiamethoxam dramatically reduces egg-laying by queen bumblebees, which were 26% less likely to lay eggs after being exposed to it.

As lead researcher Nigel Raine told The Guardian, this could have a disastrous effect on the formation of new bumblebee colonies — and thus on bumblebee populations overall. "A reduction this big in the ability of queens to start new colonies significantly increases the chances that wild populations could go extinct," said Raine, a professor of environmental sciences at the University of Guelph in Ontario, Canada.

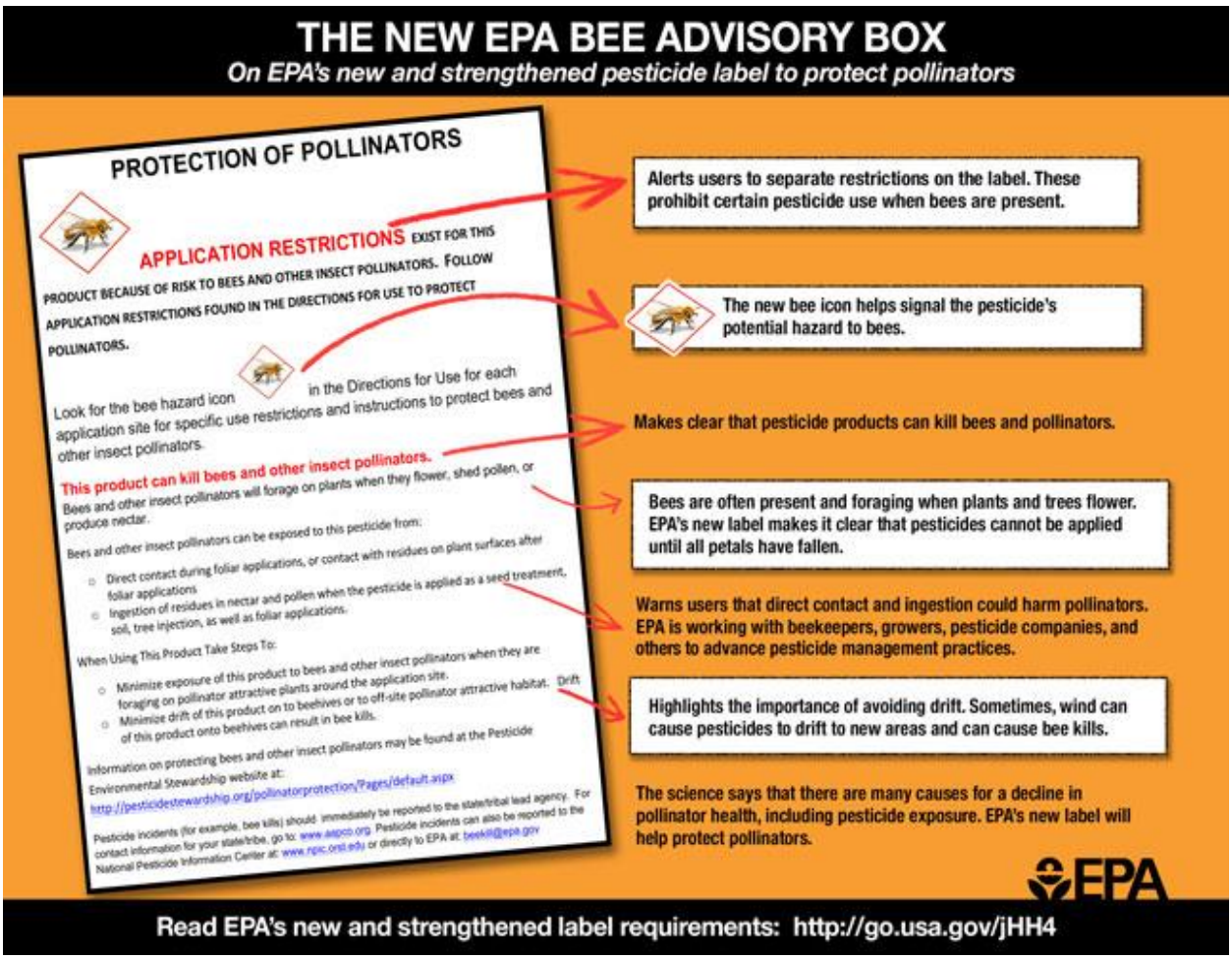
As dangerous as neonics can be for bees, some species do seem to have natural defenses against certain types of the insecticide. In one study published in Current Biology, researchers reported that enzymes in honeybees and bumblebees buffer them against thiacloprid, a neonic that's less toxic to bees than others, like imidacloprid. This may shed light on new ways to protect bees from the insecticides, the study's authors say, although more research will be needed.

How do pollinators absorb neonicotinoids?

Bees can absorb neonics in several ways, such as by drinking nectar or transferring pollen. Another is a process called guttation, or the act of a plant sweating.

Corn, for example, sweats during the night. Bees can obtain water from guttation droplets, especially during dry weather.

Aphids, one of the real targets of neonicotinoids, insert their needle-like mouthparts into plant tissue and suck plant juice all day long rather than imbibing guttation droplets. The neonicotinoids are also in the sweet excrement, or honey dew, from the aphids, which honeybees collect. So it's possible for the honeybees to absorb neonicotinoids indirectly from a treated plant without ever visiting that plant.



A graphic from the EPA explaining pollinator-related label requirements for pesticides. (Image: EPA)

What can home gardeners do?

Because neonicotinoids have been in the news, the public eye has been focused on plants at garden centers. Smitley says warnings about these plants harming pollinators have been exaggerated. In fact, he believes that purchasing flowering annuals, perennials and trees is beneficial for bees and other insects. "The discovery of neonicotinoid insecticide in the leaves and flowers of some garden center plants should not stop [home gardeners] from buying and planting flowers, because the benefit to bees far outweighs the potential risk," Smitley wrote in a 2014 paper.

Home gardens are not a primary food source for most bees, and even if neonics are present in some plants from retail centers, those plants will not necessarily harm bees, according to Smitley. Here are some reasons why:

- Many bedding flowers — such as petunias, impatiens and marigolds — are not typically treated with neonicotinoids.
- Many trees and shrubs (including all types of conifers) are pollinated by wind, and therefore not visited by bees.
- Perennial flowers, roses, flowering shrubs and flowering trees will only have neonics in their pollen and nectar for the first year or two after they are planted. However, these plants will be a valuable resource for bees and other pollinators for many years to come.
- Bees feed on a large variety of flowering plants within a mile of their colony home. The presence of a neonicotinoid in one plant will be diluted when the bees feed on untreated plants.
- Flowers in flats should be completely safe to bees.

Still, Smitley said in the paper that homeowners can take steps to help ensure bee safety with purchased perennial flowers and flowering trees.

These steps include:

- Removing the flowers in their first year in your garden or plant trees after they have finished flowering.
- Avoid spraying plants in your garden with insecticides, and never spray the flowers.

If holes that insects chew in leaves become unsightly, bee-friendly insecticides include products containing Bacillus thuringiensis (B.t.) and horticultural oils and

soaps, according to Smitley's paper. B.t. can be used any time for caterpillars, and soaps and oils are safe to bees if sprayed early in the morning before bees are present. Be careful not to exceed the application rate on the product label, because at higher concentrations soaps and oils can cause plant injury.

Honeybee lives shortened after exposure to two widely used pesticides

Date: June 16, 2020

S*ource:* Oregon State University

*Summary:*The lives of honeybees are shortened -- with evidence of physiological stress -- when they are exposed to the suggested application rates of two commercially available and widely used pesticides.

The lives of honeybees are shortened -- with evidence of physiological stress -- when they are exposed to the suggested application rates of two commercially available and widely used pesticides, according to new Oregon State University research.

In a study published in the journal PLOS ONE, honeybee researchers in OSU's College of Agricultural Sciences found detrimental effects in bees exposed to Transform and Sivanto, which are both registered for use in the United States and were developed to be more compatible with bee health.

The western honeybee is the major pollinator of fruit, nut, vegetable and seed crops that depend on bee pollination for high quality and yield.

Coupled with other stressors such as varroa mites, viruses and poor nutrition, effects from these pesticides can render honeybees incapable of performing their tasks smoothly. Beekeepers and some environmental groups have raised concerns in recent years about these insecticides and potential negative effects on bees.

According to the researchers, this is the first study to investigate "sub-lethal" effects of sulfoxaflor, the active ingredient in Transform, and flupyradifurone, the active ingredient in Sivanto. Sub-lethal effects mean that the bees don't die immediately, but experience physiological stress resulting in shortened lifespan.

In the case of Transform, the bees' lives were severely shortened. A majority of the honeybees exposed to Transform died within six hours of being exposed, confirming the severe toxicity of the pesticide to bees when exposed directly to field application rates recommended on the label, the researchers said.

Study lead author Priyadarshini Chakrabarti Basu, a postdoctoral research associate in the Honey Bee Lab in OSU's College of Agricultural Sciences, emphasized that the researchers aren't calling for Sivanto or Transform to be taken off the market.

"We are suggesting that more information be put on the labels of these products, and that more studies need to be conducted to understand sublethal effects of chronic exposure," Basu said.

Sivanto and Transform are used on crops to kill aphids, leaf hoppers and whiteflies, among other pests. Many of these same crops attract bees for pollination. There are some restrictions on their use. For example, Transform can't be applied to crops in bloom, for example.

Honeybees might be exposed indirectly through pesticide drift, said study co-author Ramesh Sagili, associate professor of apiculture and honeybee Extension specialist in OSU's College of Agricultural Sciences.

"The average life span of a worker honeybee is five to six weeks in spring and summer, so if you are reducing its life span by five to 10 days, that's a huge problem," Sagili said. "Reduced longevity resulting from oxidative stress could negatively affect colony population and ultimately compromise colony fitness."

For the study, the researchers conducted two contact exposure experiments: a six-hour study and a 10-day study in May 2019. The honeybees were obtained from six healthy colonies at the OSU apiaries. In each experiment, groups of 150 bees were placed in three cages. One group was exposed to Transform, a second to Sivanto and the third was a control group that wasn't exposed to either pesticide.

Honeybee mortality, sugar syrup and water consumption, and physiological responses were assessed in bees exposed to Sivanto and Transform and compared to bees in a control group. Mortality in each cage was recorded every hour for the six-hour experiment and daily for the 10-day experiment.

While Sivanto was not directly lethal to honeybees following contact exposure, the 10-day survival results revealed that field-application rates of Sivanto reduced adult survival and caused increased oxidative stress and apoptosis in the honey bee tissues. This suggests that even though Sivanto is apparently less toxic than Transform, it might also reduce honeybee longevity and impart physiological stress, according to the study authors.

Co-authors on the study included graduate student Emily Carlson and faculty research assistant Hannah Lucas, who both conduct research in the Honey Bee Lab; and Andony Melathopoulos, assistant professor and pollinator health Extension specialist.

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Journal Reference:

1. Priyadarshini Chakrabarti, Emily A. Carlson, Hannah M. Lucas, Andony P. Melathopoulos, Ramesh R. Sagili. **Field rates of Sivanto™ (flupyradifurone) and Transform® (sulfoxaflor) increase oxidative stress and induce apoptosis in honey bees (Apis mellifera L.)**. PLOS ONE, 2020; 15 (5): e0233033 DOI: 10.1371/journal.pone.0233033

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