

PESTICIDE REPORTS

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



January, 2019

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CHANGES TO TEST LOCATIONS AND DATES

There are some minor testing changes for 2019 applicators might want to be aware of.

ODAFF is now listing testing dates on a quarterly schedule instead of publishing the full year dates. Dates listed are for January through March right now.

Locations listed are Enid, Lawton, McAlester, OKC, Tulsa, and Goodwell. Times have not changed and testing begins at 9:00 am and all exams completed by 1:00 pm. New applicants are not accepted after 11:00 am.

Applicators in the Tulsa area should be aware that there is a new testing site for 2019. **The Tulsa location has moved to the Tulsa County Extension office at 4116 E 15th St.**

The testing dates can be found on our web page at www.pested.okstate.edu.

TEST HELP SESSIONS 2019

The OSU Pesticide Safety Education Program will conduct the first test help workshops for 2019 in January and February. The workshops will be held January 31st in Oklahoma City and February 5th in Tulsa.

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 405-744-9037.

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.

NO CEU's will be given for this program!

Please check our website below for future test help dates.
<http://pested.okstate.edu/html/practical.htm>

WATERHEMP DEVELOPS NEW RESISTANCE TO HPPD INHIBITORS

A new contender is fighting for top honors as the 'most troublesome weed.' Waterhemp has once again proven it can evolve quickly and through mechanisms of resistance researchers didn't expect.

"Our initial theory was that waterhemp would mimic corn as it does for the other two HPPD-inhibitors, but no, it found a different way," said Dean Riechers, University of Illinois Department of Crop Sciences weed scientist in a recent news release. "We don't know how or why, but it has a different mechanism from what corn naturally has. Bottom line is that you can't use any of the three HPPD-inhibitors to control this population."

The population is found in McLean County, Ill. It's resistant to mesotrione, tembotrione and topramezone, the latter is the active ingredient that troubles researchers the most. Instead of mimicking corn's natural resistance pathway it has created one of its own—and is displaying resistance to populations that have never been exposed to this particular ingredient.

Researchers brought in waterhemp plants from Nebraska that had only been exposed to mesotrione and tembotrione for testing. The waterhemp had virtually no reaction to those two active ingredients and also showed alarming resilience to topramezone.

"The greenhouse experiment showed the Nebraska population did have resistance to a herbicide it had never been exposed to," Riechers explained. "Did the other two herbicides select for topramezone resistance?"

He, and other experts think so. The question now is whether or not each herbicide has its own resistance gene or if there are genes that other herbicides can select for.

Because the McLean County, Ill. population showcases a different resistance pathway than corn it might be more difficult to control chemically.

“Right now, you could spray any of these three HPPD-inhibitor [active ingredients] on corn, not kill the corn, but potentially kill the weeds. But if the weeds are using a different mechanism to detoxify the chemical, you’d have to develop a different kind of herbicide that doesn’t use the same metabolic pathways,” Riechers said. “[And that] might be effective on weeds but who know if the corn would tolerate it.”

This discovery proves yet again that nature will find a way, and waterhemp is among the most adaptable weeds row crop farmers face every year. This highlights the importance of a multi-pronged approach to weed management.

“We’re finding out more and more about what these waterhemp populations can do for detoxification, and it’s disheartening,” he said. “Take alternative steps to limit the spread of these resistant plants or prevent it [resistance] from happening in the first place.” (AGPRO December 5, 2018)
<https://www.agprofessional.com/article/waterhemp-develops-new-resistance-hppd-inhibitors>

SCIENTISTS, STUDENTS FIND NEW PATHOGENS HIDING IN INDIANA TICKS

Many people know about the link between ticks and Lyme disease. But there may be far more lurking in tick bites than previously thought – a cocktail of bacteria and viruses that may uniquely affect each bite victim and inhibit the remedies meant to cure tick-borne diseases.

“Climate change is expanding tick ranges, and we’re spending more time in tick habitats all the time,” said Catherine Hill, a Purdue professor of entomology and vector biology. “As we come into more contact with ticks, we increase the likelihood of being bitten and contracting a tick-borne disease. We’re finding that it’s not just one microbe these ticks could pass on to us. It’s like a little microbe party in there, and we need to figure out how their interplay can affect human health.”

To build that understanding, Hill and scientists in her lab have created the Tick INsiders program, which involves collecting Indiana ticks throughout the year to map bacteria and viruses and how these change throughout the year and throughout the state. Some high school students have been trained as citizen scientists to help with the project and have been collecting ticks since the spring of 2018.

They’ve found three types of ticks: the blacklegged deer tick, the lone star tick and the American dog tick. These arachnids are capable of transmitting nine different pathogens that cause human illnesses, though not all have not been diagnosed in the state. The Indiana State Department of Health reports more than 100 cases of Lyme disease each year and dozens of cases of ehrlichiosis and Rocky Mountain spotted fever.

Scientists suspect that the severity of illnesses and human immune response can vary based on the cocktail of microbes — bacteria, viruses and pathogens — passed from tick to bite victim. It has been estimated that about 25 percent of ticks are co-infected with the bacteria and parasites that cause Lyme disease and Babesiosis, for example. Other pathogens may be in the mix in those or other ticks, as well.

“It’s not ‘one tick bite, one disease,’” Hill said. “It’s one tick bite with a unique complement of different microbes and pathogens, and we need to understand that diversity. We don’t know which of these pathogens and how many are transferred when ticks bite, how our bodies react, and how the interplay between our immune system and multiple microbes might affect disease outcome.”

So far, the Tick INsider program’s collections have identified hundreds of bacteria. These may include pathogens known to cause human illness, including several bacteria that cause Lyme disease. Scientists are looking at as many as 100 different bacteria that may be pathogenic.

“We already know that there is risk of contracting Lyme disease around the state, in any of Indiana’s 92 counties,” Hill said. “We’re looking for all the stuff that hasn’t been found yet but may show up at some point.”

Knowing what's out there, and in us, may be useful for doctors who need to know the best way to treat tick-borne illnesses that affect patients in sometimes unique ways.

“This deep dive will help us to design comprehensive diagnostics that test for hundreds of potential pathogens and enable doctors to prescribe patient-specific treatment regimes — that is personalized medicine for tick-borne diseases,” Hill said.

Nine student scientists involved with the Tick INsider program spent time on campus learning about the analysis done on the ticks they find. They toured labs that perform DNA analysis of each tick, identifying the types of viruses and bacteria present, as well as the Purdue Bioinformatics Core, where the data are analyzed.

The Tick INsider program will take application for new students in early January. Hill said she hopes to expand the program soon so that any Indiana resident can become trained to collect and send in ticks. (PCT Online, December 18, 2018)
<https://www.pctonline.com/article/ticks-purdue-program-indiana/>

BAYER RELEASES GLYPHOSATE SAFETY STUDIES

Bayer made more than 300 study summaries on the safety of glyphosate available on its [transparency platform](#). The release is part of Bayer's Transparency Initiative, which is designed to enhance trust in the science behind crop protection products.

“Trust in the integrity of crop protection science is core to us and our business,” said Liam Condon, member of the Board of Management of Bayer AG and President of the Crop Science Division. “The public is interested in knowing more about how their food is grown and what products are involved in the production of food. As one of the leaders in

agriculture, we have been working diligently to make studies on crop protection substances available beyond regulatory requirements. We want to explain the benefits that science and innovation can deliver in agriculture while championing what's important to people: safe, healthy and affordable food that is produced in an environmentally sustainable manner.”

Bayer is focusing on safety studies submitted under the European Union substance authorization process for plant protection products. On the website you can find the summaries for studies on residues and metabolism (18), environmental fate (32), toxicology (180), and ecotoxicology (88) are available on the website. More information can be found on the [FAQ page](#).

Access to the much more extensive underlying safety study reports will be enabled in 2019; this will include those owned by Bayer and submitted for the review that led to the European substance authorization renewal decision in December 2017.

Over the last 40 years, glyphosate and glyphosate-based formulations have been extensively evaluated for human health and safety. Most of this scientific research on glyphosate was conducted by independent researchers.

For additional research conducted on glyphosate, visit the [European Food Safety Authority](#), the [U.S. Environmental Protection](#) and the [glyphosate task force](#). Background information on glyphosate and its history as a safe and efficient weed control tool for farmers around the world is also available [here](#).

(PrairieFarmer, December 11, 2018)
<https://www.farmprogress.com/business/bayer-releases-glyphosate-safety-studies>

PESTICIDES CONTAMINATE MEDICAL AND RECREATIONAL MARIJUANA

As medicinal and recreational marijuana continue to be legalized in various states, concerns about the safety of the burgeoning industry — how the substance is grown, harvested, processed, distributed, sold, and used — have emerged. Colorado’s recent experience is a case in point: in early December, the state’s Marijuana Enforcement Division (MED) announced two recalls on cannabis products out of concern about their contamination by pesticide residues.

In both cases, the recall announcements from the Colorado Department of Revenue, in conjunction with the Colorado Department of Agriculture (CDA) and the Colorado Department of Public Health and Environment, said that the state agencies “deem it a threat to public health and safety when pesticides that are not on the list of approved pesticides for marijuana use as determined by CDA are applied in a manner inconsistent with the pesticide’s label.” Three off-label pesticides were listed in the recall announcement. Pyriproxyfen was found in samples tested from Colorado Wellness Centers LLC (dba Lush), and bifenthrin and diuron were found in samples from Crossroads Wellness LLC (dba Boulder Botanics). None of those compounds is approved by Colorado for use on marijuana; two are listed as possible carcinogens by the U.S. Environmental Protection Agency (EPA).

At roughly the same time came news out of California of a decidedly human glitch in that state’s recreational cannabis rollout: when the state’s new, mandated, and rigorous cannabis testing protocols became operational on July 1 of 2018, a lab director — at Sequoia Analytical Labs of Sacramento — allegedly began to falsify analyses of hundreds of batches of cannabis that went out to retailers. The alleged fraud continued for some months, without the knowledge of anyone else at the company, until — suspicious because of an unusual format of test reports that were submitted to it — the Bureau of Cannabis Control conducted an unannounced inspection of Sequoia’s laboratory. Reportedly, the lab director

acknowledged that he’d falsified the reports, saying that some testing equipment was not functioning, and that he “just kept thinking [he] was going to figure it out the next day,” according to Sequoia’s general manager. The lab director was fired the day after the inspection, and the company voluntarily surrendered its cannabis testing license for 2018, although it hopes to regain it for 2019.

It is somewhat heartening that Colorado’s recalls represent a relatively cautious approach in response to the discovery of the three prohibited pesticide residues. John Scott of the CDA’s Pesticide Division, remarked, “No one’s done the risk assessments to determine that this specific parts per million on cannabis would still be safe. . . . That’s really the unknown and why we’ve taken the approach — a very precautionary approach.” He also noted that MED may issue more recalls if its enhanced mandatory pesticide testing for growers evidences the need. As increasing numbers of states were legalizing medical marijuana, Beyond Pesticides laid out the concerns — health and safety, and environmental — related to contamination of cannabis with pesticides, as well as a survey of what states were doing by way of regulation, in the Winter 2014–2015 issue of its journal, *Pesticides and You*.

There are multiple (and confusing) layers to the legal cannabis landscape. For starters, legalization of medical or recreational cannabis by states happens within a federal legal system that continues to designate marijuana as a Class I illegal substance. Legal, legislative, and regulatory scrambling in the states — to catch up to a growing industry with which legislation and regulation have not kept abreast — arises in part from this federal conundrum.

Beyond Pesticides has maintained that pesticide use on cannabis is illegal. Because cannabis is not a legal agricultural crop under relevant federal law (FIFRA, the Federal Insecticide, Fungicide, and Rodenticide Act), EPA has not evaluated the safety of any pesticide on cannabis plants. EPA has established no restrictions for pesticides used in cannabis production, and no tolerances, nor any exemptions from tolerances, for allowable pesticide residues on cannabis. As a result, EPA-permitted

pesticide labels do not contain allowances for pesticide use in cannabis production.

As Beyond Pesticides wrote in 2015, “In the absence of federal regulations governing pesticides in cannabis production, the use of pesticides not registered by [EPA] is understood to be illegal. Several states have codified this understanding by adopting policies that prohibit all federally registered pesticides. Other states have taken the position that state policy is unnecessary, since EPA has not registered any pesticides for cannabis production and registered pesticide use is illegal. A review of state laws conducted by Beyond Pesticides finds a patchwork of regulations with varying degrees of protection for consumers and the environment.”

Beyond Pesticides wrote to the Colorado Department of Agriculture in 2015 to detail its objection and highlight the nature of the problem with the agency’s March 2015 issuance of its memo, Criteria for Pesticides Used in the Production of Marijuana in Colorado — a document that set out the parameters of permitting for use of certain pesticides on cannabis crops. Subsequently, Governor John Hickenlooper issued an Executive Order “directing state agencies to address public safety concerns related to pesticide-contaminated cannabis. The next day, the state of Oregon adopted new rules strengthening its requirements for laboratory testing of cannabis for pesticides.”

Colorado, Washington State, and Oregon have all taken steps to list “allowable” pesticides for marijuana cultivation. California began in June 2018 to set out parameters for testing of cannabis; at this juncture, all cannabis for medical and recreational use must be tested for 66 different proscribed pesticides, as well as for other contaminants, such as E. coli, feces, mold, insect and rodent parts, mycotoxins, terpenoids, and heavy metals. The regulatory matrix in the states is dynamic, and events such as Colorado’s recalls and California’s fraudulent lab reporting may spur further adjustments.

A genuinely precautionary approach would go well beyond catching prohibited pesticide (and other) contaminants in cannabis. Particularly absent

thorough federal testing of potential effects of the use of pesticides on cannabis for consumers, producers, and the environment, states should provide clear rules for sustainable production practices that would protect public health and the environment. Beyond Pesticides recommends that states establish laws and/or regulations that mandate a systems-level approach to cannabis production. A requirement, for example, that growers and processors follow the dictates of national organic standards would be prudent, precautionary, and a positive trajectory for the cannabis industry. Read more about Beyond Pesticides’ coverage of cannabis and pesticides here and at its Daily News archival page on the topic. (Beyond Pesticides, December 7, 2018)

<https://beyondpesticides.org/dailynewsblog/2018/12/pesticides-contaminate-medical-and-recreational-marijuana/>

CALIFORNIA JUDGE ADVANCES GLYPHOSATE CANCER CASE

A US state of California judge has agreed to expedite a trial for two plaintiffs who allege that they both developed cancer because of exposure to Bayer legacy company Monsanto’s glyphosate-based herbicides.

California Superior Court Judge Ioana Petrou found that the advanced age of the plaintiffs -- Alva and Alberta Pilliod -- and their relative poor health supported their motion for an expedited trial. The trial is set to begin on March 18th 2019 -- it will be the second California jury to delve into the controversy surrounding the cancer-causing potential of glyphosate, the world’s most widely used herbicide.

The California couple, both in their 70s, allege that frequent use of Monsanto’s Roundup between 1975 and 2011 caused them to develop non-Hodgkin’s lymphoma. Filed in 2017, their lawsuit argues that Monsanto knew glyphosate could cause cancer and failed to provide adequate warning to users of its herbicide products.

Judge Petrou concluded that the plaintiffs are both "very sick" and deserve an expedited trial. "Their current state of health makes it possible, but difficult, for them to travel to Court and participate in the trial," the judge wrote in the November 15th order. "Both have significant cognitive or functional impairments that greatly impact their ability to carry on the functions of everyday living. Both have significant and reasonably founded fears that their health will decline."

Bayer says that while it has "great sympathy for the plaintiffs, we are confident that our glyphosate-based herbicides were not the cause of their injuries and we will vigorously defend them at trial".

Bayer is facing a flurry of litigation brought against Monsanto related to glyphosate. Some 8,700 plaintiffs have filed claims in federal and state courts alleging that they developed cancer because of exposure to Monsanto's herbicides.

In August, a California jury sided with former groundskeeper Dewayne Johnson and ordered Monsanto to pay the cancer victim \$289 million. The judge reduced the award to \$78 million -- Bayer argues that there is little evidence glyphosate can cause cancer and plans to appeal the decision.

Other state cases may come to trial in 2019 and a federal judge in California overseeing the consolidated federal case is scheduled to begin deliberations in late February 2019. (Pesticide & Chemical Policy/AGROW, November 20, 2018)

DICAMBA RULES VARY BY STATE

Pick a state, any state, and chances are the rules for dicamba use there could differ from its neighbors next year.

EPA released federal labels for XtendiMax, Engenia and FeXapan on October 31, and already, a patchwork of additional state restrictions is developing.

Arkansas is weighing a May 20 cutoff date, with large protective buffers for certain sensitive crops. Indiana and Minnesota have both submitted 24(c) special local needs labels to EPA with proposed June 20 cutoff dates. South Dakota has submitted a 24(c) for a June 30 cutoff date, which North Dakota is also considering, and a handful of other states are considering additional steps such as new record-keeping rules and state-specific training requirements.

Whether EPA will approve these state restrictions remains uncertain, however. Recently, the agency has told state regulators that it does not want states to use 24(c) labels to create restrictions beyond federal pesticide labels, because the practice may not be legally sound. (See the DTN story here: [https://www.dtnpf.com/...](https://www.dtnpf.com/)).

So far, only four states have confirmed that they are not pursuing any additional state restrictions on the three dicamba herbicides in question. Missouri announced in a news release in early December that its applicators will follow the federal dicamba labels. Representatives from the Mississippi Department of Agriculture and Commerce, the Illinois Department of Agriculture and the Nebraska Department of Agriculture told DTN that they will not be pursuing 24(c) label restrictions either.

Here are the latest details on state restrictions in development:

ARKANSAS

On Dec. 6, the Arkansas State Plant Board voted to restrict dicamba use from May 21 through October 31. Applications made before May 21 would require a one-mile buffer around research stations, organic and specialty crops, and crops that are not tolerant to dicamba. The new regulations still have to undergo a 30-day public comment period and a public hearing, before being approved by the state legislature and the governor.

But if passed, this regulation would likely increase dicamba use in the state next year. In 2018, Arkansas banned all in-crop use from April 15 through October 31, but still received about 200 dicamba injury complaints.

The Plant Board heard a presentation from Jason Norsworthy, an Extension weed scientist with the University of Arkansas, who showed university data suggesting that volatility of the new dicamba formulations is the primary culprit in off-target dicamba movement.

"I contend today ... that it's the atmospheric loading of dicamba, especially in areas where we've had heavy use of that herbicide, that has contributed to the landscape damage, and it's a function of volatility that we are ultimately dealing with," he told the board.

The original petition for dicamba use in 2019 was brought to the Plant Board by a group of farmers who requested a June 15 cutoff date. The change to May 21 caught some farmers by surprise, noted Charles Williams, a Crittenden County, Arkansas farmer. "I don't think it's a workable solution," he said.

The May cutoff date may give some farmers "the illusion of choice" now and encourage them to buy Xtend seed, only to find they can't get into the field to spray before that date, he said. "I just wanted a decision up or down on the technology," he said.

Jimmy Williams, who grows berries and produce in northeast Arkansas, said the May cutoff date won't protect a lot of early-season crops. "This year, we started picking strawberries on May 15, and it was already 80 degrees -- and then rose to 90 degrees within a week," he said. "It's too late to be used safely."

INDIANA

Indiana pesticide regulators have submitted a 24(c) label to EPA with a late June cutoff date, based on the recommendations of a work group appointed by the Indiana Pesticide Review Board.

"In order to allow for use without causing unreasonable adverse effects on the surrounding environment, applicators must not apply dicamba post-emergent to soybeans after June 20, 2019," the Office of the Indiana State Chemist reported on its website.

Frustrated by ambiguous language on the labels, the regulators are also adding their own definitions to the 24(c) label: "The work group recommended that the terms "neighboring" and "adjacent" used on the labels shall mean any non-dicamba-tolerant soybeans within 1/4 mile and any other sensitive crop or sensitive residential-area plants within 1/2 mile downwind of the application site."

See more details on Indiana's dicamba use in 2019 here: <https://www.oisc.purdue.edu/...>

MINNESOTA

Likewise, the Minnesota Department of Agriculture confirmed on Monday that it is submitting a 24(c) label to EPA with a June 20 cutoff date, which the agency credits with limiting off-target dicamba damage in 2018.

"The decision follows the MDA's ongoing investigations and informal surveys into reports of crop damage from alleged dicamba off-target movement over the past two growing seasons," a department press release stated. "In 2017, the MDA received 253 reports of alleged dicamba drift; 55 of those were formal complaints requesting investigations. Those reports impacted an estimated 265,000 acres. After state restrictions were put in place for the 2018 growing season, the number of complaints dropped dramatically this year to 53 reports, of which 29 were formal complaints. Just over 1,800 acres were impacted in 2018."

Last year, the MDA also banned applications when temperatures rose above 85 degrees, but the agency will not be adding that restriction to the 2019 label.

SOUTH DAKOTA

The South Dakota Department of Agriculture has submitted a 24(c) label to EPA with a June 30 cutoff date, confirmed Tom Gere, agronomy services program manager for the agency.

At a meeting of state regulators in Arlington, Virginia, in early December, Gere said the agency struggled to enforce the R1 growth stage cutoff in 2018 and limit late-season spraying. For 2019, the new dicamba labels ban applications beyond the R1

growth stage or 45 days after planting, whichever comes first.

"Last year in 2018, South Dakota ran with the federal label and we really pushed hard on the R1 stage [restriction], but looking at our stats, the majority of our sales that we've looked at for the last two years resulted in applications that were made after July 1," Gere told EPA.

NORTH DAKOTA

The North Dakota Department of Agriculture is also weighing a 24(c) label with a June 30 cutoff date, although they have not yet submitted it to EPA, said Jerry Sauter, an environmental scientist with the agency. The state had that cutoff date in place last year, and it shouldn't limit growers' options too drastically, Sauter said.

"If you plant soybeans late, the June 30 cutoff will apply, but for most people, that 45-day post-planting window [on the federal label] will be closed by then," he said.

The agency hopes to have its state requirements for dicamba use finalized by the end of the year, added Eric Delzer, director of the agency's pesticide and fertilizer program.

ADDITIONAL STATE REQUIREMENTS

A handful of states are forgoing cutoff dates, but are working to add additional uses or requirements, either via 24(c) labels or new state regulations, said Dave Scott, pesticide program administrator for the Office of Indiana State Chemist.

On a conference call with state regulators and the EPA, a representative from the Texas Department of Agriculture said it is considering a 24(c) label that would extend the 60-day post-planting application restriction for cotton to 90 days, Scott said. The agency is also considering a state regulation that would address state dicamba training requirements.

Likewise, Iowa, Georgia and North Carolina regulators mentioned on the call that their agencies would be pursuing 24(c) labels to specify state

training requirements. Kentucky regulators added on the call that they are considering state regulations that would require additional record keeping for all dicamba products, not just the three new formulations, as well as a new fine structure for pesticide violations.

Finally, the Alabama Department of Agriculture and Industries is planning to pursue a 24(c), that would likely require mandatory state training through the agency and the Alabama Cooperative Extension Service, said Tony Cofer, a pesticide director with the state agency.

State regulators from Illinois had not responded to DTN's inquiries at the time of publication.

See more about state regulators' reactions to the new federal dicamba labels here:

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

(Progressive Farmer, December 12, 2018)

<https://www.dtnpf.com/agriculture/web/Ag/news/crops/article/2018/12/12/another-patchwork-state-dicamba-2019>

CHINA USING COCKROACHES TO ELIMINATE FOOD WASTE

Every day at one company in Jinan, China, 1 billion cockroaches are fed 50 tons of kitchen waste, according to [Reuters](#). Officials there say it's an efficient way to get rid of food waste as cities continue to expand.

The article says expanding Chinese cities are generating more food waste than they can accommodate in landfills, and cockroaches could be a way to get rid of hills of food scraps, providing nutritious food for livestock when the bugs eventually die and, some say, cures for stomach illness and beauty treatments.

The plant that accepts the food waste is Shandong Qiaobin Agricultural Technology Co, which plans to set up three more such plants next year, aiming to process a third of the kitchen waste produced by Jinan, home to about seven million people, according to the article..

A nationwide ban on using food waste as pig feed due to African swine fever outbreaks is also spurring the growth of the cockroach industry, the article added.

[Click here](#) to read the entire article.

(PCT Online, December 12, 2018)
<https://www.pctonline.com/article/china-cockroaches-eliminate-waste/>

Find us on Twitter at
[@OkstatePestEd](#)

CEU Meetings

Date: January 9, 2019

Title: 2019 Annual Oklahoma-Arkansas Turfgrass Short Course

Location: OSU Botanic Garden Education Center Stillwater OK

Contact: Dennis Martin (405) 744-5419

CEU's:	Category(s):
6	1A
6	10

Date: January 21-23, 2019

Title: 2019 OAAA Conference and Tradeshow

Location: Embassy Suites Norman OK

Contact: Sandy Wells (405) 341-3548

CEU's:	Category(s):
4	A
6	1A
3	2
3	3A
3	5
3	6
6	10

Date: January 23-24, 2019

Title: Red River Crops Conference

Location: Childress Event Center Childress TX

Contact: Gary Strickland (580) 477-7962

CEU's:	Category(s):
4	1A
4	10

Date: September 10, 2019

Title: General Pest Services (Defined by label/What does this mean to you?)

Location: Hampton Inn Tulsa, OK

Contact: Donald Stetler (281) 217-2965

www.ensystem.com www.for-thor.com

CEU's: Category(s):

4 3A

2 7A

3 7B

Date: September 11, 2019

Title: General Pest Services (Defined by label/What does this mean to you?)

Location: Hampton Inn Edmond, OK

Contact: Donald Stetler (281) 217-2965

www.ensystem.com www.for-thor.com

CEU's: Category(s):

4 3A

2 7A

3 7B

Date: September 12, 2019

Title: General Pest Services (Defined by label/What does this mean to you?)

Location: Hampton Inn Durant OK

Contact: Donald Stetler (281) 217-2965

www.ensystem.com www.for-thor.com

CEU's: Category(s):

4 3A

2 7A

3 7B

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

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

SW Farm Press Weed Resistance Mgmt in Cotton

<http://www.pentonag.com/CottonWRM>

Western Farm Press ABC's of MRLs

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

Western Farm Press Biopesticides Effective Use in Pest Management Programs

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

Western Farm Press Principles & Efficient Chemigation

<https://agceuonline.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>

ODAFF Test Information

Pesticide applicator test sessions dates and locations for January/February are as follows:

January		February	
3	Tulsa	5	McAlester
8	OKC	5	Goodwell
8	McAlester	12	OKC
9	Lawton	13	Lawton
24	Enid	14	Tulsa
24	Tulsa	28	Tulsa
29	OKC	28	Enid

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

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

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

Tulsa: Tulsa County Extension Office
4116 E 15th St. (**New Location**)

Pesticide Safety Education Program