

Pesticides and You

News from Beyond Pesticides: Protecting Health and the Environment with Science, Policy & Action

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Pesticide Use in Marijuana Production: Safety Issues and Sustainable Options

Also in this issue:
**Social Justice Labeling:
from Field to Table**

Pesticides in Marijuana Production? Safety Concerns, Sustainable Options

A word about our special investigation in this issue of PAY into the production of cannabis (marijuana) and questions of the practices used in its cultivation. We do not wade into the debate on legalization of marijuana; we do advance production practices, where it has been legalized by a state, that are protective of health and the environment.

When we first considered the wave of legalization that was occurring across the country for medical marijuana, it became evident that the crop was being grown without adequate attention to the pesticides being used in its production. This has serious ramifications, because exposure to the crop in its cultivation and through inhalation, ingestion and absorption through the skin has become more and more widespread. How is the crop produced? Who is evaluating the production practices? Given that cannabis is defined as a narcotic by the U.S. government, does EPA's lack of registration and associated health and environmental reviews for pesticide use in legalized marijuana production create a clear pesticide application and residue ban? Could this be an opportunity to require that legalized marijuana be grown without any registered pesticides in organic production systems? What are the states doing to ensure that legalized marijuana production practices do not harm people, the environment and workers?

State Action as the Fed Bows Out

Our investigation raises important public health and environmental issues as well as pesticide and organic policy issues concerning cannabis production. Our initial analysis led us to the conclusion that no pesticides registered for use in the U.S. by EPA are legal for use in the production of cannabis. It seems simple. EPA has and will not (until the crop is reclassified from its current status as a narcotic) label any pesticide for use in cannabis production. However, as we investigated what states are doing to enforce this, we found a range of state laws in 23 states and the District of Columbia that sought to define allowed pesticide uses and management practices in cannabis production. Some states are silent on the matter, among them California. This either means that they are ignoring what is going on in production practices or they are enforcing against any registered pesticide use. It is not clear, although the official line is that they are enforcing a no pesticide use policy. Other states, led by the Washington State, have reached out to EPA for clarification. EPA's response has muddied the waters, telling the states that, while marijuana does not fit into any general group, such as an herb, spice, or vegetable, "[I]t may be legally used on marijuana under certain general types of crops/sites when there is an exemption from tolerance," tolerance being the standard set by EPA for allowable pesticide residues in food. States have interpreted as acceptable in cannabis production, with EPA concurrence, broad spectrum herbicide and fumigant use outdoors as long as the pesticide label does not specify the food crop to be planted after the application.

This led us to question use and exposure issues associated with pre-planting uses in soil, where exposure can occur by uptake in the plant (ignored by EPA and the states). Ultimately, EPA and states

have identified a group of pesticide products, called 25(b) pesticides (named after the section of the *Federal Insecticide Fungicide and Rodenticide Act* (FIFRA) that governs) as exempt from registration and therefore allowed under federal law. EPA defines 25(b) as "demonstrably safe for its intended use," exempt from federal registration, and required to provide full disclosure on the product label of all ingredients in these products.

The bottom line is that some states do and more states should require that legalized marijuana be grown without pesticides (and in this case we're saying grown without *registered* pesticides). Interestingly, it is not sufficient to require certified organic practices because organic, under the *Organic Foods Production Act*, allows some registered pesticides, like pheromones, copper, and sulfur. So, in requiring organic production practices, these must by law be prohibited.

While this topic is particularly relevant to those who are using medical marijuana under a doctor's care because of the exposure that occurs through inhalation, ingestion, and absorption, there are also large questions about environmental impacts where the crop is cultivated and exposure for those who produce the crop.

As crop production of cannabis increases, we have an opportunity to restrict all pesticide use at the front end of a growing market, require the adoption of organic systems plans, and set a course to protect health and the environment.

Agricultural Justice

How food is grown and whether the operations are just and fair is another topic important to production systems, and particularly organic. Organic and fair trade are two of the fastest growing sectors in agriculture. This issue of PAY reprints a talk from our 2014 conference, *Advancing Sustainable Communities: People, pollinators, and practices*, which explains ongoing work to incorporate social justice standards into organic systems so that they fully reflect the values and principles that helped to nurture it.

Michael Sligh, founding member of the Rural Advancement Fund International (RAFI) and its director of policy, research and education, explains the development of a label and standard by the Agricultural Justice Project —supported by the Domestic Fair Trade Association. As Michael says, "We . . . know that farmworkers, processing workers or even retail workers are left out of the organic standard. . . we don't



have public policy to support this. . . there is growing interest on the part of consumers who want this. . . [and] businesses want to differentiate in the market." This is all part of continuous improvement and embraces the underlying principle of sustainability.

Jay Feldman is executive director of Beyond Pesticides.



2 Mail

"Safe" Pesticides? What's in a Word; Aerial Drift Dangers; #BeeKindObama

4 Washington, DC

EPA Responds to Call for Chlorpyrifos Ban with New Risk Calculations and Continued Use; Lawsuit Challenges EPA's Failure to Regulate Nano-Pesticides; Fish and Wildlife Service to Consider Federal Protection for Monarch Butterfly; Over 100 Businesses Urge Obama to Suspend Bee-Toxic Pesticides and Over 100 Scientists Call for Action on Bee-Toxic Pesticides

6 Around the Country

Study Finds Organic Agriculture Can and Must Feed the World; Washington County Bans Neonics; Rise in Chronic Diseases Correlates with Glyphosate and GE Crops; Aerial Photos Show Organic "Factory Farms" in Violation of Law; California Tightens Pesticide Limits on Strawberries and Other Crops; Leak at Chemical Plant Producing Pesticide Ingredient Kills Four Workers

9 Social Justice Labeling: From Field to Table

14 Pesticide Use in Marijuana Production: Safety Issues and Sustainable Options

As states legalize cannabis, toxics in cultivation intersect with health and the environment, and ecological practices

24 A Sting in the Tale

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“Safe” Pesticides? What’s in a Word

Beyond Pesticides,

I remember reading a quote a while back and just need clarification. “Federal EPA law states that no pesticide can be considered safe in any amount...” Do you have a source for this? Several papers and presentations I’ve come across have used that statement. Thanks for your help!

Mara N.

Hi Mara,

There certainly is confusion out there over the word “safe” in reference to pesticide products. As a 1990 U.S. Government Accountability Office (GAO) report notes, “EPA has a repeatedly stated the position that no pesticide is safe, because pesticides are, by their very nature, designed to be biologically active and kill various organisms.” GAO indicates that EPA has never specifically allowed labeling statements on pesticide products to convey an impression of safety because consumers may misinterpret the claim to believe that directions and caution statements are not important.

However, in practice EPA is allowing the claim that a pesticide is “safe” when followed by language that states “when used according to label directions.” For example, on the recent registration of Enlist Duo (a new 2,4-D based herbicide to go along with 2,4-D tolerant corn) the agency’s FAQ states:

Q: *“Is Enlist Duo Safe?”* **A:** *“When used according to label directions, Enlist Duo is safe for everyone, including infants, the developing fetus, the elderly and more highly exposed groups such as agricultural workers.”*

When registering a new pesticide, EPA is not required by law to show that the pesticide itself is safe. It is required to show that the pesticide does not pose an unreasonable adverse effect and, in the case of exposure through diet, presents a “reasonable certainty of no harm” when used according to label directions. It should be noted that these qualified protections are based

on risk assessments that themselves introduce serious issues of uncertainty and data gaps associated with a range of pre-existing health conditions, vulnerabilities, potential exposure patterns, and health outcomes.

EPA seems to now distinguish between the product and the use of the product. It is not considering the product safe, but is saying the use of the product can be considered safe. This would be a break with past interpretation of the law.

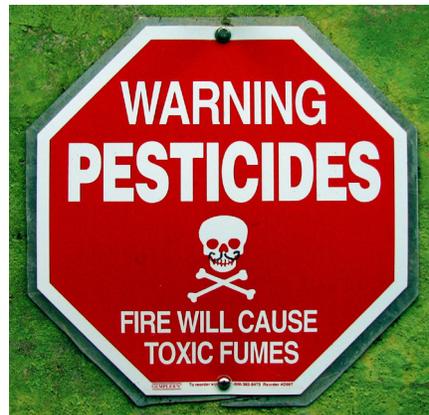
Take a look at this document EPA sent to a manufacturer wishing to call their antimicrobial pesticide safe: www.epa.gov/opad001/surface-safety-guide.pdf.

Beyond Pesticides strongly disagrees with EPA that a pesticide label can ensure safety. Most labels are not read by homeowners or even professional applicators. Further, pesticide labels do not adequately take into account sensitive populations, the potential for off-target drift, the effects of pesticide mixtures or inert ingredients in the formulation, chronic effects of a pesticide, or data gaps in the active ingredient’s toxicity profile, among a number of other issues. Please feel free to email us at info@beyondpesticides.org or call 202-543-5450 if we can provide any further clarification.

Aerial Drift Dangers

While out walking the outdoors, twice, I have been sprayed with pesticides. I live in Cotton County, OK. Consumer Protection Services requires a completed Pesticide Complaint Statement. The last time the plane had a constant stream leak coming from the left wing. Grandchildren were present! The pesticide spraying was 1/2 mile off the targeted area!

-Oma H.



Hi Oma,
We’re very sorry to hear about your incidents and appreciate you reaching out to Beyond Pesticides for assistance. We hope that all involved are okay and have sought proper medical attention. Aerial pesticide applications are notorious for causing

off-target drift. You were correct in contacting the pesticide lead agency in the state, Oklahoma Department of Agriculture’s Consumer Protection Services, to file your complaint. In reporting the incident, it is important to get information such as the date and time, weather conditions, wind speed and direction, and the flight pattern of the plane (i.e. how many turns were made). Your indication of a leak from the left wing should certainly be a red flag for regulators. In addition to alerting the state agency, Beyond Pesticides also recommends that you contact EPA to alert enforcement staff to this incident. State agencies are required to report pesticide complaints to EPA; however, this does not always occur.

Share With Us!

Beyond Pesticides welcomes your questions, comments or concerns. Have something you’d like to share or ask us? We’d like to know! If we think something might be particularly useful for others, we will print your comments in this section. Mail will be edited for length and clarity, and we will not publish your contact information. There are many ways you can contact us: Send us an email at info@beyondpesticides.org, give us a call at 202-543-5450, or simply send questions and comments to: 701 E Street SE, Washington, DC 20003.

Unfortunately, state laws in Oklahoma and in numerous states throughout the country do not adequately protect residents from drift. While Beyond Pesticides advocates for the creation of wide area buffer zones (1/2 mile or greater is needed at minimum for aerial applications, as your incident shows) around schools, hospitals, and residential areas, many states, including Oklahoma, do not even have basic notification requirements regarding aerial pesticide applications. We recommend a dual approach.

First, make an effort to organize other concerned citizens in your community and contact your state and local legislators in support of stronger protections from pesticide spraying. By changing policy you can make a large impact toward preventing these incidents from happenings both to you and other folks throughout the state in the future. At the same time, try to reach out to the farmer directly and request increased communication of when and where spraying will occur. Let the farmer know of health

concerns, and the actions that can be taken to be a leader in protecting the community. You may even encourage the development of organic pest management systems that do not rely on hazardous aerial pesticide applications. Through concerted efforts both at an individual and community scale, such poisoning incidents can be prevented in the future. For more information on what to do in a pesticide emergency, visit Beyond Pesticides website here: <http://bit.ly/pesticideemergency>.

From the Web

Beyond Pesticides' Daily News Blog features a post each weekday on the health and environmental hazards of pesticides, pesticide regulation and policy, pesticide alternatives and cutting-edge science, www.beyondpesticides.org/dailynewsblog. Want to get in on the conversation? "Like" us on Facebook, www.facebook.com/beyondpesticides, or send us a "tweet" on Twitter, @bpncamp!

Monsanto's Roundup Eradicates Milkweed, Major Food Source for Monarch Butterflies

Excerpt from Beyond Pesticides original blog post (2/9/2015): A report, Monarchs in Peril: Herbicide-Resistant Crops and the Decline of Monarch Butterflies in North America, released by the Center for Food Safety (CFS) last week, reveals the devastating impact of Monsanto's and the nation's biggest selling herbicide, Roundup (glyphosate), on the survival of monarch butterflies.

Mulysa M., of Resilience Design, Comments:

"Yes, let's plant locally-native milkweed species and nectar plants in our yards. Creating habitat at every scale is important. And let us look at how we each contribute to the GE monoculture that is the root of the monarch crisis: Are we burning corn/soy ethanol in our cars? Buying non-organic food? Using corn/soy based plastic products? Everything is connected and our everyday choices matter. While we are replanting habitat and decreasing the demand for GE crops/products, we also need to demand policy change. Thanks, Beyond Pesticides, for keeping us informed and working hard on this issue."

Tell the President: #BeeKindObama!

Excerpt from Beyond Pesticides original blog post (12/15/2014): Earlier this year, the President called on federal agencies to create a plan to "promote the health of honey bees and other pollinators." To show appreciation for all that bees and wild pollinators provide, it is essential that this plan address toxic, persistent, and systemic neonicotinoid pesticides (neonics) —which science has shown to be a critical driver of pollinator declines.

J. Lucus Comments:

"We all share our home (planet) with everything that belongs here so we must be the caretakers and protectors. Please join us. Thank you for your time."



Beyond Pesticides' staff takes to Twitter to urge the President and White House to #BeeKindObama and suspend harmful neonic pesticides.

EPA Responds to Call for Chlorpyrifos Ban with New Risk Calculations and Continued Use

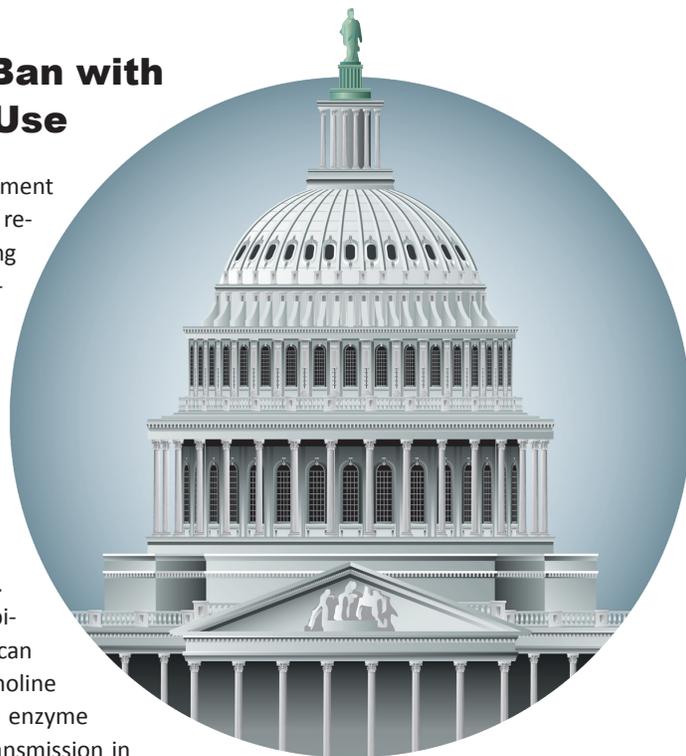
The U.S. Environmental Protection Agency (EPA) released a revised human health assessment for the insecticide chlorpyrifos at the onset of the new year. The assessment finds elevated risks to workers who mix, load, and apply chlorpyrifos, and that the chemical has the potential to contaminate drinking water in small watersheds. The assessment also notes that EPA will retain the 10X (10-fold) safety factor to protect children from all routes of exposures. EPA's latest finding confirms longstanding scientific data that has documented chlorpyrifos' toxicity to humans and environmental contamination. Despite these findings, EPA proposes to place additional restrictions on chlorpyrifos use, instead of banning the chemical.

This latest assessment updates the June 2011 preliminary human health risk assessment, which was widely criticized by environmental and farmworker groups.

EPA is releasing the assessment based on new information received after 2011, including public comments. The assessment is, in part, in response to a 2007 environmental petition that called on the agency to ban all uses of the insecticide.

Chlorpyrifos is an organophosphate insecticide that is known to be neurotoxic. It is a cholinesterase inhibitor, which means that it can bind irreversibly to acetylcholine esterase (AChE), an essential enzyme for normal nerve impulse transmission in the brain, depressing the enzyme. Studies have documented that exposure to even low levels of organophosphates, like chlorpyrifos, during pregnancy can impair learning, change brain function, and alter

thyroid levels of offspring into adulthood. The evidence of the neurotoxic dangers associated with chlorpyrifos exposure is extensive and consistent.



Lawsuit Challenges EPA's Failure to Regulate Nano-Pesticides

Beyond Pesticides joined the Center for Food Safety (CFS) in filing a lawsuit last December against the U.S. Environmental Protection Agency (EPA) over the agency's failure to regulate novel nanomaterial pesticides. In 2008, more than 13 organizations filed a legal petition demanding that the agency take action on this nanomaterial issue. The lawsuit challenges the agency for its failure to answer the petition, while the proliferation of nanomaterials in consumer products continues unabated.

"It is unfortunate that it takes a lawsuit to get EPA to carry out its responsibility to regulate nano-silver for its toxic pesticidal properties and broad exposure patterns through consumer and personal care products," said Jay Feldman, executive director of Beyond Pesticides. "Like

any toxic pesticide, nano-silver must be subject to the full force of the law and label restrictions intended to protect people's health and the environment," Mr. Feldman said.

Nanotechnology is a platform technology for manipulating materials at the atomic and molecular level; manufactured nanomaterials are so small that they cannot be seen with an ordinary microscope. In comparison, a strand of human hair is 50,000 to 80,000 nanometers wide. Their exponentially small size gives them extraordinary mobility for a manufactured material, as well as unique chemical properties. Nanomaterials' properties increase potential for biological interaction and increase potential for toxicity, which can result in DNA mutation, structural damage

within the cell, and even cell death. Once in the blood stream, they can move freely through organs and tissues, including the brain, heart, liver, kidneys, spleen, bone marrow, and nervous system.

In the 2008 petition, petitioners identified 260 nano-silver consumer products, which has increased to over 400 nano-silver products on the market today. Because there are no labeling requirements for nano-scale products, many more likely exist.

"Six years ago we provided EPA a legal and scientific blueprint to address (and) regulate these novel materials under its pesticide authority. The agency's unlawful and irresponsible delay ends now," said CFS senior attorney George Kimbrell.

Fish and Wildlife Service to Consider Protection for Monarch Butterfly

At the close of 2014, the U.S. Fish and Wildlife Service (FWS) announced plans to conduct a year-long status review of the monarch butterfly to determine whether the species is eligible for protection under the *Endangered Species Act* (ESA). FWS is taking this action as result of an August 2014 legal petition filed by health and environmental groups that presented substantial information indicating that listing under the ESA may be warranted. FWS also announced a \$3.2 million campaign in February to save monarch habitat.

In November 2014, Beyond Pesticides joined over 200 environmental groups and businesses in a letter asking for federal protection for monarch butterflies in the wake of shocking declines.

The North American monarch butterfly population has declined by 90 percent in the past 20 years, dropping from a high of approximately one billion in the mid-1990s to fewer than 35 million butterflies in the winter of 2013-2014 –the lowest number ever recorded. Each year, monarch butterflies travel over 2,000 miles between Canada, the U.S., and Mexico, across multiple generations, to reach their winter hibernation grounds in late October. As FWS indicates, this journey has become “more perilous for many monarchs” due to threats along their migratory paths. Scientists say the butterfly’s decline is being driven in large part by the loss of milkweed plants, the only food source monarch larvae can eat, in the Midwest where most monarchs are born.

FWS’ consideration of federal protection for monarchs is a positive step toward improving habitat and raising awareness about the decline of the butterfly, as well as the plight of other pollinator populations.



Photo by Diane St. John, Durham, CT

Over 100 Businesses Urge Obama to Suspend Bee-Toxic Pesticides and Over 100 Scientists Call for Action on Bee-Toxic Pesticides

More than 100 businesses, including Clif Bar, Nature’s Path, Organic Valley, and Stonyfield, sent a letter to the White House in January urging the Obama Administration to immediately suspend pesticides linked to global bee declines in order to protect the nation’s food supply, environment, and economy. The businesses, members of the American Sustainable Business Council (ASBC) and Green America’s Green Business Network, voiced concerns about the U.S. Environmental Protection Agency’s (EPA) delay in restricting neonicotinoids, the world’s most widely-used insecticides.

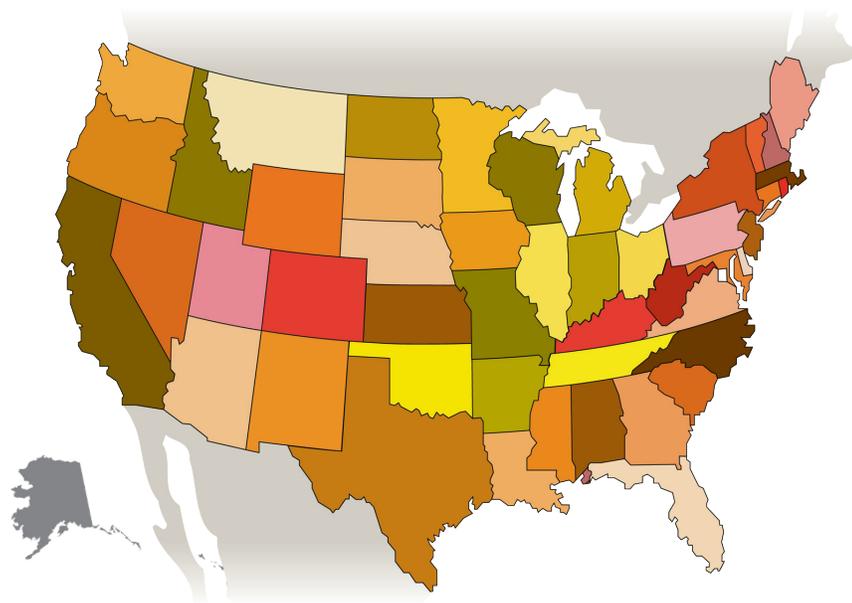
Many of the 118 businesses that signed the letter sell products with ingredients or inputs that are dependent on pollination from bees and other pollinators, including fruits, vegetables, nuts, seeds, fiber (such as cotton) and hay (including alfalfa grown to feed livestock). The businesses call on EPA to immediately suspend the registrations of neonicotinoid insecticides

for agricultural uses, including seed treatments, as well as cosmetic lawn and other unnecessary uses, pending the results of pesticide re-evaluation. They also call for increased investments in green, fair, and cutting-edge alternatives to neonicotinoids that support a prosperous and sustainable agricultural system.

This action follows a letter from over 100 scientists from diverse disciplines released back in December, which cites the growing body of scientific evidence that neonicotinoids and other systemic pesticides harm bees, and calls on leaders of President Barack Obama’s Pollinator Health Task Force to quickly take action on pesticides to protect and promote healthy populations of bees and other pollinators. The letter was submitted in response to the “listening sessions” hosted by EPA and the U.S. Department of Agriculture (USDA). These sessions were held by the agencies to collect public feedback on federal pol-

linator protection efforts as part of a plan to develop a National Pollinator Health Strategy. In June, the White House issued a Presidential Memorandum directing federal agencies to join the Pollinator Health Task Force, led by USDA and EPA, to develop pollinator health solutions.

The 108 scientists, whose areas of expertise include entomology, agronomy, ecology, and ecotoxicology, called on Task Force co-chairs, EPA Administrator Gina McCarthy, and USDA Secretary Tom Vilsack, to place a moratorium on the use of neonicotinoid pesticides in the U.S. and increase investment, research, and funding to assist in the adoption of alternatives. In the letter, the scientists note that, “While gaps do exist in knowledge around neonicotinoids, regulation with an eye to prevention of harm, precaution with regards to neonicotinoids, and commitment to safe and sustainable alternatives may well help to stem the tide of pollinator losses.”



Washington County Bans Neonics

At the close of 2014, Thurston County in Washington State became the first county government to ban the use of neonicotinoid insecticides on county-owned and managed lands. The ban comes in the form of an amended pest and vegetation policy and was passed by County Commissioners by a 3-0 vote in favor of the amendment.

According to *The Olympian*, the ban will impact 77 acres of county facilities, 2,646 acres of parks, 47.1 miles of trails, and one mile of right-of-way landscape. Commissioners instituted the ban because of concerns over the neonicotinoids' effects on pollinators.

Thurston County's ban is not the first time the county has taken up the issue of neonics in defense of pollinators. In 2013, the Commissioners petitioned the Washington State Department of Agriculture (WSDA) to restrict the sale, use, and application of neonics. Reasons for the petition included substantial bee colony loss in 2012. The petition was ultimately rejected by the state.

County Commissioner Sandra Romero told *The Olympian* that the Commission decided to take matters into its own hands, saying, "The goal of [the ban] is to send a big message to the public. . . We feel that it is a big enough issue and there could be a crisis if we have more bee colony collapses, more sick hummingbirds, more loss of our bats. All of the pollinators are in jeopardy."

While Thurston is the first county in Washington State to take action against neonics, cities within the state have led the way in protecting pollinators against the dangerous pesticides, including Seattle and Spokane. Outside of Washington, Eugene (Oregon), Skagway (Alaska), Ontario (Canada), and the European Union have all instituted either permanent or temporary bans on the use of neonics.

Study Finds Organic Agriculture Can and Must Feed the World

A new study out of the University of California, Berkeley, compares organic and conventional crop yields and finds that overall yield gaps are much smaller than earlier studies concluded and even smaller when compared crop-by-crop. The study, *Diversification practices reduce organic to conventional yield gap*, published in the journal *Royal Society Proceedings B*, also found that certain practices could further shrink the productivity gap, where it exists.

The findings are encouraging for organic advocates —organic yields are only 19.2 percent lower than conventional yields, a smaller yield gap than previous estimates. Regarding specific crops, such as legumes (lentils, beans, etc.) vs. non-legumes, no significant differences were identified. Researchers also note that the percentages were likely inflated, as available studies comparing farming methods were often biased in favor of conventional agriculture.

But the study also took one more step and analyzed whether or not organic farming could do better through agricultural diversification practices, otherwise known as multi-cropping and crop rotations. The answer was a resounding "Yes," showing that the crop yield difference could be reduced by 9 percent in the case of multi-cropping and 8 percent in the case of crop rotations.

"In terms of comparing productivity among the two techniques, this paper sets the record straight on the comparison between organic and conventional agriculture," said the study's senior author, Claire Kremen, Ph.D., professor of environmental science, policy and management and co-director of the Berkeley Food Institute. "With global food needs predicted to greatly increase in the next 50 years, it's critical to look more closely at organic farming, because aside from the environmental impacts of industrial agriculture, the ability of synthetic fertilizers to increase crop yields has been declining."

Rise in Chronic Diseases Correlates with Glyphosate and GE Crops

A study published in the *Journal of Organic Systems* finds connections between the increase in chronic diseases seen in the U.S. and other parts of the world over the last 20 years and the increase in glyphosate use. The study finds a significant correlation between glyphosate use, genetically-engineered (GE) crops, and human health.

Glyphosate, one of the most popular weed-killers in both the U.S. and the world, is the active ingredient in Monsanto's Roundup. Known as "Roundup Ready," GE soybeans, corn, cotton, and other crops have been genetically altered and patented by Monsanto to be glyphosate-tolerant. Whether a crop is grown from Roundup Ready seed or not,

glyphosate is used in almost all agricultural areas of the U.S., as well as on an international scale, in conventional, chemical-intensive farming operations. Because of Roundup's popularity, glyphosate use has skyrocketed, leading to an estimated application of nearly 250 million pounds of the chemical across the U.S. alone.

The dramatic rise in the use of glyphosate has ushered in independent data and research on the chemical's adverse health and environmental effects. As noted in the study, "Evidence is mounting that glyphosate interferes with many metabolic processes in plants and animals and glyphosate residues have been detected in both. Glyphosate dis-

rupts the endocrine system and the balance of gut bacteria, it damages DNA and is a driver of mutations that lead to cancer."

To explore the connection between the known increase in glyphosate use and similar rise in chronic diseases, the study, *Genetically Engineered Crops, Glyphosate and the Deterioration of Health in the United States of America*, examines U.S. government data on GE crops, glyphosate application, and disease epidemiology, and developed correlation coefficients for 22 diseases. The correlations were highly significant, according to researchers, and warrants a recommendation to reevaluate glyphosate residue levels and potential adverse health effects.

Aerial Photos Show Organic "Factory Farms" in Violation of Law

Stunning aerial photographs of certified organic farms taken in an investigation, "*Factory Farms*" *Producing Massive Quantities of Organic Milk and Eggs*, conducted by The Cornucopia Institute reveal industrial-scale operations housing thousands of animals in cramped conditions with limited access to the outdoors. Access to pasture for ruminants, like dairy cows, is required under National Organic Program (NOP) regulations, and all livestock certified organic must have a means of reaching the outdoors year-round. "The vast majority of these massive, industrial-scale facilities, some managing 10,000-20,000 head of cattle, and upwards of 1 million laying hens, had 100% of their animals confined in giant buildings or feedlots," said Mark Kastel, senior farm policy analyst at the Wisconsin-based Cornucopia Institute, which has filed a legal complaint against 14 livestock operations it alleges are illegally marketing themselves as organic.

It is important to note that not all organic farms house their animals in conditions seen in the aerial photographs. "Many of our dairy farmer-members have animals they truly care for that have names, not numbers," Mr. Kastel explained. Environmental and consumer groups have been sounding an alarm over the increased dependency many larger industry-owned farms have developed on synthetic inputs allowed in organic production as an exception to the no synthetics rule. Practices that create a dependence on synthetic chemicals are contrary to organic values, standards, and consumer expectations.

Organic agriculture, from the outset, is the only system of food production that is subject to independent public review and oversight, working to assure consumers that toxic, hazardous synthetic pesticides used in conventional agriculture are replaced by management practices focused on soil biology, biodiversity, and plant health. This eliminates commonly used toxic chemicals in the production and processing of food that is not labeled organic—pesticides that contaminate water and air, hurt biodiversity, harm farmworkers, and kill bees, birds, fish, and other wildlife.



California Tightens Pesticide Limits on Strawberries and Other Crops

The California Department of Pesticide Regulation (CDPR) announced in early January that it is implementing the country's strictest limits on chloropicrin, a chemical injected into the soil where strawberries, raspberries, almonds, and other crops are grown. The soil fumigant has been linked to a litany of health effects, such as respiratory ailments, skin irritation, and headaches, due to exposure to drift in surrounding areas over recent years. The new rules set up wider buffer zones of up to 100 feet around fields where the pesticide is applied, and restricts growers to fumigating 40 acres a day unless they use stronger tarps to prevent pesticide drift. Growers are also required to give the state 48 hours notice before fumigating and notify surrounding homes and businesses in Spanish and English.

Chloropicrin is used to control soil pathogens, nematodes, and certain weeds, and can be used alone or in combination with another fumigant, either 1,3-dichloropropene (1,3-D) or methyl bromide, both of which have also been shown to be toxic to human health and potent environmental contaminants. A 2011 report found that pesticide use rose in 2010 after a four-year decline, and those with the greatest increases include 1,3-D, and chloropicrin. The report also found 1,015 cases of illness between 1992 and 2007, resulting from chloropicrin exposure alone. In total, more than 173 million pounds of pesticides were reported applied statewide, an increase of nearly 15 million pounds—or 9.5 percent—from 2009.

California produces about 88 percent of the nation's strawberries, which account for 70 percent of all chloropicrin use. While the U.S. Environmental Protection Agency (EPA) completed a risk assessment of the chemical that resulted in label restrictions, CDPR found that further controls are still needed in California, and proposed additional restrictions back in early 2013. A 2010 CDPR health review recommended listing the pesticide as a toxic air contaminant. Though the new limits exceed that of the rest of the country, farmworker and advocacy groups say they fall short of scientists' recommendations. "The buffers are not large enough to protect residents, workers and schoolchildren," said Anne Katten, who monitors pesticide and worker safety for the California Rural Legal Assistance Foundation. "The long-term solution is to phase out the use of chloropicrin and other high-toxicity soil fumigants and move to alternative measures to control soil pests that are safer and more sustainable," Ms. Katten said.



Leak at Chemical Plant Producing Pesticide Ingredient Kills Four Workers

Four workers died in mid-November when the valve on a container of methyl mercaptan, a compound used in the production of insecticides, fungicides, and plastics, malfunctioned at a La Porte, Texas chemical plant owned by DuPont. The chemical, which has a strong odor of rotten eggs, spread throughout the Houston metropolitan area, causing concern for people up to 40 miles away.

This incident is the latest in a string of chemical disasters for DuPont and across the United States. A 2011 U.S. Chemical Safety Board (CSB) investigation determined that "a series of preventable safety shortcomings" led to three accidents over a 33-hour period that resulted in the death of one worker from phosgene gas exposure at a DuPont plant in Belle, West Virginia. CSB, an independent federal

agency tasked with investigating chemical accidents, began a probe into the recent incident, while the Occupational Safety and Health Administration (OSHA) is conducting its own.

In 2013, in the wake of an explosion at a chemical plant in West, Texas that claimed the lives of 15 people and injured hundreds more, President Obama signed an Executive Order, entitled *Improving Chemical Facility Safety and Security*, in an effort to improve the safety of U.S. chemical manufacturing for workers and those in surrounding communities. Beyond Pesticides joined with over 100 organizations, including health, labor, consumer, and environmental justice groups in a letter urging then newly appointed Environmental Protection Agency Administrator Gina McCarthy to make chemical disaster prevention a priority initiative.

The chemical released in the DuPont incident, methyl mercaptan, is a colorless flammable gas with an unpleasant odor, according to the Agency for Toxic Substances and Disease Registry. OSHA has set legally allowable airborne exposure limits of the compound at 10 ppm. Methyl mercaptan acts as a central nervous system depressant as well as a respiratory tract and skin irritant at high levels of exposure. The La Porte plant uses methyl mercaptan for the production of methomyl, a carbamate class of insecticide shown to be highly toxic to humans, with the potential to cause cholinesterase inhibition, resulting in flu-like symptoms, such as weakness, lack of appetite, and muscle aches. Although methomyl is not registered for residential use, tolerance levels for the insecticide have been set on over 80 crops.

Social Justice Labeling: From Field to Table



by Michael Sligh

(This piece is a talk given to the conferees of the 32nd National Pesticide Forum, Advancing Sustainable Communities: People, Pollinators, and Practices, held at Portland State University, Oregon, April 11-12, 2014.)

[Introduction by Brett Ramey. Good afternoon everyone. My name is Brett Ramey and I am on the board of directors of Beyond Pesticides, and very fortunate to be. I currently live up in Seattle and work at the School of Medicine in the Center for Equity Diversity and Inclusion at the University of Washington's School of Medicine. I am honored to introduce Michael Sligh. He is the founding member of the Rural Advancement Fund International (RAFI) USA, where he directs policy, research and education on agricultural best practices, biodiversity, biotechnology, organic, identity preservation, and other food justice related issues in the organization's Just Foods Program. Michael has been doing this work for more than 30 years, both domestically and internationally. He is also the founding chair of the USDA National Organic Standards Board, the Southern Sustainable Agriculture Working Group, and the National Organic Coalition. Especially relevant to today's talk, Michael helped found the Agriculture Justice Project (AJP) and the Domestic Fair Trade Association. He is a part-time family farmer in North Carolina. Please join me in welcoming Michael Sligh.]

Thank you very much. I am honored to be here. It's a little dangerous asking a southern boy to come preach at lunch time. We're a little slow to get started and a lot slower to finish up. I am honored to be here and I've been a big supporter of this idea of beyond pesticides for a long time and we've worked with Jay Feldman (Beyond Pesticides), Fred Kirschenmann (Aldo Leopold Center and Stone Barns Center for Food and Agriculture), George Kimbrell (Center for Food Safety), and many people here that we've worked with to try to build and nurture a Just Food Movement—one that can be good for workers, farmers, and for all of us. And, it can be good for the planet.

I think that we have to recognize that a couple of themes have come up this morning. Firstly, it's the impossible. In many ways, we're not supposed to be here and not supposed to make this progress. Secondly, I heard Kim Leval (Northwest Center for Alternatives to Pesticides) talk this morning about the need to break down our silos and reach out across movements and across sectors, recognizing how important that is. That isolation is probably one of our most dangerous realities. We need to really reach out. And then I also heard that maybe part of what I am involved in

is preventive medicine. And so I was glad to know that, which made me feel good. So I'm going to give you a little history about a couple of projects you may not know about that I think this community needs to know about and to be a part of.

History

RAFI traces its roots back to the 1930s, when America was in a rural crisis mostly because of bad policies and bad practices. Eleanor Roosevelt and a number of dignitaries organized the National Sharecroppers Fund to address the abuses of farmers and workers who worked the land, but did not own the land. We've tried to follow in the tradition of working for justice, equity and sustainability in agriculture. It was clear to us that it's not enough to save a family farm, if you don't save them for something good and they are not able to make a living at it. They have to be able to find a connection with a consumer who wants to buy their product.

I think that there are two very powerful things all of us can do to change our food system and one of them is in our buying preferences. Every day, what we buy determines the future of our food system. What we're tapping into here is this growing hunger by

the informed public that wants to know not only where their food comes from, but who grew it, and how they grew it. But, also increasingly they want to know how the farmers and workers were treated in growing that food. That's a very important and powerful connection that we have an opportunity to tap into and help pull through the marketplace.

At RAFI, we look at three things in trying to think about how to change agriculture. We think about (i) the right practices, (ii) the markets that draw those practices and how to reward them, and of course, (iii) the policies that can encourage and support this direction. Organic is a good example of when those three factors are in alignment and take off. In other cases, for example with genetically engineered organisms (GMO), we have a lot of policy

Texas. We were lucky. My grandfather didn't believe in borrowing money to farm. There were those who avoided that crisis, but I thought I would take a short break from farming and go fix the policy problem. In West Texas, we thought the problem was that public policy was just plain ass backwards. We were encouraging farmers to do the wrong thing and we were penalizing them for doing the right thing. Here we were with these organic farmers, who were being penalized, and here was this other direction and we were just throwing money at it as fast as possible. So, I thought I'd just fix that and get right back to farming. I have a small farm on the side, but its more therapy then a money making activity.

I think it's important to realize that we're embedded in a very predatory food system. Farmers are pitted against the buyers and the

workers are pitted against the farmers, the buyers are pitted against the retailers, and consumers are pitted against the retailers. It's not predatory by accident. That is the issue that we're trying to address. People go to the grocery store and they say, "Well, I don't understand why the price of food keeps going up. Surely farmers are making money. What's the problem here?" An Auburn University graph that we've been following over the decades continually shows a disconnect between the farmer pay price and the price at the grocery store.



Michael Sligh shows the Auburn University Graph at the 32nd National Pesticide Forum in Portland, OR.

and a lot of practice, but no consumer support. That's in our favor because we are not choosing that. The more we don't choose something, the quicker it will go away, and the more we reward something, the more we can grow it.

I got into this because I was a family farmer in the 1970s during the Earl Butz era (Secretary of Agriculture under Presidents Nixon and Ford). We were all told to get big or get out, and if we weren't making any money, it was because we needed a bigger truck. The Green Revolution was going to solve it, and you just needed more pesticides and more fertilizer, and the sky was the limit. Prices were high and land was high. But, it turned out that it was a bubble. Just like the urban bubble we recently had, hundreds of thousands of small family farmers were put out of business. I, myself, did not drink the cool aid and had decided that maybe organic agriculture was the right thing to do. And, so when the foreclosures happened, it did not affect our farm or our family farm out in West

Policy to Protect Workers in Organic Certification

We thought we can grow organic and that will be the sane alternative to agribusiness. Many of us who gave the bloom of our youth to the development of organic think that we have much to be proud of there. That is the base that we need to build upon. One of the things that we could not get in the federal organic legislation, however, was language to protect the workers. We have language to protect the earthworms, bees, water, air and soil. In worldwide grassroots, organic has always been a holistic approach to agriculture, but it does include fairness and it does include the people.

Now, because our relationship with USDA has been a shotgun marriage, really from day one, we are in constant marriage counseling. And Jay has now earned his red badge of courage as a National Organic Standards Board member and we thank you for all of your extra lifts on this issue. Thank you very much. But just know, every administration has attempted to undermine the organic rule. They

do not want to manage it. It does require us to constantly defend the turf we have won. We cannot get complacent, we must continue to defend it, but we also have to grow the ethic. We have to add back the parts of organic that we were not able to do within the federal rule. In a rational world, we would have policies that address fairness at the national and international level. But, as we well know, we are not in a rational world at the moment.

Fairness in Organic

Working with four other really good and diverse organizations, in 1999 when the federal rule went through on organic, we recognized that we didn't get the fairness part in there, so we started working to add it on in the marketplace. We worked with Nelson Carrasquillo (CATA—Farmworkers Support Committee), Marty Mesh (Florida Organic Farmers and Consumers), Liz Henderson (Northeast Organic Farmers Association), and one of our partners in Bolivia (Indigenous Farmers Association) to add justice onto organic. What would it need to look like? What would be included in that? What are the problems that we are all facing as farmers and as workers and as buyers? What would those standards look like? So we decided to figure out what those standards should be. Let's go test them in the marketplace and see if we can add the standards into those farm operations willing to take the risk and stick their neck out.

We know some of the bigger macro background that has been a dynamic in establishing the important need to add justice on at this time. We know that in the federal law there is nothing that really addresses fair prices for farmers. We have some small organic dairies now going out of business in the northeast. That's not right. What are we doing wrong that organic dairies are going out of business? We also know that the market is concentrated. We also know that working conditions in general for farmworkers, processing workers, or even retail workers are left out of the organic standard. We know that we don't have public policy to support this. We know that there is growing interest on the part of consumers who want this. We also know that businesses want to differentiate in the market. I've got organic down, now what? What do I do now? I want a new challenge. We are hearing this, and these are all positive signs that we're trying to take advantage of.



The Good and the Bad

We have much to be proud of in organic. It's up to \$60 billion dollars in sales globally now. It was something that was supposed to be impossible. Fred, how many years in a row were we told that it was impossible? Would you just stop doing this? That is impossible, you can't do it. Well, here we are and we are doing it. We're also seeing continued growth in fair trade. Organic and fair trade are the two fastest growing parts of the agriculture sector worldwide. We are also seeing a number of ethical claims come into the market place. Looking at consumer studies, we're now seeing fair living wages for workers right up there with pollution reduction in terms of consumer attitudes toward their food.

We also continue to see a lot of very bad news about what is going on in agricultural labor in America. It's important to remember that the U.S. and China are the two major countries in the world that have not signed on to hardly any of the international labor treaties. Europe and many of the other parts of the world have signed on, and we don't even have it on the books. This idea of the farmers and the workers coming to us and saying that I hear

about all this fair trade coffee and all that's great, but what about here? What about fairness for workers here? What about fairness for farmers here? How do we bring fair trade home and what would it look like in a domestic setting? We have a very sophisticated marketplace here. Customer expectation is very, very high. We knew right off the bat, if we were to create something that could work here, it had to be sophisticated and it had to have the allowance to address the whole supply chain.

The other thing that we saw was missing—collectively, there was no watering hole. There was no place for businesses, workers, farmers and nonprofits to come together, sit down at a table as equals and say, "How do we do this?" How do we have domestic fair trade and what the heck is it? Many of us helped form the Domestic Fair Trade Association.

Our new executive director, Colette Cosner, is here with us today. The environmental community should know the Domestic Fair Trade Association. The organization is your ally. You should ask her how you can get involved and she should ask you how

she can get involved in your issues. We are of the same movement. We are from the same side of the river. The Domestic Fair Trade Association is really trying to do two things, much like what we have to do in organic. We're trying to promote domestic fair trade, but we're also trying to protect the integrity of fair trade.

Because the United States is the biggest market in the world for fair trade, we get all these products coming in from all over the world. All come with different standards, all with different claims.

We are also trying to parse out those claims in order to help educate consumers to make more informed choices. To the extent that consumers are informed, that's what you're going to be pulling through the marketplace. Just as you want to vote for certified organic in the marketplace, you want to vote for fair trade because it is making a difference in the lives of workers and farmers. I would suggest you go to the Domestic Fair Trade Association website. They are now in the process of evaluating market claims for fairness and will be doing that on an ongoing basis. Similar to what Consumers Union does for toasters, the Domestic Fair Trade Association is doing that for evaluating fair trade. This is a valuable contribution to our movement. (See the box above for some of the principles that Domestic Fair Trade Association is using to measure these different claims in the marketplace.) We obviously don't include GMOs, we are opposed to toxic chemicals, and we are in favor of family farming, and the rights of farmers and workers. We are your kind of people.

Integrating Social Values into the Marketplace

Focusing on three activities, we want to build community with the workers, the farmers, and the companies. We have all been told that we are each other's enemies. So we are trying to break down those barriers and have workers and farmers sitting with CEOs of progressive businesses. We want non-governmental organizations (NGOs) sitting there and talking about how we make this happen. How do we make the impossible happen, here in North America? We want to defend the principles and we also want to conduct consumer education. Some of the current members of the Association certainly want to grow this, just like everyone else.



Principles

1. Family Scale Farming	9. Long-Term Trade Relationships
2. Capacity Building for Producers and Workers	10. Sustainable Agriculture
3. Democratic, Participatory Ownership and Control	11. Appropriate Technology
4. Rights of Labor	12. Indigenous Peoples' Rights
5. Equality and Opportunity	13. Transparency and Accountability
6. Direct Trade	14. Education and Advocacy
7. Fair and Stable Pricing	15. Responsible Certification and Marketing
8. Shared Risk and Affordable Credit	16. Animal Welfare

Labeling

We also need some kind of label to inspire us in the marketplace. The Agriculture Justice Project (AJP), which is made up of farmworkers, farmers, advocates, and indigenous farm organizations went on this journey. We started in 1999 and we spent about six or seven years going to forums that we hosted around the world, bringing diverse stakeholders together. We were in Thailand, Australia, and Uruguay. We went all over listening to stakeholders tell us about their problems. Tell us what we need to do if we're going to make a label claim. What would it need to do to have validity for you? So we wanted something that would be internationally compatible, but would also be appropriate in a North American setting. Just

keep in mind, much like the pesticides issue, we don't have a lot on the books. What is on the books is not enforced very well. Sound familiar? Well, that's where we are in agricultural justice –not on the books and what's on the books not very well enforced. So, in developing standards, we had to cover all of that missing territory.

Listening Sessions

So we went all around listening to people we want to hear what was working and what was not working. What are the problems with fair trade? What are the problems with organic? What is missing that we need to add? Eventually, we went through six rounds of standard setting at the international level, where we kept refining and getting feedback. We came up with this body of standards that we now have taken into the marketplace. We have tested them and are now beginning to label in the North American market.

Agricultural Justice Project (AJP) Standards (The Promise)

- Farmers and all food system workers' rights to freedom of association
- Fair wages and benefits for workers
- Fair and equitable contracts for farmers and buyers
- Fair pricing for farmers
- Clear conflict resolution policies for farmers, workers, and buyers
- The rights of indigenous peoples (under development)
- Workplace health and safety and decent farmworker housing
- High quality training for farm intern and apprentices
- The rights and protection of children on farms
- Protection of the environment (organic and sustainable farming practices)

Obviously, it's important to be holistic. We even include standards for interns because we heard from a lot of interns on organic farms that they didn't feel exactly like they were learning what they were supposed to learn. Maybe it was just that they learned what end of the hoe to use, and that's good, but that's not exactly a full education if you're trying to intern to become an organic farmer. We didn't want to miss a lick. We want to cover the interns, children and farmers. But we also want to say that all of these people have responsibilities. It's not just about rights, it's also about responsibilities. So everybody has to have responsibilities.

Elements of Certification System

This is about shining a bright light on the darkest parts of our food system. We heard very loudly that we should not create a new certification system. For God's sake, we have plenty of certifiers, we have plenty of inspectors. Just train the ones' who are already doing organic inspection and just add it on. So that's the model that we have adopted. We are completely transparent. We have advisory groups, standards committees, and we publish it all. It's all on the website. We have our first agricultural justice, certified organic strawberry farm in California with 35 workers. We are working on the first agricultural justice certified food hub in New York City. We're working with a group of small organic farmers selling back to their food co-op in the northeast. We also do a great deal of education, because we realize that one of the biggest barriers that we learned in organic was that you need to build the runway to get the farmers to go there. They need tools to become an organic farmer. So, we're trying to develop a website approach, the tools that farm businesses and farm workers need to take this new direction, and do it more swiftly. We also have 75 farms in Canada that are organic grain farms that are now selling into 60 Whole Food stores across America with the AJP symbol. We are just at the beginning of this, so we are asking you to go to the bulk bins at Whole Foods and look

for the AJP label and buy some of it. By doing this, you are telling them that you think this is a good idea. This is how we grew organic. There was plenty of time where I had organic produce and I didn't have a place to sell it. We have to have a place to sell this. If we want to pull this through, we have to have a place to sell it. So we have the food co-ops, some restaurants, food hubs, and Whole Foods. They're willing to back this, but we have to have the customers go there. You also need to go to your favorite brand of organic and ask them why they are not adding social justice to their claim. There are a number of companies that have the perfect profile for this.

We know from a bigger picture point of view that just the marketplace alone will not be sufficient. We know that we have to address bigger issues like campaign finance reform. Jim Hightower tells us that if God wanted us to vote then he would have sent us candidates. And, Churchill said that democracy is the worst form of government in the world, except for all the rest. But it should not be that democracy is the best democracy that money can buy. We know we have to address that issue if we're going to turn the ass backward progress back around.

I would just say in closing that farmworkers can't have justice if farmers don't have justice. And neither can have justice unless the enlightened self-interest of the rest of us supports that direction. I also would say, I do not believe we can have the shores of sustainability on environmental stewardship alone. We must have justice. That is the fuel that will drive this to the next generation. I don't think it's too late to get it right. If we can work together, we can make it so. Thank you.

You can view this talk and others from Advancing Sustainable Communities: People, pollinators and practices, the 32nd National Pesticide Forum on our YouTube Channel at bit.ly/YouTube32NPF.



Photo by Florida Organic Growers for Agricultural Justice Project, September, 2012 blog post by Leah Cohen, available at: www.foginfo.org/2012/09/03/departmental-spotlight-social-justice



Pesticide Use in Marijuana Production: Safety Issues and Sustainable Options

As states legalize cannabis, toxics in cultivation intersect with health and the environment, and ecological practices

By Jay Feldman*

As states legalize the production of cannabis (marijuana) for medical and recreational purposes, regulations governing its cultivation may allow the application of pesticides untested for use in the plant's production, raising safety issues for patients and consumers. In the absence of federal regulations governing pesticides in cannabis production, the use of pesticides not registered by the U.S. Environmental Protection Agency (EPA)[†] is understood to be illegal. Several states have codified this understanding by adopting policies that prohibit all federally registered pesticides. Other states have taken the position that state policy is unnecessary, since EPA has not registered any pesticides for cannabis production and registered pesticide use is illegal. A review of state laws conducted by Beyond Pesticides finds a patchwork of regulations with varying degrees of protection for consumers and the environment.

Is the public adequately protected from pesticide use in cannabis production and residues on the crop that could be inhaled, ingested, or absorbed? Are states doing an adequate job to enforce the law?

The range of state standards and the lack of a federal role in establishing which pesticides are allowed for use in the plant's production raises critical concerns related to: (i) exposure from inhalation, ingestion, or absorption of pesticide residues on the crop; (ii) exposure to workers cultivating the plant; and (iii) environmental contamination and wildlife effects. Since the federal government classifies cannabis as a Schedule 1 narcotic, EPA does not establish restrictions for pesticides used in cannabis production, or tolerances (or exemptions from tolerances) for allowable pesticide residues on cannabis. As a result, EPA-permitted pesticide labels do not contain allowances for pesticide use in cannabis production. That might seem to be the end of the story, but, in fact, states have sought to address this issue and in some cases affirm the prohibition (either with clear prohibitory language or through regulatory silence with an explanatory note on pesticide prohibition), allow certain toxic pesticides with generalized label language that are exempt from tolerances, or permit pesticides that EPA has determined are exempt from registration.

In this context, toxic pesticide use in cannabis cultivation ranges from allowances of pre-plant herbicides to restrictions that only allow organic management systems without any synthetic materials. While much of the focus is on residues in inhaled, ingested, or absorbed cannabis, environmental impacts associated with growing practices are mostly not addressed.

**Drew Toher contributed research and analysis to this investigative report.*

†For purposes of this review, federally registered pesticides are distinguished from pesticide exempt from federal registration under Section 25(b) of the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). Registered pesticides are subject to EPA-required testing by the manufacturer for health and environmental effects, while 25(b) pesticides exempt from registration are waived from data requirements because they have been determined to contain ingredients identified as harmless.

State of Cannabis Legalization

Twenty-three states¹ and the District of Columbia (DC) have passed medical cannabis laws as of January 2015, and, of these, four states² and DC have voted through ballot initiatives to allow recreational use. Of the 23 states, 17 states³ and DC have adopted policies or rules governing pesticide use in cannabis production. A review of state laws reveals a mix of approaches in the absence of federal oversight. Six states,⁴ generally those without medical marijuana dispensaries (where medical marijuana is sold and often grown in greenhouses), but including California (which has legalized medical marijuana and comprises nearly 50% of cannabis sales⁵ nationally), are silent on pesticide use in cannabis production, while five⁶ others specifically outlaw any application of a federally registered pesticide. Of these, three states⁷ have adopted a specific requirement that cannabis is grown without any pesticides.⁸ As with all crop production systems, cannabis grown without toxic pesticides not only protects the consumer from pesticide exposure, but also the workers who grow the crop, and the environment where it is grown.

Pesticide Residues in Cannabis

Pesticide residues in cannabis that has been dried and is inhaled have a direct pathway into the bloodstream.⁹ Like other foodstuffs, contaminants consumed through foods mixed with cannabis may present an exposure hazard. It is logical to assume that the prohibition on the use of a federally registered pesticide would result in a zero tolerance or allowable residue on the consumed cannabis. However, three states¹⁰ allow cannabis to contain pesticide residues of any federally registered pesticide up to a level less than the lowest legal residue of the pesticide on food. Oregon has set a generally acceptable level of .1ppm.¹¹ This allowance of pesticide exposure does not account for the lack of EPA review of cumulative risk or toxic body burden associated with the additional exposure to pesticide residues from cannabis.

Inhalation of Pesticide Residues

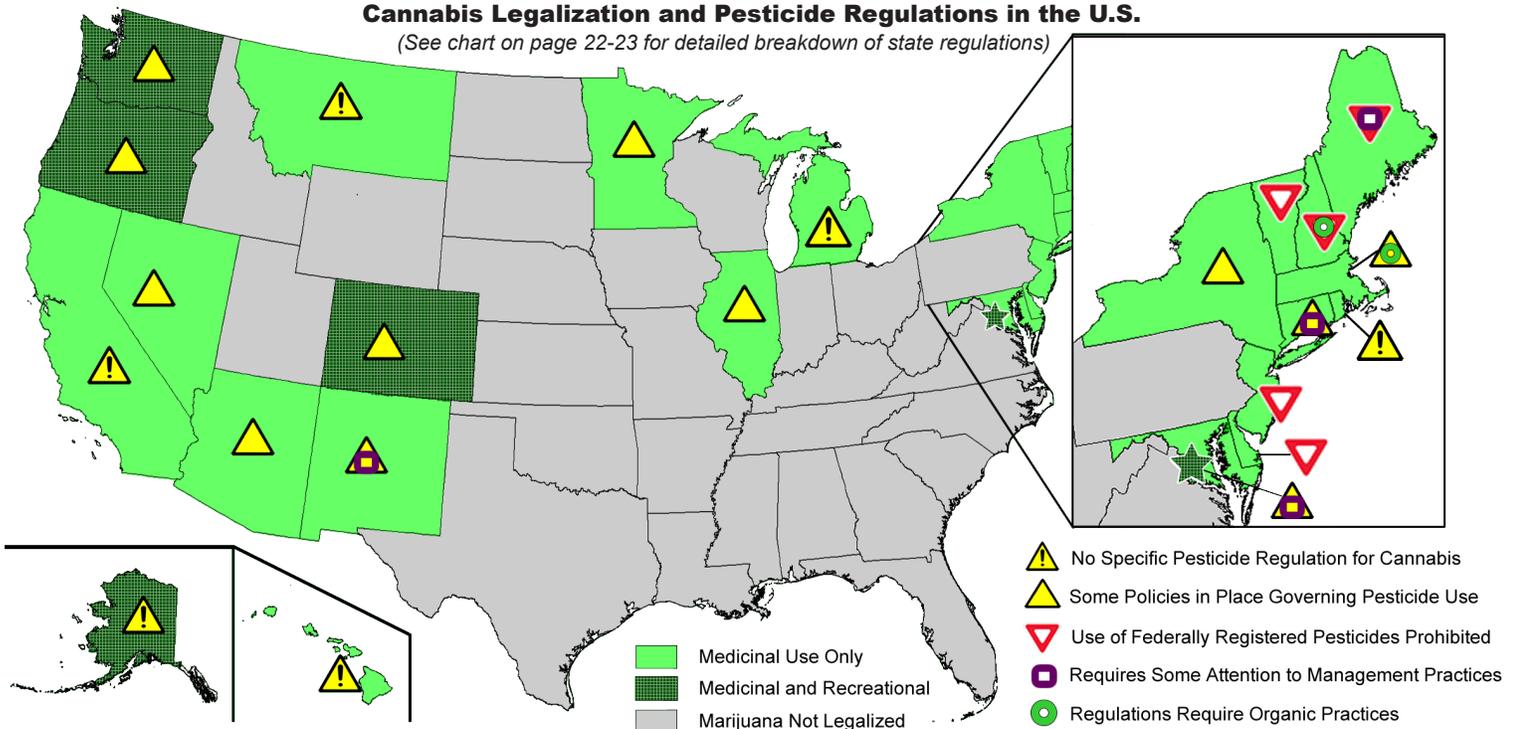
Very little peer-reviewed research has been published on the health and safety risks associated with pesticides on dried cannabis. However, the tests that have been performed show cause for significant consumer concern, particularly medical patients or those with elevated risk factors.

Studies on tobacco provide good indications of the threats that may arise from smoking pesticide-laced products and, thus, the importance of state enforcement. A 2002 study, published in the *Journal of Chromatography A*, found that 1.5-15.5% of pyrethroid insecticides on treated tobacco is transferred to cigarette smoke.¹² Significant levels of pesticide residues were found within the cigarette's cotton filter. In addition to the transference of pesticide residue from the dried plant to the smoker, burning can cause pyrolysis (decomposition) of the pesticide, forming toxic mixtures¹³ or other toxic pesticide contaminants.¹⁴ Additionally, unlike most packaged tobacco products, cannabis is not typically filtered when its smoke is inhaled, and therefore smokers may expose themselves to much higher levels of pesticides and degradates.

A 2013 study, published in the *Journal of Toxicology*, found that up to 69.5% of pesticide residues can remain in smoked marijuana.¹⁵ Filtering the smoke through water showed only a slight reduction in pesticide residues.¹⁶ However, when filtered through cotton, pesticide levels were similar to levels in tobacco, with 1-11% of tested pesticides reaching the user. Authors of the *Journal of Toxicology* study note that, "High pesticide exposure through cannabis smoking is a significant possibility, which may lead to further health complications in cannabis users." The significance of these results may confound studies that have associated cannabis use with negative health outcomes, according to researchers.¹⁷

Cannabis Legalization and Pesticide Regulations in the U.S.

(See chart on page 22-23 for detailed breakdown of state regulations)



Federal Pesticide Law

Pesticide use in the U.S. is governed by the *Federal Insecticide Fungicide and Rodenticide Act* (FIFRA), which establishes a goal of preventing “unreasonable adverse effects”¹⁸ from pesticide use. The law, passed in 1947 and overhauled in 1972, sets minimum use restrictions regarding the registration and labeling of pesticides. FIFRA is implemented in coordination with the *Federal Food Drug and Cosmetic Act*, which establishes tolerance limits for allowable pesticide residues on specific crops, unless the agency determines the pesticide is exempt from a tolerance limit. Pesticides considered minimum risk under FIFRA’s section 25(b) criteria are exempt from federal registration. Examples of minimum risk pesticides include lauryl sulfate, white pepper, and certain essential oils such as castor oil, eugenol, cinnamon oil, and soybean oil. (See box, right, on 25(b) pesticides.)

Except for 25(b) pesticides, FIFRA requires federal registration of all pesticides produced or sold in the U.S. and establishes minimum standards for allowable uses. State and local governments may adopt more stringent standards than those set by EPA under FIFRA,¹⁹ however, 43 state legislatures have stripped localities of the authority to restrict pesticide use in their communities under laws that preempt local jurisdictions.²⁰ The label on a pesticide product delineates the legal uses, application rates, and other restrictions, such as protection of agricultural workers and others who handle pesticides, limitations regarding threatened and endangered species (in coordination with the *Endangered Species Act*), and other special use and disposal requirements. Because EPA is barred from registering a pesticide for use on cannabis or setting

Breakdown of Pesticide Product Categories

Federally Registered Pesticides: Unless determined to be minimum risk and exempt from registration, pesticides, (including herbicides, insecticides, rodenticides, antimicrobial products, and biopesticides) must undergo EPA’s formal registration process, which includes a scientific assessment of the active ingredient that is included in pesticide products.

Organic pesticides: Pesticides allowed for use in organic production must be evaluated by the National Organic Standards Board for their essentiality, impacts to human and environment health, and compatibility with organic practices. In general, natural pesticides are allowed unless specifically prohibited and synthetic pesticides are prohibited unless specifically recommended by the NOSB.

List 25(b) – Federally Exempt Minimum Risk Pesticides: Minimum risk pesticides under section 25(b) of FIFRA are not required to undergo the federal registration process if their ingredients are “demonstrably safe for its intended use.”²¹ Some states require state-level registration of 25(b) pesticides, but do not conduct safety testing.

Pesticides Exempt from a Tolerance: EPA determines certain pesticides are exempt from a tolerance on a food crop based on toxicity and exposure data specific to the pesticides’ use pattern. Not all 25(b) pesticides are exempt from a tolerance.

(or exempting from) tolerance limits for pesticide residues on cannabis crops, and given the plant’s classification as a narcotic, the evaluation of pesticide use, assessment of exposure hazards, and the setting of pesticide use restrictions by EPA is also prohibited at the federal level.

The California Response –Medical Cannabis Use

California exemplifies a state with a cannabis legalization law at odds with U.S. narcotics law. Voters in the state in 1996 passed the first medical marijuana law in the country, the *Compassionate Use Act*, Prop 215. The measure allows patients to grow their own cannabis and assigns the regulation of cultivation facilities to county agencies. Because California state law and regulations are silent on the use of pesticides on cannabis, and given that there are no pesticides registered by EPA for use on the plant, use of federally registered pesticides in cannabis cultivation is not compliant with the law.

The California regulatory response to Prop 215 raises policy gaps specific to cannabis as both an agricultural crop and a medical drug. A 2012 report commissioned by California Assembly member Linda Halderman, M.D., and produced by the nonpartisan California Research Bureau, investigated the policy gaps in medical cannabis culti-



Medical marijuana dispensary in Denver, Colorado. Photo by O’Dea at WikiCommons.

vation regulation within the state. The report raised more questions than it answered. To address regulatory uncertainty, it was determined critically important that medical marijuana be legally defined.

However, as it stands, there is no clear determination as to whether medicinal cannabis is an agricultural crop or a medical drug.²² In the medical context, cannabis as a medicine is nevertheless derived from a crop, and the cultivation of the crop is subject to production input use restrictions. The report finds that because there are no pesticide products registered for use on cannabis by EPA under FIFRA, and given that applying a pesticide for an unregistered use is illegal under pesticide law, “[California Department of Pesticide Regulation] CDPR could confiscate all medical marijuana crops treated illegally with pesticides. . .” However, the report also notes that confiscation would violate the *Compassionate Use Act*, which guarantees ill Californians access to medical marijuana. California’s report notes that growers can simply not spray pesticides²³ in order to avoid potential confiscation of their crops. However, Anthony Silvaggio, Ph.D., Professor at California State University Humboldt, states in the report, “There are very, very, very few 100% organic growers.”

The Washington State Approach –Legalization of Recreational Cannabis Use

With the passage of laws legalizing recreational use of cannabis in the states of Washington and Colorado in 2012 and Alaska, Oregon, and DC in 2014, there is a growing question of pesticide use in cannabis cultivation. States have begun to look to EPA for guidance and legal authorities.

Washington state took the proactive step of requesting guidance from EPA, according to a September 2014 document released by the Washington State Department of Agriculture (WSDA),²⁴ the pesticide lead agency in the state. The state received the following response from EPA:

“In determining which pesticides, if any, might be used legally on marijuana, the WSDA asked the EPA if marijuana might fit into any general crop groups, such as herbs, spices or vegetable gardens. EPA’s current position is that marijuana is not an herb, a spice or a vegetable. EPA considers marijuana to be a controlled substance, and has indicated that marijuana is not listed as a crop/site on any pesticide label. However, EPA does concede that, depending on actual label language, pesticides may be legally used on marijuana under certain other very general types of crops/sites when there is an exemption from the requirement of a tolerance.”

While WSDA had indicated that its regulation of pesti-

cides in cannabis cultivation “may be rescinded or superseded at any time,” the state is allowing pesticides (i) registered by EPA and the state,²⁵ (ii) with active ingredients exempt from tolerances, and (iii) with directions for use on “unspecified food crops, home gardens, or herbs.”²⁶ Regarding 25(b) pesticides exempt from registration, WSDA indicates that the product must be registered with the state, and must also be labeled for use on “unspecified food crops, home gardens, or herbs” in order to be applied to cannabis plants. However, WSDA does not specifically acknowledge that not all 25(b) pesticides are exempt from tolerances on food crops. Further, WSDA explains that it finds pesticide use, including broad spectrum herbicides and soil fumigants, to be acceptable prior to planting marijuana outdoors as long as the label on the pesticide product does not specify the food crop to be planted after the pesticide application.

Other states are investigating standards similar to those adopted by WSDA. Colorado has proposed new rules that call for the development of an approved pesticide list.²⁷ In the state of Nevada, regulators have convened an Independent Laboratory Advisory Committee to establish a list of approved pesticides. As part of Illinois’ *2013 Medical Cannabis Pilot Program Act*, the state’s regulations include a list of allowed active ingredients, rather than a list of products. However, Illinois rules do not allow synthetic active ingredients, and disallows the application of pesticides to cannabis crops after its vegetative stage.²⁸

Pesticides that May Be Used and Health Effects

The use of pesticides not specifically registered for use on a crop raises health and safety issues. An allowance of a pesticide use and exposure pattern not evaluated for its potential health impacts remains a concern among health advocates.

WSDA has compiled a list of 271 allowed pesticide products that fit the criteria it developed in its opinion on cannabis production.²⁹ A review of the list finds pesticides exempt from tolerances by EPA, such as pyrethrins, sulfur, and essential oils. However, it appears that WSDA does allow a 25(b) material (sodium lauryl sulfate) that is not exempt from a tolerance.³⁰ On the other hand, the synthetic piperonyl butoxide (PBO), frequently used as a synergist to enhance the toxicity of a pesticide product’s active ingredient, is allowed by WSDA because its use in crop production is exempt from a tolerance.³¹ (See box at left on environmental effects of pesticides.) PBO has been linked to numerous adverse human health impacts, including cancer, neurotoxicity, and adverse impacts on liver function.³² Further, while natural pesticides are usually preferable to synthetic counterparts, products containing pyrethrins and metals present an exposure risk to workers and wildlife.³³

Environmental Effects of Pesticides

Analysis of the environmental effects of pesticides is a part of the federal registration process, and is based upon where a pesticide is used and its rate of application. Given the volume of pesticides used in the cultivation of cannabis, and its potential to be grown both indoors and outdoors, the lack of an environmental assessment of pesticides exempt from tolerance raises questions about potential effects to nontarget plants and wildlife, as well as the entire ecosystem in which they are used.³³

Of concern is the use of broad spectrum synthetic herbicides and soil fumigants prior to the planting of cannabis. Although regulators in those states that allow herbicide use in cannabis cultivation may not consider this a human health issue because the chemicals are not being applied directly to consumable cannabis, chemicals in the soil can be taken up by the plants, and herbicide use can result in water contamination, wildlife effects, and injury to workers.

Testing and Labeling for Production Practices

States have taken a wide variety of approaches to the testing and labeling of cannabis for pesticide residue and other contaminants. Twelve states³⁴ require regulators to test random samples of cannabis batches, a quantity of cannabis produced at one time, for pesticide residues. New Mexico and Vermont require testing only after a complaint of contaminants has been received. The District of Columbia requires growers to create a plan to test and ensure patients that cannabis is free of contaminants. Delaware requires dispensaries to develop a protocol for testing cannabis, but does not explicitly state that pesticides must be included. While rules for recreational cannabis in Colorado do not mandate laboratory analysis, if testing is not conducted, cannabis products must display a label statement that reads, "The marijuana contained within this package has not been tested for contaminants."

Four states³⁵ and DC require both residue testing and the labeling of all chemical pesticides used in the production of cannabis. Connecticut and Illinois require labels to indicate only whether the cannabis batch passed or failed laboratory tests. Oregon does not require an indication of pass or fail, but does require the label to indicate the laboratory that performed the analysis. Delaware and Massachusetts require labels to include an indication that the cannabis is free of contaminants, while New Hampshire, which mandates testing, also requires a label to note that the product is not certified to be free of contaminants.

The Maine Experience

In early 2013, Wellness Connection, a medical marijuana dispensary with several locations throughout the state of Maine, was fined \$18,000 by the Maine Department of Health and Human Services (MDHHS) for illegal pesticide applications. A tip from an employee led to an investigation.³⁶ At the time, Maine's law prohibited the use of any pesticides in cannabis production, both federally registered and exempt from fed-

eral registration. After the citation, Wellness Connection and other medical cannabis providers in the state successfully lobbied for a bill, LD 1531, *An Act to Maintain Access to Safe Medical Marijuana*, that allows the application of 25(b) pesticides in the production of cannabis. Subsequently, Becky DeKeuster, Wellness Connection executive director, told the *Portland Press Herald* that the company is now using environmental and mechanical methods, including beneficial predaceous insects, such as parasitic wasps, to control pests, and that it has no need to use even the 25(b) pesticides. "It's good to have the 25(b)'s in the toolkit," Ms. DeKeuster said to the *Press Herald*. She continued, "Are they one of the first things we'll use? No, they're probably one of the last."

A Systems Approach to Cannabis Cultivation

Five states³⁷ and DC are currently regulating medical cannabis with some focus on ensuring proper growing practices that avoid or prohibit the use of pesticides as a priority. The state of Connecticut banned the use of all pesticides except in cases where infestation would result in catastrophic loss (which is not defined). And, before this application can occur, producers must obtain authorization from state regulators. This strategy puts a focus on pest prevention, yet provides a backstop in the event of an emergency. However, Connecticut's law does not require growers to have a production or pest management plan in place. Regulators have discretionary authority to allow pesticide exemptions for producers. Moreover, the state does not detail what chemicals may be allowed to be used in the event of an emergency, raising the question of illegal use of a federally registered pesticide.

Maine and DC, which prohibit cultivation centers from using synthetic pesticides, require producers to be able to demonstrate knowledge of organic growing methods. New Mexico has a similar requirement on organic practices, but new rules may strike this provision, weakening safety standards.

Minnesota regulators have adopted rules that require producers to design the cultivation process in a way that limits contamination. Although this language is broad, it shows a focus on a systems approach to pest management. Massachusetts and New Hampshire have similar language within their regulations, but go further in protecting patient health. These two New England states are the only ones that require growers to follow cultivation practices consistent with organic methods. While Massachusetts allows only the use of



A canvasser for the Washington DC Cannabis Campaign, soliciting signatures for Initiative 71. Photo by Matthew Vanitas

pesticides permitted in certified organic production,³⁸ New Hampshire specifically permits only pesticides that are allowed in certified organic and also exempt from federal registration.

In fact, seven states³⁹ and DC cite organic production in their regulations. Most include the subject only to note that cannabis cannot be labeled organic unless certified by the U.S. Department of Agriculture (USDA). As with EPA, given cannabis' status as an illegal narcotic, USDA is barred from applying the organic seal to any end-use marijuana consumer product. However, in theory, independent certifiers could use their own seals to identify compliance with their standards. Despite this absence of the USDA certified organic seal and mandated organic production practices,

regulations in Maine require dispensaries to indicate whether the cannabis sold meets organic standards. Under USDA organic regulations, growers are required to create and follow an organic system plan (OSP) for their production process. The OSP must include: a detailed description of the practices and procedures that will be undertaken by the certifier producer, a list of substances to be used as a production input, a description of how practices will be monitored, and recordkeeping requirements to ensure the plan is followed. Growers following organic standards must implement cultural, mechanical, physical, or biological controls before considering the use of an allowed pesticide. Moreover, conditions governing the use of any such pesticide must be included within the grower's OSP.

Survey Findings Summary

Beyond Pesticides' survey evaluates the pesticide use policies on cannabis production in 23 states and DC that have passed medical cannabis laws as of January 2015, including the four states and DC that have voted through ballot initiatives to allow recreational use of marijuana. The survey findings identify state actions regarding general pesticide restrictions, testing for pesticide contaminants, labeling of pesticide products applied to cannabis, and whether organic practices are addressed by regulations.⁴⁰ (See chart on page 22 for a summary.)

Allowed and Prohibited Pesticides by State:

- **Silent on Pesticide Use Restrictions:** Six states are silent on pesticides, the assumption being that their use is illegal because they have not received federal registration for use on cannabis. It can be assumed that pesticides exempt from federal registration are in use, however, there is a lack of clarity due to inaction on policy in these states.
- **No Federally Registered Pesticides:** Five states have adopted regulations that affirmatively prohibit federally registered pesticides in cannabis production.
- **No Synthetics:** Six states and DC effectively prohibit the use of synthetic pesticides in cannabis production.
- **Strict Limits:** Two states specifically allow only federally exempt 25(b) pesticides to be applied to cannabis plants.
- **No Pesticides:** Three states have adopted regulations that prohibit pesticide use in cannabis production. However, discussions with state regulators indicate confusion on the allowance of 25(b) pesticides. (See endnote 8.)
- **Pesticide Use Lists:** Washington state maintains a list of allowed pesticide products, and three states are investigating the use of similar lists.

- **In the Works:** Four states and DC (recreational) are in the process of creating regulations that may or may not address pesticide use. Two of these states and DC are writing their first rules regarding legalized cannabis.

Growing Practices:

- **System Focus:** Five states and DC are currently regulating medical cannabis by focusing on requiring growing practices that prevent the use of pesticides.
- **Catastrophic Loss:** Connecticut allows pesticide use only when authorized by a regulator to address catastrophic loss.
- **Organic Knowledge:** Two states and DC require a dispensary applicant's knowledge of organic practices.
- **Organic Practices:** Two states require growers to follow organic practices.

Pesticide Testing:

- Fourteen states address the testing of cannabis plants for pesticide residue.
- **Required:** Twelve states require regulators to test random samples of cannabis batches for pesticide residue.
 - **After a Complaint:** Two states require testing only after a complaint about contaminants has been received.
 - **Uncertain:** In one state and DC, the

law is not explicit in requiring pesticide residue analysis.

- **Lowest Acceptable Residue Standard:** In three states, if the residues detected on the cannabis plant are lower than the most stringent acceptable standard for a pesticide residue on any food crop, the plant is deemed in compliance.
- **Less than .1 ppm:** Oregon deems a pesticide residue test to fail if found to be greater than .1 parts per million.

Pesticide Labeling:

Nine states and DC require some form of labeling regarding contaminants on cannabis plants.

- **Label Pesticides Used:** Four states and DC require the labeling of all pesticides used in the production of cannabis.
- **Pass/Fail:** Two states require labels to indicate whether cannabis passed or failed laboratory tests (based on lowest acceptable residue standard).
- **Generalized Statement:** Three states require a generalized label statement regarding contaminants in cannabis. One state (recreational)⁴¹ requires a generalized statement if lab testing is not conducted.
- **List the Lab:** One state requires the label to indicate the name of the testing facility.

Analysis/Recommendations

The survey results raise serious questions about pesticide exposure, inadequate regulatory oversight, and incentives or requirements to adopt sustainable practices in the cultivation of cannabis. While most state regulations currently offer some level of protection for patients and consumers, it is important that this growing \$1.5 billion industry,⁴² authorized by numerous state laws, has clearer standards that restrict pesticide use and establish required sustainable cultivation systems based on the organic model. The restrictions should specifically prohibit pesticides registered by EPA, but allow those exempt 25(b) pesticides.

Allowed and Prohibited Pesticides: In the absence of adequate testing at the federal level on the potential impacts of pesticide use on cannabis to consumers, workers, and the environment, states should provide clear rules to producers regarding sustainable production practices that protect public health and the environment. Beyond Pesticides recommends that states follow an approach similar to New Hampshire, which restricts growers to pesticides that are (i) allowed for use in organic production and (ii) exempt from federal registration (25(b)). It is critical that these restrictions also require a system plan that governs the potential use of a pesticide after alternative means have been exhausted.

Pesticide Testing: State regulations should be written to include the batch testing of pesticide contaminants in cannabis sold. Testing laboratories should be independently certified, and the laboratory name should be disclosed on the product label. Relying on a complaint to investigate a supplier is not an effective means of enforcing safety standards, and unfairly places the burden on consumers and patients, who are likely to submit a complaint only after suffering injury or harm.

Pre-plant Use of Pesticides:

Pre-plant (used on soil prior to planting) use of registered pesticides should be prohibited. These chemicals typically leave residues in the soil that can be taken up by plants and result in exposure through inhalation or ingestion of the crop.

Pesticide Labeling: Regardless of what pesticides are current-

ly allowed under state law, all states should require the labeling of all pesticides that have been applied to a cannabis plant throughout its entire production and processing.

Environmental Protection: Exemption from tolerance should not alone allow the use of a registered pesticide. Use patterns (in addition to those federally registered) could cause environmental damage that has not been evaluated. These include impacts on waterways and wildlife (including endangered species).

Organic Practices: States should pass laws or implement rules that require a systems approach to cannabis production. State requirements that growers follow national organic standards (with only exempt pesticides permitted in organic) represent a positive trajectory for the industry.

EPA Guidance: Current EPA guidance is misleading and suggests allowances of pesticide use that can be damaging to public health and the environment due to a lack of federal assessment of pesticide use and exposure patterns. EPA should simply notify the states that pesticides registered by the agency that are applied to fields or greenhouses before planting, or on plants during cultivation or post-harvest are illegal and subject to a violation of the pesticide product label.

EPA allowances of pesticide product labels that permit toxic pesticide use on “unspecified food crops, home gardens and herbs” undermines the agency’s fundamental responsibility to evaluate use patterns and exposure.

Conclusion

Pesticide use in the legal cultivation of cannabis in 23 states raises serious concerns about protection of public health and the environment. Those states that have adopted affirmative policies governing cannabis cultivation vary in their clarity in restricting pesticide use. EPA’s guidance has muddied the waters on this by suggesting the allowance of pre-planting pesticides and those with exemption from tolerances, or used under generalized labels that allow use on unspecified crops. Most importantly, six states of the total that have legalized cannabis production are silent on the issue of pesticide use, which raises serious questions about their efforts to



Entryway to a medical marijuana shop in Durango, Colorado.

enforce against the use of pesticides. The public and environment require uniform protections that include the following three basic elements:

1. Prohibition of federally registered pesticide use.
2. Allowance of pesticide exempt from federal registration, but

not those that are only exempt from tolerances.

3. Requirements for an organic system plan that focuses on sustainable practices and only 25(b) products as a last resort.

Matthew Porter contributed to this piece.

Endnotes

1. AK, AZ, CA, CO, CT, DE, HI, IL, ME, MD, MA, MI, MN, MO, NV, NH, NJ, NM, NY, OR, RI, VT, and WA.
2. AK, CO, OR, and WA.
3. AZ, CO, CT, DE, IL, ME, MA, MN, NV, NH, NJ, NM, OR, VT, and WA states.
4. AK, CA, HI, MI, MO, and RI.
5. Ferner, Matt. 2015. Huffington Post. Legal Marijuana is the Fastest-Growing Industry in the U.S.: Report. http://www.huffingtonpost.com/2015/01/25/marijuana-industry-fastest-growing_n_6540166.html.
6. DE, MA, NH, NJ, and VT.
7. DE, NJ, and VT. Personal communication with state regulators suggests that the laws citing "pesticide" prohibition are referring to "federally registered" pesticides and may allow pesticides exempt from federal registration, known as FIFRA 25(b) pesticides.
8. **Delaware:** Title 16 Health and Safety, 4470 State of Delaware Medical Marijuana Code, 7.1.4 "Use of pesticides is prohibited: There are no pesticides authorized for use on marijuana; as such, a compassion center shall not apply pesticides in the cultivation of marijuana."
New Jersey: Adopted New Rules NJAC 8:64 -10.9 Pesticide Use Prohibited "Inasmuch as there are no pesticides authorized for use on marijuana, and the unauthorized application of pesticides is unlawful, an ATC shall not apply pesticides in the cultivation of marijuana."
Vermont: Rules Governing the Vermont Marijuana Program, Section 6 "No pesticide use. There are no pesticides authorized for use on marijuana, and unauthorized application of pesticides is unlawful."
9. Ogg, Clyde L. et al. 2012. Managing the Risks of Pesticide Poisoning and Understanding the Signs and Symptoms. University of Nebraska Extension. <http://ianrpubs.unl.edu/live/ec2505/build/ec2505.pdf>.
10. CT, IL, NV.
11. Oregon: "A sample of usable marijuana shall be deemed to test positive for pesticides with a detection of more than 0.1 parts per million of any pesticide."
12. Cai, Jibao et al. 2002. Determination of pyrethroid residues in tobacco and cigarette smoke by capillary gas chromatography. DOI: 10.1016/S0021-9673(02)00586-1.
13. Lorenz, W. et al. 1987. Thermolysis of Pesticide Residues During Tobacco Smoking. *Chemosphere*. Vol.16, Nos.2/3, pp 521-522, 198.
14. Rodgman, Alan and Perfetti, Thomas. 2013. The Chemical Components of Tobacco and Tobacco Smoke, Second Edition. Page 1105, Table 21.2 Degradation Products of Pesticides in MSS.
15. Sullivan, Nicholas et al. 2013. Determination of Pesticide Residues in Cannabis Smoke. *Journal of Toxicology*. Volume 2013 (2013), Article ID 378168, 6 pages <http://www.hindawi.com/journals/jt/2013/378168/>.
16. Ibid.
17. Ibid.
18. For more of Beyond Pesticides take on risk assessment in FIFRA, see Kepner, John and Feldman, Jay. 2006. Taking off the Blindfold, EPA ignores toxic exposures in risk assessment. *Pesticides and You*. Beyond Pesticides.
19. See *Wisconsin Public Intervenor, et al., Petitioners v. Ralph Mortier et al.* 501 U.S. 597 (1991).
20. See Porter, Matt. 2014. State Preemption Law. *Pesticides and You*. Beyond Pesticides.
21. Environmental Protection Agency. 2014. Minimum Risk Pesticides. http://www.epa.gov/pesticides/biopesticides/regtools/25b_list.htm.
22. Lindsey, Tonya D. 2012. Medical Marijuana Cultivation and Policy Gaps. *California Research Bureau*. http://www.canorml.org/prop/CRB_Pesticides_on_Medical_Marijuana_Report.pdf.
23. It appears that the reference to "pesticides" in California is to federally registered pesticides and not those exempt from federal registration (25(b) pesticides) and not registered by the state of California.
24. Washington State Department of Agriculture. 2014. Criteria for Pesticides Used for the Production of Marijuana in Washington. <http://agr.wa.gov/FP/Pubs/docs/398-WSDACriteriaForPesticideUseOnMarijuana.pdf>.
25. State registration, with the exception of California, is simply a licensing process and does not impose independent toxicological or environmental assessments as a routine.
26. **EPA and WSDA registration is required:** (i) Prior to distribution of the pesticide; (ii) Prior to planting marijuana outdoors (such as a field), use of a pesticide (e.g., broad spectrum herbicide, soil fumigant) is allowed if the food crop to be planted following application is not specified on the label; (iii) Prior to planting marijuana in an enclosed facility (such as a greenhouse), use of a pesticide (e.g., disinfectant, sanitizer) is allowed to control microorganisms on surfaces (such as benches, floors, pallets, pots, skids).
Use of a pesticide on marijuana is allowed if: (i) The active ingredient is exempt from the requirements of a tolerance (e.g., auxins, biopesticides [most active ingredients], copper, cytokinins, gibberellins, petroleum oil, phosphorous acid, pyrethrins, soap, sulfur), and (ii) The label has directions for use on unspecified food crops, home gardens or herbs (outdoor or enclosed), including unspecified food crops or herbs grown as bedding plants. (Marijuana will not be specifically listed as a crop on the pesticide label.)
Section 25b minimum risk pesticides (exempt from federal registration): (i) WSDA registration is required prior to distribution of the pesticide; (ii) Use on marijuana is allowed if the product is labeled for use on unspecified food crops, home gardens or herbs (outdoor or enclosed), including unspecified food crops or herbs grown as bedding plants. (Marijuana will not be specifically listed as a crop on the pesticide label.)
27. Colorado Department of Agriculture Plant Industry Division. 2014. Proposed Rule: Criteria for Determining the Legal Use of Pesticides in Marijuana Cultivation. 8 CCR 1203-25.
28. The consumable product of the cannabis plant is the flower, which is produced after the vegetative stage. Barring pesticide applications after the vegetative stage prevents pesticide applications from being made directly to the end-use product.
29. Washington State University Pesticide Information Center Online. 2014. WA I502 list. <http://cru66.cahe.wsu.edu/labels/Labels.php?SrchType=>.
30. The product in question is Messina Wildlife's Mole and Vole Stopper. <http://cru66.cahe.wsu.edu/~picol/pdf/WA/54761.pdf>.
31. <http://www.gpo.gov/fdsys/pkg/CFR-2008-title40-vol23/xml/CFR-2008-title40-vol23-sec180-905.xml>.
32. Beyond Pesticides. 2006. ChemicalWATCH Factsheet - Piperonyl Butoxide. <http://www.beyondpesticides.org/pesticides/factsheets/Piperonyl%20Butoxide.pdf>.
33. Environmental Protection Agency. 2014. Pesticides: Environmental Effects. Ecological Risk Assessments. <http://www.epa.gov/pesticides/ecosystem/ecorisk.htm>.
34. AZ, CO (medical), CT, IL, ME, MA, MN, NV, NH, NJ, OR, and WA.
35. AZ, CO (medical), NV, and WA.
36. Ricker, Nok-Noi. 2013. Maine marijuana growing center cited for using pesticides. *Bangor Daily News*. <http://bangordailynews.com/2013/03/25/news/state/maine-marijuana-cultivation-center-used-pesticides-state-official-says/>.
37. CT, MA, ME, NH, and NM.
38. Since federally registered pesticides may be used in organic agriculture, their use in cannabis production (a non-labeled used) should be considered an illegal application, except that EPA allows some pesticides to be used on "unspecified crops."
39. CT, ME, MA, NV, NH, NJ, and WA.
40. Note that most states address pesticide use on cannabis through rules or regulations, which are subject to change. This analysis does not address other cannabis related issues such as user access, caretakers, ability to grow your own, licensing fees, or taxes.
41. Statement must read: "The marijuana product contained within this package has not been tested for contaminants."
42. Karnes, Matthew. 2014. State of the Emerging Marijuana Industry Current Trends and Projections. GreenWave Advisors. https://www.greenwaveadvisors.com/wp-content/uploads/GreenWave_Report_ES.pdf.

Pesticide Laws in States with Legalized Cannabis (Marijuana) Production

State	Pesticide Restrictions	Pesticide/Contaminant Testing	Pesticide Labeling	Organic Discussed	State Act or Regulation
<i>Alaska</i> -Medical	No	No	No	No	Alaska Statutes, Chapter 37: Medical Uses of Marijuana Program.
-Recreational	To be determined.	To be determined.	To be determined.	To be determined.	"An Act to Tax and Regulate the Production, Sale, and Use of Marijuana."
<i>Arizona</i>	No	Testing for pesticide residues required.	Yes-list of all chemical additives used in production.	No	Title 9. Health Services. Chapter 17. Department of Health Services Medical Marijuana Program.
<i>California</i>	No	No	No	No	SB 420, Lindsey, Tonya D. 2012. Medical Marijuana Cultivation and Policy Gaps. California Research Bureau.
<i>Colorado</i> -Medical	Individual localities may further regulate.	Testing for pesticide residues required.	Yes-list of all chemical additives used in production.	No	Colorado Department of Revenue. 1 CCR212-1.
-Recreational	No	Not required, but, if not performed, must state on label, "The marijuana contained within this package has not been tested for contaminants."	Yes-list of all non-organic pesticides used in production.	No	Colorado Department of Revenue. 1 CCR212-2.
<i>Connecticut</i>	Pesticide use not allowed unless authorized by regulator to address infestation that would result in catastrophic loss.	Testing for pesticide residues required; those that exceed acceptable levels (higher than most stringent residue standard on any food as set by EPA) must be disposed.	Must list whether the product passed/failed laboratory tests.	Not allowed to be labeled organic unless certified to be consistent with national organic standards.	State of Connecticut. Department of Consumer Protection Regulations. Sec. 21a-408.
<i>Delaware</i>	Use of pesticides prohibited.	Dispensaries required to develop testing protocol, which may or may not include pesticide contaminants.	Dispensaries required to develop labeling that includes details indicating the medical marijuana is free of contaminants.	No	4470 State of Delaware Medical Marijuana Code.
<i>District of Columbia</i> -Medical	Cultivation centers forbidden from using synthetic pesticides.	Dispensaries required to describe plan for testing or verifying medical marijuana received from a cultivation center and ensuring that all medical marijuana is free of contaminants.	Yes-list of all chemical additives used in production.	Cultivation center applicants must demonstrate knowledge of organic growing methods.	District of Columbia Title 22-C.
-Recreational	To be determined.	To be determined.	To be determined.	To be determined.	DC Initiative 71
<i>Hawaii</i>	No	No	No	No	Hawaii Administrative Rules. Chapter 23-202
<i>Illinois</i>	Department created a list of approved pesticide active ingredients; pesticides may not be applied after the vegetative stage of a cannabis plant.	Testing for pesticide residues required -product deemed to pass if lower than most stringent acceptable standard for the pesticide residue on any food item, as set by EPA; publish list of labs that can test medical cannabis.	Must list whether the product passed/failed laboratory tests, producer must have plan for ensuring cannabis is free of contaminants.	No	Illinois Department of Agriculture. 8 Ill. Adm. Code 1000.
<i>Maine</i>	Only pesticides exempt from a federal registration allowed.	Testing for pesticide residues required.	No	Require producer knowledge of organic practices; not allowed to be labeled organic unless certified to be consistent with national organic standards; must provide patients information whether products meet organic certification standards.	Rules Governing the Maine Medical Use of Marijuana Program. 10-144CMR Chapter 122.

<i>Maryland</i>	To be determined.	To be determined.	To be determined.	To be determined.	To be determined.	To be determined.
<i>Massachusetts</i>	Non-organic pesticide use prohibited—cultivation process requires best practices to limit contamination.	Testing for pesticide residues required—frequency of testing determined by regulators.	Requires statement that product has been tested for contaminants and there were no adverse findings.	Cultivation must be consistent with USDA national organic standards.	Senate Bill 923	105.CMR:Department of Health. (725.105).
<i>Michigan</i>	No	No	No	No	Department of Licensing and Regulatory Affairs. R 333.101.	Department of Licensing and Regulatory Affairs. R 333.101.
<i>Minnesota</i>	Product must be designed in a way that limits contamination.	Testing for pesticide residues required—rules regarding testing of pesticides To be determined. by regulator.	No	No	Minnesota Department of Health. 4770.	Minnesota Department of Health. 4770.
<i>Montana</i>	No	No	No	No	Montana Public Health and Human Services. 37.107 Marijuana Registry.	Montana Public Health and Human Services. 37.107 Marijuana Registry.
<i>Nevada</i>	Regulators to establish a list of pesticides approved for cultivation.	Testing for pesticide residues required—product deemed to pass if lower than most stringent acceptable standard for the pesticide residue on any food item, as set by EPA.	Yes—must disclose all pesticides applied.	Not allowed to be labeled organic unless certified to be consistent with national organic standards.	Division of Public and Behavioral Health. R004-14.	Division of Public and Behavioral Health. R004-14.
<i>New Hampshire</i>	Regulators created list of prohibited chemicals—only pesticide approved for organic cultivation and exempt from federal registration allowed—cultivation process must be designed to limit contamination.	Testing for pesticide residues required.	Label must note that the product is not certified to be free of contaminants.	Cultivation requires growing methods consistent with USDA national organic standards.	Therapeutic Cannabis Program He-C 402.	Therapeutic Cannabis Program He-C 402.
<i>New Jersey</i>	Pesticide use prohibited.	Testing for pesticide residues required.	No	Not allowed to be labeled organic unless certified to be in compliance with national organic standards.	Medical Marijuana Program Rules. NJAC 8:64.	Medical Marijuana Program Rules. NJAC 8:64.
<i>New Mexico</i>	No	Regulators may conduct unannounced inspection and testing if complaint over contaminants received.	No	Requires producer knowledge of organic practices (proposed rule removes this provision).	Medical Use of Cannabis. Title 7 Chapter 34 Part 4.	Medical Use of Cannabis. Title 7 Chapter 34 Part 4.
<i>New York</i>	To be determined.	To be determined.	To be determined.	To be determined.	Compassionate Care Act A06357.	Compassionate Care Act A06357.
<i>Oregon—Medical</i>	No	Testing for pesticide residues required—a sample shall be deemed to test positive with a detection of more than .1 parts per million of any pesticide.	Label must include name of testing facility.	No	Oregon Health Authority 333-008.	Oregon Health Authority 333-008.
<i>—Recreational</i>	To be determined.	To be determined.	To be determined.	To be determined.	Measure 91.	Measure 91.
<i>Rhode Island</i>	No	No	No	No	Rhode Island 21-28.6MIMP.	Rhode Island 21-28.6MIMP.
<i>Vermont</i>	Pesticide use prohibited.	Regulators may conduct unannounced inspection and testing if complaint over contaminants received.	No	No	18 VSA Chapter 86 Subchapter 2.	18 VSA Chapter 86 Subchapter 2.
<i>Washington—Medical</i>	Washington State Department of Agriculture created a list of pesticides it believes can be legally used on cannabis—individual localities may further regulate.	No	No	No	Washington State University Pesticide Information Center Online, and Chapter 69.51A.140.	Washington State University Pesticide Information Center Online, and Chapter 69.51A.140.
<i>—Recreational</i>	Regulating a list of pesticides that can be used on cannabis; producers must list pesticides utilized in the production process and must record pesticide applications—violations may result in cancellation of license.	Testing for pesticide residues required—label name and results available to customers upon request.	Yes—must disclose all pesticides applied.	Not allowed to be labeled organic unless permitted by USDA in accordance with national organic standards.	Washington State University Pesticide Information Center Online, and Chapter 314-55.	Washington State University Pesticide Information Center Online, and Chapter 314-55.

A Sting in the Tale

Dave Goulson, Ph.D., New York: Picador, 2014. 241pp.

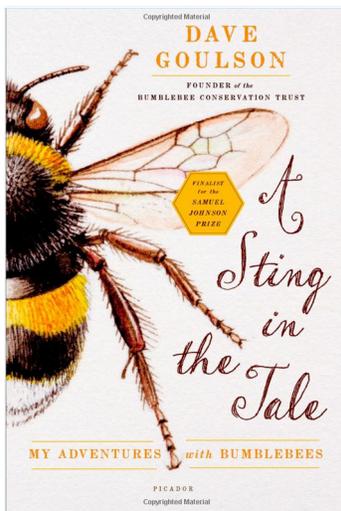
Have you ever been asked in conversation or in a policy and community decision making setting to recommend a safer replacement pesticide product for a hazardous one that is being commonly or widely used? If you don't think we should use a particular toxic material, what do you think should be used? *A Sting in the Tale* offers us insight into the complexity of answering that straightforward question through the eyes of a bumblebee, or at least the experiences of a biologist who has been fascinated since childhood by native and wild bees and the delicate ecological balance on which they depend.

The author, Dave Goulson, Ph.D., a professor and researcher at the University of Sussex in the United Kingdom, weaves a story of his own awareness and appreciation of nature with the science of its foundational support for life. The book is about the importance of insects, particularly wild or native bees, to the web of life. But, more importantly, it is a book about quickly disappearing biodiversity, its essentiality to human existence, and how utterly careful we must be when trying to control nature. To understand this, as a reader you get to travel with Dr. Goulson around the world as he seeks to understand the life of wild bees.

Dr. Goulson writes, "It is a common misapprehension that there is just one species of bee: they have yellow and black stripes and they sting; they live in wooden boxes, where they are looked after by bearded old men in funny hats and white suits; they pollinate corps and wild flowers and they produce honey. . . There are perhaps 25,000 species of bee in the world. The bees kept by beekeepers are honeybees, and they don't have yellow and black stripes—they are, in fact largely tan colored."

He continues, "Insects are responsible for delivering numerous 'ecosystem services' such as pollination and decomposition, and there is no doubt that little life on earth (including ourselves) could survive without them. As the famous biologist E.O. Wilson said, 'If all mankind were to disappear, the world would regenerate back to the rich state of equilibrium that existed ten thousand years ago. If insects were to vanish, the environment would collapse into chaos.'"

Dr. Goulson stresses the delicate balance and interwoven relationships of organisms in nature. About 50% of wild bumblebee nests die every two weeks and there are large hives that produce



necessary queens to make up for the failed nests. Dr. Goulson says, "This means there is a delicate balance, and any factor that increases mortality even a little could push a bumblebee species into rapid decline."

"So long as there is enough natural habitat, bumblebees can support this rich diversity of life," the author writes. But, modern agriculture typically destroys natural habitat. Flower-rich meadows and grasslands and hedgerows have dwindled. While the author doesn't wade into the details on the role of pesticides in the decline of bees (he leaves that to his scientific journal articles), he simply points to the disruption of ecosystems as devastating and says "widespread pesticide use no doubt exacerbates the problem."

The daily and expected challenges that organisms face from a range of predators and parasites in a vibrant ecosystem are, as the author points out, "all part of a natural community which has existed and co-evolved over millennia." Through his travels, Dr. Goulson shows us how humankind has created problems for ecosystems around the globe by intentionally and unintentionally moving species.

Because crops, such as tomatoes and peppers, require buzz-pollination, bumblebees are uniquely suited to carry out the task. Without the bees, growers would be hand pollinating with vibrating wands. With bumblebee decline, the agricultural need sparked the commercialization of bumblebee rearing by Dutch scientists in 1988. In 1991, commercialized bumblebees came into use in the U.S.

The role that we play in protecting biodiversity is urgent. By planting a bee-friendly garden, we can contribute to the protection of that diversity. As Dr. Goulson says, "We need worms to create soil; flies and beetles and fungi to break down dung; ladybirds and hoverflies to eat greenfly; bees and butterflies to pollinate plants to provide food, oxygen, fuel and medicines and hold the soil together; and bacteria to help plants fix nitrogen and to help cows to digest grass. . . [yet] we often choose to squander the irreplaceable, to discard those things that both keep us alive and make life worth living. Perhaps if we learn to save a bee today we can save the world tomorrow?"

To advance understanding and action to protect bees, Dr. Goulson founded the Bumblebee Conservation Trust (BBCT). *In addition to reading this book, please use Beyond Pesticides' extensive resources of adopting bee-friendly practices and policies.*



We Need Your Poison Pole Photos!

Why?

An international committee of experts recommended the global elimination of the toxic pesticide pentachlorophenol (PCP) last fall, proposing that the wood preservative be listed by the Stockholm Convention as a Persistent Organic Pollutant (POP).

However, EPA is trying to block international efforts to halt the global use of this highly toxic chemical and its extremely harmful contaminants. The U.S. is not a signatory to the Stockholm Convention, and is also the largest producer and user of PCP in the world.

What can you do?

Join the "Poison Pole" Campaign

1. Take a photo of that ugly pole in your neighborhood, on your street, at a bus stop, in a park, or even at your local playground.
2. Do people live, walk, or play near the pole? Show that in your picture, if possible.
3. Include your name and the location of the photo.
4. Send it to info@beyondpesticides.org by April 30, 2015.

Get your community off the toxic treadmill

...We're Here to Help!

Did you know that we assist thousands of people each year through our website, by phone, email and in person?

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Have a pest problem?

Find a service provider, learn how to do it yourself, and more.

<http://bit.ly/doorwayPests>

Tools for Change

Find resources for activists and information on Beyond Pesticides' campaigns.

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Sign Up and Donate

Your support enables our work to eliminate pesticides in our homes, schools, workplaces and food supply.

Action Alerts

Sign up for free at: <http://bit.ly/SignUpPageBP>

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- \$30 all-volunteer org
- \$50 public interest org
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Two easy ways to become a member:

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www.beyondpesticides.org/join/membership.php

- Or -

Simply mail a check to:

Beyond Pesticides, 701 E St SE, Washington, DC 20003

Questions?

Give us a call at 202-543-5450 or send an email to info@beyondpesticides.org



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