OKLAHOMA COOPERATIVE EXTENSION SERVICE

PESTICIDE REPORTS

Division of Agricultural Sciences and Natural Resources • Oklahoma State University
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July, 2023 **CHEM**

EPA RELEASES RISK ASSESSMENT SHOWING SIGNIFICANT RISKS TO HUMAN HEALTH FROM THE HERBICIDE DCPA

Today, the U.S. Environmental Protection Agency (EPA) is taking an important step to determine whether the herbicide dimethyl tetrachloroterephthalate (DCPA) can continue to be used safely in light of significant health risks identified. The Agency is releasing and requesting public comment on an Occupational and Residential Exposure (ORE) assessment on pesticide products containing DCPA, showing risks to workers and others exposed to the pesticide, with the most serious of risks to the fetuses of pregnant individuals. Additionally, EPA is releasing a companion document summarizing EPA's ongoing review of DCPA, the health risks the Agency has identified, and potential next steps for the Agency. Given the potential for serious, permanent, and irreversible health risks, EPA is considering whether feasible mitigation measures exist that would address these potential risks or whether canceling the registration of all products containing DCPA is necessary. Given the potential that cancellation of this pesticide could take several years to complete, EPA is releasing this assessment in order to provide the public with timely information about its risks.

Background on DCPA

DCPA is an herbicide registered to control weeds in both agricultural and non-agricultural settings. Agricultural crops include cole crops (e.g., broccoli, Brussels sprouts,

cabbage), onions, and other vegetables. Non-agricultural uses include non-residential turf and ornamentals.

DCPA is currently undergoing registration review, a process that requires re-evaluation of registered pesticides every 15 years to ensure that as the ability to assess risk evolves and as policies and practices change, pesticides continue to meet the statutory standard of causing no unreasonable adverse effects on human health or the environment.

The data EPA examined showed that the dose that caused adverse effects in the fetuses of pregnant rats exposed to DCPA was very low, and these effects were observed at a dose lower than the dose that affected the pregnant rats themselves. Significant thyroid hormone changes were observed in the fetuses in a 2022 study that EPA had ordered the registrant for DCPA to conduct in 2013. In general, changes in fetal thyroid hormones are linked to low birth weight, impaired brain development, decreased IQ, and impaired motor skills observed later in life. These thyroid hormone effects are harmful to the fetuses of individuals of child-bearing age that could be exposed to DCPA. The differences in the doses affecting the pregnant rats and their fetuses, extrapolated to humans, mean that a pregnant individual could be exposed to DCPA without experiencing adverse health effects to their own body, while the fetus being carried could experience permanent and significant lifelong adverse effects.

In 2013, the Agency issued a Data Call-In to the pesticide registrant, AMVAC, requiring it to submit more than 20 studies to support the existing registrations of DCPA. Between 2013 and 2021, numerous studies submitted by AMVAC were deemed insufficient by the Agency, and some studies, including the thyroid toxicity test, had not been submitted. In April 2022, EPA issued a Notice of Intent to Suspend (NOITS) for the DCPA technical-grade (high-concentration) product based on the registrant's failure to submit the complete set of required data, leaving large uncertainties in risk estimates, including data on DCPA's thyroid toxicity. In August 2022, after the issuance of the NOITS, the Agency received the thyroid toxicity data that showed the significant changes in the fetal thyroid effects discussed above.

Occupational and Residential Exposure Assessment and Companion Document

The Agency found that based on the currently allowed uses of DCPA, there is potential for some people to be exposed to DCPA at levels approaching those that, based on the rat thyroid toxicity test, are expected to result in adverse effects in humans. For the most common uses of DCPA, there are risks of concern for workers applying and supporting applications of DCPA, using typical equipment at the maximum application rate, even when personal protective equipment and engineering controls are used. There are specific concerns for the fetuses of pregnant individuals who apply DCPA. Based on current labels, some pregnant individuals could be subjected to exposures from 10 to 1,500 times greater than what is considered safe.

Furthermore, risks to fetuses of individuals entering areas where DCPA has already been applied (post-application workers involved in tasks such as transplanting, weeding, and harvesting) are of concern. In addition, living near areas treated with DCPA could also put the fetuses of pregnant individuals at risk. While DCPA does not appear to be widely used on turf, based on the current label directions that allow such use, there are also potential risks of concern for individuals using turf golf courses and athletic fields long after DCPA is applied. The labels currently specify that entry into treated fields must be restricted for 12 hours after application. However, for many crops and tasks, levels of DCPA in the previously treated fields remain of concern for 30 days or more.

In addition to the ORE assessment, EPA is releasing a companion document that summarizes the Agency's findings from the thyroid toxicity data received in response to a DCPA Generic Data Call-in and explains the regulatory approach the Agency is considering to address the risks identified in the ORE assessment, in line with the Agency's commitment to sound science and protecting human health. EPA is also publishing relevant supporting documents, including an analysis of the benefits associated with the use of DCPA. Given the breadth and severity of the potential risks identified by the Agency, the Agency's current efforts are to determine whether effective and feasible mitigation strategies exist to fully address these risks, and barring any new information provided by public comments, the

Agency is considering whether cancelation of all uses and registrations for products containing DCPA is necessary.

Upon publication of the Federal Register notice, EPA will accept public comments on the ORE assessment and its anticipated regulatory approach for DCPA for 30 days—with no extension—in docket EPA-HQ-OPP-2011-0374 at www.regulations.gov. EPA will carefully consider public input when addressing these risks. The Agency is committed to transparency as it moves forward with regulatory action on DCPA and will keep the public advised of prospective actions in the registration review process for DCPA.

View the DCPA docket. (EPA, May 31, 2023) https://www.epa.gov/pesticides/epa-releases-risk-assessment-showing-significant-risks-human-health-herbicide-dcpa

EPA RELEASES NEW INTERACTIVE MAPS OF DATA USED IN ENDANGERED SPECIES ACT ASSESSMENTS

The U.S. Environmental Protection Agency (EPA) is making the geographic data used to conduct Endangered Species Act (ESA) assessments for pesticides publicly available for the first time via interactive maps. The maps and underlying data that EPA is releasing today support the Agency's broader efforts to improve protections for federally threatened or endangered (listed) species as outlined in the ESA Workplan and increase transparency in EPA's pesticide review process. These data are not new. Rather, EPA is making existing data broadly accessible and providing a new tool to help users access the data. The maps also show which crops are grown near these species and habitats, which can help users determine which pesticides might be used in these areas. EPA relies on the Fish and Wildlife Service and National Marine Fisheries Service (the Services) for information on the biology and location of listed species. As the Services continue to learn more about where some listed species are likely located, information will be updated and refined in the maps.

Geographic Information Systems (GIS) play an important role in ESA assessments. GIS are computer-based tools used to store, visualize, analyze, and interpret geographic data, such as where listed species occur. EPA uses these data to understand the distribution of listed species and gauge their potential to be exposed to pesticides at use sites.

Until today, EPA was technologically unable to release all its ESA GIS data because of the amount of data involved, but advances in technology have allowed EPA to overcome this problem. The maps EPA is releasing today allow anyone to access the GIS data online, and are particularly useful for federal, state, and local governments, tribal partners, environmental organizations, and pesticide registrants who want to conduct their own endangered species analysis.

The new maps are interactive, allowing users to filter and explore the data in real-time, and can be shared with others through a web link or embedded in a website or app. Engaging the public and stakeholders through maps and other visual tools can help convey complex information in an easy-to-understand manner, offering a greater sense of place-based mitigations to protect species from pesticides.

By making these maps and data publicly available, EPA is:

- Advancing transparency in the Agency's ESA evaluations by making aggregated information that EPA uses to identify areas where listed species can be found publicly available.
- Promoting a more efficient regulatory process by allowing pesticide registrants to easily see what types of endangered species may be located near or in pesticide use sites. This information should be particularly useful to inform proposed mitigation measures early in the pesticide review process.
- Ensuring that users have access to information that may be incorporated into future ESA evaluations. EPA updates the spatial data it uses for its ESA analyses on a regular basis, and it intends to post updates as they occur.

Visit EPA's website to learn more about these new maps and how to use them. (EPA, June 27, 2023) https://www.epa.gov/pesticides/epa-releases-new-interactive-maps-data-used-endangered-species-act-assessments

EPA ANNOUNCES EARLY MITIGATION FOR SULFURYL FLUORIDE USED TO FUMIGATE HOMES

The U.S. Environmental Protection Agency (EPA) is announcing the Agency's final early mitigation decision for the structural fumigant sulfuryl fluoride. The "Sulfuryl Fluoride Revised Mitigation and Response to Comments on the Draft Interim Re-entry Mitigation Measures Memorandum" addresses the EPA Office of the Inspector General's (OIG) report findings that EPA can better prevent deaths and serious injuries caused during residential fumigations by amending sulfuryl fluoride labels and monitoring compliance.

Sulfuryl fluoride is a fumigant used to control pests such as termites, powder post beetles, old house borers, bedbugs, carpet beetles, moths, cockroaches, rats, and mice. It is a restricted-use pesticide, meaning it can only be used by a certified applicator or someone under the certified applicator's direct supervision. To use sulfuryl fluoride, a residential structure is covered with a tent to contain the gas, then it is filled with sulfuryl fluoride gas to kill pests. Once the fumigation is complete, the structure is aired out and the inside air is tested using a "clearance device" to ensure that the amount of sulfuryl fluoride is at or below the "clearance level", determined by the Agency as a safe level for humans to re-enter.

The OIG Report was based on human health incidents that occurred after a home had been "cleared" for re-entry. The OIG Report detailed corrective actions for EPA implementation, which are addressed in this early mitigation decision. The early mitigation proposal was open for a 120-day comment period, from May 25, 2021, until September 23, 2021. After considering public comments and meeting with stakeholders, the EPA has finalized the early mitigation for the residential uses of sulfuryl fluoride with enhanced safety guidelines. Based on EPA testing results indicating that some of the clearance devices currently listed on sulfuryl fluoride labels do not accurately measure the clearance level, the Agency has determined the following mitigation measures are necessary to provide protections for people returning to their homes after a fumigation with sulfuryl fluoride. The structural fumigant mitigation measures to be implemented will:

1. Require clearly posted no-entry warning signs to prevent admittance to fumigation tents throughout the fumigation process;
2. Require site-specific fumigation logs for residential fumigations;
3. Require additional registrant sponsored application stewardship training;
4. Remove references to "approved" clearance devices from product labels and refer users to the EPA website, which will list the portable clearance devices determined to be effective, according to the EPA's performance criteria; and
5. Require longer active and passive aeration times for residential structural fumigations.

To implement this mitigation, the Agency is requiring the revised language be included on all sulfuryl fluoride labels with residential structural uses to be submitted to the Agency for review by August 30, 2023. Once the revised labels are stamped, the existing label stock can be used in the market for a maximum of 12 months.

The final early mitigation and response to comments on the draft early mitigation proposal can now be found in the mitigation and response document, available in the public docket (EPA-HQ-OPP-2009-0136) at regulations.gov.

While these mitigation measures are focused only on residential structural fumigations, sulfuryl fluoride and all of its registered uses are still undergoing registration review, a process that re-evaluates all pesticides on a 15-year cycle. The remaining registration review risk assessments for sulfuryl fluoride are anticipated to be completed and issued for public comment in 2024.

Further information on sulfuryl fluoride can be found on EPA's website. (EPA , June 30, 2023) https://www.epa.gov/pesticides/epa-announces-early-mitigation-sulfuryl-fluoride-used-fumigate-homes

FIRST U.S. MALARIA CASES DIAGNOSED IN DECADES IN FLORIDA AND TEXAS

Five cases of malaria have been confirmed in Florida and Texas, the first time the potentially fatal mosquito-borne disease has been locally acquired in the United States in 20 years, the Centers for Disease Control and Prevention said Monday.

The four Florida cases, along with one in Texas, have been diagnosed over a period of two months, the agency said.

The state of Florida said that its first case was diagnosed on May 26 in Sarasota County, while officials in Texas said on June 23 that a Texas resident who worked outdoors in Cameron County had been diagnosed with the disease.

The CDC said in an alert released Monday that malaria is considered a medical emergency, and that anyone with symptoms should be "urgently evaluated."

However, the CDC said that risk of malaria remains low in the United States, and that most cases are acquired when people travel outside of the country. Fully 95% of malaria infections are acquired in Africa, the health agency said.

Malaria is caused by five species of a parasite carried by certain female mosquitoes. Symptoms include fever chills, headache, muscle pain and fatigue. Nausea, diarrhea and vomiting may also appear. Malaria can cause life-threatening damage, including kidney failure, seizures and coma.

The of Florida has issued a mosquito-borne illness alert and recommended that residents drain standing pools of water, make sure their window screens do not have holes in them and use insecticides that contain DEET to repel mosquitoes. Long sleeved shirts and pants are also recommended when mosquitoes are present.

The state of Texas has also issued a health alert, advising clinicians to routinely obtain a travel history to determine if a patient with symptoms of malaria has spent time outdoors and been bitten by mosquitoes in an area with malaria activity.

(This story has been corrected to say 'repel', not 'kill', in paragraph 7)

(Reuters, June 28, 2023)
https://www.reuters.com/business/healthcare-pharmaceuticals/first-us-malaria-cases-diagnosed-decades-florida-texas-2023-06-27/

LAWSUIT TARGETS EPA TREATED-SEED REGS

Environmental groups asked a federal court on Wednesday to force the EPA to close what they say is a loophole in agency regulation that allows seeds treated with pesticides to go unregulated. The lawsuit was filed in the U.S. District Court for the District of Northern California.

The Center for Food Safety and Pesticide Action Network North America asked the court to declare the EPA in violation of the Administrative Procedure Act when it declared seeds coated with pesticides as treated articles exempted (TAE) from the same regulations required of pesticides.

The EPA in September 2022 rejected a 2017 petition filed by the groups asking the agency to regulate coated seeds. That was done after a court order.

The groups outline in the lawsuit how they believe EPA is mistaken in its classification of pesticide-coated seeds.

"EPA rests its petition denial on the claims that, not only are the seed and plant an 'article' under the exception, but

the seed and living plant are the exact same article," the lawsuit said.

"According to EPA, because a seed (the 'article' treated) becomes a living plant, protection beyond the seed itself and the presence of neonicotinoids in the living tissues of the whole plant does not negate the application of the TAE. Thus, for EPA's interpretation in the denial to make logical sense, it would have to equate the seed and the whole plant, as EPA has stated in numerous places that only articles treated for the sole protection of the article itself may be exempted under the TAE."

EPA implemented regulations establishing treated article exemption in 1988.

Seeds treated with neonicotinoids are at the center of environmental contamination being cleaned up by seed companies at a former ethanol plant in Mead, Nebraska, a town of 569 residents about 40 miles north of Lincoln.

SEEDS, PLANTS LIVING ORGANISMS

The groups said the seeds and plants are "living organisms," which is different from other products

deemed as articles not covered by pesticide regulation.

"Because neonicotinoids are primarily applied to coated seeds to protect the growing plant -- not the seed -- from pests, coated seeds are not treated with pesticides solely to protect the 'article,' aka the seed," the lawsuit said.

"To equate the seed, which is living and part of the larger plant, with a whole living plant that is thousands of times larger, does not find support in either common sense, or the canons of construction. Finally, the vast majority of the seed coating does not remain on the seed and thus does not protect it as a coating as the TAE exemption intends."

The three major members of the neonicotinoids class are imidacloprid, thiamethoxam and clothianidin, registered by EPA in 1994, 2000 and 2003, respectively.

Bayer and Syngenta are the two largest producers of pesticide-coated seeds in the U.S.

Bayer declined to comment when contacted by DTN.

USE EXPLODED IN US WITHIN 10 YEARS

Neonicotinoids use in the U.S. has exploded from about 1.4 million pounds in 2004 to about 7.9 million pounds in 2014, according to the lawsuit.

Seeds coated with neonicotinoids were planted on about half of all U.S. crop acres in 2012, the lawsuit said. That includes about 90% of all corn from 2012 to 2014. About 95% of the neonicotinoids in seed coatings are typically lost to the environment, according to the groups.

The lawsuit also challenges models used by EPA to decide which products to exempt from pesticides regulation.

"Yet even though seed treatments represent roughly 90% of total neonicotinoid use and 95% of seed coatings are lost to the environment, EPA's models tell it that the remaining 10% of neonicotinoid use (comprising of soil and foliar applications) accounts for substantially more runoff," the lawsuit said.

"This apparent paradox is explained by the fact that EPA's modeling assumes that none of the neonicotinoid on treated seeds planted deeper than 2 centimeters (0.8 inch) runs off, because this places the pesticide-coated seed below the 2-cm runoff extraction zone of the model."

The lawsuit continues, "If the model predictions were correct, there would be virtually no clothianidin in Iowa streams, because nearly all the clothianidin used in the state is applied to corn seeds, which are planted at an average depth of more than 2 centimeters, below the model's 'runoff extraction zone.' Yet as noted above, this neonicotinoid is in fact found in 75% of Iowa stream and river samples, often at levels injurious to aquatic life."

(Progressive Farmer, June 2, 2023)
https://www.dtnpf.com/agriculture/web/ag/crops/article/2023/06/01/environmental-groups-lawsuit-seeks

HAWAII AIRPORT RE-OPENS GATES AFTER BED BUGS FORCED CLOSURE

Three gates in terminal two reopened on May30 at the Daniel K. Inouye International Airport. Those gates closed overnight for cleaning after bed bugs were found on May 29, KITV reported.

On May 29, the Department of Transportation received reports of pests in the E Gates of Terminal 2, the agency told USA Today in a statement. DOT staff went in to clean the area and remove anything that might have attracted the bugs that day.

The next day, a Southwest Airlines manager gave DOT a sample of the bugs, which were confirmed as bed bugs. DOT staff returned for a deep cleaning, including carpet extraction and applying a pest control spray.

As reported by KITV, HDOT Director Ed Sniffen said in a statement, "Additional deep cleaning will take place per recommendations over the next three weeks to prevent recurrence. Southwest and the Hawaii Occupational Safety and Health Division have been updated on the actions HDOT is taking."

This is not the first report of bed bugs causing disruptions at airports. In 2018, bed bugs were found in a seating area at the Kansas City International Airport in Missouri.

(PCT Online, June 4, 2023)
https://www.pctonline.com/news/bed-bugs-close-hawaii-airport-gates/

PESTICIDE USE DOWN, BUT PEST NUMBERS UP

The graph illustrating pesticide use in California commodity crops has again trended downward with the boss of the Department of Pesticide Regulation, Julie Henderson, promising: "We continue to support opportunities to expand alternatives to decrease the use of higher-risk pesticides for sustainable pest management across the state."

In releasing its Pesticide Use Report for 2021, DPR confirmed earlier data showing a more than 10% statewide decline in pesticide use compared to the previous year.

In the latest annual reporting period, 191 million pounds of active ingredients — the chemicals that make pesticides work — were applied in California with 95 million acres treated — a decrease of nearly 25 million pounds compared to 2020 numbers. Grapes were one of the crops treated with the most total pounds of pesticides and considered 'commodities of interest.'

With an increase cited in use of lower-risk biopesticides and horticultural oil over the last ten year period, Henderson said, "We applaud growers for moving to safer and more sustainable pest management alternatives while decreasing overall pesticide use."

Named department director in December 2021 after serving at the California Environmental Protection Agency, Henderson said her game plan called for "accelerating the transition to safer, more sustainable tools and practices for pest management" as part of DPR's mission to protect human health and the environment.

Jim Farrar, who directs the University of California's Statewide Integrated Pest Management Program, offered some thoughts on the latest usage numbers.

"The statistics reflect year-to-year changes as part of a fluctuating pattern, especially during drought years," he said. "In drier times, there may be fewer pests or growers may be concerned about input and yield and production materials costs because of the drought, so we expect these fluctuations.

"Longer-term trends are the really important ones and they, too, are going in the right direction. We've seen these year-to-year fluctuations before for a combination of reasons, but we more closely watch the 10-15 year longer view."

Explaining the 'why'

Pure numbers show level of occurrence without explanation and Farrar says the "why" is required.

"Besides drought, there may be several other things at play in the current reduced figures. Some of the recent regulatory changes may have made it more restrictive to use the higher-risk products. And I think some of it may be driven by particular products developed to target for specialty crops or expanding options such as programs like pest mating disruption for tree nut growers."

Any discussion about pest control procedures and products always involves the variables that growers ultimately have to contend with, things like weather changes and water availability.

While drought conditions have had an impact in recent years, this year's crops will benefit from a plethora of liquid rather than a paucity. Expectations are that it will be a positive year for farmers who will again have an important tool to make things grow. The crops will love it — and so will the pests. Bumper water supplies will promote bumper growth of both crops and the pests that like to eat them.

"All the moisture we've had, the rain and snowfall/melt will be a driving force along with increased humidity to promote increased insect activity and perhaps more crop diseases. I'm offering an early and candid prediction of more pest activity this season over last season's levels," Farrar said.

(FarmProgress, June 8, 2023)
https://www.farmprogress.com/grapes/pesticide-use-down-but-pest-numbers-up

FEDS CALL OFF PESTICIDE SPRAYING NEAR NEW MEXICO'S RIO CHAMA TO KILL INVASIVE GRASSHOPPERS

Federal land managers have called off plans to spray pesticides near the Rio Chama in northern New Mexico as part of an effort to eradicate invasive grasshoppers.

The decision announced Thursday by the Bureau of Land Management followed an outcry by environmentalists and others who worried that dispersing 670 gallons (2,536 liters) of carbaryl — a potent neurotoxin — would also kill bees, monarch butterflies and other insects vital to the area's ecosystem.

Although the U.S. Agriculture Department conducted an environmental assessment earlier this year, the Bureau of Land Management said additional analysis and outreach was needed.

"Due to the time needed to carry out additional analysis, the project cannot be achieved this season and will no longer take place. We will continue to work on this important issue in partnership with the U.S. Department of Agriculture's Animal and Plant Health Inspection Service," said Pamela Mathis, the BLM's Taos field manager.

The plan called for spraying the pesticide across 39 square miles (101 square kilometers) in Rio Arriba County. The U.S. Agriculture Department had concluded that grasshoppers had proliferated to the level deemed a severe outbreak and would not only consume grasses essential to grazing cattle but also would pose a threat to the ecosystem.

Recent surveys in the area tallied 35 grasshoppers per square yard, or more than quadruple the eight per yard considered an outbreak and a threat to rangeland ecosystems, the Santa Fe New Mexican reported.

The Xerces Society and other environmental groups argued that the pesticide could inflict widespread collateral damage for the ecosystem. Some critics also noted that the chemical has been found to be carcinogenic to humans.

Aimee Code, Xerces' pesticide program director, acknowledged that the agencies' initial action was centered on helping ranchers.

“Now we’ve taken a step back and said, ‘let’s figure out what’s the right solution for the ranchers, for the recreationalists, for the tribes and the pueblos, for the many people that use this area and the wildlife that are there.'” Code said.

Federal officials had planned to set up no-spray buffers 500 feet (152 meters) from water bodies and a quarter mile from riparian areas such as the Chama, Nutrias and Cebolla rivers. But critics were concerned that the pesticide would drift into other locations.

Terry Sloan, director of Albuquerque-based Southwest Native Cultures, said he feared that any contamination of the Rio Chama could flow downstream to the Rio Grande and ultimately farms and tribal lands along the two waterways.

“Mother Earth and her inhabitants win,” Sloan said in a statement. “... More work ahead, with public and tribal consultation, as we figure out a natural and or Indigenous way to address the grasshopper problem.”

(ABC News, July 1, 2023)
https://abcnews.go.com/US/wireStory/us-land-managers-call-off-pesticide-spraying-rio-100579779

EX-TESLA ENGINEER BUILDS AIGEN ROBOTS TO ELIMINATE WEEDS WITHOUT PESTICIDES

The Aigen Element looks like a drafting table on rugged tires. It drives itself continuously at around two miles per hour over farmland, using an advanced computer vision system to identify crops and unwanted botanical invaders.

With two-axis robotic arms positioned close to the ground, the Element can flick weeds out of the way where they’ll dry out before they can grow seeds and spread.

The robots, which are used in a fleet and sized to meet the needs of a particular growing operation, work continuously for 12 to 14 hours at a time and never need to be plugged in. They are equipped with a lithium iron phosphate battery pack, as well as flexible solar panels which are lighter than the kind typically used on rooftops. They can even run in the dark for about four hours, or six hours in light to moderate rain — all without the emissions associated with diesel-powered farm equipment.

The company behind the robots, Aigen, was founded by Rich Wurden, an ex-Tesla engineer, along with former Proofpoint executive Kenny Lee in 2020.

According to the most recent data available from the U.S. Environmental Protection Agency, U.S. pesticide usage reached more than 1.1 billion pounds annually by 2012, with herbicides accounting for nearly 60% of that. Glyphosate was the most used active ingredient that year, with 270 million to 290 million pounds used then, and it had been since 2001.

Reducing growers’ over-reliance on pesticides and heavy use of chemicals in the global food supply is of personal importance to Wurden and Lee. Both founders and several employees in their 15-person team have experienced significant health issues associated with exposure to pesticides.

Wurden, who is Aigen’s CTO, comes from a family of farmers who grew sugarbeets in Minnesota. Now, he says, his family’s farm grows sorghum and soy.

“My pancreas stopped producing insulin when I was 15 all of a sudden,” he said. He always suspected pesticide exposure, which is associated with a higher risk of diabetes, was a factor.

As a type 1 diabetic, he lives with an insulin pump with environmental health on his mind every day since his diagnosis.

Before becoming an entrepreneur, Wurden worked as a mechanical engineer and on battery technology at Tesla, helping to create the battery pack that is found in the company’s best-selling Model 3 and Y vehicles and Model S flagship sedan. He later joined an electric

boating startup called Pure Watercraft in Seattle, where he says he caught something of the startup bug.

Lee, who is Aigen's CEO, overcame non-Hodgkins lymphoma as a young man, and says he's interested in both personal and planetary health following a career in cybersecurity, where he was more focused on making the internet a safer place for all. (Lee was co-founder of Weblife.io, which was acquired by Proofpoint in a deal valued around $60 million in 2017.)

Wurden and Lee met in a Slack channel created by nonprofit Work on Climate where tech industry veterans discussed how to pivot or grow their careers while combating the climate crisis.

Gathering data to analyze pests and water

Farmers want the ability to identify exactly when and where insects are showing up so they can eliminate those that pose a risk, for example. They also want irrigation-related analytics, which would tell them whether their plants are getting enough water, and whether some parts of the field may need more irrigation than others.

Typically, a fleet of the Element robots would pass over the field continuously, gathering data each time. Currently, the system can provide what farmers call a "stand count," analyzing how many healthy plants are in the field.

The Aigen Element runs on solar and wind power, completely off the power grid. It also runs its analytics and AI-machine learning software on the device, rather than in the cloud. Because of that, Lee said, the company has the potential to give farmers more extensive crop analytics.

"While we're taking weeding actions, we can do other things that no other agtech can because we're mobile on the ground."

The Element could also help farmers work around a persistent labor shortage in agriculture and keep their crops healthy even during extreme heat that would make it hostile for people to stay out in the field weeding.

According to Trent Eidem, who has signed up to put the Aigen Element to work at his sugar beet growing operation near Fargo, the robots are also appealing because they could reduce the amount of money that growers have to spend on costly "inputs," namely herbicides. Crop inputs and energy are his biggest budget items, Eidem said.

In the next year, the company plans to build and bring more of their robots to farmers -- and to develop additional capabilities for them, too.

Aigen has raised around $7 million in early-stage funding and additional grant money from the state of Idaho to develop their system.

Investors include a mix of tech and climate-focused seed and venture funds: NEA, Global Founders, Regen Ventures, Bessemer, Climate Tech VC, Cleveland Ave., and a climate fund founded by ex-Meta exec Mike Schroepfer.

NEA Partner Andrew Schoen, who invests in emerging tech, told CNBC that Aigen founders' track record in both software and hardware and ability to build an "autonomous ground robot" before raising any funding gave him confidence to invest. He also said Aigen is tackling a massive pain point for farmers, representing a potentially massive market.

According to forecasts by Fortune Business Insights, the global market for pesticides, or "crop protection products," is expected to exceed $80 billion by 2028. Increasingly, the investor believes agricultural producers will include robotics, not just chemical inputs, in their mix. (CNBC, June 30, 2023) https://www.cnbc.com/2023/06/30/ex-tesla-engineer-builds-aigen-robots-to-get-weeds-without-pesticides.html

CEU Meetings

Please note that some of these meetings are virtual using Zoom or Microsoft Teams. Please contact the meeting host directly if you have any questions.

Date: August 1, 2023
Title: Ensystex 2023 CEU Workshop
Location: Hampton Inn 4333 SW 15th OKC
Contact: DON STETLER (281) 217-2965
https://ceuworkshop.com/#95d40a97-d688-4731-9d1a-1e00ab8de51e

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

Date: August 2, 2023
Title: Ensystex 2023 CEU Workshop
Location: Holiday Inn Express Tulsa 2201 N Stonewood Cir. Tulsa
Contact: DON STETLER (281) 217-2965
https://ceuworkshop.com/#95d40a97-d688-4731-9d1a-1e00ab8de51e

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

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

MarKev Training **https://www.markevtraining.com/**

For more information and an updated list of CEU meetings, click on this link:
http://www.kellysolutions.com/OK/applicators/courses/searchCourseTitle.asp
Find us on Twitter at @OkstatePestEd

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

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

Pesticide Safety Education Program