Effects of sublethal doses of clothianidin and/or *V. destructor* on honey bee (*Apis mellifera*) self-grooming behavior and associated gene expression


Researchers reported in April 2019 “that a sublethal, chronic exposure to clothianidin, similar to that expected under field conditions, can more negatively impact the self-grooming behavior of honey bees when combined with *V. destructor* parasitism than applied alone. Additionally, RNAseq analysis of the brains of treated bees revealed different impacts on gene expression by each stressor, which was also observed when the stressors were combined based on the number of DEGs. Surprisingly, the interaction between the stressors decreased rather than increased the number of up and down-regulated DEGs found with clothianidin. Although a variety of biological pathways were associated with the DEGs, it was notable that many terms were associated with neurodegeneration and cell damage implying that each stressor alone or in combination may negatively affect neural activity, which could help explain their impact on grooming behavior potentially reducing the bees’ survival.”

“Little is known about the combined effects of stressors on social immunity of honey bees (*Apis mellifera*) and related gene expression. The interaction between sublethal doses of a neurotoxin, clothianidin, and the ectoparasite, *Varroa destructor*, was examined by measuring differentially expressed genes (DEGs) in brains, deformed wing virus (DWV) and the proportion and intensity of self-grooming. Evidence for an interaction was observed between the stressors in a reduction in the proportion of intense groomers. Only the lowest dose of clothianidin alone reduced the proportion of self-groomers and increased DWV levels. *V. destructor* shared a higher proportion of DEGs with the combined stressors compared to clothianidin, indicating that the effects of *V. destructor* were more pervasive than those of clothianidin when they were combined. The number of up-regulated DEGs were reduced with the combined stressors compared to clothianidin alone, suggesting an interference with the impacts of clothianidin. Clothianidin and *V. destructor* affected DEGs from different..."
Biological pathways but shared impacts on pathways related to neurodegenerative disorders, like Alzheimer’s, which could be related to neurological dysfunction and may explain their negative impacts on grooming. This study shows that the combination of clothianidin and *V. destructor* resulted in a complex and non-additive interaction.” READ THE COMPLETE RESEARCH https://www.nature.com/articles/s41598-019-41365-0

**California Acts to Prohibit Chlorpyrifos Pesticide**

*Move to ban follows scientific findings that chlorpyrifos poses serious public health and environmental risks to vulnerable communities*

*Governor’s May Revision proposes $5.7 million in new funding to support the transition to safer, more sustainable alternatives*

*CDFA and DPR will convene a new working group to identify, evaluate and recommend alternative pest management solutions*

In a move to protect workers, public health and the environment, the California Environmental Protection Agency (CalEPA) announced that the “Department of Pesticide Regulation (DPR) is acting to ban the use of the pesticide and toxic air contaminant chlorpyrifos in California by initiating cancellation of the pesticide.”

“CalEPA and the California Department of Food and Agriculture (CDFA) also announced that the Governor will propose $5.7 million in new funding in the May Revision budget proposal to support the transition to safer, more sustainable alternatives, and plans to convene a working group to identify, evaluate and recommend alternative pest management solutions.”

“California’s action to cancel the registration of chlorpyrifos is needed to prevent the significant harm this pesticide causes children, farm workers and vulnerable communities,” said CalEPA Secretary Jared Blumenfeld. “This action also represents a historic opportunity for California to develop a new framework for alternative pest management practices.”

READ MORE https://calepa.ca.gov/2019/05/08/california-acts-to-prohibit-chlorpyrifos-pesticide/


**Vermont Senate OKs Bee-harming Pesticide Restriction**

By Elizabeth Gribkoff

May 7 2019

Senators gave preliminary approval Tuesday, May 7th, to a bill that would restrict the use of a class of pesticides considered to be toxic to bees. But senators expressed concerns that, by not banning the pesticide, the bill doesn’t go far enough to protect pollinators.
The bill, **H.205**, classifies neonicotinoids as a “restricted use” pesticide, meaning that only certified applicators would be able to buy and use them. Originally developed in the 1980s, neonicotinoids are now the most widely used class of insecticide in the world, largely because of their use to treat agricultural seeds.

Neonicotinoids have come under fire in recent years for their toxicity to bees. Sen. **Anthony Pollina**, D/P-Washington, warned senators while reporting the bill on the Senate floor that “if we lose bees, we lose our food supply.”

Sen. **Alison Clarkson**, D-Windsor, rose to speak in support of the bill, referencing a “grim report” on species decline from the UN. Report authors found that around 1 million species face extinction unless threats to biodiversity are addressed, according to a summary of their forthcoming global assessment on biodiversity and ecosystem services.

Pollina referred to H.205 as a “small step” in the direction of banning neonicotinoids in that it would curtail home use but not restrict agricultural or commercial use.

The bill exempts pet products and seeds treated with neonicotinoids, which are commonly used by farmers growing corn and soy. A [2015 report](https://vtdigger.org/2019/05/07/senate-oks-bee-harming-pesticide-restriction/) from the state Agency of Agriculture, Food and Markets estimated that treated seeds introduce 8,270 pounds of neonicotinoids a year to the environment.

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**Production-related contaminants (pesticides, antibiotics and hormones) in organic and conventionally produced milk samples sold in the USA**

Jean A Welsh, Hayley Braun, Nicole Brown, Caroline Um, DOI: [https://doi.org/10.1017/S136898001900106X](https://doi.org/10.1017/S136898001900106X), Published online: 26 June 2019

Consumption of cow’s milk, which is associated with diet and health benefits, has decreased in the USA. The simultaneous increase in demand for more costly organic milk suggests consumer concern about exposure to production-related contaminants may be contributing to this decline. We sought to determine if contaminant levels differ by the production method used. Half-gallon containers of organic and conventional milk (four each) were collected by volunteers in each of nine US regions and shipped on ice for analysis. Pesticide, antibiotic and hormone (bovine growth hormone (bGH), bGH-associated insulin-like growth factor 1 (IGF-1)) residues were measured using liquid or gas chromatography coupled to mass or tandem mass spectrometry. Levels were compared against established federal limits and by production method.

**Results:**
Current-use pesticides (5/15 tested) and antibiotics (5/13 tested) were detected in several conventional (26–60 %; n 35) but not in organic (n 34) samples. Among the conventional samples, residue levels exceeded federal limits for amoxicillin in one sample (3 %) and in multiple samples for sulfamethazine (37 %) and sulfathiazole (26 %). Median bGH and IGF-1 concentrations in conventional milk were 9·8 and 3·5 ng/ml, respectively, twenty and three times that in organic samples (P < 0·0001).

**Conclusions:**
Current-use antibiotics and pesticides were undetectable in organic but prevalent in conventionally produced milk samples, with multiple samples exceeding federal limits. Higher bGH and IGF-1 levels in conventional milk suggest the presence of synthetic growth hormone. Further research is needed to understand the impact of these differences, if any, on consumers.

Add-On Label Identifies Real Organic Food
July 3, 2019 from Cornucopia News

The USDA’s National Organic Program has failed consumers and true organic farmers by refusing to enforce pasture requirements for organic livestock and by allowing hydroponic produce to bear the organic label. As such, add-on labels are emerging to help consumers differentiate between industrial and authentic organic. Cornucopia supports the efforts of the Real Organic Project to verify ethical farming practices. The Real Organic Project (ROP) is a grassroots, farmer-led movement created to distinguish soil-grown and pasture-raised products. ROP has created an add-on label to assure consumers that what they are buying is authentic organic food.

In 2019, certified organic farms are eligible to apply for this add-on label, free of charge.
As a follow up to the 60 ROP-certified pilot farms across the country in 2018, ROP has begun their 2019 certification program. Real certified organic farmers can be part of the pilot program! Apply online for free Real Organic Project certification—or call ROP Associate Director Linley Dixon at 970-317-0309 to apply by phone. ROP personnel will inspect and certify real organic farms that meet ROP’s Provisional Standards, requiring cows to be pastured, chickens to be given real outdoor access, and produce to be grown in the soil.

Consumers can continue to use Cornucopia’s Organic Dairy Scorecard, Organic Egg Scorecard, and Hydroponic Buyer’s Guide to find the highest-integrity brands available on the market. https://www.cornucopia.org/2019/07/real-organic-certification/#more-67897

Unsafe at any Dose? Diagnosing Chemical Safety Failures, from DDT to BPA
Independent Science News for Food and Agriculture by Jonathan Latham, PhD

This 2016 article is a good refresher to where we have been, and the work we still need to accomplish to ensure our soil, water, and air are safe and healthy for all living organisms.

“Piecemeal, and at long last, chemical manufacturers have begun removing the endocrine-disrupting plastic bisphenol-A (BPA) from products they sell. Sunoco no longer sells BPA for products that might be used by children under three. France has a national ban on BPA food packaging. The EU has banned BPA from baby bottles. These bans and associated product withdrawals are the result of epic scientific research and some intensive environmental campaigning. But in truth these restrictions are not victories for human health. Nor are they even losses for the chemical industry. For one thing, the chemical industry now profits from selling premium-priced BPA-free products. These are usually made with the chemical substitute BPS, which current research suggests is even more of a health hazard than BPA. But since BPS is far less studied, it will likely take many years to build a sufficient case for a new ban.”

“But the true scandal of BPA is that such sagas have been repeated many times. Time and again, synthetic chemicals have been banned or withdrawn only to be replaced by others that are equally harmful, and sometimes are worse. Neonicotinoids, which the International Union for the Conservation of Nature (IUCN) credits with creating a global ecological catastrophe (1), are modern replacements for long-targeted organophosphate pesticides. Organophosphates had previously supplanted DDT and the other organochlorine pesticides from whose effects many bird species are only now recovering.”

“So the big and urgent question is this: if chemical bans are ineffective (or worse), what should anyone who wants to protect themselves and everyone else from flame retardants, pesticides, herbicides, endocrine disruptors, plastics and so on—but who doesn’t expect much help from their government or the polluters themselves—do?”

READ MORE at https://www.independentsciencenews.org/health/unsafe-at-any-dose-diagnosing-chemical-safety-failures-from-ddt-to-bpa/?fbclid=IwAR1OiIsfZIk40WYymW7wX4JoWuKldK2-uQCBqD1R-m3qq4Am1SQuMMVUFs
In early June I learned of the passing of Susan Rudnicki, a Pollinator Stewardship Council member, supporter, and Newsletter writer (page 9 at http://pollinatorstewardship.org/wp-content/uploads/2019/01/January-2019-Pollinator-News.pdf). Over the years I have spoken with, and emailed Susan on a variety of issues and concerns: nationally and locally. Susan was a voice for her honey bees. She educated local policy makers about pesticide use and its impact to the ecosystem, and she worked to re-locate swarms and feral bees. She worked with fellow beekeepers, and advocates on a project “to try to locate a teaching apiary at the LAX airport site. The mayor is interested in our idea--the airport covers 3500 acres.” She would have “lively discussions” with beekeeping authors and researchers, as Susan learned from her bees, and was their advocate. She would share research with me she found from around the US and across the globe.

Last year, Susan Rudnicki helped a small group of residents form the Manhattan Beach Pollinators Alliance, whose mission was to persuade Manhattan Beach City Council to prohibit the use of pesticides in public areas. Kathryn Lilley Cheng, of the Manhattan Beach Pollinators Alliance, provided an update of their pollinator work.

“...I’m pleased to announce that late last month the city formally committed to banning the use of nonorganic pesticides in public areas. Here’s a link to the City’s official press release https://www.citymb.info/home/showdocument?id=39876 As you know this action by the City is just a first step, but an important one. Susan was a bee rescuer and a strong advocate for promoting pollinator friendly practices and awareness within Manhattan Beach and surrounding communities. She touched many lives and made a positive impact in countless ways in our community. The City’s recent decision to limit the use of pesticides would not have happened so soon had it not been for Susan’s efforts and advocacy.”

Susan’s last email to me in February showed her optimism and love of beekeeping... “All the docs say to stay involved in things I love, as it strengthens the immune system. Until I am in another condition, I plan to do my honey bee work as usual in caring for my hives. And I have students and bee buddies who have offered to fill in when I cannot. I am lucky to have good family and friends standing by and many good doctors.”

One of email messages stands out for me, summing up Susan’s work and love of honey bees and beekeeping: There are civilized, truly regenerative public agencies stewarding the keeping of bees, teaching children beekeeping, and showing the correct manner to foster this most important of food providers. Would that our bureaucracies might learn something. Susan, Urban Beekeeper

Learn more of Susan and her work for honey bees and beekeeping:


South Bay Beekeeper Gets the Boot https://patch.com/california/manhattanbeach/south-bay-beekeeper-gets-boot-despite-free-city-services


Interview with Beekeeper, Susan Rudnicki https://www.youtube.com/watch?v=LB4__lv3Lyo


Susan Rudnicki obituary https://www.legacy.com/obituaries/name/susan-rudnicki-obituary?pid=193181606

Root Simple https://www.rootsimple.com/2019/05/rip-susan-rudnicki/
Evolution and the Environment: Studying Bees in a Changing World
By Shelby Kerrin Kilpatrick

Can you imagine an autumn market without large, bright orange pumpkins, multicolored squash, and funky-shaped gourds? Today, we may take these captivating cucurbits for granted, but their diversity is the result of thousands of years of both natural and human-driven selection. Human activities do not always hurt other species. Here at Penn State, Dr. Margarita López-Uribe and Dr. Heather Hines are interested in understanding how our long-term cultivation of these charismatic plants has influenced the biodiversity of their specialist pollinators, the squash bees!

Bees are known for their intimate mutualism with flowering plants. However, when humans began cultivating crops such as cucurbits, the landscape changed through the creation of new habitats for some insect species, but less habitats for others that were not adapted to agricultural varieties. Plant traits that farmers favor have been selected for over time, primarily their crops’ fruits and vegetables. When any plant trait changes, the flowers these products originate from may change too. This can affect bee species’ abilities to pollinate flowers, especially those that need specific floral cues to locate and collect pollen. Crops have also been grown in greater densities and spread far from their native ranges. Increasing pest resistance is also a concern for growers as these species take advantage of plentiful, nutritious food and other resources.

Thousands of years ago, one of the 22 species of squash bees expanded its range northward from Mexico into the United States as a result of cucurbit domestication by Native Americans. Today, this species is a particularly important pollinator of our cucurbit crops – one that we would not have, had it not “followed the bloom”. However, exactly how cucurbit crop domestication has influenced the diversification, distribution, and abundance of the other species of squash bees, is unknown. This is what makes them an ideal model system for studying the effects of agriculture on pollinator species, which, unlike insect pests, have not been studied in this manner.

Squash bees are found only in the Americas and the greatest number of species is in Mexico, where cucurbits got their start and coevolved with the bees before humans entered the scene. By using genetic information to reconstruct the evolutionary relationships between the species of squash bees, we can test how they, their cucurbit pollen hosts, and humans have interacted to result in change in the bees over time. Specifically, aspects of this research will include comparing climatic preferences, morphological characters, and other traits.
between both the plants and bees, based on the understanding of evolutionary relationships between the bee species.

“Understanding these questions can help us make generalizable predictions about how species are responding to human-driven changes in the environment,” says López-Uribe. She further explains that “this [research] is extremely important at this time, when there is a biodiversity crisis.” The results of the project will allow us to understand, from evolutionary and ecological perspectives, what makes a particular species successful in altered environments.

We are constantly changing the world we live in, but preserving pollinators and biodiversity remains a critical component in our efforts to sustain our future. The next time you pick out your favorite fall fruit for decoration, bake a tasty pumpkin pie, or see a bee buzzing around a flower, take a moment to consider how those species may have come to be. This bigger picture, as in the case of cucurbits and squash bees, shows that the actions humans take can change the evolutionary trajectories of species and the diversity in the world we share.


Alternatives to Synthetic Chemicals for Pest Control

Beekeepers often contact Pollinator Stewardship Council to determine “safer” pesticides to use in their own garden, or to advise farmers so pollinators can be protected as well as crops from insect pests and crop diseases. While the Pollinator Stewardship Council does not endorse any specific product, we will provide information from the manufacturer; we will even call the manufacturer to discuss their product. When a beekeeper asks about a specific product, we will share the information with our members.

Recently, beekeepers made inquiries about “Bee Safe 3 in 1 Garden Spray.” The EPA will not allow the words “Bee Safe” printed on synthetic pesticides, or even those without neonic; because typically even if a synthetic pesticide does not have neonic, it still contains a bee-toxic pesticide, just not a long-lived systemic bee toxic pesticide. Labeling then, for organic pesticides is different, can may contain the words “bee safe.” With all pesticides, it is very important to read the labels and follow directions.

All insects are aerobic organisms and they must obtain oxygen ($O_2$) from the air in order to survive. Insects use the same metabolic reactions as other animals to convert nutrients (e.g. sugars) into the chemical bond energy of ATP.

At the end of this process, hydrogen ions react with oxygen atoms to produce water and energy is released and captured in a phosphate bond of ATP.
The respiratory system of insects is a complex network of tubes (called a tracheal system) and is responsible for delivering air containing oxygen to every cell of the body, but also is responsible for removing the carbon dioxide (CO\textsubscript{2}) that is produced as a waste product of cellular respiration.

Air enters the insect’s body through valve-like openings in the exoskeleton that are called spiracles and are located laterally along the thorax and abdomen of most insects (usually one pair of spiracles per body segment). The air flow is regulated by small muscles that operate one or two flap-like valves within each spiracle contracting to close the spiracle, or relaxing to open it.

The fish oil in Organocide is an inert ingredient that transports the sesame oil, the product’s active ingredient, which mostly consists of unsaturated fatty acids that contract the small muscles that operate the flap-like valves and close the spiracles, thus killing the insect by asphyxiation.

In insects like bees, crickets, grasshoppers, beetles and others, the effect of Organocide is diminished since these hard body insects have a larger size and number of spiracles (Figure 1). In soft bodied insects like whiteflies, aphids, mites, scales and others, the small muscles in the spiracles are weaker and susceptible to the contraction caused by the sesame oil (Figure 2). For more information about this product go to:


**Read before you buy any product!** Review the products information online before you buy: the Material Safety Data Sheet, the label and directions for use in a larger font, and the environmental hazard statement.

**For more information on alternatives for pest control:**

- Alternatives to Pesticides [https://www.state.nj.us/dep/enforcement/pcp/administration/alternative.pdf](https://www.state.nj.us/dep/enforcement/pcp/administration/alternative.pdf)
- Pesticides and Alternatives [https://extension.psu.edu/pesticides-and-alternatives](https://extension.psu.edu/pesticides-and-alternatives)
- Farmers Shift Towards Virtually Non-Toxic Alternatives [https://blog.epa.gov/2015/02/02/farmers-shift-towards-virtually-non-toxic-alternatives-for-pest-control/](https://blog.epa.gov/2015/02/02/farmers-shift-towards-virtually-non-toxic-alternatives-for-pest-control/)
A Transmissible RNA Pathway in Honey Bees. Eyal Maori, Yael Garbian, Vered Kunik, Niv Sabath, Ilan Sela, Sharoni Shafir, Open Access
Published: May 02, 2019, DOI: https://doi.org/10.1016/j.celrep.2019.04.073

Systemic RNAi, initiated by double-stranded RNA (dsRNA) ingestion, has been reported in diverse invertebrates, including honey bees, demonstrating environmental RNA uptake that undermines homologous gene expression. However, the question why any organism would take up RNA from the environment has remained largely unanswered. Here, we report on horizontal RNA flow among honey bees mediated by secretion and ingestion of worker and royal jelly diets. We demonstrate that transmission of jelly-secreted dsRNA to larvae is biologically active and triggers gene knockdown that lasts into adulthood. Worker and royal jellies harbor differential naturally occurring RNA populations. Jelly RNAs corresponded to honey bee protein-coding genes, transposable elements, and non-coding RNA, as well as bacteria, fungi, and viruses. These results reveal an inherent property of honey bees to share RNA among individuals and generations. Our findings suggest a transmissible RNA pathway, playing a role in social immunity and signaling between members of the hive.

READ MORE https://www.cell.com/cell-reports/fulltext/S2211-1247(19)30553-4?_returnURL=https%3A%2F%2Flinkinghub.elsevier.com%2Fretrieve%2Fpii%2FS2211124719305534%3Fshowall%3Dtrue

Neonicotinoid Research References

- See the Research section of the Pollinator News http://pollinatorstewardship.org/index.php/pollinator-news/
- Research: Neonicotinoids http://pollinatorstewardship.org/index.php/research-neonicotinoids/
- The Task Force on Systemic Pesticides http://www.tfsp.info/findings/

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A 501c3 nonprofit
The Difference Between ‘Bug,’ ‘Insect,’ and ‘Beetle’
A bug is an insect and so is a beetle, so what’s an insect?

The word *bug* is used loosely for any itsy-bitsy, annoying, sometimes frightening, creeping or flying creature (and for any mild illness or cause of a minor computer problem, among other things). But the word’s current usage does not reflect its history, which goes back to Middle English, where *bugge* referred to either a scarecrow or a hobgoblin. Read more so you can educate non-beekeepers at your farmer’s market, in line at the bank, and next to your car featuring a bumper sticker, “Buy Local Honey.”


Feed the Pollinators; Plant Today
*Videos to inspire you to plant pesticide-free forage for pollinators*

Improve ecosystem health by creating habitat for pollinators and beneficial insects. You’ll learn about the importance of native plants and get inspired to create some healthy habitat of your own.

https://www.youtube.com/watch?v=WoeibckEnX4&feature=youtu.be

See a yard transformed into pollinator habitat
https://www.youtube.com/watch?v=BR5OsP6bKbl

Listen to the Pollinator Habitat on 30 acres at Fairborn Cement’s reclaimed mining land
https://www.youtube.com/watch?v=VZFyChhadik and https://www.youtube.com/watch?v=6-aiqob04TY

Neighbors Misuse Local Beekeeping Ordinance To Attempt to Restrict Native Bee House

Canal Winchester, OH- June 10, 2019—Dawn G., a gardener, welcomed Mason bees to her land by placing a native bee house near the peak of the garage. For four years, the Mason bees laid their eggs, emerged the next year, and repeated the cycle, and pollinated her garden, and the landscape of her neighbors. When the Mason bee land owner posted a joyful picture of a busy Mason bee house on Facebook, her neighbors let fear and ignorance run amok. They filed a nuisance complaint with the City government, stating she had an unregistered hive on her property. The neighbors claimed the Mason bees would swarm onto their property. The neighbors claimed if a child’s ball rolled near the Mason bee house children would be attacked trying to retrieve the ball. The Mason Bee house owner took action upon receipt of a written nuisance complaint from the City. Dawn contacted the local park naturalist. She contacted the state beekeeping association. And, she contacted the Pollinator Stewardship Council. We provided Dawn with information about Mason bees, explained the local beekeeping does not mention native bees at all, and we provided her with a letter of support, which we also sent to the City Planning and Zoning Commission. A hearing was held June 10, and as the Mason bee house owner exclaimed, “We won!” The Planning and
Zoning Commission agreed the beekeeping ordinance was for honey bee hives only. Dawn’s Mason bee house was not a “nuisance.”

Take action for pollinators in your community! Educate your family, your neighbors, your community about the value of pollinators making possible one in three bites of our food, food for wildlife, and the trees, shrubs, and flowers which beautify our communities.

**Vote Makes Four Native Bumble Bee Species Candidates for Listing under California Endangered Species Act**


The California Fish and Game Commission has voted to begin the listing process for four native species of bumble bees as endangered, in an attempt to ensure their survival in the state. This process was triggered by a legal petition filed last year by conservation and food safety groups requesting that the western bumble bee, Franklin’s bumble bee, Crotch’s bumble bee and the Suckley cuckoo bumble bee are listed as Endangered under the act.

The California Department of Fish and Wildlife recommended that the petition to list these bees as endangered species under the California Endangered Species Act (CESA) met the standard that listing of these bees “may be warranted.” The Commission’s vote today makes these four native bee species “candidates” for placement on the state endangered species list and triggers a 12-month scientific process to determine if the species qualify for final endangered species listing under CESA.

“This vote is crucial for the continued survival of these pollinators,” said Kim Delfino, California program director for Defenders of Wildlife. “The Commission’s vote to make these four native bee species candidates for full protection under California’s Endangered Species Act sets a precedent not only for California but for the country to express the important role pollinators play in preserving our biodiversity.”

“This vote by the Fish and Game Commission is very timely,” said Sarina Jepsen, director of the Xerces Society’s endangered species program and coauthor of the petition. “By acting on this petition, California has demonstrated how an individual state can lead the nation in protecting pollinators, benefiting both farms and natural areas.”

**Bumble Bee Profiles:**

Crotch’s bumble bee (Bombus crotchii), a bee with yellow, black and often orange on its abdomen, is considered Endangered by the International Union of the Conservation of Nature (IUCN); it only persists in 20% of its historic range, and has declined by 98% in relative abundance (its abundance relative to other species of bumble bees). This bee historically occurred from the northern Central Valley to Baja Mexico, but currently persists primarily in southern coastal habitats and some areas to the north and southwest of Sacramento.

The Suckley cuckoo bumble bee (Bombus suckleyi) was historically found throughout the western U.S. As a cuckoo bumble bee, it is found only where its host species of bumble bees, including the western bumble bee, remain. It is considered Critically Endangered by the IUCN and its range has declined by 58%.

Franklin’s bumble bee (Bombus franklini), which historically occurred in an area about 60 miles wide in the Siskiyou Mountains of northern California and southern Oregon may already be extinct. Despite extensive annual surveys by Dr. Robbin Thorp, professor emeritus at the University of California–Davis, Franklin’s bumble bee has not been seen since 2006.
The western bumble bee (Bombus occidentalis occidentalis) has a range that extends across the western U.S. and southern Canada. In California, it was historically known from the northern part of the state, the coastal region, and the mountains. It currently persists primarily in the Sierra Nevada; its relative abundance has declined by 84%.


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**Landscape predictors of pathogen prevalence and range contractions in US bumble bees**

Scott H. McArt1, Christine Urbanowicz2, Shaun McCoshum3, Rebecca E. Irwin4 and Lynn S. Adler

**Abstract:** Several species of bumblebees have recently experienced range contractions and possible extinctions. While threats to bees are numerous, few analyses have attempted to understand the relative importance of multiple stressors. Such analyses are critical for prioritizing conservation strategies. Here, we describe a landscape analysis of factors predicted to cause bumble bee declines in the USA. We quantified 24 habitat, land-use and pesticide usage variables across 284 sampling locations, assessing which variables predicted pathogen prevalence and range contractions via machine learning model selection techniques. We found that greater usage of the fungicide chlorothalonil was the best predictor of pathogen (Nosema bombi) prevalence in four declining species of bumble bees. Nosema bombi has previously been found in greater prevalence in some declining US bumblebee species compared to stable species. Greater usage of total fungicides was the strongest predictor of range contractions in declining species, with bumble bees in the northern USA experiencing greater likelihood of loss from previously occupied areas. These results extend several recent laboratory and semi-field studies that have found surprising links between fungicide exposure and bee health. Specifically, our data suggest landscape-scale connections between fungicide usage, pathogen prevalence and declines of threatened and endangered bumblebees.


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**Seed coating with a neonicotinoid insecticide negatively affects wild bees**


Understanding the effects of neonicotinoid insecticides on bees is vital because of reported declines in bee diversity and distribution1,2,3 and the crucial role bees have as pollinators in ecosystems and agriculture4. Neonicotinoids are suspected to pose an unacceptable risk to bees, partly because of their systemic uptake in plants5, and the European Union has therefore introduced a moratorium on three neonicotinoids as seed coatings in flowering crops that attract bees6. The moratorium has been criticized for being based on weak evidence7, particularly because effects have mostly been measured on bees that have been artificially fed neonicotinoids5,6,9,10,11. Thus, the key question is how neonicotinoids influence bees, and wild bees in particular, in real-world agricultural landscapes11,12,13. Here we show that a commonly used insecticide seed coating in a flowering crop can have serious consequences for wild bees. In a study with replicated and matched landscapes, we found that seed coating with Elado, an insecticide containing a combination of the neonicotinoid clothianidin and the non-systemic pyrethroid β-cyfluthrin, applied to oilseed rape seeds, reduced wild bee density, solitary bee nesting, and bumblebee colony growth and reproduction under field conditions. Hence, such insecticidal use can pose a substantial risk to wild bees in agricultural landscapes, and the contribution of pesticides to the global decline of wild bees1,2,3 may have been underestimated. The lack of a significant response in honeybee colonies suggests that reported pesticide effects on honeybees cannot always be extrapolated to wild bees. From [https://www.nature.com/articles/nature14420](https://www.nature.com/articles/nature14420)
Code of ethics for nonprofits - Why your nonprofit beekeeping association may want to adopt a statement of values

From the National Council of Nonprofits

It’s useful to adopt a set of principles to guide a nonprofit organization’s decision making and activities, as well as the behavior of its employees, volunteers, and board members. These principles could be called a “code of ethics” but they might be called the nonprofit’s “statement of values” or “code of conduct,” or something else. The purpose of adopting such a statement formally is to provide employees, volunteers, and board members with guidelines for making ethical choices and to ensure that there is accountability for those choices. When board members of a charitable nonprofit adopt a code of ethics, they are expressing their commitment to ethical behavior. Such a commitment goes a long way to earning the public’s trust. Honesty, integrity, transparency, confidentiality, and equity are each examples of values that are typically expressed in a charitable nonprofit’s code of ethics - but there may be other values that are very important to your nonprofit - and you may wish to spell those out so that the donating public, prospective employees, volunteers, and anyone who may be considering partnering with your organization, is aware of its values.

The significance of ethical leadership is of course not limited to the charitable nonprofit sector, but we think nonprofit leaders have a special obligation to demonstrate their commitment to values such as accountability, compassion, honesty, service to others, transparency, and respect. (A little sense of humor goes a long way too!) Ethical leadership is an important way for charitable nonprofits to maintain the public’s trust.

Nonprofit organizations are “public benefit” corporations; the purpose of their existence is to benefit the public. (See IRS explanation of “exemption requirements.”) The mission of a charitable nonprofit expresses the particular way that the organization will fulfill its public benefit purpose. Fittingly, board members are often referred to as “trustees,” which reinforces the concept that the assets of a nonprofit are entrusted to the board members, who have a legal and fiduciary duty to ensure that the nonprofit uses its assets to advance its public benefit mission.

It is one thing to exist for the benefit of the public; it is another to earn the public’s trust, which requires ethical leadership and responsible - and responsive - practices. Donors will give to organizations they trust. Earning trust requires using contributions wisely, but also demonstrating a commitment to ethical conduct. Volunteers will invest their time in causes when they trust that the nonprofit is acting ethically. And clients and consumers will return to a nonprofit for services, and recommend that nonprofit to others, when the nonprofit has shown it is accountable for its actions, transparent in its financial dealings, and responsive when concerns come to the nonprofit’s attention.

The Council of Nonprofits encourages all nonprofits to craft an appropriate “statement of values” or “code of ethics” for your nonprofit.

For more information and templates go to the National Council of Nonprofits
National Pollinator Week Activities

Rave reviews from participants and speakers at the Corporate Pollinator Habitat Symposium, June 17 at the Franklin Park Conservatory & Botanical Gardens, as part of our National Pollinator Week activities.

As one participant stated in an email afterwards: “Congratulations! It was a fabulous symposium! Not only did I meet some great people, but I learned things, too. (I wish that Stephanie Frischie had taught my entomology course!)”

It was obvious during the morning and afternoon breaks and at lunchtime the attendees were inspired, wanted to create pollinator habitat, and spent time talking with others to determine how to make it happen.

Speakers and topics presented included:

- Michele Colopy, Beekeepers Collaborating With Corporations to Create Pollinator Habitat
- Sabrena Schweyer, Lawn Alternatives: The Landscapes of the Future
- Dave Riddell, Large Scale Pollinator Habitat Development
- Stephanie Frischie, Pollinator-Friendly Corporate Landscaping – Planning, Implementation, and Grounds Management Opportunities
- Dr. Mary Gardiner, Insect Conservation in Urban Areas
- Scotts Corporate and Highway Pollinator Habitat Projects

Based on written evaluations by participants this Symposium certainly met expectations, and we have guidance for future educational activities. Speaker links are listed below.

http://www.salsbury-schweyer.com/services_main.html


Kroger updates pesticide policy to protect pollinating species

Environmental, consumer groups push for stronger response

CINCINNATI — Kroger (NYSE: KR) released an update to its pollinator policy today encouraging suppliers to move away from pesticides and adopt alternative pest management. The policy states Kroger supports the expansion of organic food and products that are affordable for many families. Environmental, consumer, beekeeper and farmworker groups have pressured Kroger for more than three years to eliminate toxic pesticides and expand organic offerings to protect people and pollinators, marking a small but robust victory.

“This is a step in the right direction to protect people and pollinators from toxic pesticides in Kroger’s supply chain,” said Tiffany Finck-Haynes, pesticides and pollinators program manager at Friends of the Earth. “However, this policy is non-binding and vague. We urge Kroger and other top food retailers to do their part in addressing the pollinator crisis by making clear, time-bound commitments to phase out chlorpyrifos, neonicotinoids, glyphosate and other toxic pesticides throughout their entire food supply chains.”

“While we welcome and celebrate Kroger’s expanded pollinator policy and the steps it is taking to protect bees by encouraging suppliers to limit bee-harming pesticides and increase its pesticide-free products, Kroger must do more,” said Katie Reilly, campaign manager at SumOfUs. “The loss of pollinators puts our entire food supply and Kroger’s business model at risk. As the largest grocery store chain in the US, Kroger has a responsibility to its customers and shareholders to phase out bee-killing pesticides on the food it sells and be a leader in protecting bees and our food supply.”

“We are pleased Kroger is examining how they can protect pollinators from the adverse impact of pesticides. However, the pesticide labels do not protect pollinators, nor do they protect farmers and farm workers from tank mixes of pesticides,” said program director for the Pollinator Stewardship Council. “Combinations of pesticides increase the toxicity of the pesticides killing honey bees. These pesticides remain in the soil killing the beneficial insects that protect crops and provide nutrition to crops. Healthy soils support healthy pollinators which support healthy food. We encourage Kroger to continuing learning about the impact of pesticides on the very pollinators that provide them with food to sell.”

This announcement follows three years of protests outside Kroger’s annual shareholder meetings by local Ohio organizers, farmworkers from Florida, students and public health, beekeeping, environmental, faith-based and consumer allies. The protests are part of a campaign led by Friends of the Earth and allies urging Kroger and other food retailers to protect pollinators and human health by phasing out toxic pesticides and increasing domestically produced organic offerings.

Recent independent lab testing found that Kroger’s store-brand foods contain pollinator-toxic pesticides including glyphosate, organophosphates and neonicotinoids. Kroger lags behind its competitors on pesticide reduction. A 2018 scorecard from Friends of the Earth found that Kroger is failing to protect bees and people from toxic pesticides.

Pollinators and other insects could go extinct within a century, threatening a “catastrophic collapse of nature’s ecosystems,” according to the first comprehensive global meta-analysis of insect decline. The widespread use of neonicotinoids and other toxic insecticides in industrial agriculture is a key driver of this decline. Bees and other pollinators are essential for 1-in-3 bites of food.

Neonicotinoids, the world’s most widely used synthetic pesticides, are a key driver of global declines of critical pollinators and species ranging from aquatic insects to birds. Despite millions of public comments, the U.S. Environmental Protection Agency has delayed action on most uses of these pesticides.

Chlorpyrifos is a toxic nerve agent pesticide that threatens the survival of bees and other pollinators and can cause damage to children’s developing brains, including reduced IQ, loss of memory and attention deficit disorders, as well as acute pesticide poisoning in adults and children. Agricultural workers, their families and rural communities are particularly vulnerable. The EPA was set to ban all uses of chlorpyrifos nationwide last year, but the Trump administration reversed that decision.

Glyphosate is the world’s most widely-used weed killer, a probable carcinogen and a leading driver of monarch butterfly decline. More than 13,400 people are suing Bayer-Monsanto for glyphosate’s contribution to their cancer and juries have awarded more than $2 billion in damages to date.
Plan to Expand Your Beekeeping & Pollinator Education

July 8-10, 2019 Heartland Apicultural Society Conference [http://www.heartlandbees.org/]

July 15-19, 2019 Eastern Apicultural Society Conference [https://www.easternapiculture.org/]


Sept. 20, 2019 – Cleveland Pollinator & Native Plant Symposium [https://www.clevelandpollinatorsymposium.org/]


2020

Jan. 8-11, 2020 – American Honey Producers Association Conference [https://www.ahpanet.com/]

March 20-21, 2020 - HONEY Convention, [http://honeyconvention.com/]

October 9 and 10, 2020- Tennessee Beekeepers Association Annual Conference [http://www.tnbeekeepers.org]

Tank mixes (combinations)

Spray Toxicity and Risk Potential of 42 Commonly Used Formulations of Row Crop Pesticides to Adult Honey Bees (Hymenoptera: Apidae), YU CHENG ZHU, JOHN ADAMCZYK, THOMAS RINDERER, HANXU YAO, ROBERT DANKA, RANDALL LUTTRELL, AND JEFF GORE, J. Econ. Entomol. 1–8 [2015]; DOI: 10.1093/jee/tov269

- **Three pesticides killed less than 1% of the worker bees, including the herbicide, a miticide, and a neonicotinoid.**

- **Twenty-six insecticides killed more than 99% of the bees, including commonly used organophosphates and neonicotinoids.**

- **The remainder of the 13 chemicals killed from 1–99% of the bees at field application rates.**

Thank you to member groups Los Angeles County Beekeepers Association and Long Beach Beekeepers Association for inviting me to speak to their members about “Migratory Beekeeping: Why keeping bees alive is so difficult,” and “Herbicides, Fungicides, and Insecticides: Unwelcome guests in your hives” at the end of May.
People and Pollinators Action Network http://www.peopleandpollinators.org/
Seib’s Hoosier Honey http://www.seibshoosierhoney.com/
Strachan Apiaries https://www.strachanbees.com/
Beekeepers of Middle Tennessee http://bomtn.org/
Hackenberg Apiaries http://hackenbergapiaries.org/
Old Mill Honey Co.
Wind River Honey Co.
South Dakota Beekeepers Association
Miksa Honey Farms
Sunshine Apiary, Inc.
Hiatt Honey LLC
Rick Smith
Bob McDonell
Headwaters Farm
Bret Adee
Robert Bergman
Charles Scott
Tom Sullivan
Brians Bee Haven
Acorn Beekeeping Equipment, LLC
Jubilee Honeybee Co., LLC
Joe Hurley
R.T. Marshall
Vincent Aloyo
Janet Katz
Lynn Sparks
Laura Wyatt
Sustainable Futures Fund
Scotts MiracleGro Foundation
International Mating Nucs
Mel Disselkoon
Ruby’s Apiaries
S & M Honey
Sammy Ramazani
The Studio Digital http://www.thestudiodigital.com/
Beekeeping Insurance Services http://www.beekeepingins.com/
Gene Brandi Apiaries
The Beekeepers of Indiana http://indianabeekeeper.com/
The Organic View https://www.theorganicview.com/
Bee Squared Apiaries https://bethsbees.com/
Fleur-de-lis Apiary
Los Angeles County Beekeepers Association
John Accornero, Lee Albritton, Linda & Manley Bigalk, William Cannon
Amy Davis, Margaret Donharl, Sara Grimm, Lynn Hazelrigg
David Hill, Janet Hofman, Ray Hopper, Linda Howitt, Eric Kimble, Leigh Wiley, Paula Breen, Bob Brandi,
Susan Rhodes, Janel Rogers, Wayne Ross, Susan Rudnicki, Kim Schneider, Jacob Troyer, Tom Theobald,
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Our mission is to defend managed and native pollinators vital to a sustainable and affordable food supply from the adverse impact of pesticides. Join us! You can complete this form and mail it, go online and join us, or make a donation today at www.pollinatorstewardship.org.

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___ $50 nonprofit partners with similar mission
___ $500 Beekeeping Supplier Partner
___$1,000 agricultural stakeholder partner with budgets $1M+

Beekeepers
___ $25 individual beekeeper with 25 or less hives
___ $75 individual beekeeper with 26 to 300 hives
___$1.00 per hive for commercial beekeepers with 301+ hives

Beekeeping Associations
___ $100 for a local beekeeping assn. with 10-50 members
___ $200 for a local beekeeping assn. with 51-100 members
___ $250 for a local beekeeping assn. with 101-300 members
___ $500 for a State/Regional Beekeeping Assn., and beekeeping clubs of 301+ members
___ $5,000 Founding Member

To view the benefits of membership go to www.pollinatorstewardship.org

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