

# Pesticides and You



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

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## **Protecting Pollinators Stopping the Demise of Bees**

Citing no evidence after using a flawed study,  
EPA protects polluters not the environment

## **ORGANIC Q&A with the Rodale Institute**

## **Ready or Not Genetically Engineered Crops Explode on Market**

USDA allows new GE crops over objections of growers, environmentalists,  
manufacturers, and retailers

## At the Crossroads of Sustainability: Choices

In this 30th year since Beyond Pesticides' founding, our nation and world are at a sustainability crossroads. This issue of *Pesticides and You* captures the choices that we are making every day that have dramatic generational consequences for the protection of health and the environment.

### Choices

Do we choose approaches that fundamentally manipulate nature and life through genetically engineered plants, or do we advance practices that are in sync with our ecology and natural systems? Do we choose approaches that ignore the health of honeybees and pollinators or choose a path that is protective of sensitive species that are integral to the web of life? Do we embrace risk assessment approaches to managing toxic chemicals that ignore the most vulnerable among us or establish precautionary approaches and policies that seek to protect those most threatened? Do we advance methods that ignore the social and economic impact on people and communities or choose practices and approaches that are socially just?

### Ignoring the Bees

Events that have taken place over the last several months bring into focus the stark choices in front of us. First, there is the leaked internal memo from the Environmental Fate and Effects Division of EPA, which tells us that the study EPA says is essential to determining whether the pesticide clothianidin, known to be highly toxic to bees and destabilizing to beehives, is flawed. We might be able to call it fraudulent if we could prove the intent of the chemical manufacturer that produced it; regardless, it is worthless for answering questions critical to honeybee health. This essential study, one EPA said was necessary because of the "possibility of toxic chronic exposure to nontarget pollinators through the translocation of clothianidin residues in nectar and pollen," was required in 2003 at the time that the agency granted the chemical a so-called conditional registration with serious unanswered questions. EPA accepted the study in 2007 and then in 2010 found it unacceptable for registration purposes.

Why is EPA registering toxic chemicals when it doesn't have all the answers, and then when the required study is deemed inadequate seven years later telling the public, as it did in February, that it cannot remove the chemical from the market because it doesn't have all the answers? Who should have the burden of proof? And, why don't we err on the side of precaution? Meanwhile, as bees disappear in extraordinary numbers and bee colonies collapse, EPA says it doesn't know why. The complexity of interactions unleashed by allowing the widespread introduction of toxic chemicals into the environment certainly makes things complicated and difficult when searching out a cause and effect; however, we know enough to know that a systemic pesticide that moves through the plant and expresses itself in pollen and nectar should be fully evaluated before use. Our current path is not sustainable.

### Imposing Genetic Engineering

Then, in the month leading up to USDA's decision in January to deregulate genetically engineered (GE) alfalfa, the country's fourth largest crop, the department advanced the notion that conventional and organic agriculture can "coexist" with GE plant material. Ignoring the science on gene flow and genetic drift far from GE planted fields and a long list of uncertainties associated with the environmental and health impacts of GE alfalfa, USDA moved forward in allowing the technology to further invade our lives and limit our choices. Is this the end of non-GE seed and organic? Is it possible to coexist with a genetically altered plant material that trespasses and invades areas off the planted site? Why, again, would we unleash this technology with a half-hearted environmental impact statement filled with finding after finding of uncertainty instead of having all the answers? Despite claims of pesticide reduction, improved productivity, and reasonable cost with GE, we have seen increased pesticide use, weed resistance, a failure to increase crops yields, and the demise of economical seed saving. Meanwhile, we are seeing worldwide growth of GE crops. This is not the sustainable path.

### The Choice is Clear

It is hard to escape Monsanto's claiming in its advertising that it is supporting sustainable choices. The ads are a reminder that we need to define the words that we use to ensure clarity of thought and actions in these times when our choices are crucial to our survival. Do we really have a choice but to protect honeybees and pollinators, or the genetics of plant species? We must. The only reason these are questions is because we have allowed our rights to clean water, air, food, and healthy soil to be trampled by interests committed to chemical-intensive practices that have a track record of destruction.

The framework in which EPA seems incapable of protecting health and the environment is one wedded to chemical-intensive practices where solutions that seek the elimination of toxic chemicals are outside the realm of possibility. Organic practices are marginalized in that framework and dismissed as niche or unaffordable. Economic costs are calculated as inputs, not toxic outputs with the secondary expenses of cradle to grave pollution. Meanwhile, the organic choice is clear from a health, environment, and economic perspective, where sustainability is defined by allowable practices and inputs that are protective of biodiversity, vulnerable groups, our future, and permitted uncertainty of harm is replaced by precaution.



What makes this decade exciting is that the choice is clear and the solutions are within our grasp. We just need to make the right sustainable choices happen.

*Jay Feldman is executive director of Beyond Pesticides.*

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## New Pests Causing a Stink

*I am a physician with many patients who are chemically sensitive. I have heard a lot of complaints about stink bug infestations and the lack of information on how to combat these pests. I am concerned that this lack of understanding will cause desperate homeowners to spray dangerous pesticides, which is bad news not only to my patients, but to everyone's health. I look forward to hearing your recommendations.*

*Sincerely,  
Grace Ziem, M.D.*

### Get Printed!

Beyond Pesticides always welcomes your questions, comments or concerns! Have something you'd like to share or ask us? We'd like to hear about it! If we think something might be particularly useful for others, we will print your comments in this section. Comments will be edited for length and clarity, and unless you specify otherwise, your information will remain anonymous.

There are many ways you can contact us. Join other members and activists in discussions on our Facebook page [www.facebook.com/beyondpesticides](http://www.facebook.com/beyondpesticides) or follow us on twitter [www.twitter.com/bpncamp](http://www.twitter.com/bpncamp)! And as always, you can send questions and comments to:

Beyond Pesticides, 701 E Street SE, #200, Washington, DC 20003, or [info@beyondpesticides.org](mailto:info@beyondpesticides.org)

Dear Dr. Ziem,

The stink bug you're referring to, which also goes by the name Brown Marmorated Stink Bug (BMSM), is not known to cause harm to humans and will not reproduce inside structures or cause damage, and are only a nuisance in the home. As a defense mechanism, these insects produce a foul smelling odor, and if many of the bugs are present and either killed at once or pulled into a vacuum cleaner, this odor can be quite noticeable –hence the name “stink bug.” Because their invasion is relatively new, you have no doubt heard that there is no way to effectively control these pests. This may be code for, “We don't know which pesticides to use.” Chemical controls are not an effective way to combat these pests and do not provide a long-term solution. The insect is thought to have been introduced accidentally, probably on a ship carrying imported food into the U.S. in the 1990's, being a native of China, Japan, Korea, and Taiwan.

Control for stink bug invasions inside the home is literally as easy as whipping out your vacuum cleaner, which will remove both live and dead bugs. Be forewarned, however, that the vacuum may acquire the namesake odor for a period of time. If they appear in homes in small numbers, they can be collected in a jar of soapy water and disposed of. To keep the pests from coming back or to prevent them from infesting the home in the first place, mechanical exclusion is the best bet. Stink bugs can emerge from cracks under or behind baseboards, around window and door trim, and around exhaust fans or lights in ceilings. Seal these openings with caulk or other suitable materials to prevent the insects from crawling through. Additionally, you can look to seal cracks around windows, doors, siding, utility pipes, behind



Photo: David R. Lance, USDA APHIS PPQ, Bugwood.org

chimneys, and underneath the wood fascia and other openings. Damaged screens on doors and windows should be repaired or replaced.

On the other hand, when in an agricultural setting, stink bugs can be a much more serious pest, causing significant loss of crop yield by damaging fruit. Stink bugs feed by sucking fluids from the outer surface of fruits and leaves through their beak, creating unsightly bruises and dimpling, known as “cat-facing,” in tree fruits such as peaches and apples, making them unmarketable as a fresh product.

Research on stink bug management methods in agriculture is currently underway. Some tricks to eliminating these pests currently include the use of monitoring devices, companion and trap planting, removing debris and, as with above, mechanical removal. University of Florida has invented a stink bug trap which provides visual stimulus to attract and catch the pests. Stink bugs are known to like the color yellow, so by planting things like sunflowers, buckwheat, triticale, sorghum and millet in an area away from your crops, you may be able to attract them to a single location in order to make it easier to capture. Similarly, you can try to repel them by planting herbs and other plants that they naturally avoid, like garlic, lavender, mint and thyme, near your crops.

Though this won't help this season, it's im-

portant to clean up garden debris in the fall in order to minimize any areas that the stink bug may use to overwinter, preventing them from emerging in the spring. Or, in a small enough garden, stink bugs and their eggs can be hand picked off. In a larger scale setting, try washing the

plants daily with water for at least a week straight to get rid of them and keep them from coming back. Gardeners, note that the eggs are elliptical (1.6 x 1.3 mm), light yellow to yellow-red with minute spines forming fine lines and attached, side-by-side, to the underside of leaves in masses

of 20 to 30 eggs, according to Penn State's entomology department.

*For more information, see Beyond Pesticides' "Have a Pest Problem?" webpage, [www.beyondpesticides.org/doorway/pestproblem.htm](http://www.beyondpesticides.org/doorway/pestproblem.htm).*

## Beyond Pesticides Daily News Blog

*Beyond Pesticides' Daily News Blog features a post each day on the health and environmental hazards of pesticides, pesticide regulation and policy, pesticide alternatives, and cutting-edge science, [www.beyondpesticides.org/dailynewsblog](http://www.beyondpesticides.org/dailynewsblog).*

*Excerpt from Beyond Pesticides original blog post (2/23/11):*

### **EPA Rejects Immediate Action on Pesticide Toxic to Bees**

In response to a request by beekeepers and environmentalists to remove a pesticide linked to Colony Collapse Disorder (CCD), the U.S. Environmental Protection Agency (EPA) in a letter, defended the pesticide clothianidin and the scientific study in question which was identified by beekeepers as a critically flawed study.

#### **BC says:**

In his own words, an EPA official admits he is choosing which laws to follow and which to ignore. That is not, and never has been, the intent of legal enforcement. "The study was originally classified as an acceptable study (that is, a study that fully satisfies a test guideline), but is now classified as a supplemental study (that is, a study that provides scientifically-sound information, but did not follow all protocols set forth in EPA test guideline)." Gathering "useful information" is not the goal, using sound science to test a potentially harmful chemical is the goal. That is the law. EPA is responsible for requiring rigorous testing. Period. No living organism should be the "guinea pig," while EPA sits on its butt with its lawyers playing word games. If you weren't sure rat poison was in the bottle labeled "rat poison," would you still drink it just to "gather useful information?" EPA is fully authorized to issue a "stop sale, use or removal order" on clothianidin. Instead, EPA is essentially authorizing ILLEGAL APPLICATIONS of this potentially high risk chemical.

*Excerpt from Beyond Pesticides original blog post (1/28/11):*

### **USDA Deregulates Genetically Engineered Alfalfa and Groups Pledge to Sue, While Interior Pulls GE Crops from Northeast Refuges**

Environmental and public interest groups are extremely disappointed with the announcement that the U.S. Department of Agriculture (USDA) plans to fully deregulate genetically engineered (GE) alfalfa seed, despite the risks it poses to both organic and conventional farmers.

#### **Via Facebook, Diane says:**

For a President who has an organic veggie garden, you'd think he would realize just how bad this is. He will have his organic food (for a while until this GE stuff takes over), but most of the U.S. citizens will have the kind laced with ...RoundUp. Here is his email address if you'd like to send him a note: [www.whitehouse.gov/contact](http://www.whitehouse.gov/contact).

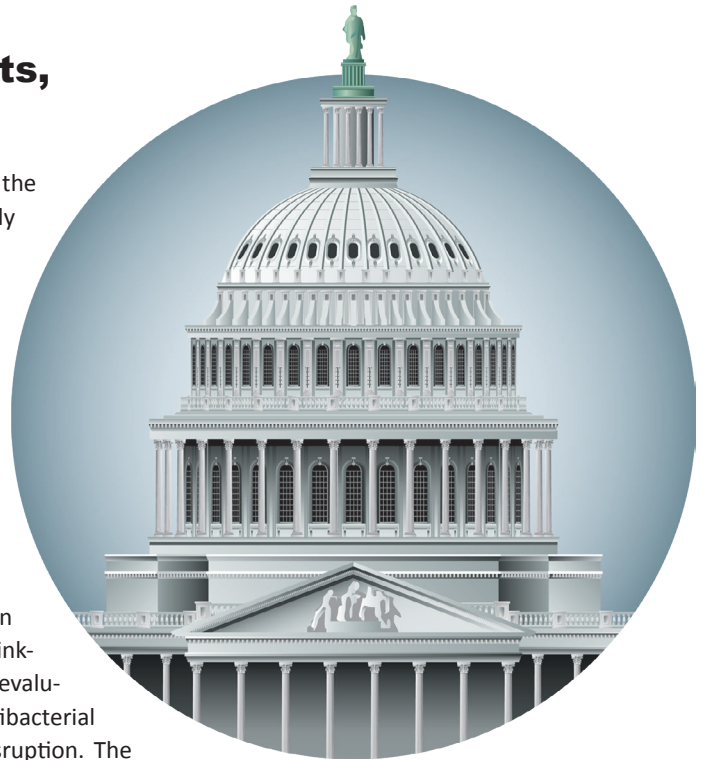


## Companies Pull Triclosan from Products, Public Comment Period Extended

Following numerous developments on the antibacterial pesticide triclosan over the last year, including several published studies highlighting the serious adverse effects of exposure, the submission of a federal petition calling for the ban of the chemical, and increased consumer awareness, experts are urging companies to take precautions and remove the ingredient from their products. During the past year, GlaxoSmithKline removed the triclosan from its toothpastes and mouthwash, and Colgate-Palmolive has removed triclosan from most of its products, excluding its Total brand toothpaste, a line that the company claims fights gingivitis.

Beyond Pesticides, in partnership with Food and Water Watch and 80 other groups, submitted petitions to both the FDA and EPA urging that they end the use of all non-medically prescribed triclosan uses on the basis that those uses violate numerous federal statutes. In December, EPA published for public comment Beyond Pesticides' petition calling for the ban of triclosan in consumer products. EPA an-

nounced that it is extending the comment period, originally set to end on February 7, to April 8, 2011. The petition, filed on January 14, 2010, identifies pervasive and widespread use of triclosan and a failure of EPA to: (i) address the impacts posed by triclosan's degradation products on human health and the environment, (ii) conduct separate assessments for triclosan residues in contaminated drinking water and food, and (iii) evaluate concerns related to antibacterial resistance and endocrine disruption. The petition cites violations of numerous environmental statutes, including laws on pesticide registration, the *Clean Water Act*, *Safe Drinking Water Act*, and *Endangered Species Act*. It also documents that triclosan is no more effective than regular soap and water in removing germs and therefore creates an unnecessary hazardous exposure for people and the environment.



**Take Action:** Tell EPA to remove triclosan from the products you buy and help get the word out to your friends and family. Triclosan must be banned to protect the public, workers and the environment. See Beyond Pesticides' triclosan webpage, [www.beyondpesticides.org/antibacterial/triclosan.htm](http://www.beyondpesticides.org/antibacterial/triclosan.htm), for more information.

## EPA Proposes Stronger Protections for Human Testing

The U.S. Environmental Protection Agency (EPA) expanded protections for humans used as subjects in pesticide studies in January 2011, making it harder for the chemical industry to experiment on people. EPA has proposed changes in how studies that intentionally expose people to pesticides can be conducted and what studies it will accept. Advocates hope these proposed changes will force the chemical industry to avoid these types of studies altogether. EPA's proposal was published in the *Federal Register* on February 2 and is open for public comment until April 4, 2011, per a settlement agreement reached between EPA and a coalition of public health groups, farm worker advocates, and environmental organizations. In 2006, the coalition, led by the Natural Resources Defense Council (NRDC), filed a lawsuit against EPA, claiming that the agency's 2006 rule violated a law Congress passed in 2005 requiring strict, ethical, and scientific protections for pesticide testing on humans.

Human testing, which was stopped by a moratorium in 1998, was reintroduced in 2003 by a court ruling on a pesticide industry suit. Following the reintroduction of human studies, EPA began to develop a rule for such testing. This came despite flaws found in such studies, and took into account industry pressure to approve testing in children, among other allowances. EPA released its final rule in 2006, despite a Congressional report decrying human testing in 2005. Beyond Pesticides rejects human testing as unethical and dangerous to both test participants and agricultural workers exposed to toxic, approved pesticides.

## Report Shows Government-Industry Conflict in Pesticide Research

According to a recent investigative report by American University's School of Communications, a company known for conducting scientific research for the pesticide industry has, in an attempt to refute research linking pesticides to Parkinson's disease (PD), paid the National Institute for Occupational Safety and Health (NIOSH) to prove that certain pesticides are safe. According to the report, Exponent Inc. is a member of CropLife America, a trade group that represents pesticide manufacturers, and also has worked regularly for Syngenta, the manufacturer of paraquat, one of the chemicals it is looking to prove is safe. Specifically, the company is looking to refute research which shows that even small amounts of the agricultural chemicals maneb and paraquat, when combined, can raise the risk of PD. According to the report, managing scientist of Exponent, Laura McIntosh, PhD, said in an interview that the company donated the money and sought participation at NIOSH to enhance the credibility of its study of maneb and paraquat, hoping to make their research "bulletproof."

NIOSH is a division of the Centers for Disease Control and Prevention (CDC). Generally, government agencies are supposed to be unbiased, and federal ethics rules prohibit employees from accepting money from businesses relating to their jobs. Exponent got around this by donating \$60,000 to the CDC Foundation, an independent 501(c)(3) charity, which then passed the money to NIOSH. "We have a professional money-laundering facility at the Centers for Disease Control Foundation," says James O'Callaghan, PhD in the report. Dr. O'Callaghan is the NIOSH researcher running the government's part of the project. "They accept projects from anyone on the outside." Dozens of studies have linked pesticide exposure to PD. *For more information, including study summaries, citations and abstracts, see Beyond Pesticides' Pesticide-Induced Diseases Database, [www.beyondpesticides.org/health](http://www.beyondpesticides.org/health).*

## Order to Destroy GE Sugar Beet Plants Overturned

In a February 2011 federal appeals court decision, the U.S. Department of Agriculture (USDA) and Monsanto won the reversal of the federal judge's order to destroy genetically engineered (GE) sugar beet seedlings planted last year. The original decision comes from a lawsuit, *Center for Food Safety (CFS) v. Vilsack*, filed by Earthjustice and CFS on behalf of a coalition of farmers and conservation groups, which argued that the GE sugar beet seedlings planted were in violation of federal law. Though the court outlined the many ways in which GE sugar beets could harm the environment and consumers in the initial decision, the three-judge appeals panel said that the groups had not shown that the seedlings were likely to contaminate natural sugar beet plants.

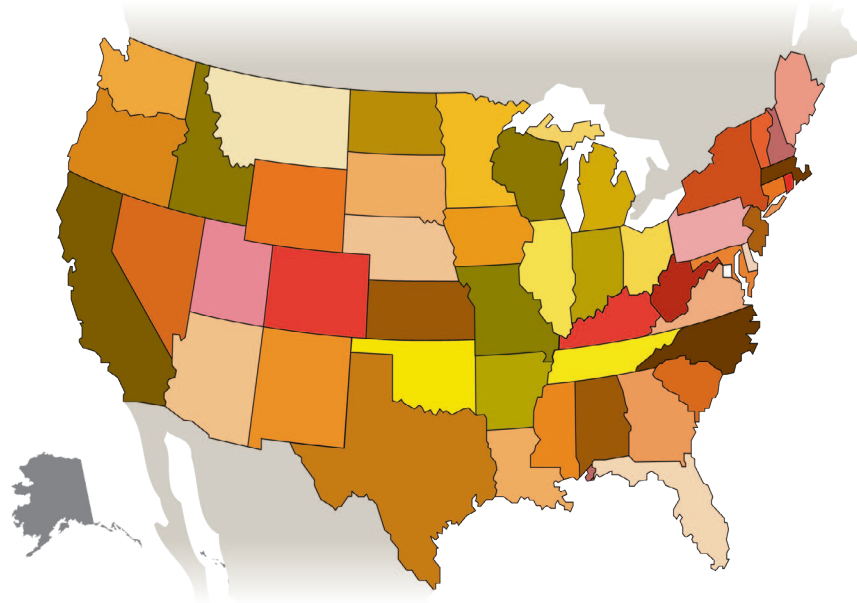
The agency has not completed an environmental impact statement (EIS) on GE sugar beets, which are genetically engineered to be resistant to glyphosate, the active ingredient in Monsanto's RoundUp weedkiller. In November 2010, USDA's

Animal and Plant Health Inspection Services (APHIS) published an environmental assessment (EA) evaluating a range of options, including authorizing production of GE sugar beets under APHIS permit conditions. Without completing the EIS, APHIS concluded that the GE sugar beet root crop, when grown under the agency's "imposed conditions," can be partially deregulated without posing a plant pest risk or having a significant effect on the environment.

This conclusion is at sharp odds with earlier court rulings and the views of growers of organic and non-GE crops, who may see their crops contaminated by the GE sugar beets, threatening their livelihoods and the ability of farmers and consumers to choose non-GE foods. In the initial court ruling, which awarded a prelimi-

nary injunction to destroy the sugar beet seedlings that were planted in violation of federal law, the court found that past incidents of contamination were numerous and current containment efforts were insufficient. Judge Jeffrey S. White noted in his court order, "Farmers and consumers would likely suffer harm from cross-contamination" between GE sugar beets and non-GE crops. He continued, "The legality of Defendants' conduct does not even appear to be a close question."





## Study Proves Resistance in Bed Bugs, Showcases Need for Alternatives

Further proof of the ineffectiveness of chemical pest control has emerged in the form of a study from Ohio State University, documenting the growing resistance of bed bugs to pesticide treatments. The study, "Transcriptomics of the Bed Bug (*Cimex lectularius*)," published January 2011 in the journal PLoS ONE, shows that modern bed bugs have developed the ability to defend themselves against pyrethroid pesticides, due in part to the widespread use of such treatment methods. The researchers found that the bugs developed the ability to produce certain enzymes, which can break down toxic chemicals at higher levels than previous generations. These enzymes allow the chemicals to be easily excreted by the insects without being harmed. When comparing modern bugs to a colony that has existed in isolation for several decades —without any exposure to pesticides, the team found strong evidence of resistance. Bugs from the isolated colony were readily killed when exposed to even small amounts of pyrethroids. However, the modern bugs, which have been exposed to pesticide treatments for decades, required a dosage of as much as 1,000 times the amount that should normally be lethal.

When chemicals are applied as a pest control, there are often at least a small number of organisms that survive the treatment due to stronger immune systems or some other genetic abnormality. Since these bugs are the only ones left to procreate, their offspring will also inherit these genes, and the process will continue, until the entire population has evolved to resist the effects of a certain chemical. This process is sped up even further when pesticides are applied over and over in large quantities, as pyrethroids have been in an attempt to eradicate bed bugs. These findings highlight the need for widespread adoption of alternative, non-chemical methods for controlling bed bugs and other insect pests.

## USDA Study Links Neonicotinoids to Bee Deaths

Research by the U.S. Department of Agriculture's (USDA) Bee Research Laboratory and Penn State University shows that the neonicotinoid insecticide imidacloprid contributes —at extremely low levels— to bee deaths and possibly Colony Collapse Disorder (CCD), the widespread disappearance of honey bees that has killed off more than a third of commercial honey bees in the U.S. While the study is still in the process of being published, the UK's *The Independent* newspaper reports that honeybees exposed to imidacloprid are more susceptible to the fungal pathogen *Nosema*. This is the first study to show that neonicotinoids impact the survival of bees at levels below the level of detection, meaning that field studies would not have considered the role of the pesticide, because they would not have detected it. USDA researcher Jeffrey Pettis, PhD and Penn State University researcher Dennis Van Engelsdorp, PhD explained their research in the 2010 documentary, *The Strange Disappearance of the Honeybees* (transcript courtesy of Grist.org):

[Pettis] *We exposed whole colonies to very low levels of neonicotinoids, and then 'challenged' bees from those colonies, with Nosema—a gut pathogen. We saw an increase (in Nosema infection)... in direct response to the low level feeding of neonicotinoids.*

[Van Engelsdorp] *You measure that effect (Nosema infection) at levels that you could not detect the pesticides — and so that brings up the question: if it's having an effect at that low dosage —we would not have discovered it in our study because it was below the limit of detection. The only reason we knew the bees HAD exposure (to neonicotinoid pesticides) is because we exposed them; otherwise we would never have known they had been exposed (to neonicotinoids).*



## Study Links Prenatal Exposure to Pyrethroid Insecticides and Learning Problems

Research published February 7, 2011 in the online edition of the journal *Pediatrics* shows that children more highly exposed to pyrethroid insecticides and piperonyl butoxide (PBO), a synergist added to increase the potency of pyrethroids, are three times as likely to have a mental delay compared to children with lower levels. The study, "Impact of Prenatal Exposure

to Piperonyl Butoxide and Permethrin on 36-Month Neurodevelopment," measured exposure to pesticides using maternal and umbilical cord plasma samples and in personal air samples, collected using backpack air monitors during pregnancy. Children were then tested for cognitive and motor development (using the Bayley Scales of Infant Development) at three years of age.

Children with the highest prenatal exposures scored about four points lower on the test. "That's about the same intelligence loss caused by lead," Philip Landrigan, MD, a pediatrics professor and environmental health expert at New York's Mount Sinai School of Medicine, told *USA Today*. Pyrethroid pesticides kill bugs by "being toxic to the developing brain," Dr. Landrigan says. The results are "very believable

and should be taken seriously."

Pyrethroid pesticides have increased in popularity over the past decade due in large part to the phase-out of most residential uses of once-popular organophosphate insecticides, which have been restricted because of concerns of neurotoxicity and children's health. However, pyrethroid insecticides are potential neurodevelopment toxicants, but have not been widely evaluated for developmental toxicity. The researchers' objective was to explore the association between prenatal exposure to permethrin, a commonly used pyrethroid insecticide for termites, ants and other household insects, and neurodevelopment at three years of age. They measured PBO rather than permethrin, which breaks down too quickly to give reliable data. *For more information on permethrin and PBO, see the Pesticide Gateway, [www.beyond-pesticides.org/gateway](http://www.beyond-pesticides.org/gateway).*



## Court Sides with Environmental Groups on Clean Air in California

As a result of a petition filed by community groups, the Ninth U.S. District Court of Appeals ruled that the U.S. Environmental Protection Agency (EPA) must reconsider its approval of California's standards for air pollution caused by ozone and pesticides. Specifically, the groups are protesting a final action by EPA approving and disapproving in part revisions to California's "State Implementation Plan" for meeting air quality standards under the federal *Clean Air Act*. One of the issues the plaintiffs raise for review is EPA's approval of a plan designed to reduce emission from pesticide application. The group argues that it violates the *Clean Air Act* because the plan lacks enforceable commitments. The Court agreed with the plaintiffs and called EPA's actions "arbitrary and capricious." Pesticide pollution has a significant role in creating smog. After application, pesticides give off large quantities of volatile organic compounds (VOC), which contribute to the formation of smog. According to the Center for Race, Poverty and the Environment (CPRE), an environmental justice litigation organization based in San Francisco, pesticides in 2005 were the fourth largest source of smog-forming VOC emissions in California's San Joaquin Valley. Smog can cause a variety of adverse health effects that include respiratory diseases such as asthma, susceptibility to various diseases, and heart disease. Children are of special concern. Because the lungs of children are not yet fully developed and because children inhale more air per unit of body weight than adults, they are more susceptible to adverse respiratory health effects. *For more information, see [www.beyondpesticides.org/health](http://www.beyondpesticides.org/health).*



## Study Shows Many Pesticides Block Male Hormones

A new study suggests that there is widespread decline in male reproductive health and endocrine disrupting pesticides are believed to play a significant role. Thirty out of 37 pesticides tested by the researchers altered male hormones, including 16 that had no known hormonal activity until now. The study, "Widely Used Pesticides with Previously Unknown Endocrine Activity Revealed as *in Vitro* Anti-Androgens," was published February 2011 in the online edition of the journal *Environmental Health Perspectives*. The researchers screened the chemicals using *in vitro* assays, which use human cells to check whether the pesticides activate or inhibit hormone receptors in cells that turn genes on and off. Of the tested compounds, the most potent in terms of blocking androgens is the insecticide fenitrothion, an organophosphate

insecticide used on orchard fruits, grains, rice, vegetables and other crops. Others with hormonal activity include fludioxonil, fenhexamid, dimethomorph and imazalil, which are all fungicides. Fungicides are often applied close to harvest, so they are frequently found as residue in food. Fungicides are typically applied as mixtures in order to increase effectiveness and prevent development of resistant strains and, therefore, human exposure to mixtures of these *in vitro* anti-androgens may be considerable.

"This study indicates that, not surprisingly, there are many other endocrine disruptors that we have not yet identified or know very little about," said Emily Barrett, PhD, a University of Rochester assistant professor in obstetrics and gynecology

who was not involved in the study. "This underlines the glaring problem that many of the chemicals that are most widely used today, including pesticides, are simply not adequately tested and may have serious long-term impacts on health and development," said Dr. Barrett.

The findings come as the U.S. Environmental Protection Agency (EPA) faces opposition from the pesticide industry after expanding its Endocrine Disruptor Screening Program, which requires testing of about 200 chemicals found in food and drinking water to see if they interfere with estrogen, androgens or thyroid hormones. None of the 16 pesticides with the newly discovered hormonal activity is included in the EPA's program, which means they are not currently being screened.

## Genetically Engineered Crops on the Rise Worldwide

After 15 years of commercialization, genetically engineered (GE) crops exceeded one billion hectares worldwide in 2010, approximately the land area of the United States. The data, compiled by the International Service for the Acquisition of Agri-Biotech Applications (ISAAA), reveals that 81% of all soybeans, 64% of cotton, 29% of corn, and 23% of canola are planted from biotech seeds. For the first time, the ten largest GE crop growing countries all had more than one million hectares in production, with the U.S. topping the list at 66.8 million hectares. The five principal industrializing countries growing GE crops—China, India, Brazil, Argentina and South Africa—planted 63 million hectares of biotech crops in 2010, equivalent to 43 percent of the global total. Industrializing nations are adopting these methods in the hopes of lowering food prices and reducing poverty and hunger in their nations. However, the findings of a comprehensive United Nation's assessment of world agriculture, *International Assessment of Agricultural Knowledge, Science and Technology for Development* (IAASTD), concluded that GE crops have little potential to alleviate poverty and hunger in the world. IAASTD experts recommend instead low-cost, low-input agro-ecological farming methods.



Beyond Pesticides believes that genetically modifying crops to be herbicide resistant or to produce its own insecticide is shortsighted and dangerous. While GE crops are often touted by chemical manufacturers as a way to reduce pesticide usage and increase disease resistance, they actually have been shown to increase pesticide usage, while disease resistant varieties are still largely in the experimental stages. In January 2011, the U.S. Department of Agriculture (USDA) announced plans to fully deregulate GE alfalfa seed, despite the risks it poses to both organic and conventional farmers. In February, the Center for Food Safety, Beyond Pesticides, and others formally filed a 60-day notice of intent to sue USDA concerning its decision to allow unrestricted deregulation of GE alfalfa. *For more information on genetic engineering or the lawsuit, contact Beyond Pesticides or visit [www.beyondpesticides.org/gmos](http://www.beyondpesticides.org/gmos).*



# Ready or Not, Genetically Engineered Crops Explode on Market

USDA allows new GE crops over objections of growers, environmentalists, manufacturers, and retailers

By Stephanie Davio and Jay Feldman

In a decision that has outraged organic and conventional alfalfa farmers, as well as environmental, consumer, grower, food manufacturers, and retailer groups, the U.S. Department of Agriculture (USDA) announced on January 27, 2011 its plans to fully deregulate RoundUp Ready (glyphosate-tolerant) genetically engineered (GE) alfalfa. This decision follows the agency's completion of a court-mandated Environmental Impact Statement (EIS), which fails to consider pesticide resistance, recognize that GE contamination or organic and conventionally grown crops present a huge problem, and prove that "coexistence" between deregulated GE alfalfa and non-GE alfalfa is likely or possible.

There is general concern that widespread contamination will result from the planting of GE alfalfa, the fourth largest agricultural crop in the U.S., which has been prohibited by a U.S. District court decision since 2007. The Center for Food Safety, seed growers, Sierra Club, Beyond Pesticides, and others sued USDA in 2006 (*Geertson Seed Farms, et al v. Johannns*) because of the department's failure to evaluate the environmental effects of GE alfalfa under the *National Environmental Policy Act* (NEPA). USDA allows GE crops under the *Plant Protection Act* (PPA), which authorizes the department to restrict the introduction of "plant pests." Court decisions have found that compliance with PPA does not release USDA from its duty to conduct an EIS. USDA and the White House have been under pressure from the manufacturer of the seed, Monsanto, and supporters of the product, which have stockpiled the GE seed since the court-ordered ban in 2007 in anticipation of a pro-GE USDA decision. Analysts have indicated that the germination quality and viability of the seed would have been threatened if it is not planted this spring.

## Background on Genetic Engineering

Genetically engineered seeds and crops, also referred to as genetically modified organisms (GMO), are touted by chemical manufacturers as a way to reduce pesticide usage, increase disease resistance, and improve crop yields. This technology is not a panacea to reduce pollution while feeding the world, however; GE crops that are currently available are either resistant to herbicides, thus increasing herbicide usage, or are engineered to produce their own pesticide, such as the biological pesticide *Bacillus thuringiensis* (Bt). GE crops are also known to contaminate conventional non-GE and organic crops through "genetic drift" and take a toll on the

## Genetic Drift

Pollen from GE crops can potentially drift and wreak havoc on both the surrounding ecosystem and for organic and non-GE farms. A study presented to the Ecological Society of America in August 2010 shows that GE canola grows like an invasive plant along roads in North Dakota. Scientists from the University of Arkansas found that as much as 80% of the wild canola they sampled along over 3,000 miles of highways and roadsides was genetically engineered to be resistant to glyphosate. If organic farmers' crops become polluted with GE pollen, they may be subject to loss of their organic certification and financial losses. Because of GE pollen drifting from a neighboring farm, non-organic farmers have been accused of using GE crops without paying for them. For instance, a Canadian canola farmer was sued by Monsanto for patent infringement after the company allegedly found their GE crops on his property. The farmer says he has never planted Monsanto's seeds.



Because of genetic drift contamination, organic farmers and public health advocates are concerned that GE alfalfa could threaten the availability of organic milk.

environment as a result of increasing insect and weed resistance to the pesticides use, contaminated waterways, and adverse affects to pollinators and other non-target organisms.

RoundUp Ready crops, which are genetically engineered to be resistant to Monsanto's best selling herbicide RoundUp (active ingredient glyphosate), have been key to Monsanto's profits, but not without environmental costs. Currently marketed RoundUp Ready crops include soy, corn, canola, cotton, sugar beets, and now alfalfa. Alfalfa, as the nation's fourth most widely grown crop,

is planted on over 20 million acres and is the country's third most valuable with a worth of about \$8 billion per year (not including the value of final products, such as dairy). It is primarily used as feed crops for dairy cows and beef cattle, as well as pork, lamb, and sheep. It's not just for livestock -some vegetable farmers use the hay as mulch and alfalfa meal as a beneficial soil amendment. Alfalfa sprouts constitute an important sector of the salad market and alfalfa also plays a major role in honey production.

The report, *Who Benefits from GM Crops?* (Friends of the Earth International, 2010), examines industry claims and finds that genetically engineered crops actually increase carbon emissions, while failing to feed the world. There is still not a single commercial GE crop with increased yield, drought-tolerance, salt-tolerance, enhanced nutrition, or other beneficial traits long promised by biotech companies. GE crops' resistance to glyphosate enables the use of the herbicide during the growing season

without harming the crop itself. With about 100 million pounds of RoundUp applied to U.S. farms and lawns every year, glyphosate is now the number one herbicide in the United States. This has serious implications for public health and the environment, as glyphosate has been linked to cancer, reproductive effects, kidney and liver damage, and skin irritation; it is neurotoxic and toxic to fish and other aquatic organisms. Since increased herbicide usage has also led to resistant varieties of "superweeds," it is not surprising the weeds treated in GE fields are showing resistance to glyphosate.

## GE in U.S. food production

- **Corn:** 86% of corn planted in the U.S. 2010 was genetically engineered to either be insect resistant (Bt), herbicide resistant, or both. The states in which this figure was taken from represents 85% of all corn planted acres in the U.S.
- **Soy:** 93% of soybeans planted in 2010 was genetically engineered to either be insect resistant (Bt), herbicide resistant, or both. The states in which this figure was taken from represents 88% of all soybean planted acres in the U.S.
- **Canola Oil:** 90% of U.S. and Canadian canola crop is genetically engineered to be herbicide resistant.
- **Cotton (Cottonseed Oil):** 93% of cotton planted in 2010 was genetically engineered to either be insect resistant (Bt), herbicide resistant, or both. The states in which this figure was taken from represents 92% of all soybean planted acres in the U.S.
- **Beet Sugar:** 95% of the planted area for sugar beets in the 2009/10 crop year were genetically modified to be herbicide resistant seed varieties.
- **Papayas:** Grown in Hawaii to be resistant to ringspot virus.



## Decision to Deregulate

Though USDA completed the court-mandated EIS, the document, according to environmental analysts, fails to take into account several scientifically-validated environmental concerns, such as the indiscriminate nature of GE gene flow in crops, a heavy reliance on faulty data, and a high degree of uncertainties in making safety determinations. It also overlooks the problem of herbicide resistant weeds, as well as the widespread corruption of conventional seed varieties by GE strains (such as occurred with StarLink corn and LibertyLink rice). Ignored are documented cases of economic injury to farmers and markets. And, there is no mention at all of possible health consequences or uncertain health outcomes from eating GE crops, despite the fact that long-term health effects of consuming GE food are still largely unstudied and unknown.

## Organic at Risk

GE crops present a unique risk to organic growers. Wind-pollinated and bee-pollinated crops, such as corn and alfalfa, have higher risks of cross pollination between GE crops and unmodified varieties. Currently, no provision exists to effectively protect organic farms from contamination, although EPA has required “refuges” or non-GE planted barriers around sites planted with GE crops.

## GE Crops Increase Chemical Dependency

USDA’s EIS fails to take into account the documented increase in RoundUp-resistant “super weeds” that is requiring the use of highly toxic herbicide cocktails for weed control on GE-planted farms. In a report published in 2009, analysts found that GE crops have been responsible for an increase of 383 million pounds of herbicide use in the U.S. over the first 13 years of commercial use of GE crops (1996-2008). The primary cause of the increase, according to the report, *Impacts of Genetically Engineered Crops on Pesticide Use in the United States: The First Thirteen Years* (Organic Center, 2009), is the emergence of herbicide-resistant weeds. Scientists at the Pan-American Weed Resistance Conference last year gathered to discuss the increasing number of documented cases of glyphosate resistance, and the possibility that the broadscale

use of the herbicide would “be driven to redundancy in the cotton, corn and soybean belt.” To combat this, Monsanto is already in the process of commercializing dicamba-resistant GE crops, such as soybeans. The dicamba tolerance trait is expected to also be stacked with the glyphosate-resistant trait, which will result in the sale of more pesticide product.

## Future of Genetic Engineering

On February 4, 2011, about one week after the decision to deregulate alfalfa, APHIS issued its decision to allow the U.S. sugar beet industry to continue growing Monsanto’s RoundUp Ready GE sugar beets, despite the fact that the decision violates many environmental laws. Like GE alfalfa, GE sugar beets are genetically engineered by Monsanto to tolerate repeated applications of that company’s weed killer RoundUp, or glyphosate.

Sugar beets are a fairly limited crop, planted on a little over one million acres, mainly in northern states, and worth approximately \$1 billion. Sugar beets account for roughly half of the American sugar supply, with the rest coming from sugar cane. GE sugar beets accounted for more than 90 percent of the sugar beets grown last year, and some farmers say there might not be enough non-engineered seed available to satisfy demand. Without a favorable decision, the government projected a possible 20 percent reduction in American sugar production. As a result, USDA was under pressure to allow the genetically engineered beets to be grown, and to do so in time for the spring 2011 planting season before the seeds would expire, and result in heavy financial losses for Monsanto.

APHIS conducted an environmental assessment (EA) that it published in November 2010. The EA evaluated a range of options, including authorizing production of GE sugar beets under APHIS permit conditions. Without completing an EIS, APHIS concluded that the GE sugar beet root crop, when grown under APHIS’ “imposed conditions,” can be partially deregulated without posing a plant pest risk or having a significant effect on the environment.



## The National Organic Coalition's Seven-point plan:

National Organic Coalition (NOC) is a national alliance of organizations working to provide a "Washington voice" for farmers, ranchers, environmentalists, consumers and progressive industry members involved in organic agriculture. The coalition seeks to protect the stringency and integrity of the national organic standards. Prior to any de-regulation of new genetically-engineered crops, NOC believes that a GE contamination plan is essential to protect all non-GE crops. At a minimum, the following seven points must be addressed transparently and fairly (for all stakeholders involved).

1. Establish a USDA Public Breeds Institute to ensure that the public has access to high quality non-GMO breeds and germplasm.
2. Create a Contamination Compensation Fund funded by GMO patent holders, to provide immediate assistance to persons contaminated by GMOs, from seed to table.
3. Complete elimination of deregulated GM crop status, including prior deregulations, with on-going oversight and public evaluation of compliance and enforcement.
4. Conduct comprehensive, independent, longitudinal studies on the health, environmental, and socio-economic impacts of GMOs, prior to GM crop approvals.
5. Prohibit the growing of promiscuous GM crops that are likely to cause GMO contamination.
6. Prevent food security risks associated with the concentration of our food system in the hands of a few companies.
7. Institute an immediate labeling protocol for all GM crops, products, and ingredients.



This conclusion is at sharp odds with earlier court rulings and the views of growers of organic and non-GE crops, who will likely see their crops contaminated by the GE sugar beets, threatening their livelihoods and the ability of farmers and consumers to choose non-GE foods. Prior to making any further decision on the petition for a full deregulation of GE sugar beets, APHIS is developing an EIS which it expects to complete by the end of May 2012.

In 2008, the Center for Food Safety, Organic Seed Alliance, High Mowing Organic Seeds, and the Sierra Club sued USDA for deregulating

Monsanto's GE sugar beets without complying with NEPA's requirement of an EIS before deregulating the crop. In August 2010, the federal court banned the crop until USDA fully analyzed in an EIS the impacts of the GE plant on the environment, farmers and the public. Three weeks later, despite the court's ruling, and without any prior environmental analysis, USDA issued permits to seed growers to again grow the genetically modified sugar beets. The groups again sued USDA. In November 2010, the court granted the plaintiffs' motion for a preliminary injunction and ordered the seed crop destroyed. However, a federal appeals court reversed the decision in February 2011, saying that the groups had not shown that the seedlings were likely to contaminate natural sugar beets.

A formal 60-day notice of intent to sue the agency concerning its decision to allow unrestricted deregulation of GE alfalfa was filed on February 7, 2011 by the Center for Food Safety, Beyond Pesticides, Sierra Club, Cornucopia Institute, and others. This officially notifies USDA's Animal and Plant Health Inspection Service (APHIS) of the groups' intent to sue pursuant to the citizen suit provision of the *Endangered Species Act* (ESA), citing APHIS' violation of Section 7 of the ESA in failing to ensure that the deregulation of GE alfalfa is not likely to jeopardize threatened or endangered species and their habitat. According to Section 7, APHIS must consult with the U.S. Fish and Wildlife Service (FWS) to ensure that agency actions do not impact threatened or endangered



species. The notice charges that there is no evidence that APHIS consulted with FWS prior to its decision to deregulate GE alfalfa; APHIS unilaterally determined that there would be “no effect” on endangered species.

### **So what can consumers do?**

A coalition of organic companies and environmental organizations, including Beyond Pesticides, opposes USDA’s GE alfalfa decision. On January 31, 2011, the coalition released an open letter and call to action on the USDA’s decision to deregulate GE alfalfa, allowing its unrestricted cultivation and threatening organic and non-GE conventional farmers. It sets a precedent for future deregulation of GE crops. The letter encourages individuals to write to President Obama opposing the decision and asking that the administration reconsider its position.

Join the coalition of those opposing the decision, including upcoming National Pesticide Forum keynote Maria Rodale (CEO, Rodale, Inc. and author of *Organic Manifesto*), National Organic Coalition, Center for Food Safety, Organic Trade Association, Organic Valley, Stonyfield Farm, and more. Call or email President Obama and

USDA and tell them you oppose their decision to deregulate GE alfalfa or GE sugar beets. Ask the Administration to reconsider its position:

### **President Obama**

Phone: (202) 456-1111

Email: <http://www.whitehouse.gov/contact/>

### **USDA**

Phone: (301) 851-2300 and record your comments

Email: [biotechquery@aphis.usda.gov](mailto:biotechquery@aphis.usda.gov)

Currently, there are no regulations requiring GE foods to be labeled as such. The best way for consumers to avoid GE foods is to choose organic products. Organic agriculture embodies an ecological approach to farming that does not rely on synthetic fertilizers, genetically engineered organisms, antibiotics, sewage sludge, irradiation, or most toxic pesticides. For more information on why organic agriculture is the best choice for you, farmworkers, and the environment see Beyond Pesticides’ *Eating with a Conscience* guide, [www.EatingWithAConscience.org](http://www.EatingWithAConscience.org).

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## **Genetically Engineered Alfalfa Timeline**

**June 27, 2005** – U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) announced its determination to grant nonregulated status to GE Alfalfa.

**February 16, 2006** – The Center for Food Safety, environmental organizations, and alfalfa farmers files a lawsuit (*Geertson Seed Farms, et al. v. Johanns*) in the Northern District of California challenging the USDA’s deregulation determination. The complaint asserts that in making its determination the USDA violated the *National Environmental Policy Act* (NEPA) and the *Plant Protection Act* (PPA). The suit asks that the court rescind the USDA’s deregulation determination until the agency has completed a full environmental review of the impacts commercialization of genetically engineered alfalfa presents to the environment.

**February 13, 2007** – U.S. District Judge Charles Breyer rules that USDA violated federal environmental law by failing to conduct an Environmental Impact Statement (EIS) on GE alfalfa seeds before deregulating them in 2005.

**March 12, 2007** – Judge Breyer orders a preliminary injunction, immediately halting seed sales and barring farmers who have already purchased the GE alfalfa seed from planting it after March 30.

**May 5, 2007** – Judge Breyer orders a complete EIS and bans further planting of GE alfalfa until USDA can confirm the seeds’ safety. Judge is-



sues permanent order stating that alfalfa is once again a regulated article, requiring an APHIS permit for future plantings. Forage Genetics must supply all known alfalfa seed production locations for public disclosure.

**September 2, 2008** – U.S. Court of Appeals Judge Mary M. Schroeder upholds the ban on planting GE alfalfa pending a full EIS. The court finds that the irreversible harm to growers and consumers wanting non-GE alfalfa far outweighs the financial hardships to Monsanto and Forage Genetics and their growers. Beyond Pesticides is a co-plaintiff in the lawsuit.

**June 25, 2009** – U.S. Court of Appeals for Ninth Circuit re-affirms previous decision to uphold the nationwide ban of planting GE alfalfa pending a full EIS.

**September 21, 2009** – Beyond Pesticides, joined by 32 other groups and individuals, submits comments to U.S. Environmental Protection Agency (EPA) showing new and emerging science illustrating that glyphosate and its formulated products (including RoundUp) pose unreasonable risk to human and environmental health, and as such should not be considered eligible for continued registration.

**September 23, 2009** – On a related topic, a Federal Court rules that the approval of GE “RoundUp Ready” sugar beets was unlawful, ordering USDA to conduct a full EIS. *Center for Food Safety v. Vilsack*, No 08-00484 JSW (N.D. Cal. 2009).

**December 14, 2009** – USDA announces the availability of a Draft EIS which preliminarily concludes that there is no significant impact to the human environment due to granting non-regulated status to GE alfalfa. Brushing aside the concerns of organic alfalfa growers, consumers, and environmentalists, this draft EIS ignores the new reports and studies that demonstrate the many environmental and health consequences that GE crops cause. USDA argues for non-regulated status of GE alfalfa, stating that the economic gains of ending the ban far outweigh any possible losses, going so far as to say USDA could find no opposition to GE products among organic consumers.

**April 27, 2010** – U.S. Supreme Court hears oral arguments in the case *Monsanto Co. V. Geertson Seed Farms*, the first GE crop case for the Supreme Court. This case hinges on the question of whether the organic growers are able to demonstrate a “likelihood of irreparable [environmental] harm.” It is Monsanto’s claim that the growers only demonstrate the likelihood of economic harm. Environmental groups are concerned that a ruling in favor of Monsanto could set a precedent greatly weakening NEPA.

**June 21, 2010** – The Supreme Court rules that the District Court had overstepped its authority by prohibiting the USDA from pursuing any partial approval of the crop, but rules that USDA must conduct an EIS.

**December 16, 2010** – USDA makes Final EIS available.

**January 27, 2011** – USDA announces its decision to deregulate RoundUp Ready alfalfa.

**February 4, 2011** – USDA announces partial deregulation for RoundUp Ready sugar beets, despite the incompleteness of an EIS.





# ORGANIC Q&A

## with the Rodale Institute



**Editor's Note:** The following article is reprinted with permission from the Rodale Institute. The Rodale Institute is a non-profit organization dedicated to pioneering organic farming through research and outreach. Demand Organic is a campaign to raise awareness about the benefits of organic food and farming and to recruit your help in advocating for an organic world. Rodale Institute's co-chair and CEO of Rodale Inc, Maria Rodale is the keynote speaker at Beyond Pesticides' 29th National Pesticide Forum, Sustainable Community, April 8-9, 2011 at the Colorado School of Public Health in Aurora, CO.

If there is one thing we can do to feed the world, protect our health and cool the climate it is switching from chemical-based agriculture to organic farming. According to Rodale's Farming Systems Trial, the longest running side-by-side comparison of chemical versus organic agriculture, our organic yields match those of our conventionally grown crops. Organic consistently does better in dry years. Organic is a viable solution for feeding the world while protecting our health and the environment.

We are not the only ones studying organic. Numerous organizations, from land grant universities to the USDA, are finding similar results. Scientific studies show that organic foods are more nutritious. Organic farming protects our land and waterways. The chemicals sprayed on conventional food crops have been linked to numerous diseases, including birth defects, Parkinson's, numerous cancers and diabetes. [See Beyond Pesticides' Pesticide-Induced Diseases Database, [www.beyondpesticides.org/health](http://www.beyondpesticides.org/health)]

New research is showing that organic soils sequester carbon at a higher rate, so organic farming is a powerful tool for mitigating climate change. If there is one thing we can do to protect our health and the future of our planet, it's going organic.

The organic movement has come far—from a good idea to a comprehensive way of farming backed by nationwide certification—but we still have a long way to go. We can't do it alone. Join us in demanding a better, safer, healthier future.

### What does organic really mean?

Broadly defined, organic is a method of farming and gardening that relies on natural systems and products, and is free of virtually all synthetic and toxic chemicals, fertilizers and pesticides. The United States Department of Agriculture has strict regulations farmers must follow to be certified organic.

Here's what certified organic is not: chemical fertilizers and pesticides, GMO seeds, biosolids (sewer sludge), or irradiated food. Certified organic meat, eggs and dairy are free of antibiotics and growth hormones. They are produced in environments where animals are fed 100 percent organic feeds and have access to outdoors and pasture.

When you buy an organic product—or grow your own!—you can be confident that it was grown in a way that protects the health of you, your family and the planet. [See "Grow Your Own Organic Food," in the Spring 2010 issue of *Pesticides and You*]

## What's better, organic or local?

These food movements stem from the same hopes: to give consumers the freshest, most nutritious foods that directly support family farmers and local economies.

Buying local provides an opportunity to know your farmers and see their practices first hand—many do grow by organic methods and aren't certified, but some do not. When buying food not raised in your region, USDA organic certification is a sound way to be assured of growing practices.

Choose organic if you want to reduce farmer and consumer exposure to toxic chemicals and negative effects on the environment and wildlife. The more local the organic purchase, the more you will support the economy and natural systems (land, air, water, biodiversity) where you live. Local can be good, but organic is great and local organic is the ideal.

## Can organic farming feed the world?

YES! Organic farming can feed the world and it's our best option for providing healthy food for everyone while improving the environment. Organic farming also improves the quality of life for people, particularly in developing countries. Despite all the resources and trade advantages given to chemical based agriculture, the United Nations estimates that about one billion people are malnourished or starving in today's world.

When political and economic powers choose to make feeding people—and not just producing crops—a priority, organic systems have many advantages. For example, organic systems:

- Increase soil quality, water retention and crop nutrition;
- Use composts and reuse seeds so farmers have fewer expens-

## United Nations: Organic Farming Can Feed Africa

Organic farming can feed Africa and bring higher incomes to poor, rural farmers, according to a United Nations report focusing on food security and sustainability issues. The report, compiled by the UN Conference on Trade and Development (UNCTAD) and the UN Environmental Programme (UNEP), contradicts a popular myth that organic-farming methods can't produce enough food to feed the world.

Much of the study data comes from East Africa, where an organic-agriculture project was put into place in 2004. Organic and near-organic crop yields in the 24 countries studied increased by 116% since the start of the project. In 11 of 13 cases, food production rose—and sometimes doubled—when farmers switched from chemical methods to more sustainable, organic growing methods. The report's authors argue this will feed millions more and bring much more food security to the continent.

es each planting season;

- Re-integrate crops and livestock in ways that help the plants and animals to do better;
- Expand employment opportunities in growing, processing and marketing; and,
- Encourage diversity by expanding the number of crops grown on each farm, so that if one crop has a bad season, no one will go hungry.



Initiated in 1981, the Rodale Institute Farming Systems Trial is the longest-running side-by-side comparison of organic and conventional farming systems in the US, and one of the oldest in the world.

Organic methods are the best way to help the people of the world to feed themselves in ways that bring the most benefit to the producing communities (be they rural, suburban or urban), and the environment.

### How does organic farming reduce everyone's carbon footprint?

Organic farming has two advantages over chemical-intensive farming when it comes to mitigating climate change:

1. The pesticides and synthetic fertilizers used by chemical farming practices are manufactured, shipped and applied with fossil fuels. By not using these additives, organic uses far less fossil fuels, and thus has fewer greenhouse gas emissions.
2. All plants take CO<sub>2</sub> from the air (where it can be harmful at excessive levels) and, through photosynthesis, store it in the soil (where it does good) in a process known as biological carbon sequestration. Organically farmed soil holds more carbon than chemically farmed soil.

Organic farming not only uses fewer petroleum-based chemicals, but even captures and stores CO<sub>2</sub> in a safe place, so it's a major tool for cooling our climate.

### How is organic healthier for people and the planet?

**For people:** Organic farmers do not spray the usual conventional pesticides to kill insects and weeds, which have been linked to wide-spread human health impacts, such as birth defects, diabetes, auto-immune disorders, such as allergies and asthma, and some cancers. Not only does going organic decrease the risks, many studies have shown greater nutrient density in organic foods, and higher levels of polyunsaturated fats (the good fats) in grass-based, organic livestock.

**For the planet:** Hundreds of synthetic chemicals used in conventional farming, and virtually excluded from organic production, have a wide range of negative impacts on our environment, even when used as directed. They degrade soil health, limit biodiversity, pollute water systems, drift to non-sprayed areas and are causing worsening weed and pest problems as they become resistant to the current chemicals. These chemicals poison all life on our planet.

### How is organic different from natural?

In the United States, products bearing the "USDA certified organic" label come through a detailed and comprehensive production process that is inspected on the farm, then verified as meeting all requirements by a third-party certifier accredited by the U.S. Department of Agriculture. All phases from field to processing to retail handling are covered.

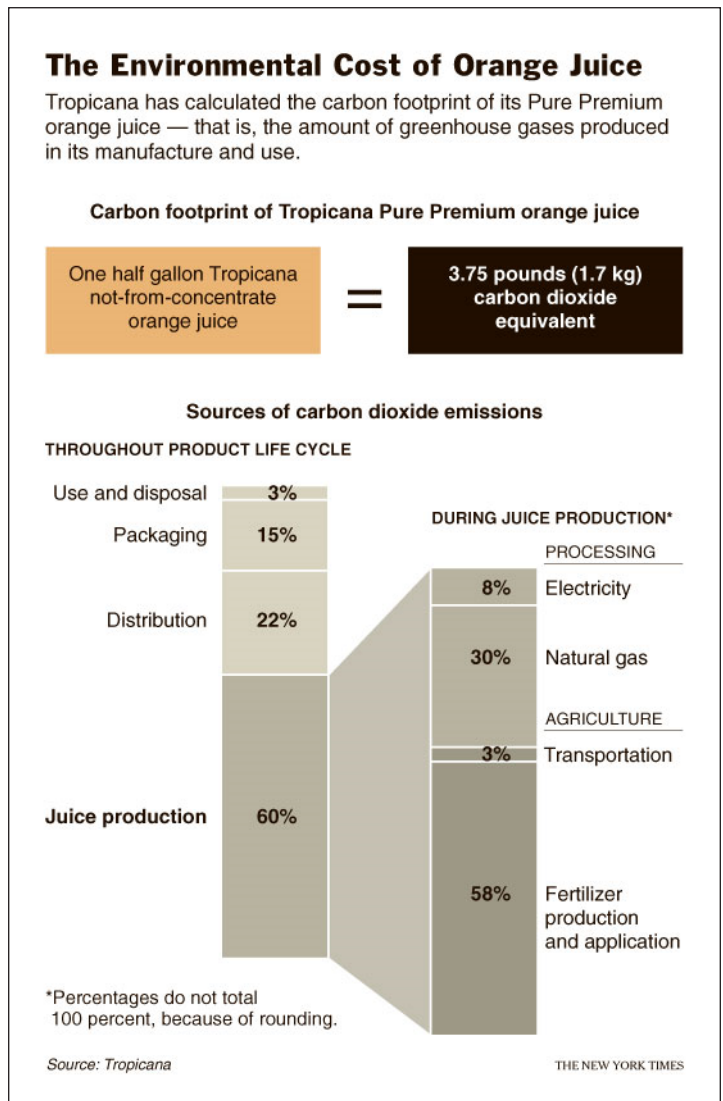
By contrast, the term "natural" may be used by anyone with-

out any reference to quality rules. Its only technical application is a voluntary post-harvest processing standard, but it has no inspection or other quality assurance system. If this provision is used, the label should explain what "natural" means in the specific product labeled. So the "natural" label may not really mean much.

### Why does organic cost more?

It costs more to raise better crops and livestock, in general. Organic farmers work within rules based on the sustainability of natural systems. They can't use chemical and GMO (genetically modified organisms) shortcuts that help to make non-organic crops cheaper to bring to market, even though they have devastating costs to human and environmental health.

Carefully auditing organic growing, handling and processing rules take more care and effort. While it continues to grow as a share



A Conventional Carbon Footprint: In the production of Tropicana's Pure Premium orange juice, the largest source of CO<sub>2</sub> emissions is the production and application of synthetic nitrogen fertilizer — more than production, packaging and transportation.

## A Defined System vs. a “Feel-Good” Claim

### Organic

In the United States, only farms and businesses that meet federal U.S. Department of Agriculture standards of the National Organic Program can market their products using the word “organic.” Certified organic farmers follow strict rules and are monitored closely to ensure that the standards are being upheld.

Organic farmers have a formal “organic systems plan” to document how they improve soil, manage animals, and use only natural materials or synthetics allowed on the “national list” as alternatives to synthetic pesticides, chemical fertilizers, and pharmaceuticals that are forbidden from use. Their farms are inspected annually by accredited certification agents to guarantee they are following their approved system plan. Non-organic farmers have no such requirements.

Every organic acre reduces the use of toxic chemicals and fossil-fuel based fertilizers, improving watersheds, decreasing pesticide residue and promoting biodiversity. When you buy organic foods you can feel safe knowing they have been produced in ways that put your family’s health first.

### Natural

The USDA’s guidelines for natural are voluntary and have no clear definition. The word “natural” can be also used without reference to any standard. Generally, a “natural” product is one that is minimally processed, does not contain artificial preservatives, and does not have artificial colors, flavors, sweeteners, preservatives, additives or artificial or synthetic ingredients.

The USDA “natural” label is a processing description for meat and poultry items, and has nothing to do with how the food was grown, whether it is healthy or was produced in an environmentally responsible way. The USDA states that any natural claim based on this definition “should be accompanied by a brief statement which explains what is meant by the term natural...directly beneath or beside all natural claims.” Again there is no certification, inspection, or compliance required by these regulations.

Long story short: The only legal requirement for these products would be the general regulations and health codes that all foods must pass in the United States.

of all food sold in the U.S., organic products are only about 2.5% percent of the U.S. food market, and have far fewer economies of scale than non-organic food. Expanding production of organic food through home and community gardens and buying from local organic farmers is helping to meet this supply-and-demand challenge.

### Is organic just about food or farming?

Organic is about more than just food! The products we use in our homes, personal care products, and the clothes we wear can all be organic. The U.S. National Organic Program also certifies natural care products, plant fibers (cotton), livestock and alcoholic beverages if they’re grown and processed according to the national standards. Choosing these products is another way to decrease your exposure to harmful chemicals.

### How can I find organic produce where I am?

Many organic farms and retail spots that carry organic items have registered with Local Harvest so you can find a nearby location.

Or search local food directories. The national grocery store Whole Foods reliably carries organic produce and products.

Organic foods and products are also sold to consumers online through sources like Diamond Organics and Door to Door Organics. Amazon.com also carries organic items.

Last but not least—if your local stores don’t carry organics, ask for it!

### Learn More

*In addition to serious health questions linked to actual residues of toxic pesticides on the food we eat, our food buying decisions support or reject hazardous agricultural practices, protection of farmworkers and farm families, and stewardship of the earth. For more information on the importance of eating organic food whenever possible, see Beyond Pesticides’ Organic Food: Eating with a Conscience webpage, [www.EatingWithAConscience.org](http://www.EatingWithAConscience.org).*



# Protecting Pollinators: Stopping the Demise of Bees

Citing no evidence after using a flawed study,  
EPA protects polluters not the environment

By Jay Feldman  
and Nichelle Harriott

An internal EPA memo, leaked to the beekeeping community from an undisclosed source at the U.S. Environmental Protection Agency (EPA) in December 2010, shines a spotlight on a key deficiency in the agency's efforts to protect honeybees. With the high percentage of disappearing bees (cited to be at 30 percent) and the collapse of their very social hive community, known as Colony Collapse Disorder (CCD), hitting the front pages of news organizations, the leaked internal memo from the science division of EPA's Office Pesticide Programs sent shock waves through organizations tracking bee health. After all, bees, as essential pollinators to food production, are a critical protector of life and the bellwether of environmental health.

How could it be that the central study on honeybee protection is flawed for purposes of EPA registration—core data required by EPA when it issued a 2003 conditional registration for a pesticide, clothianidin, known to be highly toxic to bees in the neonicotinoid family of chemicals that has been linked to CCD by many scientists and governments across Europe? How could it be that when EPA discovered the flawed study for this pesticide, it continued to allow its widespread use?

## The Seriousness of the Problem

Approximately 90 percent of all flowering plants require pollinators to survive. In agriculture, nearly a third of pollination is accomplished by honeybees. Cucumbers, almonds, carrots, melons, apricots, cherries, pears, apples, prunes, plums, cantaloupe, onions, avocados, kiwi, blueberries, cranberries and more depend on honeybee pollination. Meat, milk and cheese production are reliant on pollinated crops that livestock eat. The disappearance of the bees identifies a fundamental and systemic flaw in the approach to the use of toxic chemi-

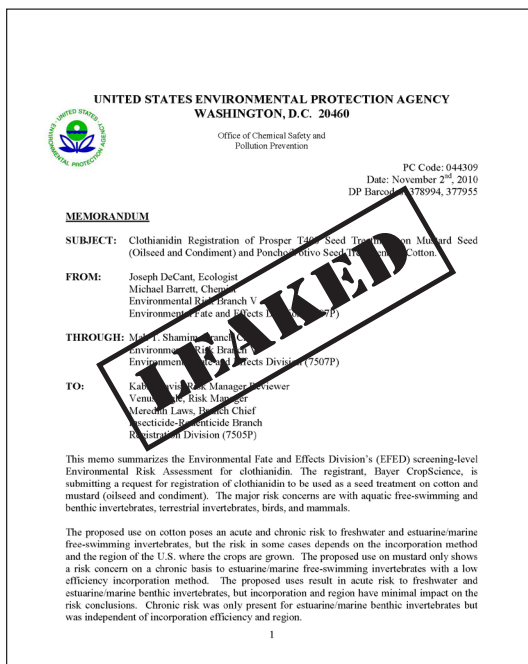
cals, and highlights the question as to whether the current regulatory approach will slowly but surely cause a growing public health threat unless there is a meaningful change of course.

## A Call for EPA to Stop Use

The disclosure rallied beekeeping and environmental organizations to request that EPA take immediate action to remove clothianidin from the market until it could get the data it needed to say for sure that bee health was not being adversely affected by this chemical. A letter to EPA in December 2010 called for immediate action:

"In light of new revelations by your agency in a November 2, 2010 memorandum that a core registration study for the insecticide clothianidin has been downgraded to unacceptable for purposes of registration, we are writing to request that you take urgent action to stop the use of this toxic chemical. Clothianidin is a widely used pesticide linked to a severe and dangerous decline in pollinator populations. As we are sure you appreciate, the failure of the agency to provide adequate protection for pollinators under its pesticide registration program creates an emergency with imminent hazards: Food production, public health and the environment are all seriously threatened, and the collapse of the commercial honeybee-keeping industry would result in economic harm of the highest magnitude for U.S. agriculture."

The letter continues: "The debate on clothianidin and the neonicotinoid pesticides is not new to the agency, but the recognition of the past failure of the Office of Pesticide Program's (OPP) 2007 scientific review, now acknowledged, requires immediate action to stop use while new studies are conducted. We refer you to



the memorandum entitled “Clothianidin Registration of Prosper T400 Seed Treatment on Mustard Seed and Poncho/Votivo Seed Treatment on Cotton,” November 2, 2010 (see pp. 2, 4). The science that the agency has, and the independent literature find that clothianidin-contaminated pollen and nectar presents an imminent hazard. Because the hazards to honeybee health are present within registered use parameters, it is clear that label changes alone will not offer adequate protection. The issue is not one of application error, in other words. We therefore urge the agency to issue a stop use order immediately. Our nation cannot afford, and the environment cannot tolerate another growing season of clothianidin use.”

### **The Regulatory History**

When EPA issued a conditional registration for clothianidin in 2003, it established a requirement for a field study that it considered core and essential to a determination allowing full and continued registration of the chemical. EPA develops requirements such as these in accordance with guidance when determined necessary. In this case, as EPA stated in 2003, **“The possibility of toxic chronic exposure to nontarget pollinators through the translocation of clothianidin residues in nectar and pollen has prompted EFED [Environmental Fate and Effects Division] to require field testing (141-5) that can help in evaluating this uncertainty. In order to fully evaluate the possibility of this long term toxic effect, a complete worker bee life cycle study must be conducted. . .”** At this point, the study requirement became “core” to the registration.

EPA accepted the required study from clothianidin’s manufacturer, Bayer AG, in November 2007. In the leaked November 2010, however, EPA changed its position on this “core” study, stating that, “A previous field study (MRID 46907801/46907802) investigated the effects of clothianidin on whole hive parameters and was classified as acceptable. However, after another review of this field study in light of additional information, deficiencies were identified that render the study supplemental. **It does not satisfy the guideline 850.3040, and another field study is needed to evaluate the effects of clothianidin on bees through contaminated**

**pollen and nectar.”** It became clear in that document that the “required” study for “Honey Bee Field Testing for Pollinators” is not acceptable to support the registration of clothianidin, and as a result “more data is needed,” according to the memo. While the study may contain “some” useful information, as stated by EPA, it does not contain “required” information necessary to registration and the protection of bees from a systemic pesticide that moves through the treated plant.

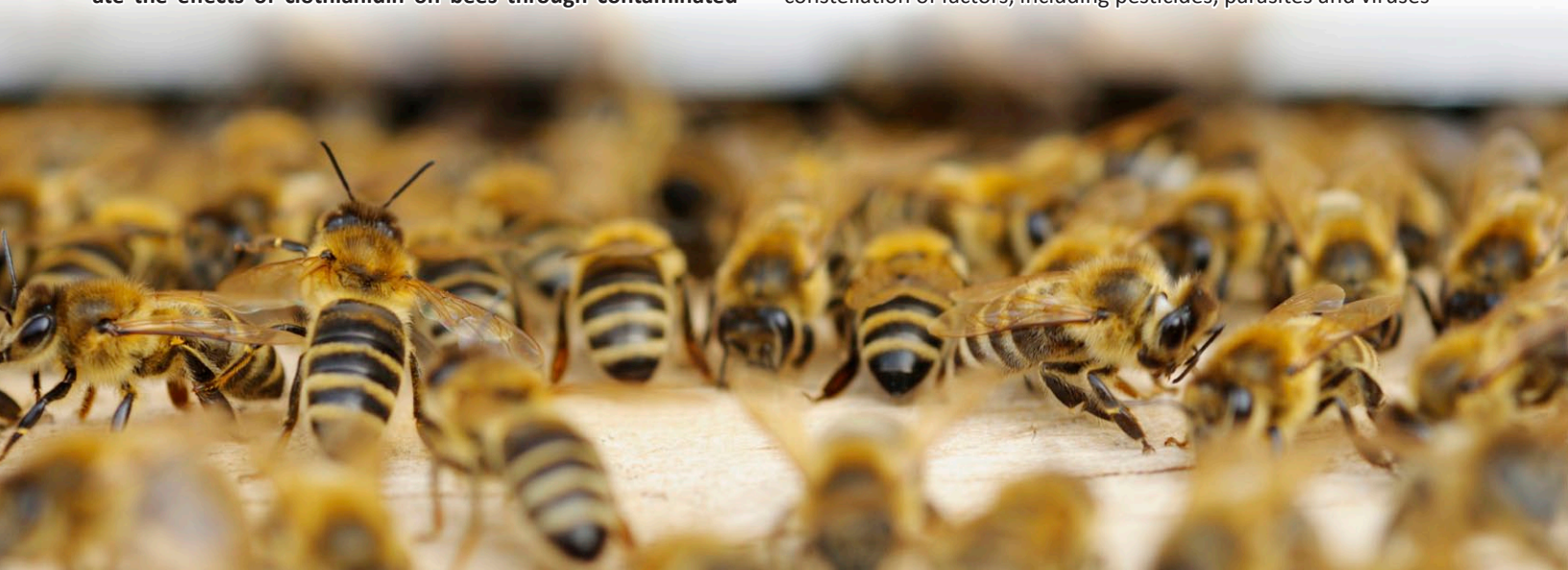
According to beekeeper Jeff Anderson, who has communicated with EPA on the topic, “The Bayer study is fatally flawed. It was an open field study with control and test plots of about two acres each. Bees typically forage at least two miles out from the hive, so it is likely they didn’t ingest much of the treated crops. And corn, not canola, is the major pollen-producing crop that bees rely on for winter nutrition. This is a critical point because we see hive losses mainly after over-wintering, so there is something going on in these winter cycles. It’s as if they designed the study to avoid seeing clothianidin’s effects on hive health.”

At the time that EPA issued the conditional registration for clothianidin, it said this: “This compound is toxic to honey bees. The persistence of residues and the expression of clothianidin in nectar and pollen suggest the possibility of chronic toxic risk to honey bee larvae and the eventual stability of the hive.” (Risk Assessment Addendum, EFED, EFA, 2003)

### **Finding the Factors Contributing to CCD**

The issue here is not whether one can identify one pesticide as the cause of CCD. That claim has not been made. The beekeeper-environmentalist alliance believes that, in a period where CCD has ravaged bee colonies with losses up to 30% of hives, it is critical that EPA, under its statutory mandate, prohibit the use of a pesticide without “required” data that enables the agency to answer a central question relating to the health of honeybees.

In the world of research on bees in the U.S., scientists have linked a constellation of factors, including pesticides, parasites and viruses



to adverse impacts on bee health. Some have gone as far as saying that pesticides, especially systemic pesticides, like clothianidin, that are taken up by the plant and translocated through the organism including its pollen, are most certainly contributing to poor health in bee populations and increasing vulnerability to other threats. Countries in Europe, including France, Germany, Italy, and Spain, have taken this information and chosen to err on the side of safety and ban the neonicotinoid pesticides.

EPA, on the other hand, defends its inaction. Despite its acknowledgment that the study on which it relied to register the pesticide is inadequate, it maintains that it has no evidence that the pesticide adversely affects bees. Beekeepers and environmentalists ask, how could the agency have the evidence it says it needs to act if the study on which it relied does not meet its own standards. In responding to the coalition of beekeepers and environmentalists that has called on EPA to remove the pesticide from the market until it gets adequate information to make an informed and regulatory-compliant decision, the agency said:

“At this time, we are not aware of any data that reasonably dem-



onstrates that bee colonies are subject to elevated losses due to chronic exposure to this pesticide. Based on EPA’s thorough review of the scientific information, EPA does not intend at this time to initiate suspension or cancellation actions against the registered uses of clothianidin. . . Given the concern about the neonicotinoid class of pesticides and protection of bees, the Agency has also accelerated scheduling the comprehensive re-evaluation of these pesticides in the registration review program. EPA’s registration review docket for clothianidin will open this year. We are coordinating re-evaluation of the neonicotinoid insecticides with California’s Department of Pesticide Regulation and Canada’s Pest Management Regulatory Authority.”

Among the more baffling elements of the current situation are EPA’s own documents, which acknowledge the problem, but allow business as usual. EPA’s factsheet states, “Clothianidin is highly toxic to honey bees on an acute contact basis (LD50 > 0.0439 µg/bee). It has the potential for toxic chronic exposure to honey bees, as well as other nontarget pollinators, through the translocation of clothianidin residues in nectar and pollen. In honey bees, the effects of this toxic chronic exposure may include lethal and/or sub-

## Clothianidin, Imidacloprid and other Neonicotinoids

Neonicotinoids are a class of insecticides that share a common mode of action that affect the central nervous system of insects, resulting in paralysis and death. They are systemic pesticides, taken up by the plant’s vascular system and expressed through pollen and nectar, highly toxic to bees, and include imidacloprid, acetamiprid, clothianidin, dinotefuran, nithiazine, thiacloprid and thiamethoxam.

- **Clothianidin** is moderately toxic and is linked to immune effects in lab animals. It is highly toxic to bees and certain aquatic organisms, as well as birds, wild mammals and other non-target organisms.
- **Dinotefuran** has a low acute toxicity, but is a moderate eye irritant. It is linked to adverse effects on the nervous and immune systems, and is a reproductive toxicant.
- **Imidacloprid** is moderately toxic and is linked to reproductive and mutagenic effects. It has been found to be highly toxic to bees and other beneficial insects. It is also toxic to upland game birds, is generally persistent in soils, and can leach to groundwater.
- **Thiacloprid** is slightly to moderately toxic and is used on crops, cotton and fruits. It is classified as a ‘likely’ human carcinogen, based on increased incidence of uterine, ovarian and thyroid tumors in exposure studies.
- **Thiamethoxam** is linked to reproductive effects and liver damage and can potentially leach to groundwater.

## Chronology of a core required study for the bee toxicant clothianidin, 2003-2010

### EPA acknowledges clothianidin is toxic to bees, 2003.

- “The possibility of toxic chronic exposure to nontarget pollinators through the translocation of clothianidin residues in nectar and pollen has prompted [EPA] to require field testing... In order to fully evaluate the possibility of this long term toxic effect, a complete worker bee life cycle study must be conducted, as well as an evaluation of exposure to the queen.”
- The agency suggests label language to read: “This compound is toxic to honey bees. The persistence of residues and the expression of clothianidin in pollen and nectar suggests the possibility of chronic toxic risk to honey bee larvae and the stability of the hive.”

### The study requirement identified as contingent to registration, 2003.

- Given the available information it was concluded, “..after further consideration, EFED would like to suggest that the registrant be given conditional registration that is contingent on their conducting the chronic honey bee study that evaluates the sublethal effects of clothianidin to the hive over time.”
- In its *Clothianidin Pesticide Registration Factsheet*, EPA states, “Clothianidin is highly toxic to honey bees on an acute contact basis...It has the potential for toxic chronic exposure to honey bees, as well as other nontarget pollinators, through the translocation of clothianidin residues in nectar and pollen. In honey bees, the effects of this toxic chronic exposure may include lethal and/or sub-lethal effects in the larvae and reproductive effects in the queen.”

### EPA accepted Bayer’s study, November 2007.

- EPA accepted the following study: Cutler, C. 2006. An Investigation of the Potential Long Term Impact of Clothianidin Seed Treated Canola on Honey Bees, *Apis mellifera* L. “This study was submitted to provide data on the toxicity of clothianidin to honeybees in a field test for the purpose of chemical registration (new use)... Bayer CropScience was asked to investigate the long-term toxicity of clothianidin-treated canola to foraging honey bees.”

### EPA changed its position on the “core” study, toxic effects remain unevaluated, November 2010.

- “A previous field study... investigated the effects of clothianidin on whole hive parameters and was classified as acceptable. However, after another review of this field study in light of additional information, deficiencies were identified that render the study supplemental. It does not satisfy the guideline 850.3040, and another field study is needed to evaluate the effects of clothianidin on bees through contaminated pollen and nectar. Exposure through contaminated pollen and nectar and potential toxic effects therefore remain an uncertainty for pollinators.”

lethal effects in the larvae and reproductive effects in the queen.”

This corresponds with data from independent studies, as well as beekeeper observations in the real world. Therefore, the question remains, why is this chemical still allowed to threaten pollinators upon which so much relies?

### Solutions Are Within Our Reach

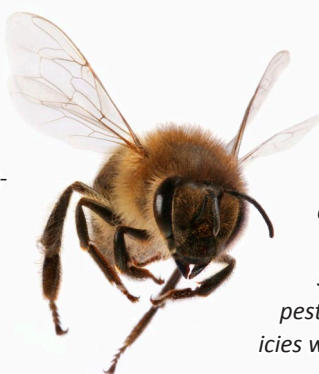
Solutions to the loss of bees and human productivity are clearly within our reach if we engage our communities and governmental bodies. A little outrage will help. The shift to organic practices is not a fad but a necessity that is protective of health and the environment, sustainable and cost effective. The bees should serve as a warning because our very existence depends on theirs. The bees are

telling us that lack of urgent action will lead to their demise...as well as our own.

### Take Action:

You can email EPA Administrator Lisa P. Jackson directly to tell her you support the ban of clothianidin: [jackson.lisa@epa.gov](mailto:jackson.lisa@epa.gov). Be sure to also send a copy (CC) to Steve Owens ([owens.steve@epa.gov](mailto:owens.steve@epa.gov)), Assistant Administrator for the Office of Chemical Safety and Pollution Prevention, and Steve Bradbury, [bradbury.steven@epa.gov](mailto:bradbury.steven@epa.gov), Director of EPA’s Office of Pesticide Programs.

See *Beyond Pesticides* bee webpage, [www.beyondpesticides.org/pollinators](http://www.beyondpesticides.org/pollinators), and organic practices and policies webpage, [www.beyondpesticides.org/organicfood](http://www.beyondpesticides.org/organicfood).





# Do We Have A PESTICIDE BLOWOUT?

Clothianidin is agriculture's Deep Water Horizon

By Tom Theobald

*Editor's note: The following are excerpts from "Do We Have a Pesticide Blowout," by Tom Theobald, published in the July 2010 issue of Bee Culture, the Magazine of American Beekeeping. Mr. Theobald is owner of Niwot Honey Farms and a member of the Boulder County (Colorado) Beekeepers Association.*

America's farmland is awash in questionable chemicals as surely as the shorelines of the Gulf Coast are awash in crude oil – and for many of the same reasons.

I doubt that there are many readers who have escaped reports of the oil well blowout - the explosion and collapse of the Deepwater Horizon drilling platform and the subsequent environmental disaster that has ensued.



Evidence is mounting that the blowout of the Deepwater Horizon was brought on by a climate of lax oversight by the federal agency responsible for "insuring the safety and environmental protection of offshore drilling operations," the Mineral Management Service, or MMS. As I've listened to the news and read the articles describing events leading up to the explosion I'm struck by the parallel to what has been occurring in the beekeeping world over the past several years.

In May of 2008 there were massive bee kills in the Baden-Wurtemberg region of Germany, with two thirds of the colonies there killed. The damage was quickly traced to one of the pesticides in the controversial family of neonicotinoids produced by the German corporation Bayer. Planting of corn seed coated with clothianidin, by way of pneumatic planters, supposedly resulted in fugitive clothianidin dust which caused the disaster. Within two weeks Germany banned clothianidin on corn and several other crops, but the damage was done.

The German bee kill came as no surprise to the beekeeping community, which had been concerned about clothianidin since its registration in the U.S. in 2003, and in Germany in 2004. For four years those concerns were met with repeated assurances of safety, until finally disaster struck in Germany. Even in the aftermath of this huge bee kill the assurances continued. Bayer's explanation was that the bee kill was caused by ". . . an application error by the seed company which failed to use the glue-like substance that sticks the pesticide to the seed . . . It is an extremely rare event and has not been seen anywhere else in Europe . . ." This is reminiscent of the finger pointing in the oil industry.

What are we to do with circumstances like these? It is simply nuts, and yet this bogus science has now been used as justification to approve the use of clothianidin on a rapidly growing roster of other crops while there is mounting evidence of problems coming from around the globe. The EPA still seems to lack any sense of urgency and says it will not review clothianidin until 2012.

I still believe that most of the working level people at the EPA want to do things right, but there seems to be a serious management failure and nobody seems to be stepping in to get the ship back on course. Some very spooky chemicals are coming onto the market without proper testing and once out are virtually unregulated. We are seeing the legacy of more than a decade of deregulation and self regulation and it has not worked.

Read the full article on the Boulder County Beekeepers Association website, <http://bit.ly/pesticide-blowout>.

# Invasive Plant Medicine: The Ecological Benefits and Healing Abilities of Invasives

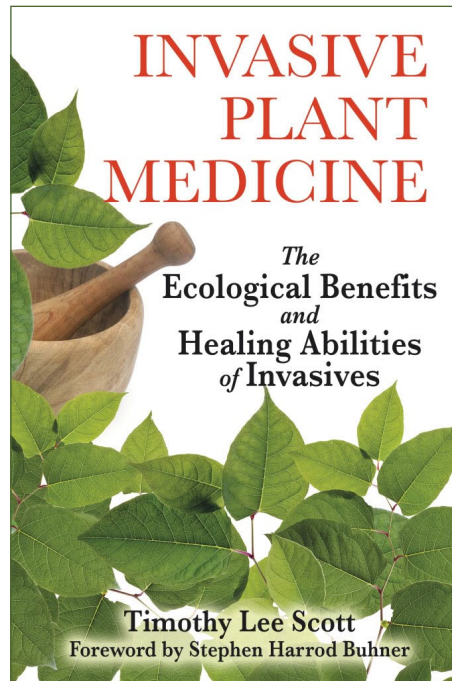
by Timothy Lee Scott. *Healing Arts Press, Rochester, VT and Toronto, Canada. 2010. 384pp.*

In recent years, those who would spread herbicidal sprays over the earth in order to conquer weedy “pests” have had a new claim to virtue. Once they were just eliminating unsightly dandelions from our lawns and costly competitors from our crops. Now they are also fighting back the troops of “invasive” plants that threaten entire ecosystems! In taking on this war, they have acquired new allies from unexpected places—environmental organizations like The Nature Conservancy, Audubon Society, and other conservation groups.

The language of “invasive species” when applied to these plants has never made a lot of sense to me. As an ecologist, I have always understood an invasive species to be one that can invade an intact ecological community, displacing others in that community. But when I look at those plants identified as “invasives,” I find plants that have colonized disturbed habitats. In spite of what seemed to be common sense to me, I found few people who dared to challenge the accepted mythology.

In 2003, David Theodoropoulos wrote a scathing attack on the war against invasive species, *Invasion Biology: Critique of a Pseudoscience*. In that book, he not only showed that “invasion biologists” lack a definition of “invasive species” and the science to support the “threat,” but also traced the motivations of those biologists to themes in “racist, xenophobic, nationalist, and fascist ideologies.”

In *Invasive Plant Medicine*, Timothy Lee Scott takes a different approach. He does critique the science and politics of invasive species biologists, but most of his book is devoted to showing the ecological and human health benefits of so-called “invasive” plants. This approach is very much akin to my thinking on the subject, and he approaches it with wisdom and a sense of humor. The wisdom comes mostly from listening to plants. As Stephen Buhner says in the Foreword, “We have to step outside the human paradigm if we are to understand what is occurring with the appearance and behavior of any plant we encounter. So, when we



see ‘invasive’ plants moving wholesale into new ecosystems, we need to ask, in all humility, ‘What are they doing? What is their purpose?’”

The theme of the book is that invasive plants do have a purpose, and that the purpose involves healing—healing illness and injury to both the earth and those living there. The plants heal the land by forming scabs across wounds cut by machines and other disturbances. They also break down or isolate toxic chemicals in the soil, and many have been used in phytoremediation projects. The same plants are in the herbalist’s medicine chest and are used to heal diseases caused by those same toxic chemicals.

The last half of the book is a “*materia medica*” containing a selection of invasive plants and telling how they are

used ecologically and medicinally. There is a wealth of technical information, with a number of citations of studies. It is not the kind of *materia medica* that one would use as a resource for medicinal treatments, mostly because the treatment does not always distinguish among related species. It also contains some holistic wisdom about the plants. For example: *The bitterness many feel for Celastrus [bittersweet] has forever been coupled with the undertones of sweetness the plant exudes. Its relentless taking over of the boundaries of disturbed landscapes and the way that it vigorously expands from there are balanced by the nurturing essence of the plant—its ability to heal these places and relax these boundaries. The sharp contrasts that are created from the cutting up of ecosystems must be softened by plants such as Oriental bittersweet, which create a barrier to further intrusion. This is how its medicine works for both ecosystems and people: it helps create a barrier from toxic influences and relaxes the stress and tensions of such disturbances.*

The narrative is interspersed with comments from other voices—some the author’s own, and some belonging to others. “It is not merely a plant: it is an expression of the land.” “Plantain tempers the fiery arrogance of a world gone mad.” “Remember: The plants grow where they do for a reason.” “The secrets are in the plants. To elicit them you have to love them enough.”—George Washington Carver

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## Signed copies of *Organic Manifesto*, *The Polluters*, and *Invasive Plant Medicine* are available through Beyond Pesticides and at the 29<sup>th</sup> National Pesticide Forum

***Organic Manifesto: How Organic Farming Can Heal Our Planet, Feed the World, and Keep Us Safe.*** Maria Rodale, CEO of Rodale Inc., sheds new light on the state of 21st-century farming. She examines the unholy alliances that have formed between the chemical companies that produce fertilizer and genetically altered seeds, the agricultural educational system that is virtually subsidized by those same companies, and the government agencies in thrall to powerful lobbyists, all of which perpetuate dangerous farming practices and deliberate misconceptions about organic farming and foods.

***The Polluters: The Making of Our Chemically Altered Environment*** reveals at last the crucial decisions that allowed environmental issues to be trumped by political agendas. It spotlights the leaders of the chemical industry and describes how they applied their economic and political power to prevent the creation of an effective system of environmental regulation. Research was slanted, unwelcome discoveries were suppressed, and friendly experts were placed in positions of influence, as science was subverted to serve the interests of business.

***Invasive Plant Medicine: The Ecological Benefits and Healing Abilities of Invasives*** demonstrates how invasive plants restore natural balance and biodiversity to the environment and examines the healing properties offered by 25 of the most common invasive plants growing in North America and Europe. Far less a threat to the environment than the pesticides used to control them, these plants perform an essential ecological function.

