

# PESTICIDE REPORTS

Division of Agricultural Sciences and Natural Resources • Oklahoma State University  
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CHEM

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## EPA IS ADVANCING POLLINATOR SCIENCE AND SHARING USEFUL INFORMATION WITH GROWERS AND BEEKEEPERS

On June 20, 2014, President Obama issued a directive to federal agencies to create a federal strategy to promote honey bee and other pollinator health. The President's directive created a Pollinator Health Task Force, co-chaired by EPA and USDA, and charged federal agencies with expanding federal efforts and taking new steps to reverse pollinator losses. Scientists believe that honey bee losses are likely caused by multiple stressors, including poor bee nutrition, loss of forage lands, parasites, pathogens, and pesticides. EPA will address the role of pesticides and take action, as appropriate, to protect pollinators. [Read President Obama's directive.](#)

Two important tools are being released today as part of EPA's [ongoing actions to protect pollinators](#). These and other EPA pollinator protection efforts complement those of the USDA, the lead federal agency tasked with identifying and mitigating the causes of U.S. honey bee decline.

## EPA's [New Pollinator Risk Assessment](#)

**Guidance:** EPA has posted its new Pollinator Risk Assessment Guidance online. The guidance is part of a [long-term strategy](#) to advance the science of assessing the risks posed by pesticides to bees, giving risk managers the means to further improve pollinator protection in our regulatory decisions. Among other things, EPA anticipates the guidance will allow the agency to assess effects from systemic pesticides quantitatively on individual bees as well as on bee colonies. The guidance, developed in cooperation with the California Department of Pesticide Regulation and Health Canada's Pest Management Regulatory agency, builds upon our ongoing efforts to advance the science of [pollinator risk assessment](#).

We are already implementing elements of the guidance in our ongoing [registration review of neonicotinoid pesticides](#) as well as in our other pesticide regulatory work. The agency is currently reviewing new data we required of the registrants, including refined semi-field studies under more real-world application conditions. Other data from ongoing full-field studies will take up to several years to complete.

**RT25 Data Now Online:** At the request of beekeepers and growers alike, the agency has also posted our Residual Time to 25% Bee Mortality (RT25) Data online. Bees may be susceptible to harm from direct exposure to pesticides sprayed on flowering plants, but pesticide residues generally decrease in toxicity as the spray dries and time passes. Farmers and beekeepers can use [EPA's RT25 data](#) to gauge the amount of time after application that a particular pesticide product remains toxic enough under real-world conditions to kill 25 percent of bees that are exposed to residues on treated plant surfaces. Some have used this information to select pesticide products with shorter periods in which the chemicals remain active and can affect bees.

(EPA June 20, 2014)

[http://www.epa.gov/oppfead1/cb/csb\\_page/updates/2014/growers-beekeep.html2ceceecac8525735900400c27/ae9fb922a3a21b6785257cd800670b45!OpenDocument](http://www.epa.gov/oppfead1/cb/csb_page/updates/2014/growers-beekeep.html2ceceecac8525735900400c27/ae9fb922a3a21b6785257cd800670b45!OpenDocument)

## PESTICIDE EXPOSURE IN PREGNANCY TIED TO AUTISM RISK

Pregnant women who live within a mile of spaces where commercial pesticides are applied appear to have an increased risk of having a child with autism, a new study suggests.

The risk that a child would develop autism appeared to be highest for women who lived near farms, golf courses and other public spaces that were treated with pesticides during the last three months of their pregnancies.

"Many of these compounds work on neurons. When they work on the insect, they're dealing with the nervous system of the insect and basically incapacitating it," said study author Irva Hertz-Picciotto, an environmental epidemiologist at the MIND Institute at University of California, Davis.

In adults, the brain is protected from many chemical exposures thanks to special filters that prevent many substances from crossing from the blood into the brain.

Hertz-Picciotto says that in young children, this blood-brain barrier isn't fully formed, which may allow pesticides to reach vulnerable nerve cells just as they are making vital connections to each other.

While the association between possible pesticide exposure and autism is interesting, an expert not involved in the research pointed out that it has a major flaw.

Because the study looked back in time, researchers weren't able to collect blood or urine samples to directly measure pesticide exposures. And they looked at risks associated with four different classes of chemicals.

"So this study cannot pinpoint specific substances as a culprit," said Philippe Grandjean, an adjunct professor of environmental health at Harvard School of Public Health in Boston, "Also, they cannot relate to specific levels of exposure, and they have not taken into account the possible contribution by residues in food," he said.

As a result, he said, the link reported in this study is weak.

Results of the study were released online on June 23 in the journal *Environmental Health Perspectives*.

One in 68 children is now diagnosed with autism, according to the U.S. Centers for Disease Control and Prevention. Autism is a disruption in normal brain development that generally appears within the first three years of a child's life.

There's no known cure for the disorder and no certain cause. But, some studies have pointed to pesticides as one possible culprit. Children of farmworker parents, who are exposed to chronic low doses of pesticides before they are born and in the first years of life, when their brains are still developing, have a higher risk for neurodevelopmental problems like autism than children who are not exposed to these chemicals.

For the new study, researchers recruited nearly 1,000 families with children who were 2 to 5 years old at the time of the study. About 486 of those children had a confirmed diagnosis of autism. Another 168 had some other kind of developmental delay, and 316 were developing as expected.

Parents were asked extensive lists of questions about lifestyle and environmental exposures, and mothers listed the addresses where they lived shortly before and during their pregnancies.

Researchers then compared those addresses to a California database of pesticide applications. The database collects information about the kind of chemical that is used, how much is used, and when it is applied.

Most of the women in the study had not lived near any pesticide applications during their pregnancies. Only about a third had been within a mile of where the chemicals were sprayed.

The researchers found that children with autism were more likely to have lived within a mile of a pesticide exposure before birth than typically developing kids. The risk was 60 percent to about 200 percent higher, depending on the kind of chemicals that were sprayed, how close the family had been to the treated area, and when, during pregnancy, a woman had been exposed.

In general, exposure during the third trimester appeared to be riskiest, and odds of having a child with autism went up the closer the family had been living to the pesticide application, suggesting that doses got higher the nearer women were to the chemicals.

Despite some concerns about the study design, Grandjean says this study -- along with previous studies that were able to measure exposure more directly -- provides further support for the notion that pesticides may be a contributing factor in the autism story.

The authors agree that their study represents only a small piece of the puzzle.

"These neurodevelopment disabilities are not the function of a single factor," said Hertz-Picciotto. "I would suspect that there's a number of different factors at play that have to do with maternal health, maternal nutrition, as well as chemicals that are used around the home as well as other factors like air pollution. It's going to be an accumulation of factors for any one woman," she said.

But based on her study, she said pregnant women should be aware that some of the chemicals found in commercial pesticides, like pyrethroids, are also sold for use around the home.

Even worse, they're sometimes labeled as "all natural" products, because they're based on a chemical that comes from chrysanthemum flowers. But Hertz-Picciotto says there's nothing natural about them.

"It's a synthetic product that's been designed to be more toxic than the natural product it's imitating," she said.

Hertz-Picciotto recommends that pregnant women with insect problems play it safe by looking for less toxic alternatives, like a powder called diatomaceous earth, which kills insects by dehydrating them.

(WebMD June 23, 2014)  
<http://www.webmd.com/baby/news/20140623/study-links-pesticide-exposure-during-pregnancy-to-autism-risk-in-kids>

## **WHEAT GROWERS ENDORSE GM CROPS**

Representatives of wheat growers in the US, Canada and Australia have reiterated their support for the future development of genetically modified wheat. The addition of the American Farm Bureau Federation and the National Farmers Union brings the number of organisations supporting the move to 16 since the original pledge was made in 2009 (*Agrow* No 568, p 21).

The groups are committed to the synchronised commercialisation of biotechnology traits in wheat crops and timely regulatory approval for those traits in importing countries. "We recognise that we are still at the early stages of a process that could last up to a decade, but we remain committed to responsibly advance wheat innovation," the pledge states.

The signatories envisage GM and non-GM wheat co-existing within production, grain handling, exporting and processing sectors to meet specific customer demands. "We support choice and are committed to ensuring customers have access to both biotech and non-biotech wheat delivered through reasonable tolerance levels." They encourage the adoption of "reasonable low level presence policies" in exporting and importing countries to minimize trade disruptions resulting from asynchronous approvals. (Pesticide & Chemical Policy/AGROW, June 10, 2014)

# **WEEDS GROW BIGGER AMONG CORN; WEEDS INFLUENCE GENE EXPRESSION, GROWTH IN CORN**

The axiom, "growing like a weed," takes on new meaning in light of changes in gene expression that occur when weeds interact with the crops they infest, according to plant scientist Sharon Clay. Using sophisticated genetic-mapping techniques, the South Dakota State University professor and her research team are documenting how corn and weeds influence one another.

"Weeds grow like weeds when they grow with corn," says Clay. "They grow bigger and taller in corn than by themselves." And inversely, "corn grows less among weeds."

Over the last 20 years, Clay has been studying weed management in range and cropping systems, weed physiology and interactions among herbicides, soil and crops. The weed scientist was the first woman to serve as president of the American Society of Agronomy.

She has received two awards from the Weed Science Society of America for outstanding papers published in *Weed Science* --one in 2007 and another in 2012. Both articles were written in collaboration with David Horvath, a research plant physiologist for the Agricultural Research Service at the U.S. Department of Agriculture in Fargo, N.D.

## **Growing better among corn**

To figure out how corn and weeds affect each other's gene response, Clay and a team of two research associates and a soils expert, planted plots of velvetleaf alone, corn with velvetleaf and corn kept weed-free.

The researchers saw an entirely different response when velvetleaf was grown by itself versus among corn plants. The velvetleaf alone was shorter and stouter, Clay explains. In addition, specific genes that influenced photosynthesis and other important plant responses differed in expression.

Another study compared the corn's growth and yield in response to weeds, lack of nitrogen, or shade. In all cases, Clay and Horvath found that genes were differentially expressed compared with nonstressed plants. However, each stress resulted in very different expression patterns.

Traditionally, weeds have been thought to reduce crop growth and yield due to competition for water, nutrients and light. This study, however, indicates that weed-crop interactions are much more complex than researchers have thought.

When grown with weeds, genes that control the major facets of the corn plant's metabolism were decreased or down-regulated, according to Clay. These included its response to light stimulus, the amount of chlorophyll it produces and its ability to convert raw materials into energy.

In short, these changes in gene expression adversely affect the plant's ability to grow and reproduce.

## **Having long-term impact**

When the researchers started taking weeds out of the corn at early points, such as when the corn had as few as two and four leaves, they still saw differences in gene expression when compared to corn without weeds. However, Clay points out, the amount of biomass--the stem and leaves--was not significantly different.

"The genes never recovered," says Clay, even after the weeds were removed. "The impact is long term," she adds, which further builds the case for controlling weeds early.

These changes in gene expression can help explain instances in which the yield is unaffected, but a slight reduction has taken place in the plant which scientists cannot pinpoint.

Next, the researchers look at the effect of water stress on gene expression using corn planted on high and low ground. The genes of the water-stressed corn on the top of the hill were down-regulated in terms of phosphorus uptake, Clay explains.



In addition, the Circadian rhythm, the internal clock which controls the operation of the plant's cells, "was affected" she adds. This, in turn, affected the plant's wounding response and made it more susceptible to pest injury. Essentially, the water-stressed corn "was getting older, faster," Clay says.

The researchers now "have a clearer idea of how that stress is affecting the plant," she explains. "We didn't have that ability before we had the genome sequence."

(ScienceDaily.com, May 13, 2014)

[www.sciencedaily.com/releases/2014/05/140513175008.htm](http://www.sciencedaily.com/releases/2014/05/140513175008.htm)

## **ANTS FORM LIVING ARKS TO WEATHER FLOODS**

[New research](#) shows that even the smallest of floods may seem like the wrath of the heavens from the perspective of ants. Researchers have found that to survive these cataclysmic events, ant colonies clump into a living arc that can ride on flood-waters until dryer land is found.

According to researcher David Hu, from the Georgia Institute of Technology, simply holding onto one another isn't enough. The ants have to form a structure with mesh-like layers, with the queen of the colony preferably protected in the very center of the "raft." (PCT Online, June 19, 2014) <http://www.pctonline.com/ants-arks-weather-floods.aspx>

## **BIOTECH INDUSTRY, LOCAL AG GROUPS CHALLENGE HAWAII COUNTY GM CROP BAN**

The Biotechnology Industry Organization (BIO) and an array of Hawaiian agricultural groups filed suit this week in federal court challenging a Hawaii

County law that bans the cultivation of most genetically modified crops on the Big Island.

The suit contends the statute -- known as Bill 113 -- violates state and federal law and calls on the court to overturn the measure.

The local law "imposes extreme burdens on plaintiffs and cripples county farmers' current and future ability to farm [GM] crops with no corresponding local benefit", according to the 49-page complaint. "Plaintiffs recognize that certain activists believe that all genetic engineering should be halted ... but such beliefs cannot save Bill 113 from its multiple fatal legal flaws."

The litigation comes amid growing controversy throughout the state of Hawaii about the cultivation of GM crops. Last week a Hawaii citizens group was given the green light to bring a petition before the Maui County Council that would temporarily suspend the planting of GM crops within the county's borders.

Kauai County, a hotbed of GM crop development, approved a local law last year that restricts pesticide use and requires growers to disclose what GM crops they are growing -- that measure is being challenged in federal court by GM seed companies.

The Hawaii County measure does not have a big an impact on the big GM seed companies, none of which currently have operations in the county, but it has irked farmers and GM crop proponents.

The law, approved in December 2013, bans the cultivation or open-air testing of new GM crops. Proponents say the measure is intended to ensure GM seed companies don't expand their operations to the Big Island. The local law exempts existing crops, notably GM papayas, but requires those growers to pay \$100 to register their fields with the county.

An anonymous papaya grower has challenged the registration requirement -- in response a state judge in Hawaii imposed a temporary restraining order in March, barring the county enforcing it and

disclosing information already received for the registry while the lawsuit is pending.

The new suit was filed with the U.S. District Court for the District of Hawaii on June 9th by the BIO, Hawaii Floriculture and Nursery Association, Hawaii Papaya Industry Association, Big Island Banana Growers Association, Hawaii Cattlemen's Council and the Pacific Floral Exchange as well as several individual farmers and florists.

The plaintiffs contend that while most farmers do not grow GM crops on the Big Island, the law wrongly blocks access to any future technologies that could help their operations. They note that GM technology has effectively saved the local papaya industry from ringspot virus -- the Rainbow GM papaya accounts for some 85% of papaya grown in the county.

"Bill 113 is backed by no findings or evidence that [GM] crops are in any way harmful, or in any way endanger the local environment," the plaintiffs argue.

The local law relies on the precautionary principle, putting the county in "direct conflict with determinations made after careful consideration by expert federal agencies, and purports to outlaw agricultural activities that the federal government has specifically authorized after performing a thorough scientific review", according to the complaint.

The suit contends the local law is preempted by federal statutes and regulatory regimes overseen by the USDA, US EPA and FDA.

"Bill 113 regulates on matters specifically addressed by the detailed federal regime, expressly banning what federal law expressly allows," the plaintiffs say. "And Bill 113 stands as an obstacle to the accomplishment and execution of the purposes of federal law, which are to evaluate [GM] crops 'based upon the best available science' and to treat them the same as their [non-GM] counterparts when they pose no unique risks."

The lawsuit also contends the law violates the interstate commerce clause of the US Constitution and represents an unlawful "taking" under the Hawaii Constitution because it "will deprive plaintiffs and other landowners of substantial economic value, the economically beneficial or productive use of their land, or both."

(Pesticide & Chemical Policy/AGROW, June 17, 2014)

## **PALMER AMARANTH THREATENS MIDWEST FARM ECONOMY, RESEARCHERS REPORT**

An invasive weed that has put some southern cotton farmers out of business is now finding its way across the Midwest -- and many corn and soybean growers don't yet appreciate the threat, University of Illinois researchers report.

Palmer amaranth (*Amaranthus palmeri*), a flowering plant native to the Sonoran desert and southwest United States, has a laundry list of traits that make it a fierce competitor on the farm, said Aaron Hager, a University of Illinois crop sciences professor.

Palmer amaranth germinates throughout much of the growing season, starts earlier and grows faster than other weeds, and is a prolific seed producer, Hager said. It can tolerate drought and heat extremes that would kill other plants. And it is becoming resistant to the most common herbicides used to combat it, he said.

Killing the plant before it can go to seed is the best way to control it, he said. That means treating young plants with herbicides when they are less than 4 inches tall.

"Once it is taller than 4 inches, the effectiveness of herbicide treatments drops off very dramatically and very quickly," Hager said.

Catching the plant that early is problematic, however. As a seedling, Palmer amaranth looks a

lot like waterhemp, another problematic weed that is difficult to control. This means farmers have the dual challenge of determining whether Palmer has invaded their fields and, if it has, taking effective action to kill it before it takes over.

"In other parts of the U.S., this species has devastated cotton production and in many areas, especially in Georgia, it was not uncommon to see cotton fields literally mowed down to prevent this weed from producing seed," Hager said. Some growers who failed to recognize the threat lost their farms as a result, he said.

Preventing a Palmer amaranth takeover also comes at a cost, however. In 2010, for example, Southeast Farm Press reported that the cost of weed control efforts on Georgia farms had risen from \$25 per acre to \$60 to \$100 an acre in response to Palmer amaranth invasions. The state spent at least \$11 million in 2009 to manually remove Palmer amaranth from 1 million acres of cotton, "something not normally done," the magazine reported.

Adam Davis, a researcher with the U.S. Department of Agriculture Agricultural Research Service and a professor of crop sciences at the U. of I., reported at a recent agricultural conference that Palmer amaranth can reduce soybean yields by 78 percent and corn yields by 91 percent. Illinois, a state with a \$9 billion agricultural commodities market and 80 percent of its land area devoted to farming (mostly corn and soybeans), could see significant losses associated with fighting -- or failing to properly fight -- this weed, Hager said.

"If you think about the value of agronomic row crops in this state, that's why we're very, very concerned about how devastating this could be to us," he said.

So far, researchers have confirmed the presence of Palmer amaranth in more than two dozen Illinois counties, from the southern tip of the state to Will County, about 50 miles south of downtown Chicago. In about half of those counties, the weed is already resistant to glyphosate, the most commonly used herbicide on Midwest farms, Hager said.

The plant grows so quickly and so tall that it can completely obscure low-growing crop plants. Some

soybean fields in Kankakee County, Illinois, became so overgrown with Palmer amaranth that the soybeans were barely visible to the eye.

Many farmers think they can use the same techniques that tend to work against other common weeds -- a onetime application of glyphosate herbicide, for example -- to control Palmer amaranth, Hager said. This assumption could endanger their farms.

"There is not one magic herbicide that a farmer could use one time and be done with it," he said. "It doesn't work that way."

And if the weed gains a foothold in planted fields, corn and soybean growers in Illinois should take a tip from Georgia cotton farmers and do everything possible to remove the plants, he said. Not a single plant should be tolerated.

"We have to set the threshold at zero. It has to be zero," Hager said. "It's hard to imagine another weed species that would be more injurious to crop production than what this one will be."

(ScienceDaily.com, June 3, 2014)  
<http://www.sciencedaily.com/releases/2014/06/140603114323.htm>



## In-State and Neighboring CEU Meetings

### **Date: July 24, 2014**

Title: BWI Tulsa Summer Seminar  
Location: Linnaeus Gardens Tulsa OK  
Contact: Kelly Keech (918) 693-6461  
Course #: OK-14-058  
www.bwicompanies.com

CEU's:	Category(s):
3	3A
3	3C
3	10

### **Date: September 23-25, 2014**

Title: OKVMA Fall Conference  
Location: Renaissance Hotel & Convention Center  
Tulsa OK  
Contact: Kathy Markham (918) 256-9302  
Course #: OK-14-  
www.okvma.com

CEU's:	Category(s):
8	A
7	3A
7	5
8	6
8	10

## ODAFF Approved Online CEU Course Links

Technical Learning College  
<http://www.abctlc.com/>

Green Applicator Training  
<http://www.greenapplicator.com/training.asp>

All Star Pro Training  
[www.allstarce.com](http://www.allstarce.com)

Wood Destroying Organism Inspection Course  
[www.nachi.org/wdocourse.htm](http://www.nachi.org/wdocourse.htm)

CTN Educational Services Inc  
[http://ctnedu.com/oklahoma\\_applicator\\_enroll.html](http://ctnedu.com/oklahoma_applicator_enroll.html)

Pest Network  
<http://www.pestnetwork.com/>

Univar USA  
<http://www.pestweb.com/>

Southwest Farm Press Spray Drift Mgmt  
<http://www.pentonag.com/nationalsdm>

SW Farm Press Weed Resistance Mgmt in Cotton  
<http://www.pentonag.com/CottonWRM>

Western Farm Press ABC's of MRLs  
<http://www.pentonag.com/mrl>

Western Farm Press Biopesticides Effective Use in Pest Management Programs  
<http://www.pentonag.com/biopesticides>

Western Farm Press Principles & Efficient Chemigation  
<http://www.pentonag.com/Valmont>

For more information and an updated list of CEU meetings, click on this link:  
<http://www.state.ok.us/~okag/cps-ceuhome.htm>

## ODAFF Test Information

Pesticide applicator test sessions dates and locations for July/August 2014 are as follows:

July		August	
7	OKC	4	OKC
10	Tulsa	14	Tulsa
21	OKC	18	OKC
24	Tulsa	21	Enid
		28	Tulsa

Altus: Western OK State College  
2801 N Main, Room A23

Enid: Garfield County Extension Office,  
316 E. Oxford.

Goodwell: Okla. Panhandle Research &  
Extension Center, Rt. 1 Box 86M

Hobart: Kiowa County Extension Center  
Courthouse Annex, 302 N. Lincoln

Lawton: Great Plains Coliseum, Annex Rm.  
920 S. Sheridan Road.

OKC: Oklahoma County Extension Office,  
930 N. Portland.

Tulsa: NE Campus of Tulsa Community  
College, (Apache & Harvard)  
Large Auditorium

McAlester: Kiamichi Tech Center on  
Highway 270 W of HWY 69

ATOKA KIAMICHI TECH CENTER 1301  
W Liberty Rd, Seminar Center

Ardmore Carter County Extension Center

# Pesticide Safety Education Program