

# PESTICIDE REPORTS

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



## February, 2020

## CHEM

- 1 TEST HELP WORKSHOPS
- 2 EPA FINALIZES GLYPHOSATE MITIGATION
- 2 EPA RELEASES PROPOSED INTERIM DECISIONS FOR NEONICOTINOIDS
- 3 EPA PESTICIDE ANNOUNCEMENT
- 4 US EPA TO OK BIOPESTICIDE FOR WAX MOTHS IN BEE HIVES
- 5 US BIOLOGIC/CAES REPORT FIELD TRIALS OF ORALLY DELIVERED ANTI-LYME VACCINE TARGETING THE FIELD MOUSE
- 5 CLARIFYING THE EXCLUSION ZONE REG
- 6 NEW CLEAN WATER ACT PROVIDES 'MUCH NEEDED CLARITY,' RISE SAYS
- 7 ANTAGONISM IN THE FIELD
- 9 GM INSECTS ON THE HORIZON
- 11 CEU MEETINGS
- 12 ONLINE CEU LINKS
- 12 ODAFF TEST INFORMATION

### TEST HELP WORKSHOPS

The OSU Pesticide Safety Education Program (PSEP) will provide the first test review sessions of 2020 in February for anyone needing help on getting certified. The dates are February 6<sup>th</sup> in Oklahoma City and February 14<sup>th</sup> for Tulsa. OSU PSEP will focus on reviewing information for the core/service technician exams but will answer category questions that applicators might have during the workshop. **The review session will be from 8:30 a.m. to 3:30 p.m. Walk-ins are welcome.**

The Tulsa program will be held at the Tulsa County Extension Office at 4116 E.15<sup>th</sup> St. in Tulsa. The Oklahoma City program will be held at the Oklahoma County Extension Office at 2500 NE 63rd St. in Oklahoma City. Registration will start at 8:15 a.m.

Cost of registration is \$50 and includes a copy of Applying Pesticides Correctly for each registration. Pre-registration is encouraged walk-ins will be accommodated as long as space is available!

**There will be no testing available on the day of the workshops!!** With the change in ODAFF testing now being done at PSI testing centers testing will not be available after the workshop. OSU PSEP has extended the review time

on the workshop and will cover the new testing procedures and how to take pesticide certification exams at PSI testing centers.

<http://pested.okstate.edu/html/new-odaff-testing-procedure>

Register online at the Pesticide Safety Education Program (PSEP) website at

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

Registration forms may also be downloaded from the website.

More test help dates for 2020 will be scheduled soon. Once scheduled they will be listed on the PSEP webpage. (OSU PSEP)

## **EPA FINALIZES GLYPHOSATE MITIGATION**

EPA has concluded its regulatory review of glyphosate—the most widely used herbicide in the United States. After a thorough review of the best available science, as required under the Federal Insecticide, Fungicide, and Rodenticide Act, EPA has concluded that there are no risks of concern to human health when glyphosate is used according to the label and that it is not a carcinogen. These findings on human health risk are consistent with the conclusions of science reviews by many other countries and other federal agencies, including the U.S. Department of Agriculture, the Canadian Pest Management Regulatory Agency, the Australian Pesticide and Veterinary Medicines Authority, the European Food Safety Authority, and the German Federal Institute for Occupational Safety and Health. The agency is requiring additional mitigation measures to help farmers target pesticide sprays to the intended pest and reduce the problem of increasing glyphosate resistance in weeds.

Glyphosate has been studied for decades and the agency reviewed thousands of studies since its registration. Glyphosate is used on more than 100 food crops, including glyphosate-resistant corn, soybean, cotton, canola, and sugar beet. It is the

leading herbicide for the management of invasive and noxious weeds and is used to manage pastures, rangeland, rights of ways, forests, public land, and residential areas. In addition, glyphosate has low residual soil toxicity and helps retain no-till and low-till farming operations.

More information on glyphosate and EPA's interim decision is available at [www.epa.gov/ingredients-used-pesticide-products/glyphosate](http://www.epa.gov/ingredients-used-pesticide-products/glyphosate)

### **Background**

EPA uses interim decisions to finalize enforceable mitigation measures while conducting other longer-term assessments, such as an endangered species assessment. EPA will next complete a draft biological evaluation for glyphosate, which is anticipated for public comment in Fall 2020.

(EPA January 30,2020)

<https://www.epa.gov/pesticides/epa-finalizes-glyphosate-mitigation>

## **EPA RELEASES PROPOSED INTERIM DECISIONS FOR NEONICOTINOIDS**

EPA is taking the next step in its regulatory review of neonicotinoid pesticides - a group of insecticides used on a wide variety of crops, turf, ornamentals, pets (for flea treatment), and other residential and commercial indoor and outdoor uses. The agency's proposed interim decisions for acetamiprid, clothianidin, dinotefuran, imidacloprid, and thiamethoxam contain new measures to reduce potential ecological risks, particularly to pollinators, and protect public health.

EPA is proposing:

management measures to help keep pesticides on the intended target and reduce the amount used on crops associated with potential ecological risks;

requiring the use of additional personal protective equipment to address potential occupational risks;

restrictions on when pesticides can be applied to blooming crops in order to limit exposure to bees;

language on the label that advises homeowners not to use neonicotinoid products; and

cancelling spray uses of imidacloprid on residential turf under the Food Quality Protection Act (FQPA) due to health concerns.

Additionally, the agency is working with industry on developing and implementing stewardship and best management practices.

Upon publication of the Federal Register notice, the agency invites comments on the proposed decisions in the following dockets for 60 days. After reviewing public input, the agency will issue final interim decisions.

More information available on EPA's proposed interim decisions for neonicotinoids. (EPA January 30, 2020) <https://www.epa.gov/pesticides/epa-releases-proposed-interim-decisions-neonicotinoids>

## **EPA PESTICIDE ANNOUNCEMENT**

The EPA made a combined announcement today on two topics: the management of hemp production and the future of atrazine use.

The agency recently registered 10 pesticides for use on hemp, to help alleviate the current dearth of products that are legal and safe to use in the fast-growing industry of commercial hemp production.

The agency also laid out a proposed interim registration decision on atrazine, including lower use rates and new label requirements, as part of the agency's re-registration review of the chemical. The decision will be posted for public comment for 60 days in the Federal Register, before EPA makes a final decision on it.

### **HEMP PESTICIDE RELIEF**

Nine of the newly registered hemp products are biopesticides, and one is a conventional pesticide. Most contain ingredients that have long been lightly regulated, such as neem oil, soybean oil and garlic oil, which have insecticidal, miticidal and fungicidal characteristics.

You can see the full list of products here: <https://www.epa.gov/...>

Although these biopesticides are unlikely to solve all hemp growers' pesticide needs, which range from insect infestations to disease and weed problems, they're a hopeful sign for an industry that has raced ahead of the government's regulatory abilities since commercial hemp production was legalized in the 2018 Farm Bill.

Last year, many hemp growers had few legal options to control any pests in their field and those that existed varied from state to state, depending on local pesticide rules.

"Today's announcement by the United States Environmental Protection Agency is a step in the right direction for the nation's growing hemp industry," Kentucky Agriculture Commissioner Ryan Quarles said in the press release. "It is important our growers have new technologies and tools to better help protect their crops and increase their yields."

## ATRAZINE RULES

Atrazine is widely used in agriculture across a range of crops, primarily corn but also sugarcane and sorghum, as well as a smaller amount of use in landscape care.

As part of its routine re-registration review of atrazine, EPA has been releasing draft ecological and human health risk assessments in the past few years for public comment. Now the agency has published its proposed interim registration decision on atrazine and two related chemicals, propazine and simazine. The decision would re-register atrazine for continued use, albeit with some new rules and label changes. The most significant of those appear to be a lower use rate for residential turf applications, new Personal Protective Equipment (PPE) and handling requirements and new label language aimed at mitigating spray drift.

The new labels will require no spraying during a temperature inversion, a 15-mph wind speed restriction for aerial and ground applications, as well as specific boom and nozzle requirements.

The EPA also proposed ending one of two ongoing atrazine water-monitoring programs that started in 2004.

See more details on the atrazine registration proposal here: <https://www.epa.gov/...>

"Although there are potential risks of concern associated with the use of atrazine, with the adoption of the mitigation measures ... any remaining potential worker and/or ecological risks are outweighed by the benefits associated with use of atrazine," the agency wrote in its proposed decision.

The decision was criticized by environmental groups that have lobbied for atrazine to be banned entirely in the past, based on longstanding concerns about human health risks and environmental problems, particularly concerning water quality.

"Restricting the spraying of atrazine is essential for protecting human health," said Olga Naidenko, the Environmental Working Group's vice president for science investigations, in a press release issued by the Center for Biological Diversity. "Instead, the Trump EPA's proposal would increase atrazine discharges, endangering children's health and harming communities. Since the beginning of the Trump administration, the agency has been working overtime on behalf of chemical agriculture while acting against the interests of children's health." See the press release here:

<https://biologicaldiversity.org/...>

See the agency's announcement, links to proposed decisions on all three chemicals and links to the Federal Register dockets for public comments here: <https://www.epa.gov/...>

(Progressive Farmer, December 19, 2019)

<https://www.dtnpf.com/agriculture/web/ag/crops/article/2019/12/19/epa-announces-new-pesticides-hemp-2>

## US EPA TO OK BIOPESTICIDE FOR WAX MOTHS IN BEE HIVES

The US EPA has proposed the first residential and beehive use of the established biopesticide active ingredient, *Bacillus thuringiensis* subsp *aizawai* (Bta) strain ABTS-1857. It is for Irish company Vita Bee Health's (Dublin) B402 Biological Larvicide for the control of greater wax moths (*Galleria mellonella*) in commercial and hobbyist bee hives. Bta ABTS-1857 was first approved in 1992 as an insecticide/acaricide for agricultural use. It has a tolerance exemption for use in or on honey and honeycomb and all other agricultural commodities, the EPA points out. B402 Biological Larvicide would be applied to beehive frames prior to winter storage to prevent and control wax moths in the stored frames. The proposed registration decision is open to public comment until January 24th. (AGROW, January 15, 2020)

## **US BIOLOGIC/CAES REPORT FIELD TRIALS OF ORALLY DELIVERED ANTI-LYME VACCINE TARGETING THE FIELD MOUSE**

The Connecticut Agricultural Experiment Station (CAES) and US Biologic announced the publication of field trials showing the effectiveness of the delivery of an orally-delivered anti-Lyme vaccine targeting the major wildlife source of Lyme disease, the white-footed mouse.

The journal article, "Field Evaluation of a Novel Oral Reservoir-Targeted Vaccine Against *Borrelia burgdorferi* Utilizing an Inactivated Whole-Cell Bacterial Antigen Expression Vehicle" has been published in the peer reviewed publication, *Experimental and Applied Acarology*.

The field trials were conducted over three years in the residential area of Redding, Connecticut. During that time, the authors observed significant drops in the numbers of mice infected with *Borrelia burgdorferi*, the bacterium that causes Lyme disease, and its infection in blacklegged ticks (*Ixodes scapularis*, the major vector associated with the disease) feeding on mice when comparing homes where the vaccine was and was not applied.

Specifically, the authors noted that, after one year of deployment, treated sites showed a 13X greater decrease in infection compared to control sites (i.e., 26% drop versus 2% drop). "Fewer infected ticks mean less infection in the field overall," says Stafford, "So the decrease would be greater year-over-year that the vaccine is applied."

"Along with fewer infected mice, we observed a second effect also seen in previous laboratory-based studies," notes Scott Williams, PhD, Agricultural Scientist at the CAES and a co-author of the study. "The vaccine causes the generation of antibodies in the mice. Previously infected ticks will ingest those antibodies when feeding on mice and be 'cleared' of infection. So, feeding ticks are a 'xenodiagnostic marker' of vaccine impact." According to Williams,

when non-infected mice consume vaccine-coated pellets, they are protected from infection with *Borrelia burgdorferi*. "Non-infected ticks, therefore, cannot pass the disease to other animals, including humans" he says.

The vaccine is currently undergoing the USDA regulatory process for commercial licensure. The research program was supported, in part, by U.S. Hatch Act funds, the Centers for Disease Control and Prevention (CK000182-03), and US Biologic. (PCT Online, January 14, 2020)

<https://www.pctonline.com/article/us-biologic-caes-report-orally-delivered-anti-lyme/>

## **CLARIFYING THE EXCLUSION ZONE REG**

If someone's in the zone, you must stop and wait for them to clear out, but EPA has proposed a change to its Application Exclusion Zone requirement under the Worker Protection Standard regulation. It involves neighboring property.

Rick Keigwin, director of EPA's Office of Pesticide Programs, reminded growers about the exclusion zone and the agency's new proposal Jan. 10 at the Southeast Regional Fruit and Vegetable Growers Conference in Savannah. Public comment on the proposal ended in January.

The original WPS was enacted in 1992. In 2015, EPA revised the WPS, including the exclusion zone, which the agency says is 25 feet in all directions for a ground rig as it moves through the field and 100 feet in all directions for outdoor aerial, air blast, air-propelled, fumigant, smoke, mist or fog applications.

Over the last four years, he said, farmers and state regulators told the agency the exclusion requirement was difficult to enforce when the zone crossed onto neighboring property.

The agency responded in October 2019 and proposed the exclusion zone around the applicator can only be enforced on the farm owner's property, where a farmer can lawfully control the applicator or people within the zone. Ag industry leaders championed the decision, including Zippy Duvall, American Farm Bureau Federation president, and Gary Black, Georgia commissioner of agriculture.

"In the past, what you would have to do with somebody if they came into that zone while you were applying, you had to stop your operation," he said. "Now what we're saying is you temporarily stop to make sure you're not spraying those people, but as long as you don't spray those people when they're on your neighbor's property, you can continue to apply."

In the spring of 2019, he said, Congress passed a law to keep the EPA from making changes to the Worker Protection Standards nor consider changes to it until October of 2021. The law, by the way, passed unanimously through both the House and Senate and President Donald Trump signed it.

"The only change that we were allowed to consider was the changes related to this application exclusions zone," he said. "But it is important to remember you still can't spray people. If someone comes into the zone, you have to stop spraying."

The new proposal will also exempt immediate family members of the farm owner from all aspects of the zone requirement. If a family member feels safe, they can remain around the zone and not have to stay in the house or any other enclosed structure on the farm during some applications.

Also, under the 2015 revisions, an applicator must be at least 18 years old or at least 16 years old on a family farm. (Southwest FarmPress, January 31, 2020)  
<https://www.farmprogress.com/regulatory/clarifying-exclusion-zone-reg>

## **NEW CLEAN WATER ACT PROVIDES 'MUCH NEEDED CLARITY,' RISE SAYS**

A new Clean Water Act (CWA) rule published Jan. 23 gives much needed clarity to specialty pesticide applicators making important public health, safety and environmental applications, including those for vector control, vegetation management, and habitat preservation and restoration, Responsible Industry for a Sound Environment (RISE) stated in a press release.

"The changes made by the United States Environmental Protection Agency and United States Army Corps of Engineers in the new Navigable Waters Protection rule bring the clarity needed to ensure essential pesticide applications protecting public health, safety, infrastructure and ecosystems continue in an environment of regulatory and business certainty," said RISE President, Megan Provost.

"For the specialty pesticide industry, the new rule contains important refinements to the definitions of waters coming under federal jurisdiction and waters coming under state and local jurisdiction. Along with our national partners, we are encouraging everyone in our industry to become familiar with the rule and to understand the intersection of our pesticide statute, the Federal Insecticide, Fungicide and Rodenticide Act, and CWA National Pollutant Discharge Elimination System permits. Our commitment to protecting people, places and our nation's waters continues with this new rule."

Since 2015, RISE, as part of the multi-stakeholder Waters Advocacy Coalition, has been working to bring much needed regulatory clarity to pesticide applications made to protect utility infrastructure, create fire breaks, ensure lines of site on highways and roadways, support effective mosquito and vector control, and care for turf and landscape on public and private property, among others.

“Finding the right balance between our pesticide statute, FIFRA, which regulates all aspects of pesticide use, including uses on or near water, and the CWA has been our objective and has now been achieved,” added Provost.

RISE is the national trade association representing manufacturers, formulators, distributors and other leaders engaged with the specialty pesticide and fertilizer industry. (PCT Online, January 30, 2020) <https://www.pctonline.com/article/new-clean-water-act-clarity-rise/>

## ANTAGONISM IN THE FIELD

Just like most families, herbicides don't always bring out the best in each other.

In the human world, it's called "sibling rivalry" or "personality differences." In the chemical world, scientists call it "herbicide antagonism," a phenomenon wherein two or more herbicides in a tank mix produce poorer weed control than the individual herbicide components would supply alone.

The primary victim of herbicide antagonism tends to be glyphosate, still a staple of many farmers' tank mixes. Clethodim (Select) is another herbicide often on the losing end of this phenomenon.

And the chief antagonists? Well, like most feuds, it can vary depending on factors such as environment and targeted weed species. But recently, auxin herbicides such as 2,4-D and dicamba are showing their antagonistic side. Contact herbicides, such as glufosinate, can cause problems, too.

The proliferation of dicamba and 2,4-D-tolerant crops on the landscape in recent years is bringing new attention to the phenomenon, said Larry Steckel, University of Tennessee Extension weed scientist.

In Tennessee, for example, dicamba-tolerant Xtend soybeans account for more than 95% of the state's soybean acreage.

"Herbicide antagonism is not new," he explained. "But what is new is that we're mixing so much dicamba and glyphosate together and using it in season now on bigger weeds. Dicamba is hindering the grass control of glyphosate, and if you put another grass herbicide in like clethodim (Select), it's antagonizing that as well."

## AUXINS DON'T PLAY NICE

Herbicides have different ways of killing weeds. Glyphosate, for example, depends on the plant moving the chemical quickly down to its growing point, a process called translocation. For translocation of glyphosate to happen, a plant must be actively growing, explained Bryan Young, a Purdue University weed scientist.

"Glyphosate needs a living plant and roughly three days of active growth for absorption and translocation to occur," he said. The chemical has a longer trip in grassy weeds than broadleaves, since the growing point of a grass is generally found at the base of the plant, he added.

Auxin herbicides are plant-growth regulators, which means they tinker with a plant's growth and development, including its photosynthetic process, Young said.

"When an auxin herbicide is applied, one of the first things that we see is the downregulation of photosynthesis within two to four hours of application," he noted. This may be part of the reason dicamba and 2,4-D hinder the full potency of a glyphosate application, although scientists aren't sure of the exact mechanism yet.

"Somehow it's muting the glyphosate," said Steckel. "So antagonism is a big issue with some species like junglerice, barnyardgrass, fall panicum and goosegrass. They're surviving even multiple applications of dicamba and glyphosate -- but if you separate them out, the glyphosate will still kill them."

Another common grass herbicide, clethodim (Select), faces the same problem with auxin antagonism.

As a Group 1 (ACCase) herbicide, clethodim also requires rapid translocation, and both 2,4-D and dicamba may indirectly interrupt that process. Upping the rate of clethodim and using an oil-based adjuvant to favor greater absorption of the grass herbicide into the plant can overcome the problem sometimes, Young said. Steckel is recommending growers simply separate the auxin herbicides from their grass herbicides in the tank.

"So far, splitting up applications is the only way to make glyphosate and clethodim work reliably here," he said. "I have had some farmers even come back and remark that they had no idea glyphosate still worked that well on their grasses after they split out the application."

## CONTACT BURNS ARE A PROBLEM TOO

Contact herbicides are another common antagonistic culprit, the weed scientists added. Here, the mechanism is better understood.

"If you apply a contact herbicide like glufosinate along with glyphosate, it might start to reduce the amount of [glyphosate] translocation because the contact herbicide will start to kill the leaves, which are the primary source for pumping glyphosate down to the meristem," Young explained.

Applying glyphosate with a contact herbicide in cooler conditions (when translocation is slower), or

without optimal adjuvants like ammonium sulfate (AMS) can increase antagonism, he added.

## POTENTIAL HERBICIDE FEUDS AHEAD

With more stacked herbicide-tolerant traits in the future, growers will have to become better acquainted with these inner feuds of the chemical world.

For example, the XtendFlex soybean, expected to be commercialized early this decade, will be tolerant to over-the-top applications of three herbicides -- glyphosate, dicamba and glufosinate. While the chemicals might work individually, between differing droplet size requirements, ammonium salt components and antagonism, they're unlikely to play well together in a tank, Young said.

Scientists are racing to figure out the nuances of herbicide antagonism in time to give growers the right recommendations in the years ahead, Steckel said.

"Growers will need research and fine-tuning to know how to handle these applications," he said. "Which herbicide needs to be applied first? How much time is needed between applications? And we are doing that research."

This year's weed escapes in the field may be growers' primary frustration with antagonism, but Young is more worried about the future consequences of weak weed control on the same grass species year after year.

"The greater long-term problem is the potential that repeated herbicide failure from antagonistic herbicide interactions could progressively lead towards the evolution of herbicide resistance," he warned. (Progressive Farmer, January 16, 2020) <https://www.dtnpf.com/agriculture/web/ag/crops/article/2020/01/16/happens-herbicides-get-along>

## GM INSECTS ON THE HORIZON

Diamondback moths would do well to be wary of potential mates in the years to come.

Scientists recently completed the first successful field testing of a genetically modified (GM) "self-limiting" insect in the U.S., using this species. When the GM male diamondback moths are released and mate with wild female moths, they pass on a gene that causes all female offspring from the match to die in the early larval stages.

"As you release our male moths over a period of time, eventually the number of female offspring goes down in the next generation and the pest population declines," explained Neil Morrison, head of agriculture programs for Oxitec, the biotech company that developed the GM moth.

Don't feel too bad for the moths, which are a major global pest of brassica crops, earning them the moniker "cabbage moths."

"Diamondback moths cause a tremendous amount of damage globally, between \$4 to \$5 billion a year," noted Anthony Shelton, a Cornell insect ecologist who led the field testing in upstate New York. "And they have an amazing propensity to develop resistance against insecticides very, very quickly. There are populations resistant to every insecticide ever used against it." That includes Bt, since foliar Bt sprays are used against this pest in the horticultural industry.

The scientists are hopeful the GM insects can be the start of a new pest control toolkit for farmers of many different crops around the world, which could combat insecticide resistance and perhaps even Bt resistance.

Unlike a gene drive, where genes are introduced into a population to permanently alter the genetic make-up of an insect population, Oxitec's GM insects will not persist in the environment, since they are designed to die off.

There was apparently no special accounting required for the corn still standing in northern...

"Because half of its offspring die, and no females can pass it on, the trait naturally declines in a population over time," Morrison said. Field and lab trials have shown that after just a few generations of no viable female offspring, the GM moths eventually vanish from the population, he said. "The desire is to reduce the damage to the crop by reducing insect population, not eliminate the species," Shelton noted.

Oxitec has also done lab and field testing with self-limiting mosquitoes, specifically *Aedes aegypti* -- the species that carries dangerous diseases such as Zika virus, yellow fever and dengue fever -- in South and Central America. The company is currently waiting on EPA approval of a self-limiting mosquito for testing in the U.S.

But its moth trials are farther along in the U.S., and Morrison is optimistic that farmers could see them in the commercial pest control market within the coming decade. That will take additional field tests and approval from regulatory agencies such as USDA's Animal and Plant Health Inspection Service (APHIS). So far, the field testing did not reveal any significant differences in behavior among GM and wild moths, nor did studies find any impacts on non-target species, Shelton said.

In earlier greenhouse trials at Cornell, scientists found that the GM moths could also lower insecticide resistance, since the released GM males contain no insecticide-resistant genes common in wild populations, Morrison said.

"The males introduce insecticide-susceptible genes out there into the population," he explained. "So as well as reducing the population, they're diluting resistance to insecticides and enhancing effectiveness of insecticides within a season."

Oxitec is working with other agricultural pests, such as fall armyworm and soybean looper, in South America. Bt resistance is a growing problem with fall armyworm, and laboratory studies at Cornell suggest the GM moths -- and other future self-limiting insects -- could slow that type of insect resistance, as well, Shelton said.

"When we introduced the genetically engineered male moths in the lab, it not only suppressed the population but it also lowered the frequency of Bt-resistant alleles in the population and brought back susceptibility to the population," Shelton said.

The recent field tests also showed that the moths are unlikely to stray too far from the field where they are released, a common concern among skeptics of GM insect development. More than 95% stayed within 35 meters of the release site, Shelton noted. "We've known this for a long time about diamondback moths. If they have good quality food and environment, they tend to stay there."

Even if the moths do catch a wind current and move to different fields, such as an organic field, the GM insects would die off after a few generations, he added.

Ultimately, Morrison hopes the GM moths and other future self-limiting insects could provide farmers with a novel mode of action to supplement current pesticides on the market.

"I think they might work best as part of an integrated pest management approach by taking advantage of the relative strengths of other tools, such as insecticides or biocontrol products," he said. "Our approach would be suited to work alongside

them. It would be highly complementary and sustainable."

See the Cornell and Oxitec scientists' recent field testing work here: <https://www.frontiersin.org/...>

(Progressive Farmer, January 16, 2020)

<https://www.dtnpf.com/agriculture/web/ag/news/article/2020/01/29/scientists-find-success-gm-moth>

## CEU Meetings

Date: February 26, 2020

Title: BWI Pest & Lawn Seminar 2020

Location: Edmond, OK

Contact: Tim Ruminer (405) 227-2985

CEU's:	Category(s):
2	3A
3	7A
2	7B

Date: February 27, 2020

Title: 2020 Univar Annual CEU Training

Location: Stoney Creek Hotel & Conference Center

200 West Albany Broken Arrow, OK

Contact: Deb Chambers (918) 622-2048

CEU's:	Category(s):
1	3A
2	7A
1	7B
1	8
4	10

Date: March 4, 2020

Title: OKVMA SPRING CONFERENCE & TRADE SHOW

Location: Grand Casino Shawnee, OK

Contact: Kathy Markham (918) 256-9302

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

CEU's:	Category(s):
2	A
3	3A
4	5
5	6
5	10

Date: March 26, 2020

Title: Noble Research Institute Managing Weeds and Insects in Your Pastures

Location: TBD

Contact: Eddie Funderburg (580) 224-1215

CEU's:	Category(s):
TBD	1A

## ODAFF Approved Online CEU Course Links

Online Pest Control Courses

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

PestED.com

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

Certified Training Institute

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

WSU URBAN IPM AND PESTICIDE SAFETY EDUCATION PROGRAM

<https://pep.wsu.edu/rct/recertonline/>

CEU University

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

Technical Learning College

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

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/>

AG CEU Online

<https://ageuonline.com/courses/state/37>

For more information and an updated list of CEU meetings, click on this link:

<http://www.kellysolutions.com/OK/applicators/courses/searchCourseTitle.asp>

## NEW ODAFF Test Information

New computerized testing began October 1, 2019. Testing will be done at testing centers in multiple locations around the state by PSI Services LLC.

For more information and instructions please go to <http://pested.okstate.edu/html/new-odaff-testing-procedure> or the PSI exam information website [www.psiexams.com/](http://www.psiexams.com/).

**Reservation must be made in advance** at [www.psiexams.com/](http://www.psiexams.com/) or call (800) 733-9267

PSI locations.

Oklahoma City I 3800 N Classen Blvd, Ste C-20, Oklahoma City, OK 73118

Oklahoma City II NW 23rd St and Villa Avenue, Suite 60, Shepherd Mall Office Complex, Oklahoma City, OK 73107

Tulsa 2816 East 51st Street, Suite 101, Tulsa, OK 74105

McAlester 21 East Carl Albert Parkway (US Hwy 270), McAlester, Oklahoma 74501

Woodward 1915 Oklahoma Ave, Suite 3, Woodward, OK 73801

Lawton Great Plains Technology Center, 4500 West Lee Blvd Building 300- RM 308, Lawton, OK 73505

Enid Autry Technology Center, 1201 W. Willow Rd, Enid, OK 73703

Ponca City Pioneer Technology Center, 2101 N Ash, Ponca City, OK 74601

**Find us on Twitter at  
@OkstatePestEd**

**Pesticide Safety  
Education Program**