

PESTICIDE REPORTS

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

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EPA SEEKS PUBLIC COMMENT ON MEASURES TO ADDRESS HUMAN HEALTH AND ECOLOGICAL RISKS POSED BY DIURON

The U.S. Environmental Protection Agency (EPA) is releasing the proposed interim decision (PID) for the pesticide diuron. The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) requires EPA to review pesticides every 15 years to ensure that risk assessments reflect the best available science, and to ensure that registered products in the marketplace do not present unreasonable adverse effects to human health and the environment. The PID is part of a multi-step process to identify risks of concern as well as actions that can mitigate these risks.

Diuron is used as an herbicide to control annual and perennial broadleaf and grassy weeds in a variety of agricultural sites and non-agricultural sites (e.g., rights-of-way, utilities, and roadways) as well as a harvest aid (defoliant) in cotton and an algaecide in commercial fish production. The pesticide also has antimicrobial uses as a mildewcide and materials preservative in paints, stains, coatings, adhesives, and sealants.

The 2021 revised draft [human health risk assessments](#) identified dietary and aggregate (i.e., combined dietary and residential painting exposures) cancer risks of concern when used on crops, non-agricultural sites, and residential exterior paint uses. These risk assessments also identified occupational non-

cancer and cancer risks of concern from use on crops and occupational cancer risks of concern from paint uses. Additionally, the 2021 revised [ecological risk assessments](#) identified risks of concern to birds and mammals (from consumption of food items on treated fields and off-field risk from spray drift); to terrestrial plants (from runoff and spray drift from treated fields); and to fish, aquatic invertebrates, and aquatic plants (from runoff and sediment from treated fields and from exterior paint uses).

- Based on the revised draft risk assessments and feedback submitted during the public comment period, EPA is proposing the following new measures to mitigate the ecological, dietary, and aggregate cancer risks of concern:
- Terminate all herbicide uses on food and feed crops to address dietary and aggregate risks of concern to the general public and ecological risks of concern;
- Terminate all herbicide uses on non-food agricultural sites (e.g., ornamentals) and on all non-agricultural sites (e.g., rights-of-way, utilities, roadways) to address dietary and aggregate risks of concern to the general public and ecological risks of concern; Terminate the use as an algaecide for commercial fish production to address dietary risks of concern; and
- Revoke all food and feed tolerances to address dietary risks of concern to the general public (except for a single tolerance to support the remaining cotton harvest aid use).

There are many alternative herbicides available for important use sites such as cotton, asparagus, blueberry, citrus, and non-agricultural sites. More limited alternatives are available for use on pineapple and in commercial fish production.

EPA also identified risks of concern for occupational painters, and the Agency is proposing new mitigation measures that:

- Reduce application rates;
- Require personal protective equipment (PPE) language to be included on the paint can labels

to protect occupational painters using airless spraying equipment; and

- Require registrant-sponsored applicator stewardship plans aimed at educating occupational painters on the proper use of PPE while using such equipment.

EPA is not proposing changes at this time to diuron's registrations as a cotton harvest aid (defoliant) and use in aquariums/containerized ponds in residential settings because these uses don't present dietary or aggregate risks of concern. The Agency will also allow for the continued use of diuron for the antimicrobial uses because the proposed mitigation addresses risks of concern for painters and reduces ecological risks.

Upon publication of the Federal Register notice, public comments will be accepted for 60 days in the diuron registration review docket ID number [EPA-HQ-OPP-2015-0077 WEBSITE](#) at [www.regulations.gov](#). EPA will carefully consider public input when evaluating the proposed PPE and stewardship plans as these mitigation measures will likely be used to mitigate risks for other biocides used in paints and coatings.

After considering comments on the PID, the next step in the registration review process will be to proceed with the interim decision, which finalizes any required risk mitigation measures to address human health and ecological risks of concern.

(EPA, April, 28,2022)

<https://www.epa.gov/pesticides/epa-seeks-public-comment-measures-address-human-health-and-ecological-risks-posed-diuron>

EPA ANNOUNCES PLAN TO PROTECT ENDANGERED SPECIES AND SUPPORT SUSTAINABLE AGRICULTURE

Today, the U.S. Environmental Protection Agency (EPA) released its first-ever comprehensive workplan to address the decades-old challenge of protecting endangered species from pesticides. The plan establishes four overall strategies and dozens of actions to adopt those protections while providing farmers, public health authorities, and others with access to pesticides.

“Today’s workplan serves as the blueprint for how EPA will create an enduring path to meet its goals of protecting endangered species and providing all people with safe, affordable food and protection from pests,” **said EPA Administrator Michael S. Regan.**

“The workplan reflects EPA’s collaboration with other federal agencies and commitment to listening to stakeholders about how they can work with the Agency to solve this longstanding challenge.”

“The workplan announced today will allow us to better protect wildlife, imperiled species, and ecosystems” **said White House Council on Environmental Quality Chair Brenda Mallory.** “I look forward to continuing to work collaboratively across the federal government to better protect wildlife from extinction and minimize the impacts of pesticides.”

“USDA appreciates the steps EPA is taking today. We are confident that EPA can streamline ESA consultations around pesticides in a way that continues to conserve wildlife while allowing farmers access to the tools they need to produce the food and fiber that all of us rely on,” **said USDA Under Secretary for Farm Production and Conservation Robert Bonnie.**

“The U.S. Fish and Wildlife Service is eager to help EPA achieve its vision to protect federally listed threatened and endangered species while fulfilling its obligations related to authorizing the safe use of pesticides,” **said Martha Williams, U.S. Fish and Wildlife Service Director.**

“NOAA supports the Environmental Protection Agency’s ESA-FIFRA workplan and looks forward to continued collaboration with our interagency partners to ensure the protection of federally listed species and their habitats. Implementation of this work plan will lead to a more consistent and timely regulatory process, and better outcomes for our species and our partners,” **said NOAA Administrator Rick Spinrad, Ph.D.**

EPA has an opportunity and an obligation to improve how it meets its duties under the Endangered Species Act (ESA) when it registers pesticides under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). For most of EPA’s history, the Agency has met these duties for less than five percent of its FIFRA decisions. This has resulted in over 20 ESA lawsuits against the Agency, which have increased in frequency in recent years, creating uncertainty for farmers and other pesticide users, unnecessary expenses and inefficiencies for EPA, and delays in how EPA protects endangered species.

EPA currently has over 50 pesticide ingredients, covering over 1,000 pesticide products, with court-enforceable deadlines to comply with the ESA or in pending litigation alleging ESA violations. Completing this work will take EPA past 2040, yet the work represents less than five percent of all the FIFRA decisions in the next decade for which ESA obligations exist. This is an unsustainable and legally tenuous situation, in which EPA’s schedule for meeting its ESA obligations has historically been determined through the courts. The workplan must provide a path for the Agency to meet those obligations on its own, thus protecting endangered species while supporting responsible pesticide use.

Today’s workplan also sets a new vision for a successful ESA-FIFRA program that focuses on protecting species under the ESA, while minimizing regulatory impacts to pesticide users, supporting the development of safer technologies to control pests, completing timely FIFRA decisions, and collaborating with other agencies and stakeholders on implementing the plan.

The workplan describes four strategies and multiple actions to further the vision.

- A key strategy is for EPA to meet its ESA obligations for all FIFRA actions that invoke ESA. Because EPA does not have the capacity or scientific processes in place to meet all these obligations immediately, it has identified the FIFRA actions that are the highest priority for fulfilling its ESA obligations. These include actions with court-enforceable deadlines and new registrations of conventional pesticides.
- A second strategy is to improve approaches to identifying and requiring ESA protections, especially for species facing the greatest risk from pesticides.
- A third strategy is to improve the efficiency and timeliness of the ESA consultation process for pesticides, in coordination with other federal agencies.
- And the final strategy is to engage stakeholders more effectively, to better understand their pest control practices and implement species protection measures.

EPA needs the help of other federal agencies, state agencies, and stakeholders to implement these actions. Through the workplan, EPA is describing its future directions in the hope of collaborating with all these organizations on implementation. Over the coming months, EPA will engage with a wide range of stakeholders to identify opportunities for collaboration and will continue seeking input on more effective and efficient ways to meet its ESA obligations. The workplan is a living document that EPA will periodically revisit to incorporate lessons learned from implementation.

[Read the workplan.](#)

Background

Under the Biden-Harris Administration, EPA has begun taking unprecedented steps to fully meet its ESA obligations when registering pesticides, including:

- In November 2021, EPA worked with the U.S. Department of Agriculture, Department of the

Interior, Department of Commerce, and Council on Environmental Quality to [reconvene](#) the ESA-FIFRA Interagency Working Group established under the 2018 Farm Bill. In January 2021, the group held its first-ever stakeholder meeting in the form of a [public listening session](#) with over 500 participants. The group is evaluating feedback from the event and determining next steps.

- In January 2022, EPA [renewed the registrations](#) of two herbicide products for the 2022 growing season while incorporating robust measures to protect non-target plants and animals under FIFRA and the ESA.
- In January 2022, EPA [announced](#) that before it registers any new conventional pesticide active ingredient, the Agency will meet its ESA obligations, including by evaluating potential effects on ESA-listed species and, where necessary, initiating ESA consultation with the federal wildlife agencies.
- In March 2022, EPA announced that it will [begin taking steps](#) to protect endangered species in response to the U.S. Fish and Wildlife Service's biological opinion for the insecticide malathion. The opinion represents a major milestone in EPA's collaboration with the Service on the first-ever completed nationwide consultation between the agencies.

In addition to these measures, EPA has held numerous internal strategy sessions and workshops to identify practical steps the Agency will pursue under the ESA-FIFRA workplan. In the coming months, EPA will offer more details on implementing the workplan, especially actions to adopt mitigation earlier in its FIFRA process and to meet its ESA obligations when reevaluating pesticides every 15 years.

[Learn more about EPA's work to protect endangered species from pesticides.](#)

(EPA, April 12, 2022)
<https://www.epa.gov/newsreleases/epa-announces-plan-protect-endangered-species-and-support-sustainable-agriculture>

WHAT AG CAN LEARN FROM ENLIST

Zack Rendel is walking a little lighter on his feet this week after EPA reversed course and announced on March 29 that farmers in 134 previously banned counties may use Enlist herbicides in 2022.

"I can't tell you how big a weight came off my shoulders," the Miami, Oklahoma, farmer told DTN. Rendel will now be able to use Corteva Agriscience's 2,4-D-choline herbicides on his soybean acres, which are devoted to the Enlist E3 platform this year. "I can't be quite as excited as I want to be, though, because I know there are still farmers out there who will not be able to spray it in counties that are still banned," he added.

About 40 counties in Arizona, Colorado, Florida, Tennessee and south-central Texas still face these county-level prohibitions due to risks to certain endangered species, confirmed Corteva's U.S. Marketing Lead Cynthia Ericson. "We're continuing to work on generating and providing data to EPA ... and continue to pursue getting more of those counties back on label," she told DTN.

And don't expect Rendel to relax anytime soon.

"We just jumped a big hurdle that came out of nowhere," Rendel said of the EPA's release of the new Enlist labels in January, with county-level restrictions that took the industry off guard. "We're good for now, but what's the next chemical we have to worry about losing because of the Endangered Species Act?"

It's a question on a lot of minds in agriculture, as EPA unrolls a new policy of fully complying with the Endangered Species Act (ESA), which means evaluating risks to every listed species and critical habitat for new active ingredients -- and for chemicals up for re-registration, such as the Enlist herbicides were.

The goal is pesticide registrations that will be less vulnerable to lawsuits and, as a result, more reliably available to farmers, representatives from Corteva and EPA told DTN. Other commonly used herbicides, such as glyphosate and atrazine, are in the final stages of the

ESA evaluations now, and some, such as dicamba, are slotted to begin this year.

In some ways, these sources noted, the Enlist label rollercoaster was unique, namely in the quick turnaround by the agency and the timing of the decision so close to spray season. But other aspects of it, such as the county-level bans and other new label rules, are indeed the new normal for farmers and pesticide use.

THE NEW NORMAL

EPA is in new regulatory territory as it actively works with regulatory partners, U.S. Fish and Wildlife Service and the National Marine Fisheries Service, to create a work map that will create a predictable path through endangered species risk assessments, noted Rod Snyder, agriculture advisor to the EPA. "It will shed a lot of light on what we think we can do, what timelines we're looking at, mechanisms we would follow, and schedules of registration reviews," he said. (See more on what EPA's new policy of complying with the Endangered Species Act means here: <https://www.dtnpf.com/...>)

But for now, it's hard for farmers and industry to know exactly what lies ahead, Corteva's Ericson noted.

"We're kind of in uncharted water the entire Endangered Species Act," she said. "We'll have to learn as we go and learn what EPA needs from us."

For Rendel, the most startling experience was discovering that old and trusted chemistries, such as 2,4-D, might face new and unforeseen restrictions, as they wind their way through endangered species risk assessments. "That's the thing that puts me on heightened alert," he explained. "2,4-D has always been one of the safest pesticides I've used. It's one I never thought would be on the radar."

And indeed, many of the things on the Enlist labels, such as county-level prohibitions on use and "pick lists" of drift and run-off mitigations, such as riparian buffers, are likely to surface on other pesticide labels moving forward, Snyder said.

"The Enlist label was, in some respects, a very early example of trying to address those ESA concerns through the re-registration process rather than waiting on a court order," he said, noting that, "in the long term, we believe it will create more predictability and stability to these registrations and more legal defensibility."

Ericson agreed. "The good news is we have what we think is a legally defensible label, and it is worth the additional time in hopes that it provides better certainty for farmers that the products they use will be here and not taken to the courts over the ESA."

WHAT WAS UNIQUE TO ENLIST

The unveiling of county-level bans on the new Enlist labels, which took farmers off guard in January, was far from ideal, Ericson conceded. The company hopes it's not a scenario that will be repeated again.

"The reality was that we were working on collecting that data, but ran out of time on Jan. 11," when the old Enlist labels expired, she explained.

Corteva worked swiftly through the winter months to generate and supply new data to EPA on the endangered species in question, the American Burying Beetle and the Eastern Massasauga rattlesnake, and asked the agency to re-open the registration and consider it.

At the same time, EPA's partner agency, U.S. Fish and Wildlife Services, provided EPA with updated range maps for those two species, Snyder noted, which removed much of the risks to them in 134 of the banned counties.

That's largely why EPA was able to move decisively to put those counties back on the label, Snyder explained. "The science was crystal clear," he noted. But the speed with which EPA moved toward a March release of those label changes was a testament to the agency's awareness of the unique pressures on farmers this season, he added.

"There was real commitment in this instance to do whatever we could to address this year's growing season," he noted. "Also, there are clearly supply chain concerns that we have heard loud and clear from the grower community."

FARMERS MAY HAVE NEWFOUND ACCESS TO EPA

Snyder has noted before that the Enlist labels provoked robust lobbying from ag trade and commodity groups, state agriculture officials and farmers. (See more here: <https://www.dtnpf.com/...>). That this advocacy may have helped convince the agency of the urgency of the situation impressed Rendel.

"I think the voice of the American farmer is a lot bigger than some people think -- even us fringe acre farmers," he said. "It was amazing to see so many of the ag groups go to bat for us."

As EPA navigates a new regulatory path on endangered species, farmers and ag stakeholders do have a unique chance to make their voice heard, Snyder noted. The 2018 farm bill created an interagency work group to help EPA integrate ESA compliance into its regulatory framework, he noted. That working group has already conducted its first listening sessions on its new ESA policy in January, which netted 700 participants, many from agricultural backgrounds.

"That was an extremely valuable session for all the agencies to get a sense of where folks in ag and the environmental community are with how they view these issues and where they think there are opportunities for improvement," Snyder said. "And all of that has contributed to the work plan that is now under development. We're committed to this in a really significant way."

See more on that listening session here: <https://www.epa.gov/...>

(Progressive Farmer, April 5, 2022)
<https://www.dtnpf.com/agriculture/web/ag/crops/article/2022/04/05/enlist-herbicide-regulatory-holds>

UNIVERSITY OF NEBRASKA ENTOMOLOGIST DEVELOPING NEXT-GENERATION MOSQUITO BAIT STATION

The Bill and Melinda Gates Foundation awarded University of Nebraska–Lincoln a three-year, \$1.43 million grant to support the development of a more effective mosquito bait station.

Bait stations look simple but are a major tool in mosquito mitigation. In many cases, they're rectangular devices about the size and shape of a piece of printer paper, with a thin membrane containing a combination of odorant and sugar for insect attraction plus a toxicant lethal to the insect. Mosquito bait stations can be placed on the outside wall of a home or on poles.

To develop a next-generation bait station prototype, Anderson and his colleagues will test variations in membrane composition, station design and attraction elements to determine the most effective combination. Reduced insecticide efficacy has "increased the need to develop technologies to reduce and eliminate mosquito-borne pathogen transmission," Anderson, an expert in insect toxicology, said. "This work focuses on the development and introduction of an insecticide delivery technology to insecticide-resistant mosquito populations for the purposes of preventing community transmission of malaria."

Researchers will follow up by conducting field tests of prototype stations in Nebraska, Florida and Costa Rica.

Stronger mosquito mitigation technology is needed because recent years have reversed positive trends for malaria prevention achieved earlier this century.

Between 2000 and 2015, the World Health Organization reported, many nations achieved a significant decline in the global incidence of this debilitating and often fatal disease. But in recent years, key global indicators such as total deaths, total cases and the number of cases per 1,000 people have worsened, according to WHO's "Global Technical Strategy for Malaria 2016-2030."

Malaria cases in 2020 totaled an estimated 241 million, primarily in sub-Saharan Africa, up from 227 million in 2019. Deaths from malaria totaled an estimated 627,000 adults and children in 2020, according to WHO figures. That was a 12% increase from the year before. The COVID-19 crisis disrupted efforts at mosquito mitigation in some countries, as did humanitarian emergencies.

Malaria each year strikes more than 25 million pregnant women, raising multiple health concerns for the mother and her child. One of malaria's most harmful effects is that the disease greatly increases the chances of low birthweight for newborns. In 2020, WHO reports, malaria infections resulted in low birthweight conditions for 819,000 newborns.

As part of the effort to protect vulnerable populations, the majority of pregnant women and young children in sub-Saharan Africa now sleep each night under insecticide-treated mosquito nets. But a growing number of countries report increased mosquito resistance to conventional insecticides used against them.

To achieve renewed progress on this global public health need, new tools are needed to combat malaria, with increased investment in research and development a key part of that effort, WHO Director General Tedros Adhanom Ghebreyesus wrote in his organization's "Global Technical Strategy for Malaria 2016-2030."

Anderson's project to develop an effective attractive toxic sugar bait station aims to provide one of the new tools in that fight.

"We will consider this work successful if we can achieve a 70% or greater reduction in community mosquito populations and sustain this reduction of mosquito numbers for several months," Anderson said.

The next-generation bait station being developed by Anderson and his colleagues "does have applications for reducing mosquitoes in other communities, such as in Nebraska," Anderson said. "It would target not only nuisance mosquitoes, but also those that carry West Nile virus."

Since early in his academic career, Anderson said, “I’ve been interested in the discovery and development of chemical interventions that reduce pathogen-transmitting arthropods and community transmission of disease. This work has been a broad interest of mine since I was a student.”

With adequate investments, strong political commitment and the proper mix of strategies, the world can make major strides in combatting the malaria threat, WHO Director General Ghebreyesus has written. Anderson’s cutting-edge research has the potential to provide a key asset in that global campaign.

(PCT Online April 13, 2022)

<https://www.pctonline.com/article/university-nebraska-mosquito-research-project/>

WEAR PROTECTIVE GEAR WHEN WORKING WITH PESTICIDES

The hurry to get an agriculture chemical in the ground before the next rain finds many farmers rushing. While you read and follow label instructions for application parameters, you may be glossing over one key part of that label — personal protective gear.

According to the Upper Midwest Agricultural Safety and Health Center, pesticides can be serious irritants to skin, eyes and lungs, and can affect your internal organs and your health in the short and long term. So, farmers and farm employees need protection.

In a recent Ag Connection Newsletter, University of Missouri Extension agronomy specialist Dhruva Dhakal outlined five pieces of personal protective equipment farmers should consider using this spraying season:

1. Gloves. Pesticide labels generally specify the type of gloves needed. Dhakal recommends farmers use chemical-resistant unlined gloves during pesticide handling and application. Cotton, leather and canvas

gloves do not provide protection when handling and applying pesticides.

2. Body protection. To protect the front of your body, wear a chemical-resistant apron when mixing, loading and cleaning equipment. For some products, an apron is required, along with other protective clothing to protect against spills. Make sure aprons are made from chemical-resistant PPE materials. Also, Dhakal notes they are more protective than cotton and polyester aprons.

“Disposable coveralls have become increasingly popular because of their low cost, availability and ease of use,” he adds. “They should be discarded at the end of each workday.”

3. Footwear. While some pesticides can be used with simple shoes and socks, others require the applicator to wear “chemical-resistant footwear, plus socks.” Chemical-resistant boots are the most protective footwear, Dhakal says. Natural rubber, which may be coated with polyurethane, polyvinyl chloride or blends of these materials, make up these types of shoes. Shoe covers can also be used over footwear that is not chemically resistant, such as fabric and leather shoes.

4. Eye and face protection. “Common sense should determine which type of protective eyewear is appropriate,” Dhakal says. Excluding the full-face respirator, there are three basic types of protective eyewear — chemical splash goggles, face shields and shielded safety glasses.

Safety glasses provide minimal protection, he explains, and should only be used when handling the least toxic pesticides. “Chemical splash goggles always provide better eye protection than safety glasses,” he adds. Face shields can be used with safety glasses or goggles for protection against pesticide splashes.

5. Respiratory protection. Use only respirators approved by the National Institute of Occupational Safety and Health and the Mine Safety and Health Administration. Approved respirators will carry a “TC” number prefix, which signifies they have been tested and certified for a specific level of protection, Dhakal explains.

There are two types of respirators: air-purifying and air-supplying. “Air-purifying respirators should be used where there is sufficient oxygen,” he says. “They remove airborne contaminants as air enters the respirator through chemical cartridges or mechanical filters. The chemical cartridges are filled with activated carbon, which has a very high absorption capacity for gases and vapors. Mechanical filters provide protection by trapping particulate matter in the fibrous filter material.”

An air-supplying respirator supplies an independent source of breathable air and is used in conditions where oxygen is deficient or the applicator is exposed to high concentrations of very toxic pesticides in enclosed areas.

To learn more about personal protective equipment, refer to University of Missouri guide 1917 at extension.missouri.edu.

Read the label

Every pesticide product label contains specific information about necessary clothing and equipment to be worn while mixing, loading and applying that product.

This information may be found in the "Precautionary Statements" section of the label. The label is the law. Farmers must read it and wear the appropriate protective equipment.

For more detailed information about chemical and physical hazards associated with a specific pesticide, read the Safety Data Sheet for that product. The SDS is available from the pesticide dealer.

The University of Missouri Extension contributed to this article

(Southwest FarmPress, March 29, 2022)
<https://www.farmprogress.com/safety/wear-protective-gear-when-working-pesticides>

CU BOULDER ENGINEERING STUDY FINDS AT LEAST NINE PESTICIDE CHEMICALS NEAR BOULDER COUNTY HOMES

Paul M. Rady Department of Mechanical Engineering researchers have identified at least nine pesticide chemicals in the air around Boulder County homes that humans and their dogs have been exposed to.

The air quality study, led by PhD candidate [Aniya Khalili](#) and funded by a [University of Colorado Boulder Outreach Award](#), tracked the chemicals that people and their dogs came into contact with in fall 2021. The 38 human-dog pairs that participated in the study had to wear wristbands and dog collar clips for a week that contained sampling tubes to measure the pesticides around them.

“We used high-resolution mass spectrometry to analyze the samples,” said Khalili. “The results showed that of the 15 compounds we were testing for, we detected nine of them. Three of them were detected in all the human and dog samples.”

The three compounds identified in all 76 samples were n-nitrosodiphenylamine, 4-nitroaniline and 4-chloroaniline. Each of those compounds can be found in pesticides and could pose various health risks including eye, skin and respiratory tract irritation. Very high and repeated exposures may damage the liver and kidneys, according to the EPA.

Mechanical Engineering PhD candidate [Aniya Khalili](#) documents the results of her study.

Khalili handles one of the dog collar clips that tracks the chemicals in the air.

“These results could mean that the chemicals are in the air since the 38 people are not living together and have different lifestyles,” said Khalili. “If they are exposed to the same compound, it could say something about the community that we are living in.”

The study also detected DDD in one human and two dogs, and DDT in two humans and one dog, even though the United States has banned the use of both due to damage to wildlife. The [EPA has said](#) that "after the use of DDT was discontinued in the United States, its concentration in the environment and animals has decreased, but because of its persistence, residues of concern from historical use still remain."

"The fact that we even have detected DDD and DDT in any of the participants' samples is a big deal," said Khalili. "There is a 99% correlation between the dogs and their owners that were exposed to DDD and DDT, and yes, it is a small percentage out of the 38 pairings in the whole study. But we shouldn't be exposed to those compounds at all."

Khalili's study focused on detecting the compounds rather than identifying where they are coming from. She noted the chemicals could have originated from pesticides, dog tick and flea medications, or industrial sources.

Khalili conducted this research after seeing several yellow flags on people's yards around Boulder indicating that chemicals had recently been applied. She wanted to educate the community about the compounds that are in some of those pesticides and inspire people to live cleaner lifestyles.

Many of the participants have told Khalili that they are already being more conscious about using pesticides around their homes to protect themselves and their dogs. Khalili said she's proud and excited to see community members taking this next step. Moving forward, she wants to promote even bigger changes.

"I would love to see the regulations around the compounds in these products that we use for gardening be revised," said Khalili. "It wouldn't happen overnight. We would need more studies to ensure that policymakers can rely on the results and make a change. I'd like to not see those yellow flags around anymore."

Khalili partnered with the [City of Boulder](#) and [Healthy Baby Bright Futures](#) to recruit participants and design the deployment of the study, since the city and organization are well connected with the community.

Both collaborators also had a stake in the research, as they were interested in seeing what compounds are in their air.

"It was important to work with the City of Boulder because they could be empowered to make changes to regulations," said Khalili. "With Healthy Baby Bright Futures, it was an educational opportunity. Our study can help teach mothers to not let their babies crawl on chemically treated grass, for example."

The research was very community friendly and accessible. The wristbands were easy to wear, had no electronics in them and did not collect personal or private information. The study could also be used as a baseline to analyze the change in air quality following wildfires in Boulder County, such as the Marshall Fire at the end of 2021.

The researchers are now applying for funds to repeat the study in spring 2023 and Khalili expects the results will be different. This will likely be due to most pesticides being applied during that time of year, more people getting outside in warmer weather and decreased COVID-19 protocols.

"My hope is that this won't be the last research regarding pesticides – it's just the start," said Khalili. "The benefits are for the community, as long as the people in power pay attention to the results."

Read more information about pesticide ingredients, regulations, and ways to help protect our health and environment on the [EPA website](#).

(University of Colorado Boulder April 28, 2022)
<https://www.colorado.edu/mechanical/2022/04/28/cu-boulder-engineering-study-finds-least-nine-pesticide-chemicals-near-boulder-county>

CEU Meetings

Please note that many of these meetings are now being done virtual. Please contact the meeting host directly if you have any questions.

Date: May 5, 2022

Title: Payne County Improving Forages and Crops with Herbicides

Location: Payne County Stillwater, OK

Contact: Nathan Anderson (405) 747-8320

CEU's:	Category(s):
2	1A

Date: June 9, 2022

Title: Oklahoma Pecan Growers Association Annual Conference

Location Ardmore Convention Center Ardmore, OK

Contact: Becky Carroll (405) 744-6139

CEU's:	Category(s):
2	1A
2	10

Date: September 28, 2022

Title: ENSYSTEX 2022 CEU Workshop

Location: Hilton Garden Inn· Oklahoma City OK

Contact: Don Stetler (281) 217-2965

<https://ceuworkshop.com/>

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

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

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/>

Veseris

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

AG CEU Online

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

Target Specialty Products Online Training

<https://www.target-specialty.com/training/online-training>

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

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 <https://bit.ly/3sF4y0x>.

Reservation must be made in advance at www.psiexams.com/ or call **855-579-4643**

PSI locations.

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

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

Norman Moore Norman Technology Center, 4701
12th Ave NW, Norman, Oklahoma, 73070

South Penn - Moore Norman Technology Center
13301 S. Pennsylvania, Oklahoma City, OK 73170

If you have questions on pesticide certification. Please
email or call:

Kevin Shelton
405-744-1060 kevin.shelton@okstate.edu or

Charles Luper
405-744-5808 charles.luper@okstate.edu
Find us on Twitter at @OkstatePestEd

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