

PESTICIDE REPORTS

Division of Agricultural Sciences and Natural Resources • Oklahoma State University
<http://pested.okstate.edu>



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CHEM

- 1 JUNE TEST HELP SESSIONS
- 2 EPA EXTENDS COMMENT PERIOD FOR THE NATIONAL MARINE FISHERIES SERVICE'S BIOLOGICAL OPINION ON CHLORPYRIFOS, DIAZINON, AND MALATHION
- 2 PERMETHRIN-TREATED CLOTHING SHOWS PROMISE IN PREVENTING TICK BITES, STUDY FINDS
- 2 THE MOST COMMON TYPES OF OFF-LABEL DICAMBA USE
- 4 ANOTHER MOSQUITO SPECIES MAY CARRY ZIKA VIRUS
- 5 ENLIST EXPANSION
- 6 PESTICIDE POLICIES IN US FARM BILL SPARK CONTROVERSY
- 8 CONNECTICUT STATE LEGISLATURE BANS RESIDENTIAL MOSQUITO MISTERS
- 9 US EPA SUED FOR GLYPHOSATE RESIDUE RECORDS
- 10 CDC: TICK-BORNE ILLNESSES IN THE U.S ON THE RISE
- 10 RESEARCHERS DELVE INTO ROLE OF GUT BACTERIA IN INSECT RESISTANCE TO PESTICIDES
- 11 COCKROACH MILK ANYONE? IT MAY BE THE NEXT BIG SUPERFOOD
- 12 CEU MEETINGS
- 12 ONLINE CEU LINKS
- 13 ODAFF TEST SESSION INFORMATION

JUNE TEST HELP SESSIONS

The OSU Pesticide Safety Education Program will conduct the next test help workshops in June. The workshops will be held June 19th in Tulsa and June 29th in Oklahoma City. Please note the next test help workshops after the June dates will not occur until October.

The Tulsa session will be at the Tulsa County Extension Office at 4116 E. 15th. The Oklahoma City Test help session will at the Oklahoma County Extension Office 2500 NE 63rd.

The help sessions will focus on information covered in the core and service tech tests. OSU PSEP will answer any questions over other category tests during this session.

Applicators should acquire and study the manuals before coming to the help session for optimum success. Study manuals can be purchased by using the manual order form available at our website <http://pested.okstate.edu/pdf/order.pdf> or by calling University Mailing at 405-744-5385.

ODAFF Testing fees are not included in the registration fee and must be paid separately.

Register online at the Pesticide Safety Education Program (PSEP) website at <http://pested.okstate.edu/html/practical.htm>.

Registration forms can also be downloaded from the website.

Registration will start at 8:30 and the program will run from 8:45 am to 12:30 pm at both locations. Testing will begin at 1:30 pm at both locations.

The next test help workshop dates are October 11th in Oklahoma City and October 16th in Tulsa.

NO CEU's will be given for this program!

<http://pested.okstate.edu/html/practical.htm>

EPA EXTENDS COMMENT PERIOD FOR THE NATIONAL MARINE FISHERIES SERVICE'S BIOLOGICAL OPINION ON CHLORPYRIFOS, DIAZINON, AND MALATHION

In response to numerous requests, EPA is extending the public comment period on the National Marine Fisheries Service's Biological Opinion on chlorpyrifos, diazinon, and malathion. Please submit comments by July 23, 2018, to the docket [EPA-HQ-OPP-2018-0141](https://www.regulations.gov/docket/EPA-HQ-OPP-2018-0141) at [regulations.gov](https://www.regulations.gov). EPA will share all public comments received on this Biological Opinion with NMFS, and EPA will evaluate them before determining how to proceed. EPA is seeking comment on the NMFS's Biological Opinion for chlorpyrifos, diazinon and malathion in accordance with EPA's public stakeholder process for ESA consultations – an open and transparent process supported by the Services, EPA, and USDA. Stakeholder input is critical to the development of any measures EPA may implement to address risks to listed species and designated critical habitat.

Read more about the Biological Opinion in the docket or at www.epa.gov/pesticides/epa-opens-comment-period-nmfss-assessment-chlorpyrifos-diazinon-and-malathion. (EPA May 15, 2018) <https://www.epa.gov/pesticides/epa-extends-comment-period-national-marine-fisheries-services-biological-opinion>

PERMETHRIN-TREATED CLOTHING SHOWS PROMISE IN PREVENTING TICK BITES, STUDY FINDS

A new study by CDC researchers has found that just a minute or two of contact with permethrin-treated clothing caused ticks to become incapacitated or fall off fabric.

The research examined a variety of permethrin-treated clothing types and fabrics. It revealed that the items can be toxic to several species of ticks and at different stages in their life cycles, potentially keeping them from getting beneath clothing and staying next to skin long enough to bite.

While the CDC research sounds promising, it's still unclear whether the permethrin-embedded apparel actually prevents bites, says James Dickerson, Ph.D., Consumer Reports' chief scientific officer.

"The CDC's study did not test any items while they were being worn, so it doesn't show conclusively how well the clothes might keep ticks from biting you," Dickerson says. (PCT, May 28, 2018) <http://www.pctonline.com/article/permethrin-treated-clothing-tick-prevention/>

THE MOST COMMON TYPES OF OFF-LABEL DICAMBA USE

Dicamba is a tattletale, and the 2017 crop season taught us just how readily common mistakes can show up as crop injury.

While much of the dicamba drift may have been accidental or beyond human control, some applicators engaged in the use of illegal formulations, improper additives and the wrong nozzles, said Larry Steckel and Bill Johnson, weed scientists from the University of Tennessee and Purdue.

DTN asked both scientists to break down the most common misuses of the new dicamba herbicides: Why they happen, what the consequences are and why they're not worth the risk.

GOING GENERIC GOES WRONG

Using older and generic dicamba formulations on Xtend soybeans may seem cheap, but only if you don't do your homework, Steckel said.

The marketing incentives from the manufacturers of Engenia, FeXapan and XtendiMax can help with costs, he explained. "And the other thing, of course, is the peace of mind that you did everything you could to keep dicamba in your field," Steckel added. That may be hard to pin a price on, but fines, civil or criminal lawsuits and ugly neighbor relations will certainly chip away at any short-term savings of generic dicamba formulations.

Because dicamba use isn't new, many applicators mistakenly assumed they could use the same products they used in corn, Steckel said.

"Not only were we spraying higher volumes [in 2017], but we were spraying in higher temperatures in June and July, not March and April," he noted. Dicamba is far more likely to volatilize at temperatures above 80 degrees Fahrenheit, and older formulations are significantly more volatile than the new ones.

"This was eye-opening for everyone. I don't think many will be tempted to use [old formulations] as readily this year," Steckel added.

If they are, some state laws have been put in place to catch them, Johnson warned. Indiana has made all agricultural dicamba products restricted-use pesticides this year, which will allow the state regulators to track all sales of older formulations, as well as the new ones. Missouri is weighing the same restriction.

AMS AND ADDITIVE ANGST

Certain additives can compromise the reduced volatility of the new dicamba herbicides, particularly ones that change the pH of the herbicide, Steckel said.

The labels of the new dicamba herbicides specifically ban the use of ammonium sulfate (AMS), because it undoes the work manufacturers have done to make the new dicamba herbicides less volatile. "Basically, AMS causes the dicamba molecule in the new formulations to disassociate from the BAPMA or DGA salt, and it becomes a straight acid, which is highly volatile," Steckel explained.

Midwest applicators who use dicamba after they've sprayed a tank mixture of AMS and glyphosate may not realize that they are at risk for drift, Johnson said.

"You've got to get all the AMS out of the tank," he said. "If you don't get it all out, just a little bit can defeat the performance of volatility-reducing agents in new dicamba formulations."

The manufacturers of Engenia, FeXapan and XtendiMax have created websites listing the approved additives for tank mixes, which they link to on the herbicide labels. See them here:

[http://agro.basf.us/campaigns/engenia/tankmixselect or/](http://agro.basf.us/campaigns/engenia/tankmixselector/)

<http://www.dupont.com/products-and-services/crop-protection/soybean-protection/articles/fexapan-tank-mix-partner.html>

<http://www.xtendimaxapplicationrequirements.com/Pages/nozzles.aspx>

The approved additives are primarily herbicides, adjuvants and some nutritional products. Only a very small number of insecticides, fungicides and plant growth regulators are permitted.

Nonetheless, some producers were tempted to cut out a field pass and add their preferred insecticides and fungicides to the tank this summer, Steckel said.

Many applicators also missed the label requirement to use drift reduction agents (DRAs) with certain tank mix ingredients, Johnson added. Engenia's tank mix website uses a superscript (1) to alert readers that a tank mix ingredient requires the use of a DRA, XtendiMax's website uses bold, red print in all-caps, and FeXapan's website uses black, bold print in all-caps.

NOZZLES AND WEED CONTROL

Much of the improper nozzle use in 2017 was likely unintentional -- applicators were often confused over which nozzles were approved to use with Engenia, FeXapan and XtendiMax. Find them here:

<http://agro.basf.us/campaigns/engenia/tankmixselector/>

<http://www.dupont.com/products-and-services/crop-protection/soybean-protection/articles/nozzle.html>

<http://www.xtendimaxapplicationrequirements.com/Pages/nozzles.aspx>

However, some misinformation also circulated, blaming the approved turbo-tee induction (TTI) nozzles for poor control of weeds, particularly Palmer amaranth pigweed, Steckel said.

"From a weed control standpoint, it's really not going to compromise weed control even in a thick stand of weeds," Steckel said. Johnson agreed and noted that pushing the carrier volume up to 15 gallons per acre could help with problematic weeds like pigweed, which must be sprayed when they are small.

Poor dicamba control of Palmer is due more to the weed's physiology, Steckel added.

"There are populations of pigweeds out there that have a little bit of tolerance to dicamba right at the start," he said. Southern scientists found that

dicamba was particularly weak on PPO-resistant populations of pigweed in 2017.

"You're going to see some escapes and will need some kind of follow-up application," Steckel explained. "You can follow up with another dicamba application or -- because we're finding that these PPO-resistant pigweeds are becoming sensitive to PPO herbicides again after a dicamba pass -- a herbicide like FlexStar will work again." (DTN Progressive Farmer, April 30, 2018) https://www.dtnpf.com/agriculture/web/ag/news/crops/article/2018/04/30/common-types-label-dicamba-use?referrer=twitter#.Wub_RiLOGAA.twitter

ANOTHER MOSQUITO SPECIES MAY CARRY ZIKA VIRUS

Another mosquito may carry the Zika virus, but more research is needed to confirm the early lab tests, University of Florida scientists reported. UF Institute of Food and Agricultural Sciences researchers detected Zika in the saliva of southern house mosquitoes collected in Florida.

Chelsea Smartt, an associate professor at the [UF/IFAS Florida Medical Entomology Lab](#) in Vero Beach, Florida, said her study's finding supports that the mosquito species, known scientifically as *Culex quinquefasciatus* mosquitoes, can contain live Zika virus in saliva. To date the mosquito species *Aedes aegypti* is considered the primary carrier of Zika virus.

Smartt said researchers must perform more experiments to know whether and how much of a role *Culex quinquefasciatus* plays in spreading Zika.

In 2016, Zika caused cases of microcephaly – a rare neurological condition in which an infant's head is significantly smaller than the heads of other children of the same age and gender – in some newborns in the United States, due in part to traveler-related global spread of Zika virus.

Scientists worldwide, including Smartt, have been studying the origins of Zika and how to control it.

Culex quinquefasciatus is common in the southern U.S. and is abundant in Florida, she said. The mosquito is found in tropical and sub-tropical areas, including Brazil, Africa and Southeast Asia.

In areas of the world where these mosquitoes feed on humans, there may be populations of *Culex quinquefasciatus* that can spread Zika, Smartt said.

Her research is published in the journal [Frontiers of Microbiology](#).

ENLIST EXPANSION

Enlist Cotton Acreage Triples, Enlist Corn Joins the Landscape

The Enlist weed control system is expanding this year, and with it, the need to be diligent about label compliance.

"We had such a good year last year, so let's not be overconfident and cut any corners this year," said Larry Steckel, University of Tennessee weed scientist. "Enlist is going to be used on a larger commercial scale this year, so the chance of problems is greater."

Enlist cotton acres are set to triple in 2018 to 1.5 million acres across the Cotton Belt, up from 500,000 in 2017, said Shawna Hubbard, herbicides product manager for Corteva Agriscience, the agriculture division of DowDuPont. The Enlist trait was developed by Dow AgriSciences to allow cotton plants to tolerate glyphosate, 2,4-D choline and glufosinate herbicides.

Enlist corn hybrids are also fully commercialized this season, and planting is underway across the Midwest and South, with a concentration in Iowa, Kansas and southern Minnesota, Hubbard said. The Enlist soybean trait is still awaiting Chinese import approval, but some growers are growing it in closed loop production agreements with ADM, she added.

Enlist growers have two options for post-emergence herbicides: Enlist Duo, a pre-mix of glyphosate and 2,4-D choline, and Enlist One, a 2,4-D-choline standalone herbicide, which has a broader range of tank-mix options.

KNOW THE LABEL

The Enlist cotton trait is offered under the PhytoGen brand. It is stacked with Roundup Ready technology as well as Widestrike 3, a triple Bt-protein stack for aboveground insects. In corn, the Enlist trait is stacked with either Powercore, an aboveground dual Bt-trait stack, or SmartStax, which adds two rootworm Bt proteins to that stack.

Both Hubbard and Steckel urged growers to remain diligent about following the label during the 2018 season. Non-Enlist cotton is especially susceptible to 2,4-D.

"This is not a time to take the foot off the gas in terms of training and education," Hubbard said. "Quite a few new customers will be using Enlist for the first time, which makes it just as important to make sure they understand all the requirements."

Here are the highlights of the federal label requirements for Enlist Duo and Enlist One:

- Don't spray when winds surpass 15 mph
- Don't spray during a temperature inversion
- Do not spray when the wind is blowing toward susceptible crops
- Leave a 30-foot downwind in-field buffer when spraying
- Use only pre-approved nozzles listed on the labels
- Follow a triple-rinse tank cleanout process after use
- Use only tank mix ingredients listed for Enlist Duo and Enlist One here:
<http://www.enlist.com/en/approved-tank-mixes>

See the Enlist Duo label here: <http://www.cdms.net/ldat/ldAEA005.pdf>, and the Enlist One label here: <http://www.cdms.net/ldat/ldE27000.pdf>

AN ABUNDANCE OF CAUTION

Remember that a number of states have additional 24-C labels for both products. Some states, such as Mississippi, Georgia, Alabama and Louisiana, require additional mandatory state training. A few states, such as Alabama and North Carolina, also drop the maximum wind speed to 10 miles per hour. Be sure to check with your state department of agriculture for any additional requirements.

Dow added a technology called Colex-D to Enlist Duo and Enlist One, which has significantly reduced volatilization of the product, Steckel noted. (The company permitted Steckel and other university weed scientists to test Enlist Duo many years before commercialization.)

However, many crops and plants are extremely susceptible to injury from 2,4-D, so even small amounts of drift can damage them. The Enlist labels ban any spraying when the wind is blowing toward susceptible crops such as tomatoes, fruiting vegetables (EPA Crop Group 8), cucurbits (EPA Crop Group 9), grapes and non-Enlist cotton fields.

Steckel said most of the problems he saw with Enlist technology last year stemmed from improper tank cleanout or mix-ups among growers who used both the Xtend and Enlist platform. "When you're running both systems, be careful cleaning out the tank, and watch what jug you grab," he said.

Don't use generic forms of 2,4-D on Enlist crops, Steckel said. They are much more volatile and -- because they are not labeled for post-emergence use -- can contain trace amounts of other herbicides that could injure your crop.

Growers are accustomed to add insecticides to herbicide passes, but many insecticides cannot be mixed with Enlist One and Enlist Duo, Steckel said. However, Enlist One does permit a greater number

of herbicide tank mix options than Enlist Duo, namely glufosinate. "That tank mix is a great Palmer amaranth control option," Steckel said.

Although Enlist had a relatively drama-free commercial roll-out in 2017, applicators will still fall under increased scrutiny this year, Mississippi State University weed scientist Jason Bond said.

"Be smart, go through the list of things that are required on the label, because they are all there for a reason," he said. "It may seem frustrating, like someone is looking over your shoulder, but if we are going to use this technology successfully on a broad number of acres, that is way we will have to do it." (DTN Progressive Farmer, May 23, 2018) <https://www.dtnpf.com/agriculture/web/ag/news/article/2018/05/23/enlist-cotton-acreage-triples-enlist?referrer=twitter#.Wwa3b0rzFqs.twitter>

PESTICIDE POLICIES IN US FARM BILL SPARK CONTROVERSY

The US House of Representatives' version of the 2018 Farm Bill could be a big win for agrochemical registrants and users. Language in the legislation eases the EPA's endangered species requirements, extends a key pesticide funding bill and bars local authorities from imposing their own pesticide rules. Other provisions in the Bill roll back permitting requirements under the Clean Water Act, require the EPA's Office of Pesticide Programs to increase coordination with state officials and relax restrictions on the fumigant, methyl bromide.

The pesticide policies in the Bill have been widely welcomed by the industry and US farm groups, but have drawn the ire of environmentalists who say that the provisions roll back vital public health and environmental safeguards and have no place in the Farm Bill.

Passed every five years or so, the Farm Bill contains billions of dollars for farm programmes, agriculture subsidies, research and food assistance. The 2018

version was approved last month by the House Agriculture Committee and looks likely to be considered by the full House this week. Whether the measure will pass is unclear. Bitter divisions remain among lawmakers over subsidies and newly proposed work requirements for food assistance, but the pesticide riders have caused additional controversy.

The provisions are akin to the "pesticide industry's wish list", according to Colin O'Neil, a spokesperson for the Environmental Working Group.

The change to the EPA's obligations under the Endangered Species Act (ESA) has particularly served as a rallying cry for environmentalists opposed to the Farm Bill. The provision would eliminate the EPA's requirement to consult with federal wildlife agencies about the effects of pesticides on endangered species; a move that environmentalists say would undermine the intent of the ESA to safeguard imperiled plants and animals.

Currently, the EPA is required to assess the potential harms to listed species and seek formal consultation with the federal wildlife agencies if it determines that legal pesticide uses are "likely to adversely impact" protected species or their critical habitats. The wildlife agencies are then tasked with determining if a pesticide puts a listed species in jeopardy and what mitigation measures are required for legal uses.

Fundamental differences between the EPA and the wildlife agencies about how to scientifically assess the potential harms posed by pesticides to endangered species -- and how to mitigate those effects -- have plagued the consultation process for decades. Few consultations have been completed and the controversy has sparked an array of litigation by environmentalists and pesticide manufacturers frustrated with the process.

The Farm Bill language says that the EPA would still be required to determine whether legal uses of pesticides were likely to jeopardize the survival of an endangered species or alter critical habitat, but

would not have to consult with federal wildlife agencies unless requested by a registrant.

The provision is needed to "streamline" the ESA process for pesticide registrants, says House Agriculture Committee chairman Michael Conaway. "EPA doesn't have the resources to do a species-by-species deal, so we're trying to figure out a way to protect species, but also being able to get the crop protection [products] in place," says Mr Conaway, a Texas Republican and author of the legislation. "The current system works to the advantage of people who don't want anything to happen."

Environmentalists disagree and say that the industry-friendly provision would allow the EPA to abandon critical efforts to protect imperiled species from pesticides. Defenders of Wildlife President Jamie Rappaport Clark says that the ESA language is "reckless" and argues that it shields the pesticide industry from "liability for harming endangered wildlife".

Industry interests counter that the current system clearly is not working and is in dire need of reform. CropLife America (CLA) president and CEO Jay Vroom says that the provision is much needed, arguing that the current process "delays timely approval" of crop protection products and "fails to provide additional benefits to threatened and endangered species".

It is unclear if opponents will have the opportunity - or the votes -- to strip the ESA language and the other pesticide riders from the House Farm Bill. The rules governing the House afford considerable deference to the majority party and Republicans appear generally supportive of the pesticide provisions. But critics remain optimistic that the Senate has little appetite for the controversy.

Leaders of the Senate Agriculture Committee are working on their own Farm Bill and the "thin margins" in the Senate means there is much greater need for bipartisan co-operation, Mr O'Neil told Agrow, adding that the pesticide provisions are "a non-starter for a number of Senators". (Pesticide & Chemical Policy/AGROW, May 15, 2018)

CONNECTICUT STATE LEGISLATURE BANS RESIDENTIAL MOSQUITO MISTERS

Earlier this month, the Connecticut state legislature voted to ban the use of residential pesticide misting systems. (These are devices that are typically placed outdoors and spray insecticides –mostly in an attempt to control mosquitoes.) This is the latest move from a state legislature that has also recently banned the use of bee-toxic neonicotinoids and stopped the use of hazardous lawn care pesticides on public playgrounds. The vote was unanimous in the state Senate, and won by a count of 132-17 in the state House. The bill is set to become law on May 24, unless Governor Malloy vetoes the legislation, which is not expected.

Pesticide misters are machines primarily used to spray mosquito adulticides. Many health advocates have expressed concern that these products, able to spray toxic pesticides on a timer at regular intervals, pose a significant risk to pets and children who can be directly in the path of a mister's spray. The chemicals employed in these machines are often synthetic pyrethroids, which have been linked to a range of human health effects, from early puberty in boys, to behavioral disorders, learning problems, ADHD, and certain cancers. Neighbors who do not want to be exposed to these chemicals are also put at risk from pesticide drift.

Nancy Alderman, president of the Connecticut nonprofit Environment and Human Health, the organization that supported the legislation, said: "Mosquito misting devices are extremely dangerous and there were absolutely no regulations to control them. They spray toxic insecticides on a continual basis at heights that could spray children and pets. EPA does not regulate them, declaring they can only regulate pesticides – not the appliances that spray them. States therefore are left to do something about these dangerous appliances. There is no way to regulate them – they are so dangerous they must be banned. These pesticide misting devices go off every few minutes spraying toxic pesticides. Because they are often installed around the

perimeter of a yard, they affect neighbors who have no way to protect themselves or their pets. The pesticides used in them are toxic to bees."

These machines also endanger pollinators that may be foraging in an area where these devices are used. Studies find that sublethal concentrations of synthetic pyrethroids can significantly reduce bee fecundity and decrease the rate at which bees develop to adulthood and reproduce. Several field and laboratory studies using pyrethroids have consistently documented decreases in foraging activity and activity at the hive entrance after exposure.

While pesticides are regulated by the U.S. Environmental Protection Agency (EPA), pesticide misters and other application devices are not subject to EPA oversight. This leaves states with the authority to control their use. Connecticut appears to be the first state to restrict these machines through legislation. The state of New York took an administrative approach to regulating these devices, as the commissioner of the state's Department of Environmental Conservation used his authority to deem pesticides used in misting systems as restricted use (only available to certified applications).

In 2015, Public Employees for Environmental Responsibility (PEER) filed a complaint with the Federal Trade Commission, detailing false and deceptive claims by manufacturers of pesticide misters. Specifically, PEER noted that manufacturers claim that these misters i) are effective in controlling mosquitoes despite contention from experts and even the American Mosquito Control Association that they are not effective, ii) have the ability to kill ticks, of which there is no evidence, and iii) are "safe" and "natural," despite their use of highly toxic pesticides. Absent federal action, the responsibility to regulate these dangerous devices falls to the states.

Staying mosquito-free in one's backyard requires both individual and community efforts. For the individual, during mosquito season use least-toxic repellents like oil of lemon eucalyptus. If possible, wear loose, light colored long-sleeved clothing. If

you want to spend protected periods outside sipping lemonade during a hot summer day, sit next to an oscillating fan, as mosquitoes are not great fliers. Or, for more effective management, sit inside a screened in deck, or more economical pop-up tent.

At the community level, you can achieve neighborhood-level reductions in mosquitoes by joining with your neighbors in regularly dumping out standing water or larvaciding sites that cannot be drained. Most common mosquitoes don't fly too far from where they hatched, and often one location in a community, such as stagnant water in a neighbor's old pool, can be a major vector for mosquito breeding throughout the neighborhood. (Beyond Pesticides, May 23, 2018) <https://beyondpesticides.org/dailynewsblog/2018/05/connecticut-state-legislature-bans-residential-mosquito-misters/>

US EPA SUED FOR GLYPHOSATE RESIDUE RECORDS

A US consumer advocacy group has sued the EPA for failing to release records related to federal testing of food for the herbicide, glyphosate, and its communications with the agrochemical industry. The lawsuit by US Right to Know (USRTK) seeks documents and correspondence between the EPA, Monsanto and the FDA about the testing effort, as well as recent records between the EPA and industry trade group CropLife America (CLA).

Filed on May 21st in the US District Court for the District of Columbia, the complaint calls on the Court to order the EPA to complete the two Freedom of Information Act (FOIA) requests and provide USRTK with the requested records.

The FDA decided in early 2016 that it would begin testing four commodities -- maize, soybeans, milk and eggs -- for glyphosate as part of a "special assignment" within its pesticide residue testing program. The testing regime is a compliance program used by the FDA to ensure that foods do

not exceed EPA limits or tolerances. The FDA produces an annual report of its results, which usually includes details of thousands of foods and some 700 pesticides.

USRTK's July 2016 FOIA request asked for communications between the EPA and the FDA -- as well as the EPA and Monsanto -- about the glyphosate testing. The EPA has confirmed receipt of the request, but provided no updates on when it might comply. The advocacy group filed a second FOIA request in February 2017 asking for communications between the EPA and CLA between October 2015 and February 15th 2017. The Agency had also failed to respond or comply with that request by the opening of the case.

The lawsuit argues that the EPA has "no legal basis" for ignoring the FOIA requests. The complaint comes after USRTK had recently secured the release of internal FDA records related to the glyphosate testing program, including emails from agency researchers that reported one maize sample had been found with residues in excess of the federal tolerance. Documents obtained by USRTK also reported that an FDA scientist had found glyphosate in "wheat crackers, granola cereal and corn meal".

The official results will not be available until late 2018 or early next year and internal FDA emails released by USRTK suggest that the agency is not concerned about the levels of glyphosate found in its official tests. In an email to the EPA last year, an FDA official said that the agency had found "no violations for glyphosate in any official sample we have tested", adding that the maize sample that was found to have exceeded tolerance levels "was not an official sample". (Pesticide & Chemical Policy/AGROW, May 24, 2018)

CDC: TICK-BORNE ILLNESSES IN THE U.S ON THE RISE

Tick-borne illnesses are on the increase in the United States and disease cases have doubled between 2004 and 2016, according to a new report released by the Centers for Disease Control and Prevention.

Further, the report found that disease cases from infected mosquitoes, ticks and fleas have tripled in 13 years and since 2004, nine vector-borne diseases were discovered or introduced for the first time from the United States and its territories.

According to the CDC report, 48,000 tick-borne diseases were reported in 2016 and Lyme disease accounted for 82 percent of all tick-borne diseases between 2004 and 2016. In 2004, 22,000 tick-borne diseases were reported. In its report, the CDC said the nation needs to be better prepared to face this public health threat.

“Zika, West Nile, Lyme, and chikungunya—a growing list of diseases caused by the bite of an infected mosquito, tick, or flea—have confronted the U.S. in recent years, making a lot of people sick. And we don’t know what will threaten Americans next,” CDC Director Robert R. Redfield said in a news release. “Our Nation’s first lines of defense are state and local health departments and vector control organizations, and we must continue to enhance our investment in their ability to fight against these diseases.”(PCT, May 8, 2018) <http://www.pctonline.com/article/cdc-tick-borne-illnesses-rise/>

RESEARCHERS DELVE INTO ROLE OF GUT BACTERIA IN INSECT RESISTANCE TO PESTICIDES

An insect’s gut microbiome plays an important role in conferring pesticide resistance, according to a new review published in the *Annals of the*

Entomological Society of America. “Whether you’re looking at agricultural pests, household pests like cockroaches, or medical pests like disease-carrying mosquitoes, insects are great at adapting to whatever we throw at them, especially when it comes to different chemicals,” said lead author Jose Pietri, Ph.D to *Entomology Today*. The review adds to the numerous ways pests can evade the effects of chemical agriculture, reinforcing calls from recent studies showing that the best method of addressing this issue is to simply stop using synthetic pesticides and employ alternative pest management practices.

The authors identify two overarching methods through which microbes help confer resistance to toxic pesticides. The first involves the pest accepting a physiological trade-off, where a pest is able to better withstand an insecticide at the cost of losing its ability to regulate certain gut bacterium. For instance, diamondback moths resistant to fipronil and chlorpyrifos are found to contain higher levels of Lactobacillales, Pseudomonadales, and Xanthomonadales bacteria than non-resistant moths. While this trade-off affects the fitness of the organism, alterations of the bacterial community the pest are exposed to can reinforce and strengthen the pest. For example, culex mosquitoes that contain resistant genes can increase the likelihood that they will survive to adulthood through infection of a certain fungal parasite called *Vavraia culicis*.

The second method through which microbes could assist in conferring resistance to pests is directly through the bacterium. “There are several possible ways they can directly help insects deal with the toxins in insecticides, and one is a very direct mechanism whereby a toxin comes into the gut of an insect and, through enzymatic means, the microbes break it down and render it ineffective,” said Dr. Pietri. A specific example cited by authors was the development of fenitrothion (an organophosphate insecticide) resistance in bean bugs. During the nymph stage of the pest, the bugs pick up a soil bacterium called *Burkholderia*. Although generally uncommon, certain strains of *Burkholderia* have the ability to break down fenitrothion. However, when the chemical is continuously sprayed onto soil, fenitrothion-resistant *Burkholderia* become more common,

leading to a greater number of bean bugs picking up the resistant strain of the bacterium.

This review underscores the variety of means insects can take advantage of in their environment to rapidly adapt to changing environmental factors. A 2013 study underscores this ability, finding that the common practice of “stacking” two or more *Bacillus thuringiensis* (Bt) toxins in genetically engineered plants did not work. Researchers assumed that pests resistant to the first Bt toxin would survive on the one-toxin plants, but die when consuming two-toxin plants because they had not yet developed resistance to the new formulation. However, pests selected for resistance to one toxin survived significantly better than caterpillars from a susceptible strain.

In the field, whether insect or weed, pests develop resistances because those that don't die from toxic pesticide use develop some method to stop the chemical from causing it harm. A study published earlier this year in the journal *Nature Ecology and Evolution* found that the only tried and true method to reduce weed resistance was to eliminate the use of pesticides sprayed on target weeds.

While this study may lead to attempts to halt resistance to chemical pesticides, investigations of how microbes interact with insect detoxification could provide insight into new methods of bioremediation, or ways to model how humans may respond to changes in gut bacterial composition. There is already ample evidence that pesticide use alters the diversity of microflora in the human mouth and gut. (Beyond Pesticides, May 9, 2018) <https://beyondpesticides.org/dailynewsblog/2018/05/researchers-delve-role-gut-bacteria-insect-resistance-pesticides/>

COCKROACH MILK ANYONE? IT MAY BE THE NEXT BIG SUPERFOOD

Health freaks will go to extreme lengths in the name of nutrients (and staying one step ahead of the trend). However, the latest "superfood" is just plain gross.

Cockroach milk is comprised of the nutrient-rich milk crystals found inside the Pacific Beetle cockroach. This species uses said protein crystals as food for cockroach infants, but new research suggests that it could be beneficial to humans, too, as it's one of the most nourishing and highly caloric substances on the planet. It boasts four times as much protein as cow's milk, but also contains essential amino acids that promote cell growth, lipids that keep our bodies healthy, and sugars that fuel energy.

The insect milk may also have beauty benefits.

"The levels of growth hormone in this particular liquid are unknown, and there is evidence that shows that growth hormones may exacerbate acne in certain individuals," Rachel Nazarian, M.D. at Schweiger Dermatology Group explains. "The high levels of sugar may also make it a poor choice in terms of skin health and beauty, as we know that high-sugar diets actually accelerate skin aging."

"Protein and fat are vital components of good hair and nails, and this particular liquid may make getting optimal levels of both things much easier," Dr. Nazarian adds. (KOCO.com, May 29, 2018) <http://www.koco.com/article/cockroach-milk-anyone-it-may-be-the-next-big-superfood/20950351>

CEU Meetings

Date: September 18, 2018

Title: 2018 Ensystem CEU Workshop

Location: Hampton Inn & Suites 85th Ave Tulsa OK

Contact: Donald Stetler Jr. (281) 217-2965

www.ceuworkshop.com

CEU's: Category(s):

2 3A

2 7A

1 7B

1 8

6 10

Date: September 19, 2018

Title: 2018 Ensystem CEU Workshop

Location: Holiday Inn Express Durant OK

Contact: Donald Stetler Jr. (281) 217-2965

www.ceuworkshop.com

CEU's: Category(s):

2 3A

2 7A

1 7B

1 8

6 10

ODAFF Approved Online CEU Course Links

PestED.com

<https://www.pested.com/>

CEU School

<http://www.ceuschool.org/>

Technical Learning College

<http://www.abctlc.com/>

Green Applicator Training

<http://www.greenapplicator.com/training.asp>

All Star Pro Training

www.allstarce.com

Wood Destroying Organism Inspection Course

www.nachi.org/wdocourse.htm

CTN Educational Services Inc

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.oda.state.ok.us/cps-ceu.htm>

ODAFF Test Information

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

June		July	
4	OKC	2	OKC
14	Tulsa	12	Tulsa
18	OKC	16	OKC
28	Tulsa	26	Tulsa

Altus: SW Research & Extension Center
16721 US HWY 283

Ardmore: Carter County Extension Office
107 1st Ave Ardmore OK

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,
920 S. Sheridan Road., Prairie Bldg

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

OKC: ODAFF Building 2800 N Lincoln
BLVD Oklahoma City OK (**New
Location**)

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

**Pesticide Safety
Education Program**