



## The Root

### Dispatches from Maine's food sources

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[The Employment of Pesticides: Management and Application](#)

Thursday April 25, 2013 | 07:04 AM

Posted by [Sharon Kitchens](#)



Big box store pesticides aisle (photo by Sharon Kitchens).

Nothing about pesticides is easy. Between the drug corporations that produce pesticides, the regulators, scientists, and environmental groups there is a lot of information out there about pesticides, and not all of it is credible. This doesn't even touch on the extensive amount of information people pass on to each other without any direct experience or real knowledge. Then there is the intimidation factor. Whether synthetic, non-synthetic, or organic pesticides can be pretty intimidating. I don't know about you, but when I have to don protective gear to apply something and

there is a label with a skull and crossbones warning about what levels are safe...well that's all a bit disconcerting to me. Today's Root post is going to dig into important information intended to help you safely manage in as eco/human friendly way as possible pesticides. I will not be addressing specific products, their efficacy, or application requirements. I will not be weighing in on synthetic vs. organic. At the end of this post I provide a Resources section with a list of persons/agencies qualified to answer many of the questions you might have about specific pests and pesticides. Okay, let's dig in.

Before using a pesticide: evaluate the situation, know the pest, take measurements (how much area needs treatment), choose products wisely, read the entire label before purchasing, follow instructions (i.e. do you need to wear/use personal protective equipment), look for sensitive sites (pet bowls, laundry), watch the wind and temperature. (Tips provided by University of Maine Cooperative Extension [Master Gardener](#) Program.)

In addition to the above, check out these tips provided by the National Pesticide Information Center ([NPIC](#) is a cooperative agreement between Oregon State University and the U.S. Environmental Protection Agency).

Strategy Number One: Correctly Identify Your Problem (Disease, Pest) Start here (especially if you are in Maine) at the [Got pests?](#) site.

"Pests can be insects, weeds, fungi, mice and other animals, or microorganisms, like bacteria and viruses. Before you swat, stamp, or spray, know your enemy and, most importantly, know that it is an enemy, and not a beneficial or harmless plant or animal." – Got Pests? site.

The goal of Got Pests? is to provide a way for homeowners to quickly identify pest problems and obtain information on least-risk management options. The site also provides a detailed list of experts who can be contacted for assistance. Maine Board of Pesticides Control, University of Maine Cooperative Extension Pest Management Office, Maine Department of Agriculture, Maine Forest Service, and Maine Integrated Pest Management (IPM) Council collaborated to produce the site.

The University of Maine's Insect and Plant Disease Diagnostic Lab (IPDDL) operates year-round and offers diagnostic services to the public. The clinic's services include plant disease identification, insect and insect injury identification, and nutritional and cultural problem assessment. Inquiries arrive in the form of walk-ins, phone calls, e-mails (especially now that smartphones have cameras w/ good photo quality), and regular mail. Plant diagnostics submission forms can be found [here](#).

Additional sources for disease identification (these are ones I checked out, there are likely many more).

<http://umaine.edu/ipm/ipddl/>

[http://www.ppws.vt.edu/ipm/image\\_gallery.html](http://www.ppws.vt.edu/ipm/image_gallery.html)

<http://pnwhandbooks.org/plantdisease/host-disease-descriptions>

<http://vegetablemdonline.ppath.cornell.edu/>

[James Dill](#), a Pest Management specialist with University of Maine Cooperative Extension, said due to climate change, Maine is warming up and he is seeing an increase of new pests in Maine (as well as a migration of pests from southern to northern Maine). Examples of new pests in Maine include the (dreaded!!) Spotted Wing Drosophila (info [here](#) and [here](#)).

Other insects, including the Asian Longhorned Beetle, are practically knocking on Maine's door. For a list and illustrations of invasive threats to Maine's forests and trees (including those in your backyard) visit [here](#).

## Integrated Pest Management (IPM): Think First- Spray Last

According to the U.S. Environmental Protection Agency, [Integrated Pest Management](#) (IPM) is an effective and environmentally sensitive approach to pest management that relies on a combination of common-sense practices. In practicing IPM, growers who are aware of the potential for pest infestation follow a four-tiered approach: Set Action Thresholds, Monitor and Identify Pests, Prevention, and Control. Here is a [link](#) to Maine's Integrated Pest Management Programs for apples, blueberries, cranberries, home & garden, potatoes, strawberries, and sweet corn. The Home & Garden IPM from the University of Maine Cooperative Extension is [here](#).

[Clay Kirby](#), an entomologist with University of Maine Extension, advises considering pesticides as a last resort after exhausting non-pesticide options. He also suggests contacting pesticide toxicologist, Lebel Hicks [lebel.hicks@maine.gov](mailto:lebel.hicks@maine.gov) (287-2731), Maine Board of Pesticides Control, to help you in your pesticide risk assessment.

This article "[Think First...Spray Last](#)" by Gary Fish, Environmental Specialist Maine Board of Pesticides Control provides a checklist of considerations before using a pesticide.

Henry Jennings, the Director of the Maine Board of Pesticides Control, encourages finding our more about the lowest risk strategy by using the best available science. "The simple answer is to rely on university research, because universities aren't out to make money through their recommendations," said Jennings. "Since conditions and pests vary by climate and geography, look for university recommendations from your geographical area. For instance, there are a series of university developed New England Pest Management Guides, and these will almost always contain the most relevant information."

"Certain universities tend to specialize in different areas," said Jennings. "Purdue is known for structural pests (e.g. pests in and around your home). Cornell has a renowned agricultural program, U Mass has the best turf program in New England, and the Maine Forest Service does a nice job with pests of trees. "

For additional information on turf management, Jennings sent me [this paper](#) on "Management of Turf Using 'Low-Impact' Pesticides" from Rutgers Center for Turfgrass Science, so that could be another academic resource.

### Strategy Number Three: Read the Label

Before you purchase a pesticide, and absolutely before you use it, read the label and follow the directions. Did you know pesticide labels are legal documents? Check out these [helpful tips](#) provided by the NPIC on reading pesticide labels.

Pesticides have signal words printed on the packaging. Every pesticide product label contains a signal word – CAUTION, WARNING, or DANGER, depending upon its toxicological classification, describing the short-term toxicity of the product. Products with the DANGER signal word are the most toxic. Products with the signal word CAUTION are lower in toxicity. WARNING indicates the pesticide product is moderately toxic if eaten, absorbed through the skin, inhaled, or it causes moderate eye or skin irritation. This NPIC [fact sheet](#) on understanding pesticide label signal words answers general questions about pesticides.

According to James Dill, some products do not use a signal word anymore, i.e. [Dupont ACELEPRYN®](#) and [Scotts® GrubEx®1](#) (both commonly used for white grub control on lawns and turf). The active ingredient: [chlorantraniliprole](#), is a new class of chemistry, anthranilic diamide. To Dill's knowledge, for the EPA not to assign a signal word for the mentioned products is unprecedented. Chlorantraniliprole, according to Dill, has the potential to accumulate in soil and

groundwater (therefore, New York has some restrictions on these products) and is also toxic to aquatic invertebrates, oysters and shrimp."Because chlorantraniliprole is so highly effective against white grubs (and other pests), its use is increasing around the country," said Dill. "I make it a point to tell people, who are considering products for use directly on turf, to be aware of groundwater vulnerability and surface water runoff patterns that may lead to streams, ponds, and estuaries."

Dill explained pesticides are registered annually. He estimated about 10,000 were registered in Maine between January, 2013 and March, 2013. A big percentage of these are re-registrations from the previous year. Many seem identical at first glance various, i.e. there might be 15 containers of Raid ( home, garden, ant & roach, spider, etc.), but you have to read the label...and when you do you'll find there are different active ingredients.

"Even though it is somewhat of a marketing ploy, they may have slightly different percentages of the same pesticide," Dill said. "Therefore, although the active ingredients may be the same, one label may be 5% and other label 6%, etc. So they are slightly different formulations and labeled for specific sites. So, you can't legally use the garden spray in the house and vice versa, or you'd be in violation of the label (which is a legal document)."

At some big box stores, you may find a posted flyer offering free expert advice with contact information for the Maine Board of Pesticides Control and the University of Maine Cooperative Extension: Insects Pests & Plant Diseases.

#### Types of Pesticides

According to the [EPA](#), Pesticides are often referred to according to the type of pest they control. Chemical Pesticides, Biopesticides (certain types of pesticides derived from such natural materials as animals, plants, bacteria, and certain minerals. For example, canola oil and baking soda have pesticidal applications and are considered biopesticides). Pest Types include: Disinfectants and Sanitizers, Fungicides, Fumigants, Herbicides, Insecticides, Miticides, Pheromones (disrupt mating behaviour), Repellents...(Mothballs are insecticides used to kill fabric pests by fumigation in sealed containers), and Defoliants. Pest Control Devices are intended for trapping, destroying, repelling, or mitigating any pest (a mousetrap is an example of a device).

"First of all, under both state and federal law, the definition of a "pesticide" is very broad," said Henry Jennings, Director of the Maine Board of Pesticides Control. "It's essentially any substance that's used for the purpose of controlling or mitigating any pest problem. It doesn't matter whether the product is synthetic or non-synthetic, natural, organic, food-grade substances or homemade..."

Jennings explained non-synthetic, organic and low-impact pesticides are different ways of looking at pesticides that are perceived to have lower risks than the synthetic ones. "The reality is that some synthetic products are low risk, some organic ones are low risk, and all the "low impact" ones presumably are – in general terms – low risk if applied as intended," said Jennings.

Following Jennings definitions of different categories of (or ways of looking at) pesticides:

**Synthetic:** produced by way of chemical synthesis or chemical reaction. Some of these are approved by the Organic Materials Review Institute ([OMRI](#)) for use in organic farming, but most are not.

**Non-synthetic:** produced in a way that does not involve chemical synthesis. Some of these are extracted from plants, some of them are micro-organisms (Bt) and some are extracted from other sources that "naturally" occur on the planet, but no chemical synthesis is required in the production.

**Organic:** Approved for use in certified organic farms by OMRI. Most of these are non-synthetic, but

some are not. I don't fully understand how OMRI decides when to approve synthetic pesticides or other materials for that matter, but presumably there is an evaluation of the health and environmental risks behind it all. A review board, made up of folks with an organic background, makes these determinations. This is a research project unto itself.

Low Impact Pesticides: This is a category specific to the New Jersey School IPM law and is [defined](#) by the State of New Jersey.

For information on pesticides qualifying as "Minimum Risk Pesticides" by the Environmental Protection Agency, visit [this site](#) and then check the list of the allowed [active ingredients](#). According to Jennings, this group of products has exploded because there are no testing requirements and they cost nothing on the research and development side. He said, states are generally upset with this exemption for a number of reasons, including:

- The lack of scientific data on the effects
- The claims that manufacturers are making
- And the fact that EPA essentially failed to anticipate the ways in which these products might be used. For examples, essential oils may be relatively low risk for some uses, but aerosolizing them in large volumes appears to potentially create inhalation risks that EPA never considered. Moreover, since many of these food grade products, intuitively these appear rather harmless, until you start distributing enormous volumes of them (which is often necessary to have any effect) across the surface of the planet. The first rule toxicology is that any substance can be toxic at a certain dose, and these products need to be applied at very high doses in general.

#### Organic Doesn't Always Mean Safe

Organic and "all natural" pesticides may be as toxic or more toxic to the applicator than synthetic pesticides. This [fact sheet](#) from The Xerces Society "Organic-Approved Pesticides Minimizing Risks to Pollinators" states "even pesticides approved for organic agriculture can cause significant harm to bees."

If you want to try and avoid using chemicals (non-synthetic, low-impact, or organic), a great source of information is going to be the Maine Organic Farmers and Gardeners Association (MOFGA). Dr. Eric Sideman, Director of Technical Services for MOFGA, is available to farmers and gardeners by phone and email. The pest reports he produces regularly during the growing season, let people know what to look for when and how to control those pests. They can be found on MOFGA's site [here](#). MOFGA certified farmers, and other growers may also request updates be emailed to them. Each report is on a specific pest, which plants are affected and how, and recommendations for combating the pest. Though he will recommend crop rotation, sanitation, avoiding planting in fields with lots of decaying vegetation...I did find mention of use of pesticides...

Sideman also co-authored the newly revised [Resource Guide for Organic Insect and Disease Management](#).

*Mother Earth News* published [this article](#) on organic pesticides and organic gardening in 1994. It has a combination of homemade remedies and natural insecticides.

Here is a [link](#) to the USDA's National Organic Program's national list of allowed and prohibited substances for organic crop and livestock production.

#### Using Pesticides Properly

After you have confirmed the pest and the site of application, you will need to figure out how to choose the right pesticide (i.e. dry or liquid) and then how much to apply and how frequently.

Effective pest control is based on pest identification, biology, and occurrence; the host organism; and timing. Purdue University's Cooperative Extension Service produced [this document](#) "Pesticide Safety and Calibration Math for the Homeowner" to help you calculate the area to be treated.

Both state and federal pesticide statutes prohibit the application of pesticides inconsistent with the product label. ([See 8 F](#)) Maine's statutes allow for a penalty of up to \$1,500 per offense for a first offense.

### Pesticide Etiquette

Clay Kirby, an entomologist with University of Maine Extension, recommends a person applying a pesticide be knowledgeable about vulnerable/sensitive areas (i.e. groundwater, surface water, abutting schools and day cares, food crops, areas that attract bees), be considerate of neighbors (especially those who are chemically sensitive, keep bees, and have strong convictions against pesticides), and mindful of the pets and farm animals.

### Disposal

For pesticide disposal check out [this brochure](#).

### Homemade Solutions/Home Remedies

A common question the Maine Board of Pesticides Control receives, according to Henry Jennings, involves homemade pesticides.. "Homemade pesticides are legal only for personal use, which means they must be applied by the person making the concoction, and only on that person's property," said Jennings. "So home gardeners are generally legally okay using homemade pesticides. It's a little trickier with commercial farming, because once food enters into commerce, the presence of any "deleterious substance" has the potential to render the food as "adulterated" under state and federal food laws. Moreover, with the increase in food allergies, we caution growers about the potential for causing adverse reactions and the liability associated with that prospect."

Per Bruce Watt, Plant Disease Diagnostician with University of Maine Extension, some biocontrol agents, which are most effective as preventatives, can be found in [this publication](#). He also found this reference to use of [baking soda](#), and this one for cow's milk for [powdery mildew control](#).



AppleScab (photo provided by Bruce A. Watt)

Resources (used for this article)

Henry Jennings, Director of the [Maine Board of Pesticides Control](#) (public resources [links](#))  
[James Dill](#), a Pest Management Specialist with University of Maine Extension  
[Clay Kirby](#), Associate Scientist/Entomologist with University of Maine Extension  
[Bruce Watt](#), Plant Disease Diagnostician with University of Maine Extension

(additional resources pests and pest management)

[Maine State Beekeepers Association](#)  
[Northeastern IPM Center](#)

For more information on fruit diseases visit [Penn State Extension](#)

Power point presentations from Cornell's 26th Annual Tomato Disease Workshop can be found [here](#)

The 2012-2013 New England Small Fruit Pest Management Guide will be available later this spring, and usually costs around \$6.00. The [2010-2011 New England Small Fruit Pest Management Guide](#) can be downloaded free of charge at the UMass Amherst Extension website.

University of Maine Cooperative Extension and Maine Vegetable & Small Fruit Growers Association will hold a Spray Calibration Clinic and Twilight Meeting for commercial growers at David Pike's farm (Farm to You 115 Mountain View Rd., Farmington) in the afternoon and evening of May 21st.

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## About the Author

Sharon Kitchens is a neo-homesteader learning the ins and outs of country living by luck and pluck and a lot of expert advice. She writes about bees for The Huffington Post and stuff she loves on her personal blog, [deliciousmusings.com](#).

When she is not writing, she enjoys edible gardening, reading books on food and/or thinking about food, hanging out by her beehives and patiently tracking down her chickens in the woods behind her old farmhouse.

In her blog, Sharon profiles farm families, reports on farm-based education and internships, conducts Q&A's with master beekeepers, offers tips on picking a CSA, and much more.

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Posted: April 23  
Updated: Today at 6:58 AM

## Should Maine require labeling for genetically modified food?

**Hundreds gather in Augusta to debate consumer awareness of bioengineered farm products as lawmakers try to decide.**

<

By Steve Mistler [smistler@pressherald.com](mailto:smistler@pressherald.com)  
State House Bureau

**AUGUSTA** — The national debate over genetically modified food moved to the State House on Tuesday, pitting agribusiness, grocers and some Maine farmers against a well-organized group of organic farmers and national food-safety advocates seeking to opt out of the "GMO experiment."

Logan Perkins, Right to Know-GMO Campaign Coordinator for Maine Organic Farmers and Gardeners Association, speaks at a rally outside the State House on Tuesday April 23, 2013 before a legislative hearing on LD 718, An Act to Protect Maine Food Consumers' Right to Know About Genetically Engineered Food and Seed Stock, in Augusta.

click image to enlarge



Staff photo by Joe Phelan



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Products labeled with Non Genetically Modified Organism (GMO) are sold at the Lassens Natural Foods & Vitamins store in Los Feliz district of Los Angeles Friday, Oct. 5, 2012. The national debate over genetically modified food moved to the Maine State House on Tuesday, pitting agribusiness, grocers and some Maine farmers against a well-organized group of organic farmers and national food-safety advocates seeking to opt out of the "GMO experiment."

AP

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### WHAT ARE GMOs?

Genetically modified organisms, or GMOs, are plant or animal genes that have been artificially spliced with the DNA of an unrelated plant, animal, bacterium or virus.

- GMOs were developed by scientists to increase a plant or animal's resistance to disease.
- The U.S. Department of Agriculture estimates that 70 percent of the processed food in American supermarkets is made from GMO ingredients.

More than 100 people signed up to testify before lawmakers on [L.D. 718](#), a bill that would require food retailers to label products containing genetically modified seeds or ingredients. Sponsored by Rep. Lance Harvell, R-Farmington, the bill also would prohibit retailers from labeling a product as "natural" if it contained GMOs. GMO stands for "genetically modified organism."

Current Maine law allows retailers to voluntarily label their products as certified organic or "GMO-free."

Supporters of L.D. 718 argued that consumers have the right to know if they're buying food that has been bioengineered – its DNA has been spliced with that of an unrelated plant, animal, bacterium or virus.

Opponents countered that the bill unfairly stigmatizes farmers who sell genetically modified produce despite a dearth of scientific research proving that such products are any less healthful than those conventionally grown. They also cited a 2012 position by the American Medical Association that found no evidence that bioengineered foods are more dangerous than conventional foods.

Advocates of the bill said Tuesday that scientific evidence is emerging that genetically modified foods can increase health risks and food allergies. They said there is a lack of scientific studies proving health risks because federal regulators have left testing up to the biotech industry that is producing and profiting from genetically modified products, which have been in the domestic food supply for nearly 20 years.

The Food and Drug Administration regulates genetically modified foods but does not approve them. The agency assumes the foods are safe until confronted with evidence that they're not.

"If you're not going to test it, at least label it," Harvell said. "If we're involved in this grand experiment of being turned into lab rats, we should at least know about it."

Michael Hansen, a senior scientist with Consumers Union, the policy advocacy division of Consumer

Reports, has worked on labeling legislation in Congress. He told lawmakers Tuesday that federal regulators have ceded review of genetically modified products to ensure that the industry -- not the government -- is legally liable if health problems surface.

Jon Olson, speaking on behalf of the Maine Farm Bureau, said the bill would be costly to farmers and sellers, who would need to review affidavits to determine if the food they're selling contains genetically modified ingredients.

Olson also said the bill would "falsely alarm" the public that GMO foods are harmful.

"We need to provide opportunity for all farmers, not take sides on farming practices," he said.

At least 18 other states are considering similar legislation, according to the National Conference of State Legislatures. Congress is also considering a GMO-labeling bill, a proposal that supporters acknowledge faces long odds because of opposition from businesses, biotech food producers and agribusiness groups.

Similarly, the Maine proposal has been the subject of behind-the-scenes legislative maneuvering between supporters and opponents, who began wrangling over which committee should hear the bill, the Agricultural Affairs Committee or the Labor Committee.

Lawmakers on the agriculture panel heard the bill Tuesday. The Legislature has previously reviewed, and defeated, four GMO-labeling bills.

However, supporters believe that the tide is turning. They cite growing international mistrust of genetically modified foods. Currently, 62 countries, including the European Union, have labeling laws.

Consumers' growing preference for organic foods also has influenced some retailers.

Earlier this year, the Whole Foods retail grocery chain told its suppliers that they had until 2018 to label foods containing genetically engineered ingredients.

Labeling laws face an uphill climb, despite polls showing support for them. California voters narrowly defeated a labeling bill in 2012. The biotech food products industry outspent advocates, \$45 million to \$6.7 million, according to published reports.

In Maine, advocates of L.D. 718 include the Maine Organic Farmers & Gardeners Association, which has enlisted the expertise of one of the state's top lobbying firms, Preti Flaherty. The organic farmers group brought a large crowd to the public hearing, including Samuel Kaymen, co-founder of Stonyfield yogurt.

An industry coalition opposed to the bill includes the Maine State Chamber of Commerce and the Maine Farm Bureau, with backing from agribusiness giant Monsanto and the Grocery Manufacturers Association.

The industry coalition has hired lobbyist Robert Tardy and start-up Red Hill Strategies, a Portland consulting firm headed by Republican operative Lance Dutson and Mike Leavitt, the former chief of staff for the Republican National Committee.

Monsanto and the Grocery Manufacturers Association, active campaign donors to lawmakers in agriculture-heavy states, are also involved in the congressional debate.

Monsanto managed to insert a rider in the recent congressional budget bill. Critics say the rider prohibits the U.S. Department of Agriculture from halting production of a genetically engineered crop once it's in the ground even if studies prove the crop could be harmful.

The competing influential interests make passage of L.D. 718 uncertain despite its having more than 120 legislative co-sponsors, composed of Democrats, independents and libertarian Republicans.

Opponents on Tuesday argued that the bill violates constitutional provisions on interstate commerce allowing companies to avoid disclosing whether their products are genetically engineered.

Hansen, with Consumers Union, rebutted the constitutional argument. He said there are more than 200 state-enacted food labeling laws, including for maple syrup grades and kosher foods. No state has enacted a comprehensive GMO-label law, although Alaska recently passed a resolution against genetically modified salmon.

The agriculture committee on April 16 sent a letter to Attorney General Janet Mills seeking review of the constitutionality of the bill. She has not yet responded.

Constitutional concerns also have surfaced in Vermont, where the Legislature is poised to enact a labeling law. Monsanto has threatened to sue the state if it passes the bill.

Monsanto's history of litigation was noted by Harvell, the bill's sponsor. He said he is skeptical that the company will adequately test its products.

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### GMO Labeling: Simple Transparency, or Undue Burden for Maine Farmers?


04/23/2013 Reported By: [Jay Field](#)

Genetically-engineered food in Maine would need to be labeled as such, under a bill being considered by Maine lawmakers. If it were to pass, the measure could only take effect after similar legislation has passed in a handful of other states. Opponents, including major food and agriculture industry groups, told lawmakers at a public hearing that the bill isn't supported by science and would raise costs for businesses and consumers. But supporters argued that consumers have a right to know whether the food they're consuming comes from genetically-modified organisms - or GMOs. Jay Field reports.

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**GMO Labeling: Simple Transparency, or Undue Burde**  *Duration: 3:35*

GMOs have been engineered to include DNA from organisms, whose genetic material wouldn't otherwise mix together in nature. The idea is to create crops that have certain traits - say a resistance to herbicides - that do not occur in plants that are traditionally bred. Eighty-five percent of all the corn grown in the U.S. is genetically modified, according to the Just Label It coalition.

"And if you're going to engage the American public, and the people of Maine, in a lab experiment, you know, it's my opinion that perhaps they ought to know they're in that lab experiment," said Rep. Lance Harvell, testifying before the Legislature's Agriculture, Conservation and Forestry Committee.

Harvell is sponsoring a bill that would would make Maine the first state in the nation to require GMO labeling of all genetically-modified foods. The U.S. Food and Drug Administration, the Farmington Republican told fellow lawmakers, doesn't test GMO seeds to see if they pose any risks to human health. Instead, Harvell says the government has left this safety testing to the biotech industry.

"And so we're taking the word of the biotech industry," he said. "And in my opinion, this is somewhat like the fox guarding the hen house."

On it's Web site, the Just Label It coalition notes that more than 70 percent of all processed foods in the U.S. now contain GMO material. The group says not enough research has been done on the question of whether genetically-engineered food is safe for

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agriculture. The Maine Farm Bureau Association, where John Olson is executive secretary, contends the measure would hurt non-organic, conventional farmers who don't grow GMO crops.

"I don't think that they realize when they sell their non-GMO, non-organic sweet corn that they have to have a paper trail with that," Olson said. "They have to sign an affidavit that it's not from a GMO seed. And that has to go to all of their vendors and all of their retailers and all of their distributors. I think many farmers would say that's an unnecessary burden."

Many mainstream grocers, meantime, says GMO labeling would increase their costs, which they would then be forced to pass on to consumers. The Agriculture, Conservation and Forestry Committee will now digest the public testimony and begin work sessions on the bill in the coming weeks.

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# BANGOR DAILY NEWS

## Debate raging in Augusta over genetically modified food labeling

By Tom Walsh, BDN Staff

Posted April 25, 2013, at 1:38 p.m.

AUGUSTA, Maine — The State House debate over requiring labeling of food products that have been genetically modified is one of many similar debates now raging throughout the country.

It is also a debate that has been underway in Maine for 20 years. Legislative proposals to require labeling of consumables that contain genetically modified animal or plant organisms (GMOs) have been floated, debated and abandoned then and in 1993, 1995, 1997 and 2001.

GMOs are plants and animals created through gene-splicing techniques that combine the genetics of different species. An estimated 94 percent of America's soybean crop, 90 percent of its cotton crop and 88 percent of its corn crop has been genetically engineered to resist pests and climatic conditions such as drought. Consumer products considered at risk to GMO modifications include meat, milk and eggs, given that feeds contain GMO-engineered grains.

Since 20 years ago, proponents of labeling have included the Unity-based Maine Organic Farmers and Growers Association. Heather Spalding, the group's acting director, said Wednesday afternoon that she is more optimistic than ever that the current push for labeling, as proposed in [LD 718](#), will succeed.

"There's a lot more public awareness and concern about this issue, and in terms of this proposed legislation, a lot more bipartisan support," she said. "There are 123 co-sponsors within the Legislature, including many Republicans. The sponsor of the bill, Rep. Lance Harvell of Farmington, is a conservative Republican. There is much more broad-based support for this than we've seen in the past four rounds."

Spalding characterizes the labeling effort as an issue steeped in the consumers right to know what they are eating and feeding their children. She was among the dozens of people who testified Tuesday during a State House public hearing that lasted almost seven hours.

Spalding refutes the argument made by opponents to labeling who claim consumers have been buying and eating GMO-based food for decades without any reports of associated health issues.

"That's a fallacy in the sense that what little testing has been done on the health effects has been done by the food industry, and the results have been guarded and not released for peer review," she said. "You can't say there are no health effects when you haven't been testing for them. There is emerging science, some of it out of Europe that there are significant 'scientific uncertainties' about the impact of GMOs on human health. We see labeling as a risk-management strategy."

GMO-manipulated food products are banned in many European countries.

Shelley Doak, executive director of the Maine Grocers Association, said Wednesday that a state-mandated labeling law would prove a costly burden to the state's grocers and an inconvenience to consumers.

"It would prove expensive for Maine farmers, processors and manufacturers to implement and enforce such regulations," she told the Bangor Daily News. "If the Food and Drug Administration, the U.S. Department of Agriculture, and the [Environmental Protection Agency] felt that these products needed to be labeled, we would support that. Consumers expect reliable, fact-based labeling that are statements of fact backed by scientific

evidence.

“And how likely will out-of-state product producers be willing to change their labels [to accommodate Maine]? Either they will not send their products to the state of Maine, or will ship in their products and tell independent grocers that they are responsible for affixing stickers on products.”

Food labeling policies similar to the measure now being debated in Augusta also are under consideration in 36 other states. Legislative bills are actively under consideration in Connecticut, Maryland, New Hampshire, New Jersey, New York, Pennsylvania, Vermont and Minnesota. The labeling requirement is on this year’s November ballot for voters in Washington state.

Opponents to the Maine proposal also argue that any requirement for product labeling should be a federal, not a state, regulatory issue. Spalding agrees, but says the federal process has taken too long, forcing Maine and other states to take action.

“Efforts at the federal level have been moving too slow,” she said. “This is not an issue for which we can wait for Congress to act.”

GMO techniques have not been applied to any of three of Maine’s dominant agricultural crops: potatoes, broccoli or blueberries. They have been applied elsewhere to apples and to farm-raised salmon, which are also Maine commodities.

The legislative committee on Agriculture, Conservation and Forestry has yet to schedule a work session on LD 718.

<http://bangordailynews.com/2013/04/25/news/augusta/debate-raging-in-augusta-over-genetically-modified-food-labeling/> printed on April 26, 2013

Posted: May 14  
Updated: Today at 6:41 AM

## Maine panel endorses labels for genetically modified food

**Agribusiness giants like Monsanto will likely sue and have deep pockets, the AG says, but lawmakers still recommend passage.**

By [Steve Mistlersmistler@pressherald.com](mailto:Steve.Mistlersmistler@pressherald.com)  
Staff Writer

**AUGUSTA** – The Legislature’s Agriculture Committee endorsed a bill Tuesday that would require food retailers to label products containing genetically modified seeds or ingredients.



[click image to enlarge](#)

A product labeled with Non Genetically Modified Organism (GMO) is sold at the Lassens Natural Foods & Vitamins store in Los Feliz district of Los Angeles Friday, Oct. 5, 2012. A Maine legislative panel approved the bill 8-4 on Tuesday, May 14, 2013 that would require foods that are genetically modified to be labeled as such. (AP Photo/Damian Dovarganes)



click image to enlarge



In this April 23, 2013 file photo, Logan Perkins of the Maine Organic Farmers and Gardeners Association, right, rallies supporters outside the State House for a bill that would require genetically modified products to be labeled. A legislative panel approved the bill 8-4 on Tuesday, May 14, 2013.

Staff photo by Joe Phelan

[Select images available for purchase in the Maine Today Photo Store](#)

## WHAT ARE GMOs?

Genetically modified organisms are plant or animal genes that have been artificially spliced with the DNA of an unrelated plant, animal, bacterium or virus.

GMOs were developed by scientists to increase plants' and animals' resistance to disease.

The U.S. Department of Agriculture estimates that 70 percent of the processed food in American supermarkets is made with GMO ingredients.

The 8-4 vote moves Maine farther into a national debate over genetically modified food. It also moves Maine closer to tangling with agribusiness and biotech giants like Monsanto, which has threatened to sue other states that pass such labeling legislation.

A lawsuit may await Maine if the Legislature enacts L.D. 718, a bill sponsored by Rep. Lance Harvell, R-Farmington, and co-sponsored by 120 lawmakers, including Democrats, independents and libertarian Republicans.

Attorney General Janet Mills, who was asked to review the constitutionality of the bill, told lawmakers that it is "almost certain" to face a legal challenge from the industry. Mills did not guarantee that her office would be able to defend its constitutionality.

"These entities are very litigious," Mills told the committee.

Proponents of the bill, including the Maine Organic Farmers & Gardeners Association, said it is up to states to take on industry to ensure that it discloses whether food is bioengineered – its DNA has been spliced with that of an unrelated plant, animal, bacterium or virus – because Congress has failed to enact federal legislation.

Harvell acknowledged that a lawsuit is likely if the bill passes. "You're challenging a biotech industry that's operated on the basis of throwing their weight around," he said. "Somebody once said that

Monsanto isn't a seed company, it's a law firm that makes seeds."

No state has passed such a labeling law. At least 18 states are considering them, according to the National Conference of State Legislatures. On Monday, Vermont inched closer to enacting the nation's first such labeling bill when its House of Representatives passed a measure similar to Maine's.

Monsanto has already threatened to sue Vermont if the legislation passes.

Lance Dutson, a spokesman for the business and industry coalition that's opposing the bill, said he was surprised that the committee endorsed the legislation after Mills delivered her remarks. He said Mills' review essentially reaffirmed "serious constitutional concerns."

The constitutional issue centers on free speech, specifically compelling food manufacturers and retailers to disclose ingredients that don't pose a known public health risk.

The Maine State Chamber of Commerce, the Maine Farm Bureau and the Grocery Manufacturers Association say the bill would unfairly stigmatize genetically modified foods despite a dearth of scientific research proving that such products are any less healthful than those that are conventionally grown.

Dutson said, "For the state to compel a food producer to put something on their label that doesn't serve any public health or nutrition issue, that seems very clearly to be a violation of the First Amendment."

Maine law now allows retailers to voluntarily label products as certified organic or "GMO-free." Harvell's bill would prohibit retailers from labeling a product "natural" if it contained GMOs, genetically modified organisms.

Advocates of new regulations say scientific evidence is emerging that genetically modified foods can increase health risks and food allergies. They say federal regulators have left testing up to the industry that is producing and profiting from genetically modified products.

The Food and Drug Administration regulates genetically modified foods but does not approve them. The agency assumes the foods are safe until confronted with evidence that they're not.

Michael Hansen, a senior scientist with Consumers Union, has worked on labeling legislation in Congress. He told lawmakers during a public hearing on Maine's bill that federal regulators have ceded review of genetically modified products to ensure that the industry – not the government – is legally liable if health problems surface.

Opponents say a labeling law would be costly to farmers and sellers, who would have to review affidavits to determine if the food they're selling contains genetically modified ingredients.

The Legislature has previously rejected four GMO-labeling bills, but supporters say there is growing support for a law.

Earlier this year, the Whole Foods grocery chain told its suppliers that they have until 2018 to label foods containing genetically engineered ingredients.

In advocating for L.D. 718, the Maine Organic Farmers & Gardeners Association has enlisted one of the state's top lobbying firms, Preti Flaherty.

The proposal endorsed by the Agriculture Committee on Tuesday is slightly different from the original bill. It would not take effect until five other states passed similar legislation. If that didn't happen before 2018, the law would be repealed.

The proposal goes to the House of Representatives for its first floor vote.

*Steve Mistler can be contacted at 620-7016 or at:*

*smistler@pressherald.com*

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**From:** NANCY ODEN [<mailto:cleaneearth@myfairpoint.net>]

**Sent:** Friday, April 26, 2013 2:02 PM

**To:** Jennings, Henry

**Subject:** 'We Speak for the Bees'

Henry - Please print out this website (below link) and put it in the packets of the Board for their next meeting, and please put neonicotinoids on the Agenda again. I don't seem to get the Agenda anymore. Please ensure that my email address if [cleaneearth@acadia.net](mailto:cleaneearth@acadia.net) in your email lists. Thank you..... - Nancy Oden

<http://www.commondreams.org/headline/2013/04/26-2>

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**From:** NANCY ODEN [<mailto:cleaneearth@myfairpoint.net>]

**Sent:** Tuesday, April 30, 2013 9:29 AM

**To:** Jennings, Henry

**Subject:** EU Votes to Ban Bee-Harming Pesticides

Henry - I still don't seem to be on the Agenda email list. Please put [cleaneearth@acadia.net](mailto:cleaneearth@acadia.net) on the Agenda email list. Thank you.

The article in the link below is very important for the Board to have and, hopefully, to read.

Even if, to all appearances, Board members are in the pockets of various chemical companies, I still believe there are some decent consciences that have been in hiding.

I'd like to think that, given enough evidence, Board members will ignore the blandishments of the chemical companies and do the right thing so earth's life forms have a chance to live.

Doing the right thing would mean severely restricting the use of pesticides, not just express little "concerns" and then approve every new poison that's requested.

The Board could, and should, then pose clean alternatives to poisonous pesticides, and ensure alternatives are used rather than allowing the continuous poisoning our life-giving eco-systems.

Please print the article in the link below my signature, along with the article's comments, and put it in the Board members' packets. Feel free to include my comments here, if you wish.

Please send me by return email that you have received this, and tell me when the next Board meeting will be, and where, if you would.

Thank you.

- Nancy Oden, <http://www.cleaneearth.net>

<http://www.commondreams.org/headline/2013/04/29-3>

## Return



Published on Friday, April 26, 2013 by Common Dreams

### **'We Speak for the Bees': Marchers Urge EU-Wide Ban of Killer Pesticides**

**'This is not abstract theorizing. Bees are dying out. Now.'**

- Jon Queally, staff writer

They came to speak for the bees.

Ahead of an expected EU vote on Monday that will determine a possible ban on a class of pesticides that scientists say are killing off the continents' bees and other pollinators, a coalition of beekeepers, conservationists, gardeners, and environmental activists marched on Parliament in London on Friday as a way to urge the UK to join other European nations in supporting the ban.

Yellow and black dominated the scene as many in attendance dressed as bees, wore their apiary suits and carried signs that read "Like Food? Love Bees" and "No to Neonic," referring to pesticide class called neonicotinoids that a number of recent studies have tied directly to the decline of bee populations.

The organizers of the so-called "**March of the Beekeepers**" included Avaaz, Friends of the Earth, Buglife, Environmental Justice Foundation, Greenpeace, Pesticide Action Network UK, Soil Association and the group 38 Degrees.

"Ministers can't ignore the growing scientific evidence linking neonicotinoid insecticides to bee decline," said Friends of the Earth's campaigns director Andrew Pendleton. "Their claims to be concerned about bee health will ring hollow if they fail to back European moves to restrict the use of these chemicals."

He continued: "If we lose our bees and other vital pollinators it'll have a devastating impact on our food, gardens and environment. We urgently need tougher pesticide restrictions and a British Bee Action Plan to tackle all the threats they face."

Underlining the urgency of the threat on Friday, Greenpeace's Graham Patterson issued a stark warning: "This is not abstract theorizing. Bees are dying out. Now."

He **explained**:

*In the US, bee numbers have halved in the last few decades, with a **30%** decline in the last five years. Several countries in Europe have suffered similar declines, with nearly **80%** of Spanish hives lost.*

*This is, at least in part, due to a phenomenon called **colony collapse disorder** (CCD), where the worker bees from a hive mysteriously disappear. There's general agreement that CCD is caused by combination of factors including the varroa mite (a bee parasite), disease, monocultural farming and weather impacts exacerbated by climate change. The*

*disagreement comes over whether pesticides, and particularly neonicotinoids, are a contributing factor.*

And as the *Guardian* **reports**:

*Bees and other wild **insects** such as moths, ladybirds and hoverflies, pollinate three-quarters of all food crops, but have been in serious decline in recent decades. **Scientific research** published in the world's most prestigious journals is increasingly linking neonicotinoids, the world's most widely used insecticides, to severe harm to bee colonies. The chemical industry, which makes billions a year from their products, insist their **products are safe** and banning them would harm food production.*

Those chemical companies, led by firms Syngenta and Bayer, are fighting aggressively against the pending EU vote, as the Center for Media & Democracy's Rebekah Wilce recently **documented**.

Wilce reported:

*Private letters recently obtained and released by Corporate Europe Observatory (CEO) reveal that Bayer and Syngenta have engaged in **furious lobbying** against these measures. [...]*

*In the wake of EFSA's and the European Commission's **recommendations** and the subsequent **failure** of the European Member States to reach a qualified majority to put the ban in place effective July 2013, Bayer and Syngenta then launched what CEO called a "charm offensive to be seen as part of the solution rather than of the problem." For Syngenta, this consists of an upgrade of its PR sting "**Operation Pollinator**," in which the company **proposes to provide payments** to a few farmers to grow strips of flowers and other plants attractive to bees alongside their neonicotinoid-treated crops.*

Paul de Zylva, also from Friends of the Earth, points out that claims that neonicotinoids "are safe" are claims with no basis in scientific review. "It's notable," he said, "that the words of ministers and civil servants sound just like those from the pesticides industry."

As Wilce notes in her reporting, support for the pesticide ban varies from country to country, but many expect the ban to pass based on a growing public opposition and consensus from the scientific evidence. That support, however, has not been clearly seen in the UK.

Pushing to create that that political will, of course, is the whole basis of the protest in London today and those coming to the defense of the bees and other pollinators declared the support of over 2.6 million people **who signed a global petition** supportive of the ban, with a stated goal of attracting 3 million.

The language of that **petition** follows:

*Quietly, globally, **billions of bees are dying**, threatening our crops and food. But **in days the European Union could ban the most poisonous pesticides**, and pave the way to a global prohibition that would save bees from extinction.*

***Four EU countries have begun banning these poisons**, and some bee populations are*

*already recovering. Weeks ago the official European food safety watchdog stated for the first time that certain pesticides are fatally harming bees. Now legal experts and **European politicians are calling for an immediate ban. But, Bayer and other giant pesticide producers are lobbying hard** to keep them on the market. If we build a huge swarm of public outrage now, **we can push the European Union to put our health and our environment before the profit of a few.***

***We know our voices count!** Last year, our 1.2 million strong petition forced US authorities to open a formal consultation on pesticides -- now **if we reach 3 million, we can persuade the EU to get rid of these crazy poisons** and pave the way for a ban worldwide. Sign the urgent petition and share this with everyone -- **Avaaz will deliver our message ahead of the key vote next week in Brussels.***

On twitter:

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Article printed from [www.CommonDreams.org](http://www.CommonDreams.org)

Source URL: <http://www.commondreams.org/headline/2013/04/26-2>



February 2013

Dear Reader:

I am pleased to present the Pesticide Data Program's (PDP) 21st Annual Summary for calendar year 2011. The U.S. Department of Agriculture implemented the PDP in 1991 to test food commodities for pesticide residues. The data produced by the PDP are used to estimate consumer dietary exposure to pesticides and the relationship of those exposures to science-based standards of safety. This report shows that overall pesticide residues found on foods tested are at levels below the tolerances (maximum legal residue levels) set by the U.S. Environmental Protection Agency (EPA).

Using a rigorous statistical approach to sampling along with the most current laboratory methods, the PDP tests a wide variety of domestic and imported foods. Foods tested include fresh and processed fruit and vegetables, soybeans, eggs, dairy products, and water.

The 1996 Food Quality Protection Act (FQPA) directs the Secretary of Agriculture to collect pesticide residue data on foods that are highly consumed, particularly by infants and children. The FQPA also established a strict health-based standard for a "reasonable certainty of no harm" for pesticide residues in food to ensure consumer protection from unacceptable pesticide exposure. The EPA uses the PDP data as a critical component for dietary assessments of pesticide exposure, a critical step to verify that all sources of exposure to pesticides meet the safety standards set by the 1996 FQPA.

The PDP is not designed for enforcement of EPA tolerances. However, we inform the U.S. Food and Drug Administration if residues detected exceed the EPA tolerance or have no EPA tolerance established. In 2011, residues exceeding the tolerance were detected in 0.27 percent (32 samples) of the total samples tested (11,894 samples). Residues with no established tolerance were found in 3.4 percent (399 samples) of the total samples tested. The data reported by PDP corroborate that residues found in fruit and vegetables are at levels that do not pose risk to consumers' health (i.e., are safe according to EPA).

The PDP works with cooperating State agencies that are responsible for sample collection and analysis. Thirteen states participated in the program during 2011: California, Colorado, Florida, Maryland, Michigan, Minnesota, Montana, New York, North Carolina, Ohio, Texas, Washington, and Wisconsin. These States represent all regions of the country and more than half of the U.S. population.

For more information please visit our website at [www.ams.usda.gov](http://www.ams.usda.gov) or the EPA at <http://www.epa.gov/pesticides/food>.

Sincerely,

*David R. Shipman*

David R. Shipman  
Administrator

GUIDE

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## HELPFUL VIDEOS



Harvard professor Chensheng (Alex) Lu explains why people should avoid pesticides.



Dr. Sanjay Gupta tours a grocery store to show us which foods have the highest levels of pesticide residue.

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## EXECUTIVE SUMMARY

### EWG's 2013 Shopper's Guide to Pesticides in Produce™

#### Eat fruits and vegetables!

The health benefits of a diet rich in fruits and vegetables outweigh the risks of pesticide exposure. Use EWG's Shopper's Guide to Pesticides™ to reduce your exposures as much as possible, but eating conventionally-grown produce is far better than not eating fruits and vegetables at all. The Shopper's Guide to Pesticides in Produce™ will help you determine which fruits and vegetables have the most pesticide residues and are the most important to buy organic. You can lower your pesticide intake by avoiding the 12 most contaminated fruits and vegetables and choosing the least contaminated produce.

For the second year, we have expanded the Dirty Dozen™ with a Plus category to highlight two crops – domestically-grown summer squash and leafy greens, specifically kale and collards. These crops did not meet traditional Dirty Dozen™ criteria but were commonly contaminated with pesticides exceptionally toxic to the nervous system.

Though the Environmental Protection Agency has been restricting the uses of the most toxic pesticides, they are still detected on some foods. For example, green beans were on last year's Plus list because they were often contaminated with two highly toxic organophosphates. Those pesticides are being withdrawn from agriculture. But leafy greens still show residues of organophosphates and other risky pesticides. That's why they are on the Plus list for 2013.

Tests in 2008 found that some domestically-grown summer squash – zucchini and yellow crookneck squash -- contained residues of harmful organochlorine pesticides that were phased out of agriculture in the 1970s and 1980s but that linger on some farm fields.

Genetically modified plants, or GMOs, are not often found in the produce section of grocery stores. Field corn, nearly all of which is produced with genetically modified seeds, is used to make tortillas, chips, corn syrup, animal feed and biofuels. Because it is not sold as a fresh vegetable, it is not included in EWG's Shopper's Guide to Pesticides in Produce. Nor is soy, another heavily GMO crop that makes its way into processed food.

The genetically modified crops likely to be found in produce aisles of American supermarkets are zucchini, Hawaiian papaya and some varieties of sweet corn. Most Hawaiian papaya is a GMO. Only a small fraction of zucchini and sweet corn are GMO. Since U.S. law does not require labeling of GMO produce, EWG advises people who want to avoid it to purchase the organically-grown versions of these items.

DIRTY DOZEN

CLEAN FIFTEEN™

EWG helps protect your family from pesticides! Donate \$10 today and EWG will send you our *Shopper's Guide to Pesticides in Produce™ bag tag* FREE to say thank you.



Asparagus



Avocados



Cabbage



Cantaloupe



Corn



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Apples



Grapefruit



Celery



Kiwi



Cherry tomatoes



Mangos



Cucumbers



Mushrooms



Grapes



Onions



EWG helps protect your family from pesticides! Donate \$10 today and EWG will send you our *Shopper's Guide to Pesticides in Produce™* bag tag FREE to say thank you.



Nectarines - imported



Papayas



Peaches



Pineapples



Potatoes



Sweet peas - frozen



Spinach



Sweet potatoes



Strawberries

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Sweet bell peppers



Kale / collard greens +



Summer squash +

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HZ J z løvhqg | rx rxuVkrsshuvJxlgh w Shwiflgjhv lq Surgxfh<sup>®</sup> edj  
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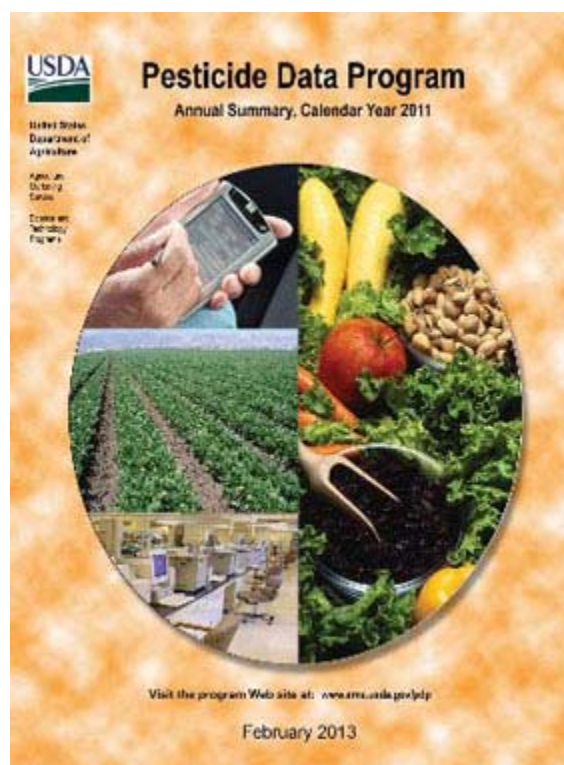
# THE PACKER

Covering the fresh produce industry since 1893

## Pesticide data shows fresh produce safety record

02/25/2013 2:55:25 PM

Tom Karst



**(UPDATED COVERAGE, Feb. 28)** An annual U.S. Department of Agriculture report on pesticides on fruits and vegetables once again shows that residues are below government tolerances.

The USDA's Agricultural Marketing Service **2011 Pesticide Data Program** report also includes a **letter** explaining the levels of residue pose no health risk.

"Consistent with guidance from health and nutrition experts — and as affirmed federal nutrition guidance that urges people to make half their plate fruits and vegetables — we encourage everyone to continue to eat more fruits and vegetables in every meal and wash them before you do so," according to the letter.

The new data confirms that pesticide residues in food "do not pose a safety concern for Americans," according to the Environmental Protection Agency, in the letter.

The USDA's report has been consistent in its message that pesticide residues shouldn't be a concern for consumers, said Kathy Means, vice president for government relations

and public affairs for the Produce Marketing Association, Newark, Del.

"One of the things that is most important is that government is now offering some context around (the data) and we really appreciate that," she said.

Marilyn Dolan, executive director of the Watsonville, Calif.-based Alliance for Food and Farming, said Feb. 28 she has observed little consumer media coverage of the USDA report compared to the heavy media coverage that accompanies the release of the Environmental Working Group's Dirty Dozen report. The latest Dirty Dozen list was released by EWG in June last year.

"We're just really trying to encourage reporters to read that PDP report before they do the story on the Dirty Dozen list," she said. The group continues its campaign to educate consumers about the safety of both conventional and organic produce, with the website [www.safefruitsandveggies.com](http://www.safefruitsandveggies.com) as the centerpiece.

In the PDP summary, the agency said sampling was carried out by the AMS in California, Colorado, Florida, Maryland, Michigan, Minnesota, Montana, New York, North Carolina, Ohio, Texas, Washington and Wisconsin.

Samples are selected without regard to country of origin, variety, or organic labeling, according to the report. Fresh and processed fruit and vegetables accounted for 82.3% of total samples collected in 2011, with other samples including water (6.6% of samples collected), milk (5.8%), eggs (2.9%) and soybeans (2.4%). Fresh and processed fruits and vegetables tested in 2011 were samples baby food (green beans, pears, sweet potatoes), canned beets, cabbage, cantaloupe, cauliflower, cherry tomatoes, hot peppers, lettuce, mushrooms, onions, orange juice, papayas, plums, snap peas, canned and frozen spinach, sweet bell peppers, tangerines and winter squash.

According to the USDA, 72.7% of the samples were from the U.S., 22.8% were imports, 3.8% were of mixed origin and 0.7% were of unknown origin.

Excluding water, residues exceeding government established tolerances were detected in 32 of the 11,894 samples. Of those 32 samples, 78% were imported items.

**Find this article at:**

<http://www.thepacker.com/fruit-vegetable-news/Pesticide-data-shows-fresh-produce-safety-record-193104611.html>

Check the box to include the list of links referenced in the article.



Published on *International Business Times* (<http://www.ibtimes.com>)

# Bee Population Decline Prompts Likely Pesticide Ban In Europe

By [ROXANNE PALMER](#) | APRIL 29 2013 3:03 PM

Europe is poised to take a hard line against pesticides that have been linked to a dramatic decline in bee populations across the globe.

The move was spurred by a burgeoning body of scientific evidence linking neonicotinoids, a class of pesticides chemically similar to nicotine, with colony collapse disorder, a mysterious phenomenon where worker bees vanish.

European Union states voted Monday to restrict the use of three kinds of pesticides -- clothianidin, imidacloprid and thiametoxam. These kinds of chemicals can be taken up by the plant through the soil and attack insects through their nervous systems. Neonicotinoids are also frequently applied directly to the seeds of plants.

"I pledge to do my utmost to ensure that our bees, which are so vital to our ecosystem and contribute over 22 billion euros [\$29 billion] annually to European agriculture, are protected," EU Health and Consumer Commissioner Tonio Borg said [in a statement Monday](#).

The vote came after the European Food Safety Authority issued a finding in January that the three pesticides [pose high risks to bee health](#). Fifteen EU nations, including France, Germany and the Netherlands, voted in favor of the pesticide restrictions. The United Kingdom and seven other nations voted against the ban, and four nations -- Ireland, Lithuania, Finland and Greece -- abstained.

The final tally does not reach the majority needed to automatically enact the proposal, so the final decision on implementing a continent-wide ban rests with the European Commission. But the ban seems likely to go through -- "it's done," one unnamed source [told the Guardian on Monday](#).

The ban would bar farmers from using any of three kinds of neonicotinoids on bee-pollinated flowering plants, plus the seeds of such plants and the soil around them, starting no later than Dec. 1 of this year. There may be exceptions that allow for using neonicotinoids on bee-attracting crops in greenhouses or using the pesticides on plants after they have flowered. The ban also does not apply to crops grown in the winter, when bees are dormant.

In two years, the European Commission will review the impact of the ban and scrutinize any further scientific evidence linking neonicotinoids to bee decline.

Meanwhile, both UK politicians and pesticide makers have argued that the ban will mean a big hit to food production in Europe. Swiss-based Syngenta, one of the makers of neonicotinoid pesticides, claims the EFSA's review of the pesticides overestimates the amount of the chemical that insects are exposed to in the field.

"The proposal is based on poor science and ignores a wealth of evidence from the field that these pesticides do not damage the health of bees," Syngenta COO John Atkin [said in a statement Monday](#). "Instead of banning these products, the commission should now take the opportunity to address the real reasons for bee health decline: disease, viruses and loss of habitat and nutrition."

Several high-profile scientific studies have pointed toward neonicotinoids as a prime suspect in colony collapse disorder. [One such study came in March 2012](#) in the journal *Science*, where British scientists reported the results of spraying bumblebee colonies with pesticide levels matching those seen in the field. Treated colonies had a severely reduced growth rate, and the production of new queen bees -- essential to the health of the hive and the establishment of new colonies -- was cut by 85 percent.

In a January 2012 study [published in the journal PLoS ONE](#), German scientists reported how doses of neonicotinoids don't kill foraging bees right away but do result in them failing to return to their hives. Disappearing bees are one of the major symptoms of colony collapse disorder.

In the U.S., anti-pesticide action has been more of a bottom-up effort. Last month, a coalition of beekeepers, environmental groups and consumer organizations sued the U.S. Environmental Protection Agency for allegedly failing to protect the nation's bee population. The U.S. lawsuit focuses on two kinds of neonicotinoids: Bayer's clothianidin and Syngenta's thiamethoxam, both of which fall under the EU ban.

"America's beekeepers cannot survive for long with the toxic environment EPA has supported," plaintiff and beekeeper Steve Ellis said [in a press release in March](#). "Bee-toxic pesticides in dozens of widely used products, on top of many other stresses our industry faces, are killing our bees and threatening our livelihoods."

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Source URL: <http://www.ibtimes.com/bee-population-decline-prompts-likely-pesticide-ban-europe-1223933>

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## Federal agricultural officials swat down Europe's pesticide ban to aid bees



Master Beekeeper Stephen Repasky of Dormont says he lost 68% of his hives over the winter.

By **Rick Wills**

PITTSBURGH TRIBUNE-REVIEW

**Published:** Friday, May 3, 2013, 12:01 a.m.

*Updated: Friday, May 3, 2013*

Federal officials are rejecting steps the European Union took to ban three pesticides that beekeepers associate with sharp declines in the honeybee population.

A report on honeybee health, issued on Thursday by the Environmental Protection Agency and the Department of Agriculture, said factors beyond pesticide exposure weaken honeybee colonies crucial to American agriculture, including parasites, disease, genetics and poor nutrition.

"As in most things biological, there is no smoking gun," said Sonny Ramaswamy, director of the USDA's National Institute of Food and Agriculture.

"The decline in honeybee health is a complex problem caused by a combination of stressors," acting EPA Administrator Bob Perciasepe said, during a conference call with reporters to discuss the report.

The European Commission, governing body of the 27-country EU, announced on Monday a

### About Rick Wills

Pittsburgh Tribune-Review Staff Reporter Rick Wills can be reached [via e-mail](#) or at 412-320-7944

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two-year ban will begin in December on the use of pesticides clothianidin, imidacloprid and thiametoxam.

“Bee decline cannot be unambiguously linked to one factor. There are bees with over 100 different pesticides in them, and not all pesticides are neonicotinoids. It is not just a simple matter of removing pesticides,” said May Berenbaum, professor and entomology department head at the University of Illinois at Urbana.

Bayer CropScience developed the three banned pesticides, known as neonicotinoids. Farmers use them to treat corn and soybean seeds prior to planting.

Bayer did not return phone calls on Thursday.

A statement on the Bayer CropScience website says the company does not think the commission's plan will help bee health and considers the restriction “a setback for technology, innovation and sustainability.”

“The company is concerned that the restriction of these neonicotinoids will result in crop yield losses, reduced food quality and loss of competitiveness for European agriculture,” the website says.

Some environmental groups, however, complained that U.S. officials refused to implement a similar ban.

“Bees and pollinators are so critical. If we can't use these pesticides without killing off pollinators, then we should look at what Europe is doing,” said Jennifer Sass, a senior scientist in the health program at the Natural Resources Defense Council in Washington.

Scientific evidence against using neonicotinoids is mounting, Sass said.

Four commercial beekeepers and several environmental groups last month sued the EPA. They want clothianidin and thiamethoxam taken off the market and say the EPA should not have given conditional approval to the pesticides.

Pollination from honeybees adds \$20 billion to \$30 billion a year to the value of agricultural production in the United States, Ramaswamy said.

“It is imperative that we take action. The survival rate of honeybees is too low to meet the demand. Honeybee health is critical to American agriculture,” he said.

Crops that depend on bees include asparagus, broccoli, celery, squash, citrus fruits, peaches, blueberries, strawberries and melons.

Next week, the USDA and two industry groups, the Bee Informed Partnership and Apiary Inspectors of America, plan to release a winter survey of beekeepers' losses. Many beekeepers reported losing 50 percent to 70 percent of their bees this winter.

Since 2006, the year scientists identified Colony Collapse Disorder, commercial beekeepers have lost bees at a rate of at least 30 percent each winter. Even before scientists identified Colony Collapse Disorder, varroa mites and pathogens were killing bees at alarming rates.

Beekeeper Zac Browning, co-owner of Browning Honey Co. Inc., which manages more than 20,000 hives for honey production and pollination in Idaho, North Dakota and California, said his losses were twice as high last winter as the winter before.

“There are certain periods where there is very high demand, specifically relating to almond pollination in winter. We are on the brink of not meeting demand. There is concern about availability of bees for blueberries in Maine,” Browning said.

Browning attributed his losses to drought, pesticides and poor nutrition.

Smaller, backyard beekeepers such as Steve Repasky of Dormont also experienced steep losses.

“I had 35 hives and ended the winter with 12,” he said.

Rick Wills is a Trib Total Media staff writer. Reach him at 412-320-7944 or [rwills@tribweb.com](mailto:rwills@tribweb.com).

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# One-Third of U.S. Honeybee Colonies Died Last Winter, Threatening Food Supply

[By Brandon Keim](#)

05.08.13

6:30 AM

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*Image: Jennifer C./Flickr*

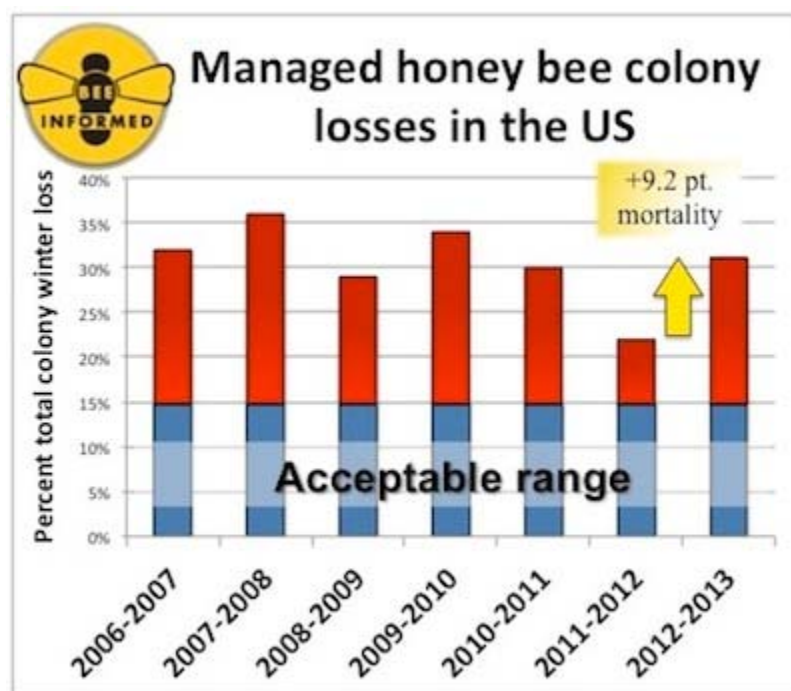
Nearly one in three commercial honeybee colonies in the United States died or disappeared last winter, an unsustainable decline that threatens the nation's food supply.

Multiple factors — pesticides, fungicides, parasites, viruses and malnutrition — are believed to cause the losses, which were [officially announced today](#) by a consortium of academic researchers, beekeepers and Department of Agriculture scientists.

“We’re getting closer and closer to the point where we don’t have enough bees in this country to meet pollination demands,” said entomologist Dennis vanEngelstorp of the University of Maryland, who led the survey documenting the declines.

Beekeepers lost 31 percent of their colonies in late 2012 and early 2013, roughly double what’s considered acceptable attrition through natural causes. The losses are in keeping with rates documented since 2006, when beekeeper concerns prompted the first nationwide survey of honeybee health. Hopes raised by drop in rates of loss to 22 percent in 2011-2012 were wiped out by

the new numbers.



Honeybee colony losses over the last seven years. *Image: Engelstorp et al.*

The honeybee shortage nearly came to a head in March in California, when there were **barely enough bees** to pollinate the almond crop.

Had the weather not been ideal, the almonds would have gone unpollinated — a taste, as it were, of a future in which honeybee problems are not solved.

“If we want to grow fruits and nuts and berries, this is important,” said vanEngelstorp. “**One in every three bites** [of food consumed in the U.S.] is directly or indirectly pollinated by bees.”

Scientists have raced to explain the losses, which fall into different categories. Some result from what’s called colony collapse disorder, a malady first reported in 2006 in which honeybees abandon their hives and vanish. Colony collapse disorder, or CCD, subsequently became a public shorthand for describing bee calamities.

Most losses reported in the latest survey, however, don’t actually fit the CCD profile. And though CCD is largely undocumented in western Europe, honeybee losses there have also been dramatic. In fact, CCD seems to be declining, even as total losses mount. The honeybees are simply dying.

“Even if CCD went away, we’d still have tremendous losses,” said entomologist Diana Cox-Foster at Pennsylvania State University. “CCD losses are like the straw that breaks the camel’s back. The system has many other issues.”

Studying these issues isn’t easy. In real-world agricultural settings, it’s hard to run the rigorous, every-last-variable-controlled experiments on which definitive conclusions are founded. These experiments can be run in labs and small-scale test fields, but whether those accurately reflect real-world complexity is debated.

Amidst the uncertainties, scientific attention has **settled on a group of culprits**, the most high-profile of which is a class of pesticides known as neonicotinoids. These were developed in the 1990s, rushed to market with minimal studies of potential harms, and subsequently became the world’s most-used pesticides.

In the last several years, it’s become evident that neonicotinoids are extremely toxic to honeybees and, even in small, sub-lethal doses, make bees more vulnerable to disease. The European Union recently **limited neonicotinoid use**, and the U.S. Environmental Protection Agency is reviewing their use.

Pesticide companies have fought the restrictions, arguing that neonicotinoids are unfairly blamed.

Most non-industry scientists say the question isn't whether neonicotinoids are a problem, but where they fit into a constellation of problems.

"Different studies indicate that this class of pesticide is rather harmful to the bees," said honeybee pathologist Cédric Alaux of the French National Institute for Agricultural Research, who said the E.U.'s restrictions are sensible. "However, we should not be too naive and think that it will solve the bee problem."

Just as important as neonicotinoids, and perhaps more so, are *Varroa destructor* mites. First detected in the United States in 1987, the mites weaken bees by sucking their hemolymph, the insect analogue of blood, and also transmit viruses and other parasites. A recent USDA report called *Varroa* "the single most detrimental pest of honey bees."

The report also noted that neonicotinoid exposure [alters immune system function](#) in *Varroa*-infected bees and [makes bees more vulnerable to infection](#) by *Nosema ceranae*, another parasite implicated in honeybee losses. It's possible that neonicotinoids used on crops don't usually kill bees outright, but weaken them enough for other stresses to become lethal.

Agricultural entomologist Christian Krupke of Purdue University likened the effects to "living in an area with extreme levels of smog, causing your body and immune system to become overtaxed so that a common cold progresses to pneumonia."

Krupke noted that although neonicotinoids are the most common poisonous chemicals in honeybee environments, they're far from the only chemicals. Cox-Foster and vanEngelstorp stressed that point, referencing research that found [121 different pesticides in honeybee hives](#). On average, each hive contained traces of 6 pesticides, and sometimes several dozen.

Research on pesticide interactions is in its infancy, but [combinations may be extremely harmful](#) to bees, amplifying what the chemicals would do alone. "I worry that the neonicotinoid attention is distracting from the other pesticides that have clear effects, and might even have stronger effects. Things like fungicides are completely unregulated for bees," said vanEngelstorp. "I think we need to keep the pesticide investigation broader."

'We're getting closer and closer to the point where we don't have enough bees.'

Another, less-appreciated aspect of honeybee life also gained attention in the winter survey and new USDA report: what they eat. Though commercial bees are trucked on pollination circuits around the United States, most beekeepers have home bases in the upper Midwest, an area that's undergone significant changes in recent years.

Rising food prices led farmers to plant crops in fields previously considered marginal or set aside as grasslands. Honeybees forage in those grasslands, and can't get the nutrition they need from flowering crops alone.

Add the record-setting drought of summer 2012, and bees were hard-pressed for nourishment.

Malnourishment could in turn make bees more vulnerable to pests and infections, or exacerbate the effects of pesticides.

"The drought, the possible combination of factors that went with it, was clearly a big problem for a lot of beekeepers," vanEngelstorp said. "In some cases, it was a combination of *Varroa* and these malnourished, pesticide-exposed bees."

Commercial bees [pollinate dozens of crops](#), and though colonies can be replaced, continuing losses could soon render beekeeping economically unviable. Researchers are trying to breed more resilient bees, but the combination of chemicals, nutrition and disease will likely prove insurmountable by genetic improvements alone, said Cox-Foster.

The honeybee catastrophe could also signal problems in other pollinator species, such as bumblebees and butterflies, that are not often studied.

"Thinking of honeybees as our canary in the coal mine, a monitor for environmental conditions, is very appropriate," Cox-Foster said. "With honeybee colonies, you have the ability to open them up and see what's going on. There are many other species needed for pollination, but with most of

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For Immediate Release, April 22, 2013

Contact: Jeff Miller, (415) 669-7357

### Federal Court Ruling Leaves Hundreds of Endangered Species Vulnerable to Pesticides

SAN FRANCISCO— A federal district court in San Francisco today issued an [order](#) dismissing a lawsuit that sought to protect endangered wildlife from pesticides. The Center for Biological Diversity and Pesticide Action Network North America brought suit in 2011 challenging the Environmental Protection Agency's failure to assess the impacts of 382 pesticides known to be harmful to more than 200 endangered and threatened species. Today's court order focuses on procedural issues and allows the environmental groups to amend and re-file their legal complaint within 30 days.

"Despite today's ruling, we won't allow the EPA to ignore its duty to protect endangered species and human health from toxic pesticides," said Jeff Miller, a conservation advocate with the Center. "We're evaluating our options, including amending the complaint or filing an appeal. We'll do everything we can to ensure harmful chemicals aren't allowed to contaminate the places endangered species rely on for their survival."

The 2011 lawsuit sought protection from pesticides for 214 endangered and threatened species throughout the United States, including the Florida panther, California condor, piping plover, black-footed ferret, arroyo toad, Indiana bat, bonytail chub and Alabama sturgeon. Documents from the U.S. Fish and Wildlife Service and EPA, as well as peer-reviewed scientific studies, indicate these species are harmed by the pesticides at issue. More than a billion pounds of pesticides are used annually in the United States, and the EPA has registered more than 18,000 different pesticides for use.

For decades the EPA has registered pesticides without input from expert federal agencies to evaluate harmful impacts to wildlife. Hundreds of scientific studies document harm to endangered wildlife from pesticides, and there is evidence of widespread contamination of groundwater, drinking water and wildlife habitats throughout the country.

The EPA has refused to initiate formal consultations required under the Endangered Species Act, preventing the U.S. Fish and Wildlife Service and National Marine Fisheries Service from evaluating pesticide risks to imperiled wildlife and from restricting harmful pesticide uses.

"This is a disappointing ruling for endangered species on Earth Day," said Miller. "But the court's decision does not change the fact that the EPA's pesticide registration program is completely broken and that the agency is not keeping toxic chemicals out of sensitive wildlife habitats."

The National Academy of Sciences' National Research Council is currently examining how the EPA and federal wildlife agencies assess the harmful impacts of pesticides, and how best to complete the consultation process under the Endangered Species Act. A final academy report on how to better protect endangered species from pesticides is expected in May.

*The Center for Biological Diversity is a national, nonprofit conservation organization with more than 500,000 members and online activists dedicated to the protection of endangered species and wild places.*

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[Jon Entine](#), Contributor

OP/ED | 4/11/2013 @ 8:52PM | 603 views

## Science Collapse Disorder -- The Real Story Behind Neonics And Mass Bee Deaths

**Colony Collapse Disorder—it sounds catastrophic and frightening. The [Genetic Literacy Project's Jon Entine](#) separates fact from fiction.**

It's estimated that over the past five years, some 30 percent of bees in the United States have either disappeared or failed to survive to pollinate blossoms in the spring. That's about 50% more than the rate expected. The problem is direr in some other countries. In Spain, recent data indicate a loss close to 80% of beehives. On the other hand, in Canada and Australia, there is no sign of Colony Collapse Disorder.

What may be causing the die-offs and why the dramatic disparities from one region to another? Scientists have a



number of hypotheses but the activist community has coalesced around one explanation: They blame it on [neonicotinoids](#), also known as neonics, which are the widest used class of insecticide ever.

"It's time to ban dangerous neonicotinoid pesticides," [declares](#) *Mother Earth News*. "Bees need help now! Time to up the ante," declares the Pesticide Action Network [announcing its suit](#) against the Environmental Protection Agency. "EPA should cancel all uses of neonics where they can lead to harm for bees and other beneficial insects, and chemical manufacturers like Bayer and Syngenta that make neonics should use their resources to develop less harmful alternatives instead of defending the neonics," [writes](#) Jennifer Sass of the Natural Resources Defense Council.

Birds, bats and insects all pollinate flowering plants, but the most celebrated pollinator is the honeybee, and for good reason. United States commercial beekeepers take millions of bee hives on the road each year to pollinate

blueberries and papaya, almonds and apples, and a cornucopia of other fruits, vegetables and nuts. Close to one third of our food supply is linked to pollination. Without the bee our diet would be less nutritious and less tasty. Bee die offs are a serious issue and need to be evaluated. But the question remains: are neonicotinoids the culprit?

### Fingering neonics

Neonics are a new class of systemic pesticide popular in the US, Australia, Europe and elsewhere to help corn, soy, cotton and canola farmers. They were adopted over the past 20 years as a less toxic replacement of organophosphate pesticides, which are known to kill bees and wildlife, and have been linked to health problems in workers. By universal agreement, neonicotinoids are extremely effective. Applied to the soil, sprayed on the crop or used as a seed treatment, they eventually reach the pollen and nectar, which is ingested by insects, discouraging pests from wrecking havoc on crops. The seed treatment lowers the amount used 10 to 20 fold, decreasing the need for open spraying of the plant, a genuine sustainability benefit.



Neonics were phased in without incident in the 1990s. But an age-old problem in the bee world—a periodic and unpredictable dramatic rise in bee deaths in one region or another—reemerged in 2004. Bee death rates approached 60% in California. Beekeepers called it the vampire mite scare because of its likely [link to varroa mites](#)—parasites that feed on

the bodily fluids of bees.

The explanatory narrative began to change in 2006, when [new waves](#) of bee deaths were reported around the world. Anti-biotechnology activists [blamed GMOs](#). “There are many reasons given to the decline in Bees, but one argument that matters most is the use of Genetically Modified Organisms (GMO) and “Terminator Seeds” that are presently being endorsed by governments and forcefully utilized as our primary agricultural needs of survival,” argued the anti-globalization group Global Research, in what amounted to a rhetorical and circumstantial argument. But as GMOs have gained favor with the science community, the focus of activist groups shifted and a new culprit was identified: neonicotinoids.

Over the past few months, [CBS News](#), [NPR](#) and [Dan Rather](#) have run powerful segments and the popular media in general has cheerleaded a recent lawsuit spearheaded by the [Center for Food Safety](#) and other anti-chemical groups demanding that the Environmental Protection Agency ban the insecticide. In less than a month, the *New York Times* ran a [front-page article](#) and [editorialized twice](#) on the subject, dismissing what it called “manufacturers’ bland assurances” about its safety and all but calling for a ban.

History raises questions about the almost exclusive focus on neonics to explain the regional bee crisis. Periodic occurrences resembling what has come to be known as bee Colony Collapse Disorder have been documented as far back as 1869. In the last half century, the domesticated honeybee population has declined by about 50 percent, with incidents common well

before the introduction of neonics, which was hailed by environmentalists because of their comparatively modest environmental footprint. The term CCD was originally used to describe the phenomenon when worker bees suddenly and mysteriously disappeared. The term, with its alarmist ring, was co-opted by activists in the mid 2000s to describe a new development—mass bee deaths.

The research on bee colony deaths is dicey—and often political. The science based view of this issue took a sharp turn in January when the European Food Safety Authority issued [three studies](#) raising questions about the potential role of neonics in this latest wave of bee deaths. The studies did not link the pesticides to the collapse of whole bee colonies, but did raise enough issues to lead to a vote last month for a 2-year precautionary ban by the European Commission. The ban was blocked, temporarily, by Germany, Britain and seven other countries, citing evidence that neonics were not the sole or likely the primary culprit, their impact still unclear. The EC plans an [appeal](#).

Last year, one [study](#) showed that bumblebees exposed to high doses of the neonic imidacloprid in the lab, then released to forage in the field, had sharply reduced colony growth rates and produced 85 percent fewer queens to found new colonies. In another [study](#), more than 30 percent of free-ranging honeybees whose [brains were doused](#) with the neonic thiamethoxam—which is not the way bees encounter the chemical in the real world—got confused, failing to return to the hive.



### Real world contradictions

The results were so dramatic—and so contradictory of real life experience of some beekeepers in Canada, Europe and Australia who use neonics and where many bee colonies are thriving—that the United Kingdom's Department for Environment, Food and Rural Affairs ([DEFRA](#)) decided to [reevaluate](#) existing research. The agency pointed to the problem with much of the lab based data—it measures doses and application methods that farmers don't use. "The risk to bee populations from neonics, as they are currently used, is low." DEFRA [concluded](#) in March. "Laboratory-based studies demonstrating sub-lethal effects on bees from neonics did not replicate realistic conditions, but extreme scenarios.. ... While this assessment cannot exclude rare effects of neonicotinoids on bees in the field, it suggests that effects on bees do not occur under normal circumstances. Consequently, it supports the view that the risk to bee populations from neonicotinoids, as they are currently used, is low," the study concluded.

Farmers are almost universally [opposed](#) to even a temporary ban absent definitive real world research, calling it reckless. As they note, because of the ban on organophosphates, there are no real alternatives to neonics, which everyone agrees have been extremely effective. Insecticides are used for a reason: to kill pests and make our food safer to eat. Without neonics or a suitable replacement, farmers could face losses estimated by one industry study as [\\$5.78 billion](#) per year in Europe alone—and many multiples of that if a ban is instituted in the United States and other major agricultural economies, with the costs passed on to consumers.

Understandably alarmed at the economic implications to consumers and to their bottom lines, Syngenta and Bayer, the two primary manufacturers of the chemicals, have proposed a [plan](#) to accelerate bee health research. They've also proposed adding new flowering margins around fields to provide pesticide-free bee habitats and monitoring for the presence of neonics in crops.

Industry is concerned as to what they see as a 'rush to judgment'—and should a “temporary” ban is instituted it will be difficult to unring the precautionary bell regardless of what new evidence might show. They point to real world contradictions that suggest that pathogens, parasites and habitat loss, which has been the driver of CCD for more than a century before the introduction of insecticides, are the likely prime cause this time as well.

Canada, the UK and Australia all provide provocative real world case studies. Canola is grown commercially mostly on the prairies in Canada, the largest single producer of canola in the world with more than 50,000 canola producers and 16 million acres. It's a nutritionally rich crop for bees. Some 80% of Canada's honey crop is from canola, amounting to 50 million pounds per year of Grade No 1 white honey. Approximately 300,000 colonies harvest open pollinated canola.

Despite the fact that neonicotinoids are widely used in Canada to protect canola from pests, Canadian bee populations have been largely unaffected and produce around 50 million pounds of canola honey. A large-scale Ontario field study funded by Bayer appears to back up the real life evidence challenging the activist doomsday scenario. It [found](#) no difference in colony health between hives exposed to neonics and those that weren't, in real life conditions. “The doses the bees are exposed to [in lab studies] are far above what a realistic field dose exposure would be,” says Dr. Cynthia Scott-Dupree, head of the Ontario study. Canadian canola farmers say they have had 10 years of large scale use of neonics on canola with no observed ill effect.

Britain's rapeseed crop, which is similar to canola but has a high acid content and is generally produced for animal feed, has not experienced serious bee losses either. The [DEFRA study](#) noted that oilseed rape (OSR) “requires insect pollinators to support its productivity. The fact that OSR treated with neonicotinoids has been a productive crop for over a decade in the UK is itself evidence that pollinator populations, including bees, are not being reduced by the presence of neonicotinoids.”

### **Varroa mites: The real culprit?**

Australia presents the most striking dilemma for those isolating their attacks on neonics. On a per crop basis, it is one of the world's heaviest users of the pesticide—and has among the healthiest bee colonies in the world.

Government records indicate there has not been even one adverse experience report from either the public or beekeepers concerning the use of neonics. The other thing they don't see in Australia—but we do see everywhere else in the world where CCD is claimed—is the Varroa mite, the culprit in the 2005/06 bee death march.

While not deadly in themselves, these



parasites act as a vector, attaching to honeybees and appearing to be “both a disseminator and activator of a number of bee viruses,” according to a report on honeybee disease in Europe by the Food and Environment Research Agency. In countries experiencing bee decline, varroa is a feared and growing presence among beekeepers—even or especially if neonicotinoids are absent. For [example](#), in upland areas of Switzerland where the pesticide is not used, bee colony populations are under significant pressure from the mites; and in France, declines in the bee population in mountainous areas (where neonics are uncommon) are similar to those in agricultural areas (where neonics are widely used).

At one point in Dan Rather’s report, the President of the California Beekeepers Association, John Miller, opens a hive and picks out a bee with a red dot on its back. “That’s a *varroa* mite,” he explains. “That is Satan incarnate. That is the central challenge of beekeeping globally.” The spreading problem of disease itself is compounded by the desperate efforts of beekeepers to extinguish the mites and other pests by dousing their hives with miticides and antibiotics, which would increase if there were no approved and effective pesticides. As Miller says, “You can imagine how hard it is to kill a bug on a bug. It’s the hardest thing I’ve ever had to do.”

Bee deaths are not to be taken lightly. But the technology-intensive agricultural industry certainly provides an easy target for those who want to “do something yesterday,” without any regard to balancing costs and benefits and regardless of the long-term consequences. As the British Bee Keeper Association recently warned, rushing to ban neonics, when the evidence remains contradictory, could well do more damage than good, as other pesticides, some known to be more harmful to bees, would of necessity be reintroduced. The EPA is now addressing the issue, sending a research team to California where more than 1.6 million hives are needed every spring. Let science—and scientists—do their work.

**More on genetics and science literacy [at the Genetic Literacy Project](#)**

**[Follow Jon on Twitter](#)**

***Jon Entine, executive director of the [Genetic Literacy Project](#), is a senior fellow at the [Center for Health & Risk Communication](#) and [STATS \(Statistical Assessment Service\)](#) at George Mason University.***

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This article is available online at:

<http://www.forbes.com/sites/jonentine/2013/04/11/science-collapse-disorder-the-real-story-behind-neonics-and-mass-bee-deaths/>

# CONTENTS

What happened to the bees this spring? .....	2
Part 1: Environmental and biotic factors .....	2
Randy Oliver .....	2
ScientificBeekeeping.com .....	2
setting the stage .....	2
the lead up.....	3
the drought.....	4
lack of good forage .....	5
varroa .....	6
diseases .....	7
Other indicators of impending collapse .....	9
an unexpected chill .....	9
feedback from brokers .....	11
The silent majority.....	11
beekeeper management .....	12
What happened to the bees this spring? .....	13
Part 2: the contribution from pesticides .....	13
Randy Oliver .....	13
ScientificBeekeeping.com .....	13
The lynch mob .....	14
debunking the myths.....	15
The precautionary principle .....	20
See for yourself.....	21
be careful what you ask for!.....	24
the effect of drought .....	24
actions to take .....	25
bottom line .....	27
References .....	27

# WHAT HAPPENED TO THE BEES THIS SPRING?

## PART 1: ENVIRONMENTAL AND BIOTIC FACTORS

Randy Oliver

ScientificBeekeeping.com

By now, most everyone has heard that honey bee colonies died in massive numbers this winter. Reporter Dan Rather, in his newscast *Buzzkill* [<sup>1</sup>], showed unfortunate beekeepers, some of whom had lost half or more of their colonies, predicting gloom and doom for the bee industry. What were the causes of this year's bee shortage? As Rather says, "Everyone has an opinion." The question is whether those opinions are based upon fact! So let's go over the events leading up to the bee supply debacle.

### SETTING THE STAGE

Nearly 800,000 acres of almond trees in California came into bloom this winter—the trees typically start flowering about Valentine's Day, and the bloom lasts for only about two weeks. Almonds require cross fertilization between adjacent rows of varieties (Fig. 1), and honey bees are trucked in from all over the country to do the job (roughly a million and a half colonies). Many large commercial beekeepers move their hives into California in November to overwinter in holding yards; others build them up on winter pollen flows in Florida or Texas, or hold them in temperature-controlled potato cellars until shortly before bloom. The hives are generally placed into the orchards about a week before the first flowers appear. There is virtually no forage in the orchards prior to, or after bloom in many areas.



Figure 1. An almond orchard in late February, showing the flowering of rows of different cultivars required for cross pollination. The bare "late" varieties have not yet bloomed; the green "early" pollenizers have finished bloom. Grading of colonies is normally done during the bloom of the main crop (usually Nonpareil).

## THE LEAD UP

Two seasons ago there was also a shortage of bees in almonds, following the coldest January (2011) in 17 years (cold being a major stressor of wintering bee colonies). Beekeepers then replaced their deadouts with package bees and splits, thus starting a new generation of colonies, which tend to have lower varroa mite levels than established colonies. These colonies entered autumn 2011 in pretty good shape, and then enjoyed the fourth warmest January (2012) on record! As a result, there was the lowest rate of winter mortality in years, and plenty of bees for almonds in 2012 (Fig. 2).

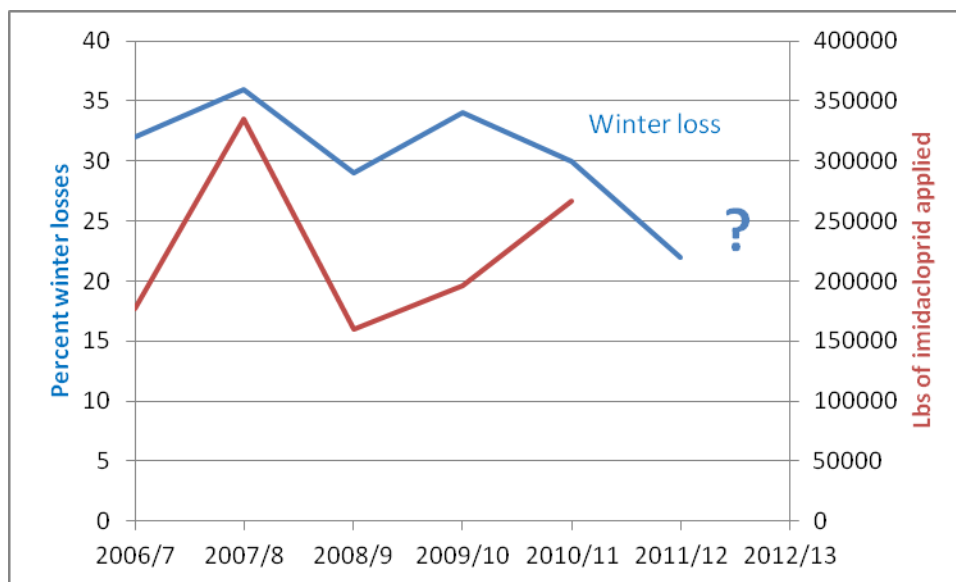


Figure 2. Percent winter losses since the beginning of the national survey—the data is not yet in for 2012/13. Note that there has been a general downward trend, suggesting that whatever caused the high losses in 2007/8 has not been such a problem in recent years. Note also the cyclical nature of colony winter losses, with high losses in 2004/5, 2006/7, 2009/10, and 2012/13 (some data not shown) Data from [2].

I was curious as to whether the colony loss rate was linked to the use of neonicotinoid insecticides. There is no recent USDA data, so I went through the California Pesticide Use Reports (data available through 2010). I plotted the amount of imidacloprid applied to crops in California in the preceding year in red (the seed treatment clothianidin didn't even make the top 100 list of pesticides applied). Although there appears to be a possible correlation from 2006 through 2009, the trends were reversed for 2010. I will be curious to add the 2011 data when it becomes available.

In March of 2012 I received a phone call from a California queen producer who had a prescient insight as to a potential brewing disaster. He was receiving calls for queen bees from Northern beekeepers whose bees had already grown to swarming condition due to the unseasonably warm spring weather (Fig. 3).



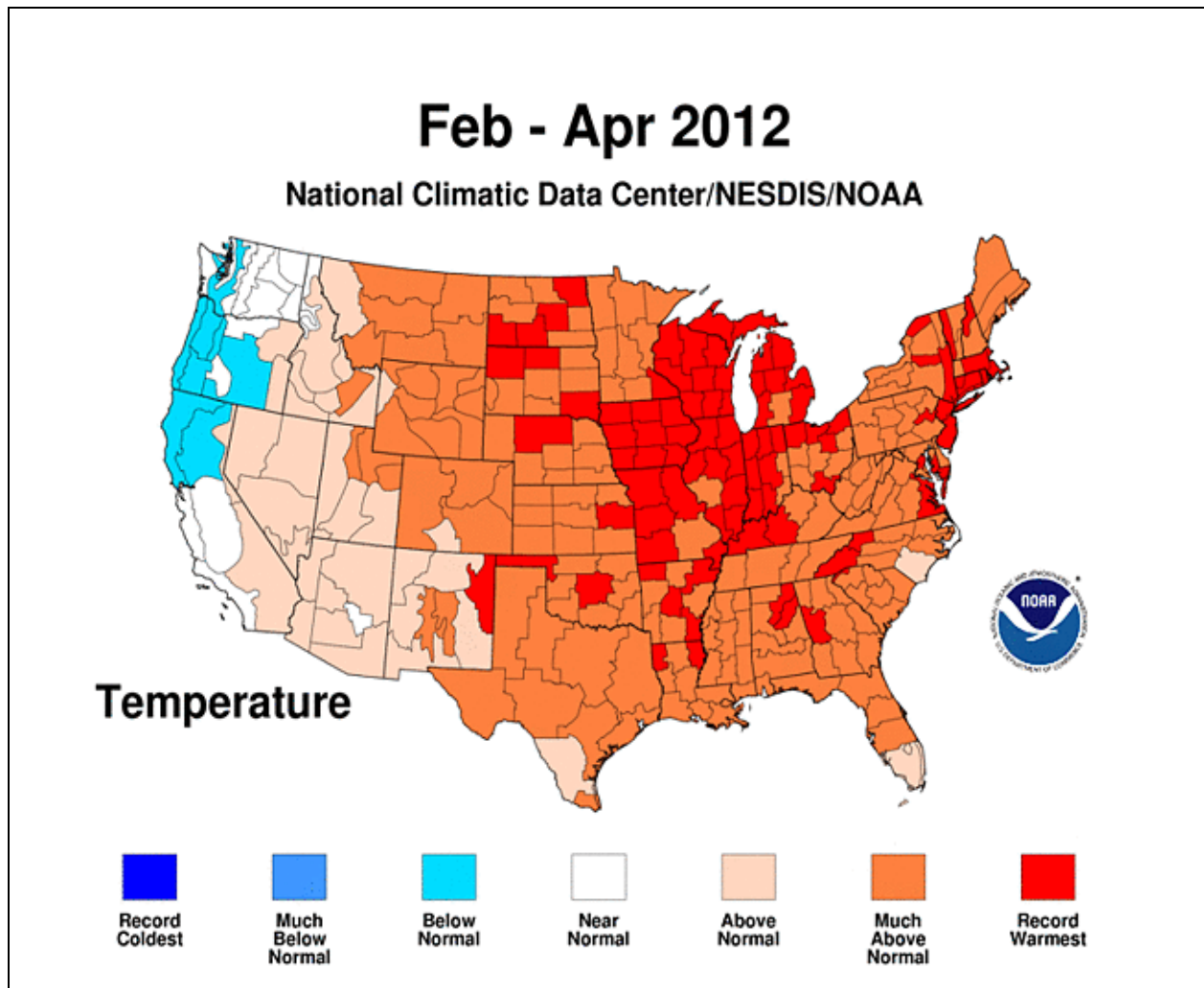


Figure 3. Last year's warm spring in much of the country led to early broodrearing, and as a result, early buildup of varroa levels. Note the record warm spring in the Midwest.

The queen producer noted that such early brood rearing also meant early mite buildup, and predicted that since most Midwestern beekeepers treat for mites by the calendar, that they would unknowingly allow mites to build to excessive levels before treatment. **This was strike one against the bees.**

## THE DROUGHT

Then it didn't rain--by midsummer, it was clear that the continental U.S. was in serious drought, including California, whose beekeepers supply nearly half the bees for almond pollination. The only ways that we kept our colonies strong was to either feed expensive pollen supplement and sugar syrup, or to move them to elusive better pasture out of state. By late summer, 60% of the U.S. was in drought, meaning that unless your bees were next to soybeans or irrigated crops, there was little forage for them. **This lack of good nutrition was strike two against the bees (Fig. 4).**

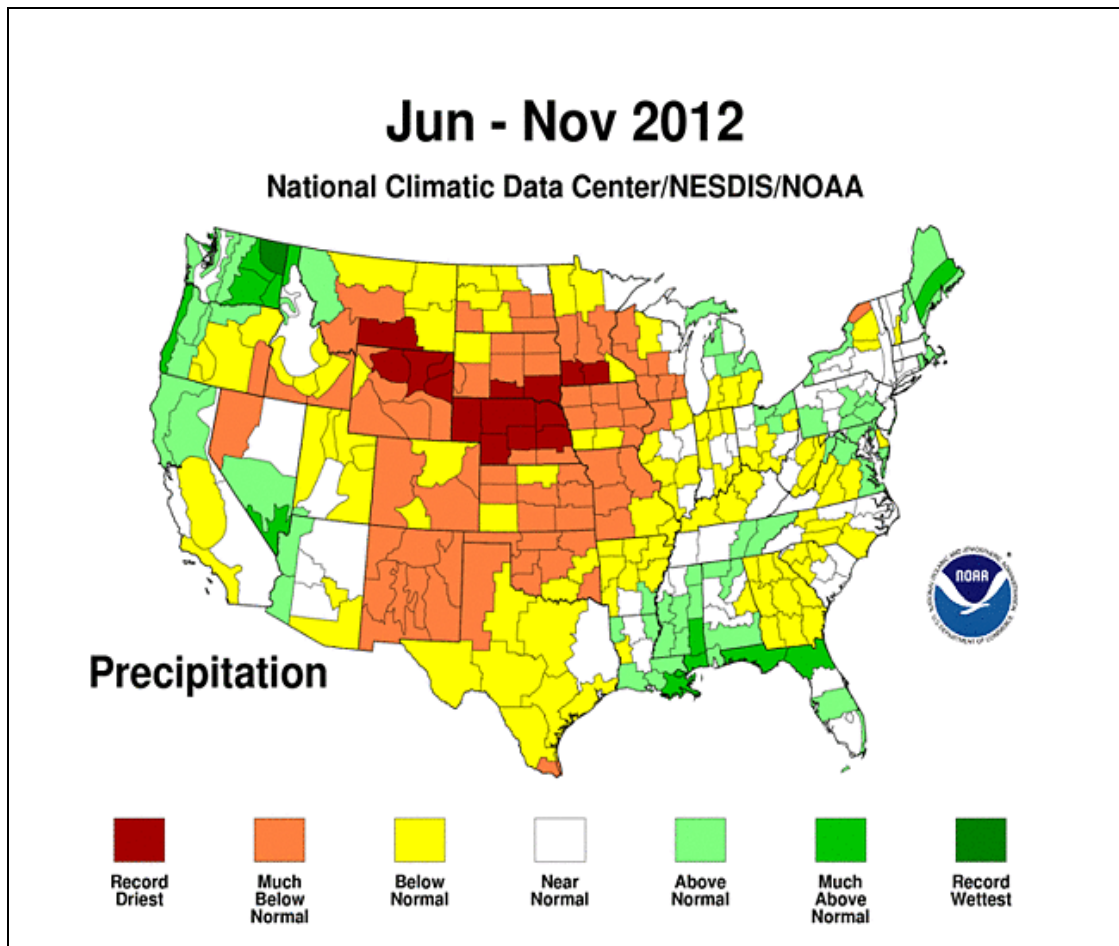


Figure 4. The severe drought in the Midwest really put the hurt to bee pasture in those states in which the majority of commercial hives spend the summer. Source [3].

Drought not only dries up nectar and pollen sources, but also forces bees to fly further and more frequently for water. Plus it concentrates ag chemicals and pesticides in the few sources of surface water available to bees. The bees started to show the hurt.

Beekeepers tried to move their hives to areas of better forage, sometimes overstocking an area with too many hives, which led to excessive competition for resources, and the spreading of parasites. Others desperately chased less desirable crops such as sunflowers. Colonies in holding yards in California found little to eat, due to our record dry weather. Some beekeepers with winter eucalyptus locations found them crowded with other hives.

## LACK OF GOOD FORAGE

In *Buzzkill*, Bret Adee brought up the fact that bee pasture in the Midwest is disappearing under the plow, largely due to our environmentally-irresponsible taxpayer-subsidized policies that encourage farmers to plant every square foot of land into corn (Fig. 5). Bee brokers told me that colonies coming to almonds from the Midwest were in generally poorer shape this year than those coming from the southern states.

**Practical application: some Midwestern beekeepers split their operations, hauling some to the South to rebuild over winter, and the rest directly to California--there was a night and day difference as to how the colonies looked in February!**

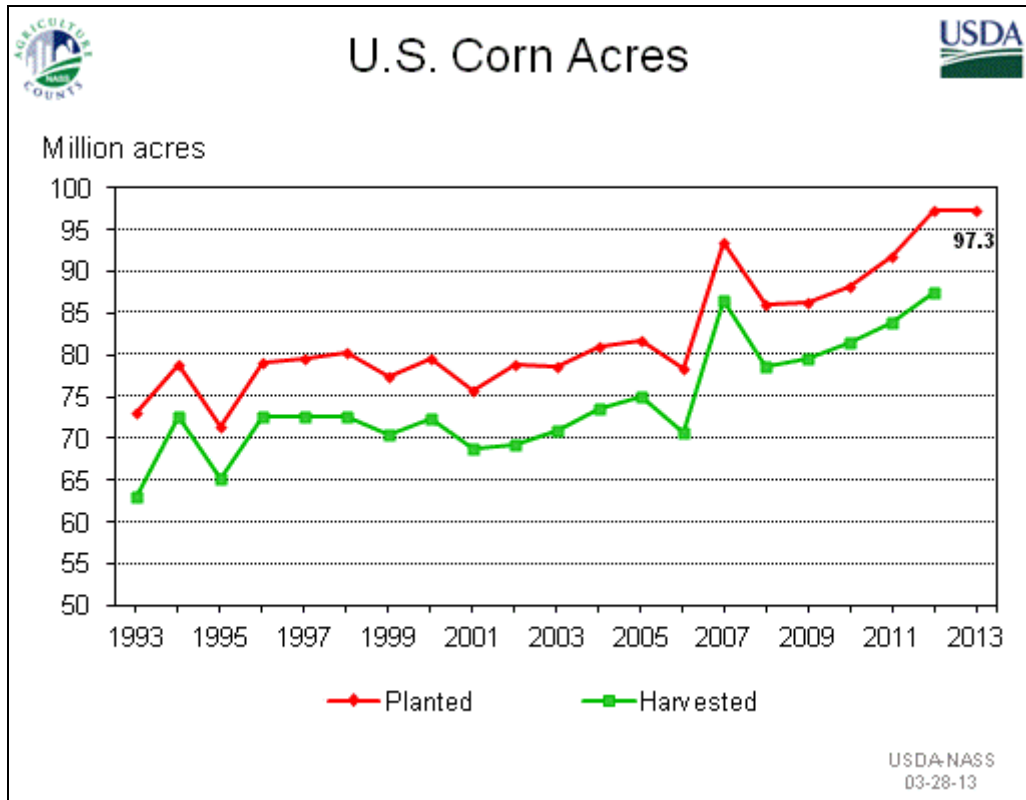


Figure 5. Grasslands and wetlands in the Corn Belt are rapidly being converted to monocultural, heavily herbicided corn/soy, which eliminates virtually all bee and wildlife forage. A new study found that between 2006 and 2011 there was a net loss of 1.3 million acres of grassland. This affects not only bees—the authors [4] state that “As a consequence, populations of grassland nesting birds are declining faster than any other group of birds in North America.”

To put this loss of bee pasture into perspective, I asked some Dakota beekeepers for estimates of how many acres of CRP grassland are needed to sustain a colony of bees. In recent years, the overall hive density in North Dakota has been more than 10 hives per square mile (less than 64 acres per hive, including wastelands).

**Practical application: the best guess by those beekeepers was that each colony of bees requires about 5-15 acres of productive land for forage (late summer forage being the critical factor). If we use the figure of 10 acres per colony, then the conversion of 1.3 million acres of grassland to herbicided cropland suggests that forage for 130,000 colonies of bees has been eliminated in the past five years in the Corn Belt alone! This figure represents nearly 9% of all colonies needed for almond pollination.**

## VARROA

An excellent window into the causes of colony health problems is the USDA National Honey Bee Pests and Diseases Survey Report [5] (the latest data have not yet been released). It is worrisome that varroa levels appear to be steadily climbing year after year.

And if the drought and forage problems weren't enough, the favored miticide of commercial beekeepers became unavailable for a time last summer, and mite levels built to killing levels in a number of operations. By late July, some of us were already predicting a disaster for the upcoming almond pollination season. Although

many beekeepers finally got mite levels down with late-season treatments, the damage had already been done, and there was no turning the colonies around. **Strike three for the bees!**

In November semi loads of hives started moving into California, or had been placed in potato cellars. Some of the colonies that arrived from the Midwest were in poor shape, or crawling with mites. Oddly, few beekeepers at the time owned up to having problems, despite the reports that I kept hearing of mite and forage issues! I'm not sure whether this was due to denial, wishful thinking, simple lack of lifting the lids, or something else.

## DISEASES

Nosema infection also runs rampant across the country—70% of colonies were infected in June of last year. The stressful factors leading up to almond bloom apparently put a lot of hives close to the “tip point” at which pathogens can overwhelm the colony immune system and start it going backwards, or initiate the slide into sudden depopulation (detailed at [6]). Few seem to be mentioning signs of CCD—it is unfortunate that the media keep using that term as a catch-all for all hive problems!

One should keep in mind that the winter collapse issue appears to be cyclical, similar to flu or other pathogen epidemics. I have strong reason to suspect that the constantly-evolving viruses are involved in these colony collapse epidemics.

There has also been a strong resurgence of European Foulbrood and other unidentified brood diseases [7] (Figs. 6, 7, and 8). Unlike EFB of old, the new forms don't go away with a nectar flow.



Figure 6. “Shot brood” due to EFB. Note the fat queen near the center. Despite her vigorous egg-laying, this colony is unable to pull ahead due to excessive brood mortality. Lots of beekeepers reported EFB symptoms this winter.



Figure 7. You really have to look hard in some colonies with spotty brood to see the cause! Two larvae in this photo show signs of EFB infection.



Figure 8. Dying brood from one of my sick colonies this spring with EFB-like symptoms. Note the "shot" pattern, the twisted larvae, and the dried larval remains. There is also some AFB-like coloration, but lack of roping or AFB odor (this odor is distinct and sour), nor a positive Holst milk test. In this colony, even pupae were

dying. I observe these symptoms independent of whether the hives went to almond pollination or not. Colonies with this (or similar) infection cannot grow. Treatment with oxytetracycline generally clears it up.

## OTHER INDICATORS OF IMPENDING COLLAPSE

One thing that I noticed in *Buzzkill* was the uneaten pollen supplement patties in many of the crashed hives. I've mentioned before [<sup>8</sup>] that I've found a colony's failure to consume pollen supplement to be a reliable predictor that that colony will later collapse.

Another strong predictor of winter collapse is weak strength in fall (upcoming article), again strongly suggesting that those colonies already have some sort of health issue going into winter. I heard reports from all over the country that bees went into winter in poor condition.

## AN UNEXPECTED CHILL

**The final blow to hives in California was a blast of icy weather** (Fig. 9). This unexpected chilling compounded all the existing problems! I've previously pointed out that colony collapse often follows unseasonable chills, since it shifts the tip point for virus and nosema epidemics. Clusters that had expanded for broodrearing contracted, resulting in chilled brood and dead young bees on the ground. My own colonies simply shut down broodrearing completely, losing about two weeks of buildup.

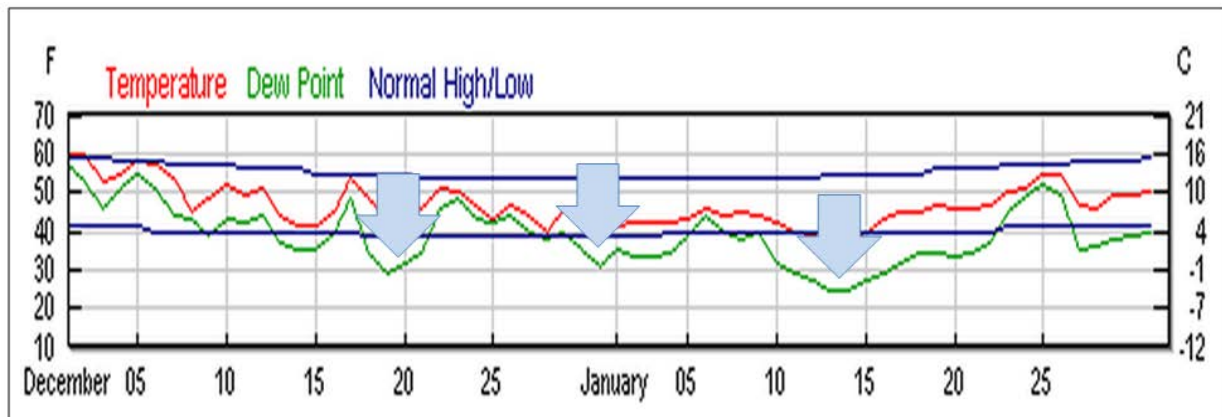


Figure 9. Chilling events (blue arrows) in Modesto, California this winter (the dark blue lines represent normal highs and lows). The unusual chilling in late December and early January (hitting the '20's in a number of areas) came at the time when colonies normally begin to build up for almonds. This severe (for California) cold set the already-stressed colonies back hard, and may have allowed nosema and viruses to gain the upper hand. Graph from wunderground.com.

At the national convention in January, the first reports of beekeepers with collapsing operations were heard. But still, the industry was in denial, with an apparent glut of promised bees as late as the end of the month (two weeks before start of bloom)! But when the rubber finally hit the road in mid February, that illusory supply quickly evaporated, with desperate growers and brokers scrambling to obtain bees—some offering obscenely high prices for substandard colonies.

And then, due to the cool spring, the trees held off on blooming for an extra 10-14 days [<sup>9</sup>]-colonies placed in anticipation of normal start of bloom just sat there starving and shivering on the cold orchard floors.

**Practical application:** the biology here is that this is the time of the “spring turnover” in bee populations in California, during which the old overwintered adult bees must rear their replacements for the spring buildup of population. The conditions in the almond orchards prior to bloom are miserable for smaller colonies—it is warm enough to encourage them to break winter cluster and expand the broodnest, but overnight frosts on the Valley floor can cause serious chill stress. Furthermore, it is often warm enough to fly at midday, but there is virtually nothing to forage upon until the trees start blooming! Such fruitless foraging further wears out the workers, and allows sick bees to drift to adjacent hives. Worse yet, the desperate foragers rob out any dead or dying colonies in adjacent orchards, rapidly and effectively transmitting mites, nosema, viruses, and anything else harmful in the deadouts.

Many colonies went backwards during this excruciatingly long wait. Some beekeepers told me that hives graded at placement scored better than those graded at bloom (just the opposite of normal)!

I’ve been carefully observing spring turnover in my “dinks” (weak colonies) in February (Fig. 10). What I find is that the problem is generally not the queen; rather, the colonies are infected with some pathogen--most commonly nosema [<sup>10</sup>], the paralytic viruses [<sup>11</sup>], or EFB (or EFB-like brood disease). Those colonies that are able to successfully emerge one solid round of brood are often able to “clear” the infection and completely rebound by April. Those that get hit by frost in February often collapse.



Figure 10. An example of an unsuccessful spring turnover. This colony is in the middle of typical February collapse from nosema or IAPV. You can easily see the outline of the area recently covered with brood, delineated by the crescents of freshly-packed pollen. Colonies undergoing this sort of depopulation tend not to forage for nectar, and do not respond well to supplemental feeding. This colony continued to collapse quickly, and finally died in a cold snap a week later—with only silver-dollar sized patch of dead bees remaining.

## FEEDBACK FROM BROKERS

I asked a few of the major pollination brokers for their observations on the colony shortage this season. Their feedback suggested that the causes for the bee shortage were varied and many. Summary:

1. Most were able to eventually fill their contracts. Beekeepers often hold colonies in reserve “just in case,” or gambling that in “short” years they can rent those last hives at an elevated price. Also, when the offered price went up, hives not originally intended to go to almonds were loaded up at the last minute and shipped to California (I was in Florida at the start of bloom, and had an inspector tell me of certifying colonies for shipment after the bloom had already begun!).
2. A number of hives received in November were already headed downhill. Some exhibited the symptom of bees not clustering properly (a typical sign preceding sudden colony depopulation/CCD). Some arrived crawling with mites, or with recent mite treatments in place (suggesting that they were treated too late).
3. Some graders saw piles of dead bees in front of hives—cause unknown. There were reports of some herbicide tank mixes killing bees.
4. Many of the placed colonies were below standard grade— growers paid for less than they expected!
5. Graders told me that there was a huge variation in hive strength from beekeeper to beekeeper. Many hives were strong (12-16 frames of bees) and healthy; other operations graded at zero to three frames of bees (some of the deadouts had spider webs inside, suggesting that they hadn’t been occupied by bees for some time).
6. The unusual winter chill was tough on colonies that had been stimulated into early buildup, and then forced to contract their broodnests. Some colonies kicked out chilled brood and dead bees afterwards.
7. Many beekeepers watched their colonies go “backward” prior to bloom.
8. Colonies from the Southern states (especially those delivered in February) were generally in better shape than those from the Midwest.
9. Midwestern beekeepers blamed drought, mites, poor nutrition.
10. Several beekeepers said that their best bees came from remote areas, and their worst from ag areas.
11. A number of beekeepers admitted inadequate mite treatment; mites were a recurrent theme.
12. There were a number of reports of EFB hitting colonies.
13. Some had gotten hit last summer with pesticide sprays, and their colonies didn’t recover.
14. “There were good bees and bad bees from every state. They all seemed to have different problems depending on location/state.”
15. Many good beekeepers simply didn’t know what happened to their hives; there were lots of lifeless hives delivered. The atmosphere was ripe with speculation as to the actual causes.
16. “The shortage was also created by beekeepers that chose not to come to California for a variety of reasons. They can make more money with honey, didn’t get paid for what they have brought in the past, bees come back home with mites, beetles and whatever else takes a ride on the hives. Beekeepers don’t want to risk bee health to chase the dollar.” Many out-of-state beekeepers have had bad experiences going to almonds, and simply don’t feel that it’s worth it. The supply of bees will largely depend upon the price that growers offer for renting them!

## THE SILENT MAJORITY

*Buzzkill* leaves one with the impression that the entire bee and almond industries are on the verge of collapse. Of course, the news media focus on fear and disaster, so we may consider taking such dire



projections with a grain of salt. In the case of Dan Rather, the focus was on the beekeepers with troubles, not upon those who successfully filled their pollination contracts.

So just how severe *was* the problem? Let's say that there was an overall shortage of 100,000 hives (a figure that I heard floated)—that would represent only about 6% of the total number of hives placed into almond pollination. The other 94% were successfully delivered (although a proportion of those were weak due to the poor season).

Since the debacle, I've heard from plenty of beekeepers whom I'll refer to as the "silent majority," who experienced "normal" colony winter losses in the 5-25% range, and who successfully filled their pollination contracts. Although the hearts of all beekeepers go out to those who suffered severe colony losses, many felt that some of those losses could have been prevented if the afflicted beekeepers had been more proactive than reactive.

And don't forget those upon whom the rest of the industry depends to supply bees for restocking their deadouts! The California package producers, who have been pollinating almonds for decades, are routinely counted on to consistently take strong hives to almonds, and to then shake over a hundred thousand packages of bees for sale afterwards. Few of these major producers experience severe ***unexplained*** colony losses.

## **BEEKEEPER MANAGEMENT**

By no means am I suggesting that those beekeepers who suffered losses engaged in poor beekeeping practices, but I can't help but notice that not all beekeepers were equally affected—a great number provided strong, healthy colonies to almonds. I've spoken to some of them--the common thread is that those who recognized the problems of poor nutrition and mites in August, and took remedial action for the rest of the season, had acceptable winter losses.

Some beekeepers who really put serious effort and money into bee husbandry were even able to sell "shook bees" from their colonies to others in February! For example, watch Keith Jarrett feeding substantial quantities of pollen supplement to very strong colonies in January [<sup>12</sup>]*—Keith consistently brings very strong colonies to almonds every year, and this year was no exception!*

**Practical application: I'm here to tell you, that one lesson that I've learned during our intense California drought, is that those yards that I fed with protein in late summer before they started going downhill went to almonds much stronger than those that I didn't feed until fall! Proactive is better than reactive—if you wait until colonies are already going downhill, it is much more difficult to turn them around!**

I've often been accused of being politically incorrect for speaking frankly. I'd like to make amends at this point by retiring the rude and unsympathetic term "PPB" (Piss Poor Beekeeping). The fact is that the average wintering loss for the past few years has hovered around 30%. So if you experience 30% losses, you can now proudly call yourself an "Average" beekeeper!

But what about those beekeepers who consistently manage to enjoy lower rates of winter loss? I propose that we call them "Lucky" beekeepers, and the best of them, "Consistently Lucky."

**Practical application: the harder those beekeepers work, the luckier they get!**

But there were clearly “unlucky” beekeepers this year—especially the “big boys” who brought tens of thousands of hives from the drought-ravaged, and corn-converted Midwest to California. California beekeepers are used to summer drought. We have learned to either move our colonies to better (often irrigated) pasture, or to feed expensive pollen supplements. This would be a very expensive proposition to the larger operators, with hives spread all over the place—a cost not covered by current pollination prices.

# WHAT HAPPENED TO THE BEES THIS SPRING?

## PART 2: THE CONTRIBUTION FROM PESTICIDES

Randy Oliver

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It's pretty straightforward to attribute the majority of colony losses this winter to the usual and aforementioned causes, but a number of beekeepers are also pointing the finger at pesticides. There is no doubt that in certain areas pesticides were a serious issue to beekeepers. Colonies set back by pesticide kills may not fully recover over the season, and those going into winter with pesticide residues may go downhill. There is also reason to suspect that pesticides and miticides have something to do with today's high rates of queen failure.

The bees in some drought-stricken areas were forced to forage on irrigated and pesticide-laden crops—the only place in which there was anything to eat. This changes the entire dynamics of pesticide exposure, since residues would no longer be diluted by the pollen and nectar of non crop plants. The lack of good natural forage also suppresses the ability of colonies to deal with the insult of those pesticides. And colonies may be forced, by necessity, to forage upon one treated crop after another, resulting in multiple exposures.

**Practical application: under drought conditions, bees may suffer more from pesticides than when times are good.**

Due to the current high prices for agricultural commodities, farmers are often applying pesticides indiscriminately as “risk insurance” rather than due to actual need. A chilling recommendation from an extension entomologist reads:

*I encourage you to be risk averse and to make an investment that will pay dividends for your valuable crop. Consider applying [flubendiamide, indoxacarb, or spinosad] for corn earworm. If you have stink bugs and are in the [mature plant] stages, you might want to tank mix one of these products with a pyrethroid. A tank mix of a pyrethroid and acephate are an option, but will wipe out all beneficials [13].*

The first three insecticides mentioned are considered to be “reduced risk” to bees if residues are allowed to dry for a few hours, but no mention was made to spray at night. Of the five insecticides recommended above for spraying on corn in tassel, at least four are highly toxic to bees if sprayed during the day! No farmer wants to kill bees, but with recommendations like this from state extension agents, well-meaning growers may unwittingly be hurting pollinators.

Bees in agricultural areas are exposed to a vast array of insecticides, miticides, fungicides and surfactants—many of which have clear links to colony health problems. And applications of new mixes of chemicals are up. For example, in addition to the neonicotinoid seed treatments, granular insecticide soil

treatments for corn in the Midwest were up by 30% over the previous year [14]. These treatments consist of combinations of organophosphates and pyrethroids.

But I'm not hearing either the bird groups or beekeepers even addressing these treatments! It is scary to read the sales literature for Counter insecticide, the organophosphate terbufos [15]. Growers are encouraged to apply it at planting time, despite the facts that:

1. "Terbufos is highly toxic to birds, fish, and aquatic invertebrates [and bees]. [It] shows significant acute mortalities of birds, mammals, reptiles, and fish resulting from broadcast application...In the same study, the application of terbufos as a soil-incorporated treatment to corn...resulted in acute mortalities to birds and reptiles" [16].
2. Terbufos is strongly systemic, meaning that it is absorbed by the plant roots and could be expected to be expressed in the pollen and nectar.
3. It can synergize with other pesticides since it ties up the critical CP450 enzymes used in detoxification, to the extent that growers are cautioned that it can cause problems to corn from herbicides [17].

During drought, certain insect pests become more problematic, perhaps resulting in increased exposure to insecticides by bees. For example, drought encourages corn leaf aphids. Read this chilling recommendation for aphids on corn during tasseling (when bees are actively foraging):

*If less than 50% of pollination has occurred, aphids and honeydew are covering tassels and plants are stressed, an insecticide may be necessary to ensure adequate pollination, but treatments need to be made within 48 hours of tassel emergence. Asana XL, Brigade, Capture, Cobalt, Dimethoate, Lannate, Lorsban, or Malathion may be used for control [18].*

Or this:

*Prolonged drought always raises the specter of two-spotted spider mite outbreaks in soybeans and corn. As the 2012 drought intensifies in Minnesota, infestations are reaching treatable levels...The only products that are recommended for spider mites in soybean include insecticides containing chlorpyrifos, dimethoate and bifenthrin[19].*

The names of the recommended insecticides above strike fear into the hearts of beekeepers!

**Practical application: many "consistently lucky" beekeepers go to great effort to allow their colonies to recover after exposure to pesticides—moving them to unsprayed areas or natural forage, or by immediately feeding protein supplement to stimulate increased broodrearing. Unfortunately, such "recovery" areas are getting harder and harder to find.**

## THE LYNCH MOB

Despite the fact that a wide range of bee-toxic insecticides are being applied (often during bloom) to corn, soy, sunflowers, alfalfa, cotton, and other major crops, if you Google anything about insecticide use, you'll quickly find that the blogosphere focuses only upon the putative link between a single class of insecticides—the neonicotinoids--and the demise of pollinators [20].

People look at me incredulously when I point out that there is zero firm evidence to date that the neonic seed treatments are a serious problem! But the notion that all honey bee problems are caused by an

insidious new insecticide resonates with a distrustful public [21], and has firmly established itself as “common knowledge.” But repeating something does not make it true!

*“It’s easier to fool people than to convince them that they have been fooled”--Mark Twain*

**Practical application: the question is, “Are the neonic seed treatments being railroaded into a guilty verdict in the media’s kangaroo court of public opinion?”**

One group recently brought suit against the EPA to ban the use of the seed treatments clothianidin and thiamethoxam [22], neither of which even make California’s top 100 list of pesticides applied [23], nor that have ever been demonstrated to harm colonies feeding on the pollen or nectar of seed-treated plants! A number of people have made up their minds that the neonics are the main cause of colony collapse, and it appears that no amount of facts to the contrary will cause them to reconsider!

## DEBUNKING THE MYTHS

As anyone who knows me will tell you, I am a stickler for honesty, accuracy, and factuality. I am concerned about the amount of misinformation and speculation going around about the neonics. So let’s look at some of the claims vs. the actual facts.

Arguments against neonic seed treatments	Actual facts
The neonicotinoids have been “linked” to increased colony mortality.	<p>In actuality, such a “link” is merely an urban legend, and has never been demonstrated or confirmed in any study.</p> <p>On the other hand, the residues of other classes of pesticides are more suspect for causing increased brood or adult bee mortality [24].</p>
The timing of CCD coincides with the introduction of the neonic seed treatments in 2004.	CCD started in California bees in the winter of 2004/2005, prior to them ever being exposed to seed treated crops.
But what else could have changed at that time other than the introduction of neonics?	<p>In California, Dr. Eric Mussen [25] determined that the increased colony losses were due to poor summer forage and failure of mite control products (just as this last winter).</p> <p>There is actually a much stronger association between the incidence of the novel gut parasite <i>Nosema ceranae</i> and increased colony mortality [26]</p> <p>But the main thing that has changed is the dynamics of the varroa/virus complex, which coincidentally occurred at about the same time that the neonics came into use.</p>

<p>European countries banned the neonics, and the bees recovered after those bans.</p>	<p>A few countries placed temporary suspensions on certain seed treatments until planting dust issues were resolved [27]—only Germany has one suspension still in place. The foliar applications were not suspended. The suspensions did not resolve bee health problems.</p>
<p>The European Food Safety Authority recently decided that neonics pose a threat to bees.</p>	<p>“The Center for Regulatory Effectiveness (CRE) has recently completed a Data Quality Act (DQA) Alert on the ... (EFSA) report on neonicotinoids which found that neonicotinoids pose a risk to bees. The DQA Alert outlines the serious deficiencies of the EFSA report and demonstrates why the EFSA report violates the DQA...In particular, the EFSA report failed to maximize the objectivity of the data by failing to reconcile numerous studies whose conclusions contradicted the findings of the EFSA report” [28].</p>
<p>Several lab studies have found that neonics affect individual bee behavior, longevity, or immunity.</p>	<p>True—although many studies used unrealistically high doses. The question is whether such artificial studies apply to actual colonies in the field. The numerous <u>field</u> studies to date have failed to find any link between seed treatments and later colony health issues.</p>
<p>It is the seed treatments that make corn a problem.</p>	<p>As Bret Adee points out in <i>Buzzkill</i>, corn is replacing pastureland (Fig. 4). Corn, as grown today, is a virtual “bee desert” (similar to the way in which suburban lawns are green bee deserts). And it’s not only the bees that this is affecting, the populations of birds and other wildlife are plummeting due to loss of favorable habitat (see my blog on birds and neonics [29]).</p> <p>A recent survey by Dr. Jerry Bromenshenk found that bees actually avoid field corn pollen, and are exposed to very little of the seed treatment residues [30].</p> <p>Numerous independent studies, and the experience of stationary beekeepers throughout the Corn Belt, support the conclusion that colonies can thrive when surrounded by corn, provided that there is some alternative forage within flight range.</p>

<p>As the use of neonic seed treatments increases, bee mortality goes up.</p>	<p>In actuality, colony mortality rates go up and down year to year, largely dependent upon weather and varroa mite control. If the neonics were to blame for this winter's bee losses, why didn't they cause similar losses last winter, in which the colony mortality rate was the lowest in years?</p>
<p>French beekeepers also started seeing problems with the introduction of the neonics</p>	<p>I've spoken with beekeepers in France whose apiaries are in pesticide-free areas. They tell me that they experience the same sorts of colony mortality problems as do those in areas exposed to neonics.</p>
<p>Bees in the U.S. are commonly exposed to neonicotinoids.</p>	<p>In the most recent USDA survey (100 samples across the country), imidacloprid was only detected 9% of the samples [<sup>31</sup>] (although I found some of the residue levels alarmingly high). However, the most common seed treatment, clothianidin (or its degradation products), was not detected at all!</p> <p>The above real-world data suggests that efforts to ban clothianidin as a seed treatment may be misplaced. It appears that imidacloprid, especially as a foliar application, would be of more concern.</p>
<p>Neonics are the most common pesticides that bees are exposed to.</p>	<p>In the above survey, other serious insecticides were more commonly prevalent: chlorpyrifos (in 20% of samples), cyhalothrin (in 7%), and endosulfan (in 11%).</p> <p>Notably, there was also a high prevalence of beekeeper-applied miticides: fluvalinate (in 38%), coumaphos (in 87%), amitraz (in 27%), fenpyroximate (in 11%), and thymol (in 27%).</p> <p>There was even higher exposure to fungicides and adjuvants.</p>
<p>It is misleading for the pesticide companies to blame the problems on varroa, nosema, or poor nutrition.</p>	<p>The above survey (over 1000 samples) found that the <u>average varroa infestation rate in the U.S. in autumn is above the danger level for virus epidemics!</u></p> <p>Sixty to 100% of hives are infected with nosema in December.</p>

	<p>Summer drought has historically been associated with high winter mortality.</p>
<p>But didn't the planting dust from corn seeding kill colonies in Ontario?</p>	<p>Planting dust is separate issue that clearly needs to be remedied. It does on occasion cause bee kills, for which beekeepers are rarely compensated. This situation must change! All parties are actively working on solutions [<sup>32</sup>].</p>
<p>Bees in certain agricultural areas tend to go downhill later in the season.</p>	<p>This has been observed for a long time—long before the neonics. The question is which chemicals, chemical synergies, or chemical/nutrient interactions are responsible? The Frazier/Mullin team at Penn State has developed a protocol for helping to figure this out. I strongly support its adoption by the EPA for pesticide risk analysis.</p>
<p>Colonies foraging upon nectar or pollen of seed-treated crops get poisoned.</p>	<p>Ask yourself this: if neonic residues were actually so harmful to bees, how is it that the Canadian beekeepers, whose bees forage largely on seed-treated canola, feeding solely upon a diet of canola nectar and pollen with well-documented residues of clothianidin, experience very low winter losses, despite the long Canadian winter (so long as they control varroa and nosema)?</p> <p>And how is it that the vast majority of beekeepers in the U.S. Corn Belt report that their colonies thrive and that they have far fewer pesticide issues these days than in the past?</p>
<p>The neonicotinoids are "systemic," meaning that they are in the plants all the time!</p>	<p>True, but this property is not unique to the neonics—a number of other insecticides also go systemic. In any case, with seed treatment, the concentration of the insecticide in the plant is only high when the plant is young—it gets diluted as the plant grows (e.g., clothianidin in canola is at a level high enough to kill aphids for only about the first 30 days of growth).</p> <p>The only time that residues in the plant matter to pollinators is when the mature plant flowers. The amount of seed treatment is carefully calibrated so that the residue in the pollen and nectar are below the level that causes demonstrable harm to bees.</p> <p>In the case of foliar, drench, or chemigation</p>

	<p>applications prior to bloom, there are greater possibilities for bees to be exposed to toxic levels.</p>
<p>There are fewer butterflies and pollinators in the fields these days.</p>	<p>Not surprising, since the new push for “clean farming” has removed the host plants upon which the butterfly larvae feed. Pollinators are forced to subsist upon the stretches of weeds growing along roads at the edges of fields. But surprisingly, pollinators may be abundant there, suggesting that even though populations as a whole are reduced by habitat conversion, it is that, rather than the use of seed treatments, that causes the population declines.</p>
<p>The evil pesticide companies want to kill honey bees.</p>	<p>Give me a break! Does anyone truly believe that anyone wants to kill honey bees? What pesticide company would want the bad press of being associated with killing bees? The chemists and biologists on their staffs earnestly work to develop insecticides that are bee friendly.</p>
<p>The EPA is being derelict in their duty to protect pollinators.</p>	<p>I have spoken at length with EPA staff, and reviewed their risk assessments, as well as those by, DEFRA, EFSA, PMRA, and other regulatory agencies. find that the risk assessors have not overlooked any evidence, are well-informed on the subject of neonics, and are justified in their assessments that the on-the-ground evidence (to date) indicates that neonic seed treatments pose acceptable risk to pollinators.</p>
<p>We must all remember that the tobacco industry tried to hide the fact that nicotine was addictive [33]</p>	<p>Spare me! Does anyone seriously think that the EPA is unaware that industry executives may stretch the truth? Of course the EPA is skeptical of any reassuring claims by the pesticide industry—that’s why they go over all studies with a fine-toothed comb!</p>
<p>This winter’s losses spell the end to commercial beekeeping.</p>	<p>The fact of the matter is that many observers note that the bee supply for almonds often follows a boom-bust cycle. Although losses were high this year, the trend for the last decade has been for beekeepers keep ramping up the supply of bees for almonds. So long as growers are willing to pay a profitable rental rate for colonies, market forces will encourage the bee industry to meet the</p>



	demand (for a detailed analysis, see [34]).
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## THE PRECAUTIONARY PRINCIPLE

“But,” you say, “shouldn’t we exercise precaution due to the lab studies that find adverse effects from the neonics?” Look, I make my living as a beekeeper, I’m not out to sell insecticides, and am as concerned as the next person about the environment and the safety of the food I eat. I’ve researched the neonics exhaustively, and addressed them in several articles [35]. I am acutely aware that there are suggestions that the neonics may be causing insidious effects in the environment, and I’ve studied the excellent environmental document *Late Lessons from Early Warnings* [36], which hammers the message that we should use the “precautionary principle” when dealing with chemicals. The problem is, there is nothing without risk—for example, you have a 1 in 83 chance of being killed in an auto accident in your lifetime. But most people still take the risk of getting into cars, since they feel that the benefit outweighs the clearly high risk!

**My practical perspective as both a scientist and a beekeeper: if researchers perform lab studies on any insecticide, they will find that there are all kinds of negative effects upon bees—this should be pretty obvious, since insecticides are specifically designed to harm insects! However, the majority of these studies are taken out of the context of full colonies under field conditions, where bees fly free and choose the flowers upon which they forage. The evidence to date supports the contention that the neonics, *properly used as seed treatments*, are indeed an improvement over other insecticide options.**

As Dr. Eric Mussen succinctly notes:

***Nobody’s really been able to show that [the neonicotinoids] are more problematic than the rest [of the pesticides to which bees are exposed] [37].***

Far be it from me to suggest that the neonics (or any other pesticides) are harmless! But consider this—if the neonic seed treatments were indeed as harmful as some make them out to be, you’d think that after a decade of intense study that at least one researcher could have come up with a single solid piece of field evidence against them!

Let’s do a thought experiment. Why doesn’t someone simply put a bunch of healthy hives into the middle of seed treated crops and see whether they die afterward? Oh, I forgot—this experiment has already been run by thousands of beekeepers year after year in the Corn Belt and the Canadian prairie! And those beekeepers have invited me to look at their colonies, sent me photos of colonies stacked head high with honey supers, and bragged about their high winter survival!

Some will argue 'til they're blue in the face, but the fact remains that virtually every beekeeper that I've spoken with in the Corn Belt and in canola areas feels that the seed treatments are not a problem [38]. In fact, most tell me that this is the best it's ever been as far as bees and pesticides!

**Common sense: I just don’t get what is so hard to understand about the reality that there are thousands of colonies thriving year after year in areas of intense seed treatment? To any reasonable person it would suggest that the treatments are causing little noticeable harm other than the occasional planting dust kill, which I have repeatedly stated is a problem that needs to be corrected!**

## SEE FOR YOURSELF

Let's look at actual independent (from the manufacturer) data from corn and canola areas:

### Corn

I asked friends in the Corn Belt if they had any data on winter losses. It so happens that the Michiana Beekeepers Association has been collecting exactly that since the spring of 2010 (Fig. 11).

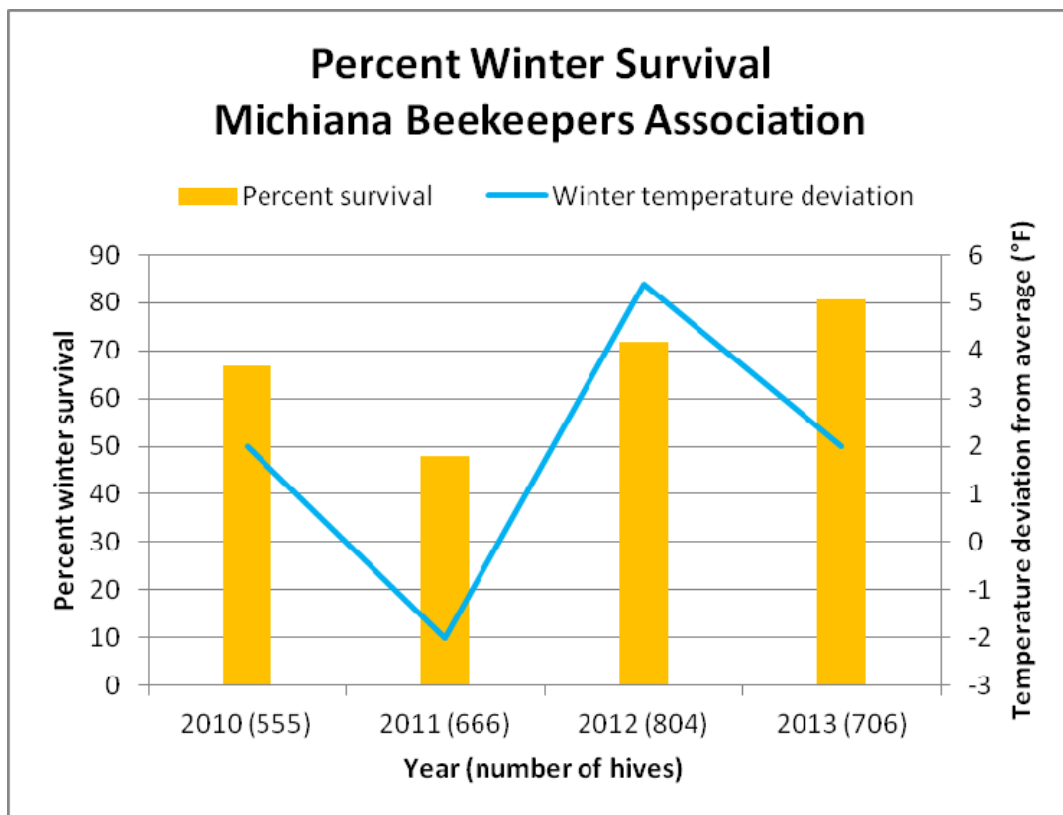


Figure 11. Percentage of winter losses by the “Michiana” hobby beekeepers. The 2013 figure is as of mid March; it may eventually go down a bit due to a prolonged cold spring. Note that the winter survival rate appears to be linked to average winter temperature. Thanks to beekeeper Danny Slabaugh for sharing the data; temp deviations from [39].

How could the above be? Eighty percent winter survival despite sitting in the middle of seed-treated corn and soy? So of course I did a fact check to confirm that those beekeepers were indeed sitting in corn/soy areas (Fig. 12).

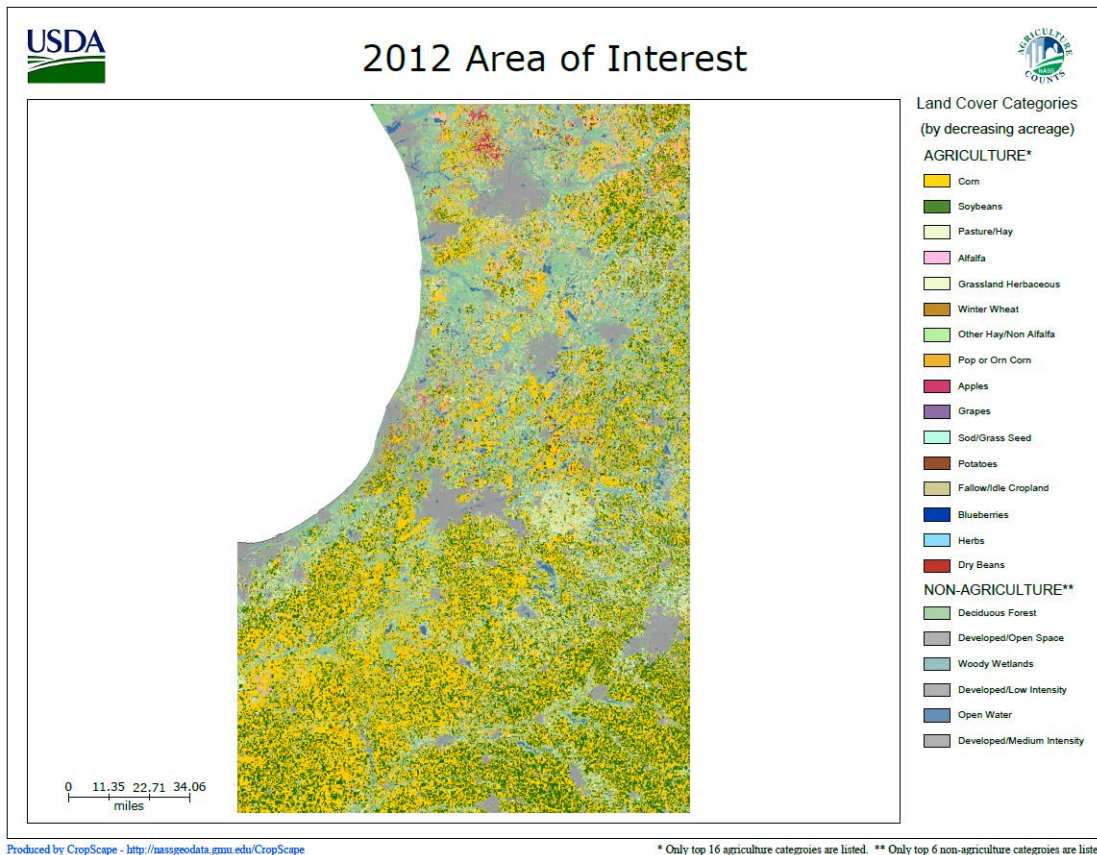


Figure 12. USDA land cover categories for the region in which the Michiana hobby beekeepers keep bees—corn and soy acreage is color coded yellow and green, respectively. The selected area is the top half of Indiana and bottom of Michigan, with Lake Michigan at the left. Clearly, these apiaries were exposed to seed-treated corn and soy! I created the map at [40].

The above figures suggest that colony winter survival for stationary hobby beekeepers in the above corn/soy region is higher than the national average, ***despite the fact that about half of them don't even treat for mites!*** They also suggest that the neonics or other pesticides used in corn/soy in that region do not cause excessive winter loss. Finally, the data indicate that a main factor for winter loss rates is the winter temperature.

## Canola

I've heard some beekeepers saying that their bees crashed after working canola, suspecting that the seed treatments were the problem. So as a reality check I called a Dakota beekeeper who has been running bees to canola for over a decade—some 10,000 hives last season. He tells me that colony strength after canola varies from year to year, but that he sees no problem with the seed treatments. He did point out that beekeepers should be aware that colonies can plug the broodnest on intense canola flows.

**The biology:** The plugging out of the broodnest during an intense bloom means that three weeks afterward, there will be few emerging workers to take the place of the worn-out foragers, and the colony population will temporarily plummet. Even worse, the remaining mites are then concentrated onto fewer bees—which can initiate virus epidemics. These colonies must then attempt to rebuild from scratch, starting in August, meaning that the weakened, mite-infested colonies faced three long months of drought last summer for that rebuilding process.

Every field study that I've seen for canola also supports the conclusion that the seed-treatments are safe for bees. I joined other beekeepers and regulators in observing a large-scale study of seed-treated canola in Canada [41]. Canola (or rapeseed) is likely the best test crop, since bees eagerly (and virtually exclusively) forage upon it for both pollen and nectar, meaning that every bit of their food supply contains easily verifiable residues of the insecticides. The preliminary results indicate that the clothianidin seed treatment did not harm the colonies [42].

Another recent independent long-term field study in Poland [43] came to the same conclusion. In it, the researchers followed 50 colonies for more than two years under field conditions as they foraged on five different large fields of oilseed rape treated with various combinations of five different neonicotinoids applied by seed treatment and spraying. Pollen and nectar samples were taken, and demonstrated that the bees were clearly exposed to normal residues of the insecticides (there was also additional exposure to other common agricultural pesticides). The colonies were monitored for health, brood, strength, nosema, viruses, and winter survival, and compared to two control apiaries set in an area free of the crop. The results?

***During the time from the placing of the colonies on the rape fields until wintering, the colonies developed properly in all groups... All colonies overwintered properly... In both years, during the period of being placed in the oilseed rape fields as well as after being moved to the stationary apiary, none of the groups showed disturbances in development or functioning.***

Following a paper that suggested that the seed treatments would impair bumblebee colonies' ability to rear queens, DEFRA performed a common-sense field study last year [44]. Their findings:

*...the study has shown that bumble bee colonies remained viable and productive in the presence of the neonicotinoid pesticides under these field conditions...The study underlines the importance of taking care in extrapolating laboratory toxicology studies to the field, as well as the great need of further studies under natural conditions.*

## **Sunflowers**

Some beekeepers report that their colonies later crashed after they chased sunflowers last summer for honey. One must keep in mind that sunflowers are not a natural food for honey bees, and provide only poor-quality, nutritionally-inadequate pollen [45]. But the main problem with putting bees on sunflowers may be related to the fact that sunflowers are a native plant—meaning that there are a number of native insects that evolved to feed upon it:

*Maximum seed yields often require the use of insecticides to protect the crop from insect competitors. Unfortunately, many of the major insect pests of sunflower attack the crop when it is flowering. Thus, insecticides used to control the pest also harm pollinating bees [46].*

If sunflowers are the only forage available, colonies may eventually go downhill, due to the one-two punch of poor pollen nutrition coupled with insecticide exposure. And which pesticides would those be? One scary list-- Asana XL, Baythroid, endosulfan, Furadan, Lorsban, methyl or ethyl parathion, Proaxis, Scout X-TRA, Sevin, Warrior, Mustang Max, Declare, Cobalt, Yuma, Delta Gold, and Grizzly Z [47]!

Note that none of the above are neonics, other than seed treatments for wireworms. Surprisingly, field evidence indicates that the seed treatments only "stun" the wireworms for a while [48], which certainly raises

the question as to how harmful they might be to bees months later when the plants flower! I will return to sunflowers below.

## **BE CAREFUL WHAT YOU ASK FOR!**

Allow me to assure you that I am no pitchman for neonics or any other insecticide—the typical farmer practices far too little integrated pest management, and applies far too many pesticides! All insecticides (and several fungicides and adjuvants) cause problems to pollinators—the neonics are no exception. Any systemic insecticide has the potential to harm bees when applied as foliar applications, by chemigation, or to flowering trees, but if there is no compelling evidence that the neonics are any worse than the alternatives in most applications. On the contrary, there is quite a bit of evidence that they may often be “safer” (“reduced risk”).

If the neonic seed treatments were banned, it’s not as though all agriculture is suddenly going to go pesticide free—only about 1% of U.S. cropland is registered as “organic”! We must consider the likely alternatives. The products that farmers would then use to control insects would need to be sprayed all over the cropland—we’d then be back to the problem that the bulk of sprayed insecticides go into the environment without ever hitting the intended pest!

I hear from knowledgeable beekeepers that worse than in previous years, some of the new formulations of the spray-applied insecticides [<sup>49</sup>, <sup>50</sup>, <sup>51</sup>] can really knock the snot out of bees! One large beekeeper found his hives already dead before moving them away from the fields. Again, this was not a neonicotinoid issue.

**Practical application: no one is saying that the neonics are “harmless.” The question is whether they are better or worse than the alternatives.**

## **THE EFFECT OF DROUGHT**

Let’s discuss some of the problems (or suspected problems) with the neonics last season. The record warm and dry spring appeared to exacerbate corn planting dust issues (corn seeds are the worst offender due to their non spherical shape). Beekeepers in some areas of the Corn Belt, the East Coast, and in Ontario suffered from confirmed (in at least some of the cases) planting dust kills (although many went on to make good honey crops after their colonies recovered). The final analysis from Ontario is not yet completed, but dry soil conditions and an early clover bloom likely contributed to the problem. Regulators and the seed companies are working on solutions to the problem [<sup>52</sup>]. Still, IMHO it is unacceptable to ask beekeepers to bear the burden of bee kills without compensation, and no one could blame the affected beekeepers for being pissed!

### **Drought-stressed plants**

There are a number of advantages to the neonic seed treatments. Besides their safety to the farmer and to most wildlife, **there is virtually no way for the farmer to misapply them!** The timing of application is only at planting time (when bees normally have little interest in the bare fields), and the dose is determined by the seed-treating company. This means that the applicator can’t be tempted to apply at the wrong time, or to over apply too strong a dose (however, their excessive near universal use can be expected to accelerate the development of resistant pests).

That said, beekeeper Bret Adee brought an interesting question to my attention: the dose of seed-applied systemic insecticides (whether neonic or other) is based upon the dilution factor as the plant grows, so that

the residues in nectar and pollen will be reduced to below the “no observed adverse effects level.” But what happens during drought, when the water-stressed plants only grow knee high before desperately flowering? There would be far less plant biomass in which to dilute the insecticide (assuming that drought-stressed plants absorb the same amount from the seed treatment).

Certain plants (including sunflowers and canola) are known to “hyperaccumulate” toxic metals [53], perhaps more so during drought. Could this also be the case with systemic insecticides? Something that’s been stuck in the back of my mind is that Bonmantin [54] found that the concentration of imidacloprid first drops in sunflower plant tissue as it grows, and then reconcentrates in the flower heads.

It occurs to me that the translocation of systemic insecticides is generally studied in plants grown under “normal” conditions. I’d very much like to see data for residues in pollen and nectar from seed-treated plants grown under drought. Had we thought of this earlier, we could have collected pollen and nectar samples from drought-stressed plants last summer. I’m currently trying to track down any data or samples from such plants—if any reader has any such sample analyses, please let me know!

**Practical application: the above hypothesis is speculative, but we need actual data from drought-stressed plants to see whether such an effect occurs. If so, it would need to be taken into consideration for the registration of seed treatment products!**

Once planting was completed and the drought took its toll, the reports that I’ve heard are that soybean honey saved a lot of bee operations this season, right in the middle of treated corn/soy farmland. In this case, seed treatment with neonicotinoids may have been a blessing to beekeepers:

*The benefits of [seed treatment] not only include the early-season disease control but also suppression of soybean aphids for quite a ways into the growing season. With it, we typically make only one foliar insecticide application for aphid control, usually in August, instead of two applications when [treatment] isn’t used. In 2012, with the extremely dry conditions in mid-season, there wasn’t as much of an aphid problem, and we treated just 300 acres of soybeans...Last year we sprayed closer to 30,000 acres for aphids [55].*

On the other hand, some beekeepers on alfalfa or cotton got hit hard by other classes of insecticides. A hit from a pesticide application can lead to poor subsequent colony performance, queen failure, dwindling, or winter collapse. ABJ published an excellent series of articles on pesticides by Drs. Barbara and Eric Erickson in 1983; Editor Joe Graham has graciously granted me permission to post copies of those articles to my website [56]—I strongly suggest any beekeepers interested in pesticide issues read them! In the second article, the authors discuss both the problems with systemic insecticides and of sublethal effects—note that these articles were written long before the introduction of the neonics!

## **ACTIONS TO TAKE**

An anti-pesticide group, along with a handful of beekeepers, recently filed suit against the EPA [57], calling for an immediate ban on the two most common neonicotinoid seed treatments, despite the easily-verifiable fact that hundreds of thousands of colonies thrive in the midst of seed-treated corn, soy, and canola! To me, this suit smacks of being some sort of well-orchestrated publicity stunt, and does not serve the interests of either beekeepers or environmentalism. Worse, it now gives the powerful farm lobby cause to label beekeepers as “radical” enemies.

**We don't want this battle:** do we really want to take on the farm lobby by backing them into a corner? The French beekeepers took a similar case against fipronil all the way to *their* supreme court and lost [<sup>58</sup>, <sup>59</sup>--worth reading]. Agriculture is already positioning itself for a fight [<sup>60</sup>, <sup>61</sup>, <sup>62</sup>]. Think about it—the EPA lives in fear of a conservative congress slashing their funding. Does anyone really think that they are going to go against the agricultural lobby without unimpeachable evidence? We should also think twice before calling for a ban on the seed treatments—the alternatives are not pretty!

It disturbs me to hear industry executives and lawyers stretching the truth or misrepresenting data. It disturbs me even more to hear my fellow environmentalists and beekeepers doing so! If we wish to maintain credibility, we should hold ourselves to a higher standard. The question we must ask ourselves the way in which we wish to have pesticide regulation decisions made:

- 1. By the EPA (the Environmental Protection Agency), whose risk assessors carefully study and weigh all available research and evidence in order to make objective and rational decisions, or**
- 2. To have it decided instead by impassioned, fearful, and often misinformed advocacy groups who hire lawyers and pressure politicians who know little about the subject?**

We depend upon the EPA to strike a balance between the availability of cheap food and profitability for those who provide it, versus the risks to human and environmental health and safety. It is good to have activists on both sides of the issues (industry and the anti-pesticide groups) to keep the EPA informed. But I don't feel that either of those groups should be telling the EPA which pesticides to register or to ban! Let the regulators do their job!

Rather than wasting EPA's funding to fight frivolous lawsuits, there are more productive actions that we can take:

1. Help the EPA to do its job by filing "adverse effects incident reports" if you observe a problem due to pesticides [<sup>63</sup>]. EPA is begging beekeepers to do this! Unless they have documented reports of pesticide problems, their hands are tied as to restricting the uses of those pesticides!
2. Support the National Pollinator Defense Fund [<sup>64</sup>]. Our industry is currently represented by a reasoned and knowledgeable group of (mostly) beekeepers. (Challenge to the pesticide companies: why don't you stand behind the safety of your products and donate? The NPFD is about ensuring that your pesticides are properly applied, so there would be no conflict of interest).
3. If your local state lead agency is not actively investigating bee kills or enforcing pesticide regulations, then use the local media to embarrass them into action!
4. Keep pressure on the EPA to resolve corn planting dust problems. Here's a wild idea: I'm not sure of the exact figures, but let's say that 90% of the 95 million acres of corn is grown from neonic-treated seed. If the states were to levy a surcharge of 50 cents per acre (neonic seed treatment adds about \$12 per acre to seed costs), they could collect over \$42 million each year to fund a pool from which to indemnify the occasional beekeeper who suffers a confirmed kill from planting dust!
5. Tell Congress that we'd like to see wording added to the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) to specifically protect pollinators. Currently, such protection is nebulous (although the EPA is acutely aware of pollinator issues): "The Administrator shall register a pesticide if... when used in accordance with widespread and commonly recognized practice it will not generally cause unreasonable adverse effects on the environment." Unless there is specific wording to protect pollinators, bee kills may not be considered to be "unreasonable"!

6. We need far more independent field studies to determine which pesticides and application practices are actually causing harm to pollinators. For pesticides in question, keep pressure on the EPA to require additional field trials to demonstrate whether they are indeed safe for pollinators under field conditions. I'd like to see the establishment of monitoring apiaries (and patches of untilled land) in representative agricultural areas nationwide, with the hives in each apiary to be carefully managed by independent parties. Such apiaries and sites could then be closely monitored each summer to see whether honey bees and other pollinators are able to survive local pesticide practices.
7. Give farmers workable options! Disseminate and promote bee-friendly agricultural practices that don't hurt the farmers' bottom line. For example, by adopting IPM practices, Arizona cotton growers reduced insecticide spraying from 12.5 times a season to only 1.3 times (cutting insecticide use twentyfold), *while* using more environmentally-friendly insecticides [<sup>65</sup>]. Another recent study in Iowa found that adding additional clover or alfalfa rotations in corn/soy farmland was equally profitable, improved the soil, used less energy, used far less pesticides, and decreased water pollution [<sup>66</sup>].
8. Business and agriculture respond to consumer demand. Consumer demand stopped most dairymen from injecting their cows with the hormone BST. Consumers could do the same by demanding pasture-fed beef and dairy (which would create more pollinator forage)! I'd also like to see the expansion of consumer choices (other than organic certification) that reward farmers who manage their lands to the benefit of wildlife and pollinators. For ideas, see [<sup>67, 68, 69</sup>].

## **BOTTOM LINE**

In conclusion, it appears that a perfect storm of a preceding exceptionally warm winter, followed by serious drought across the country, the lack of good mite control, a high prevalence of pathogens, and an unexpected California chill in the orchards prior to bloom, resulted in an unusual degree of colony losses. In other words, rather than one specific cause, there were simply not enough of the good things, and too many of the bad things.

I don't see evidence that pesticides were the major factor in the shortage of bees in almonds this winter, although, as usual, a number of individual beekeepers on certain crops certainly took serious hits.

And how about the fear that there won't be enough bees for almond pollination next year? Beekeepers have already told almond growers to expect higher pollination prices next year (especially since California is again going into serious drought, and beekeepers will be forced to invest extra money in feeding their hives). Most every beekeeper I know is madly making increase right now in anticipation of higher pollination prices next season. The fact of the matter is that should conditions allow beekeepers to successfully rebuild their numbers (following the typical swings of our boom/bust cycle), there could possibly even be a glut of bees for almonds next winter!

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