



California Farm Equipment

JUNE 2023 Volume 42 • Number 6
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Magazine



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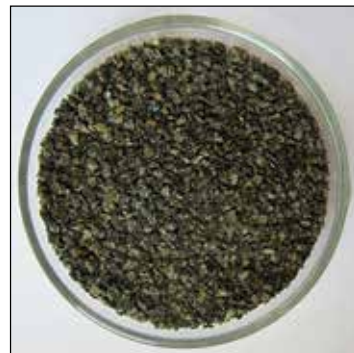
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A Purrr-fect Use for Soy Waste?

Scientists with the Agricultural Research Service (ARS) are building a better mouse trap when it comes to cat litter. And in the process, they hope to kill two birds with one stone.

Cliches aside, the scientists' efforts are part of a broader effort at the ARS National Center for Agricultural Utilization Research in Peoria, Illinois, to develop new, value-added markets for U.S. crops and the waste generated from their harvest and processing.



ARS researchers have improved on an earlier biobased cat litter formulation using biochar from soybean hulls and a starch-based ingredient called amylose inclusion complex. (Photo by Steve Vaughn, USDA-ARS)

In this instance, they've opened the door to a new commercial use for soybean hulls and other agricultural wastes that could yield a new, biodegradable litter that cuts down on the dust and the smell of cat urine when the felines tidy up after themselves. Backlighting this prospect is the nearly \$11 billion world cat litter market (2021) and yearly U.S. waste generation of more than 80 million pounds of soy hulls (2018) whose current primary use is in livestock feed.

Steve Vaughn, a plant physiologist with the ARS center's Functional Foods Research Unit, said the team began researching biobased cat litter formulations after learning of pet owner interest in alternatives to sodium bentonite, an absorbent swelling clay used in traditional clumping litters.

Cat litter made from soybean hulls ARS researchers have improved on an earlier biobased cat litter formulation using biochar from soybean hulls and a starch-based ingredient called amylose inclusion complex.

Initially, the team examined an alternative ingredient waste byproduct of corn-ethanol production, called "dried distillers' grains with solubles" (DDGS). However, the scientists later found that flakes made from Eastern red cedar worked better, including when some of them were turned into a porous, charcoal-like substance called biochar, which absorbs MMB (3-mercapto-3-methylbutan-1-ol), the chief odor-producing compound in cat urine.

Now, the team has improved its litter formulation yet again. This time, the researchers used a starch-based ingredient with antimicrobial properties, called amylose inclusion complex (AIC), and discarded soybean hulls—processed into both 1-millimeter particles and as biochar. Two other ingredients, guar gum and mineral oil, were also added to ensure proper clumping and minimal dust emission, such as when litter is poured into a box, disposed or kicked up by cats after relieving themselves.

In 2020 tests, the red cedar-based formulation eliminated all traces of MMB in air samples and cut the release of dust particles by 60 percent compared to tradi-

See Soy Waste page 5

New Research Reveals How Grazing Management Practices Affect Cattle Weight Gain by Altering Foraging Behavior

Rotational or continuous grazing? Which system allows for more sustainable and profitable free-range livestock production?

Ranchers often rotate cattle seasonally among different pastures on their operations but may allow cattle to graze season-long in a single pasture. Implementing a more intensive rotational system within the growing season—dividing the pasture into smaller areas, or paddocks, and shifting a herd of animals throughout the season—has been suggested to offer a greater chance for more sustainable grazing management. However, there have been very few experimental studies testing these ideas in extensive grazing systems.

A team of researchers at the USDA's Agricultural Research Service is completing a 10-year study on how grazing practices used in these two systems affect cattle foraging behavior, diet quality, and yearly weight gain in semi-arid, extensive rangelands.

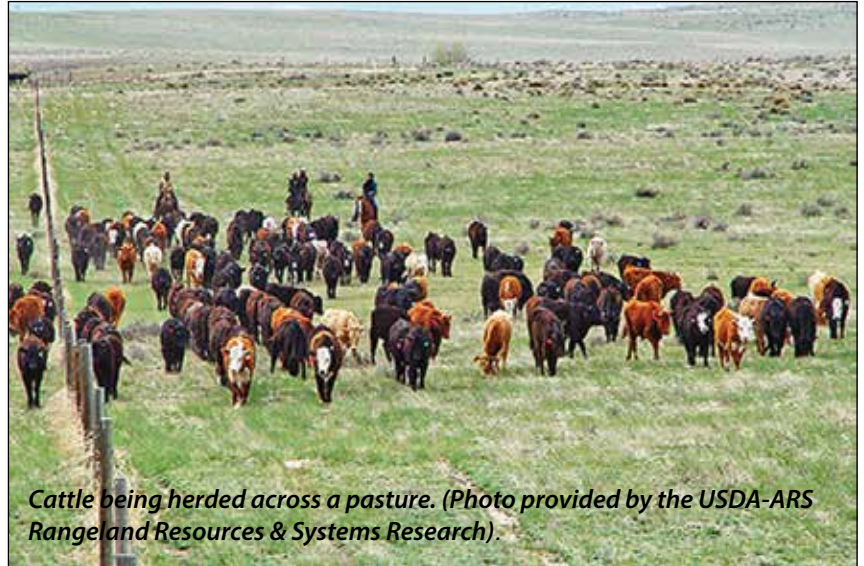
The team started by exploring the efficiency of using cattle global positioning system (GPS) tracking collars, combined with activity sensors, to monitor the animals' grazing activities.

"The primary objective of the study was using the sensors to measure the steers' foraging behavior, and relate this to how they are gaining weight," said David Augustine, a research ecologist with the ARS Rangeland Resources & Systems Research in Colorado.

The collars collected precise data based on the animals' feeding habits per day, such as how much time was spent grazing every day, how many steps were taken (grazing speed), the shape of the foraging pathways, and how long each animal lowered their head as a sign of eating (representing the length of meals).

Even though the accuracy of the application is still being refined, results showed that the technology can inform livestock managers about animal distribution and foraging behaviors of free-ranging cattle in extensive rangelands. Being able to monitor foraging behavior continuously in turn allows managers to make more timely decisions on how, when, and where to move cattle within their operation, or to sell cattle at optimal times.

The researchers then applied the same technology in a range-scale experiment where steers were either divided into smaller herds in the paddocks of a non-rotational (season-long) grazing system or managed as a single large herd in a multi-paddock rotational system (using a collaborative and adaptive rangeland management approach). The first five years of data showed that the rotationally managed cattle gained, on average, 14 percent



Cattle being herded across a pasture. (Photo provided by the USDA-ARS Rangeland Resources & Systems Research).

less weight than cattle in the season-long management system.

"Cattle did not have as much freedom to roam and be more selective on what to eat, so they ended up eating what was available in front of them, which was lower quality forages with less protein, and they gained less weight as a result. These behaviors were directly correlated to the average of 14 percent reduction in steer weight gain in the multi-paddock rotating system compared to the non-rotational continuous system," explained Augustine.

The study showed herds in the multi-paddock rotating system feeding in more linear pathways instead of moving around looking for greener grass and selecting bites of more digestible vegetation. They also fed slower, spent more time on the same patch of grass, and didn't turn their heads around much while feeding, compared with steers in the continuous grazing system. These behaviors of less selective foraging resulted in a lower diet quality, which led to reduced weight gain during the growing season.

Results, published in *Agriculture, Ecosystems, and Environment*, show that large herds grazing in small, homogenous paddocks have little opportunity to move around in ways that let them feed on high quality diet.

The collaborative experiment was conducted at the Central Plains Experimental Range, an ARS Long-term agroecosystem research network site in Colorado.

Augustine and coauthors Sean P. Kearney, Edward J. Raynor, Lauren M. Porensky, and Justin D. Derner, hope this study can help better understand cattle foraging behavior and assist rangeland managers in selecting grazing practices between a traditional continuous system versus a collaborative multi-rotational system.

Key climate data added to enhance grower decision-support tool

Free CalAgroClimate tool helps growers protect crops from frost and extreme heat



With advance notice from CalAgroClimate, farmers may be able to use heaters, wind machines, irrigation and other tactics to lessen some of the impacts of cold weather, such as damaging almond blooms.

Photo by Will Suckow

By Pamela Kan-Rice

Assistant Director, News and Information Outreach

California farmers can see how climatic conditions that may affect agriculture are changing in their regions by using CalAgroClimate so they can make strategic changes. Nine new agriculturally important climate indicators have been added to the decision-support tool created by UC Cooperative Extension and U.S. Department of Agriculture scientists.

These new tools use a high-resolution climate dataset called PRISM to provide location-specific or county-aggregated long-term trends in agroclimatic indicators from 1980 to last year. These new agroclimate indicators include Frost Days, Last Spring Freeze, First Fall Freeze, Freeze-Free Season, Tropical Nights, Hot Days, Extreme Heat Days, Heatwaves and Diurnal Temperature Range (see definitions below). These indicators were derived from a study published in the journal *Agronomy*.

All of the new tools are free and available on CalAgroClimate for anyone to access.

“Frost-related tools such as Frost Days, Last Spring Freeze, First Fall Freeze, and Freeze-Free Season can help farmers and agricultural clientele make informed long-term choices,” said Tapan B. Pathak, UC Cooperative Extension specialist in climate adaptation in agricul-

ture based at UC Merced, who is leading the CalAgroClimate project.

“For instance, if you are planning to invest in a frost sensitive crop in your region, these indicators can provide valuable information on whether frost risk has changed over time and whether it is less risky to make such an investment,” he said. “Wine grapes, for instance, are very sensitive to frost. Although not all frost events are damaging, understanding long-term trends in frost can help in making long-term strategic decisions such as whether to invest in frost protections.”

Another set of new agroclimatic indicators, on CalAgroClimate – Tropical Nights, Hot Days, Extreme Heat Days, Heatwaves and Diurnal Temperature Range – are based on higher maximum and minimum temperatures. Tropical Nights,

for instance, calculates total number of nights when overnight temperatures exceed 68 F. More frequent tropical nights can increase crop respiration rates and can be detrimental for fruit quality and quantity, increase the risk of damage from pathogens, and potentially impact fruit set and yield.

Knowing how trends are evolving over time can assist growers in managing their crops to reduce risks. Similarly, growers can easily look at trends related to heat – hot days, extreme heat and heatwaves – on CalAgroClimate to assess their options on what they need to do to be adaptive. In the short term, growers may put up shade or for longer term, choose varieties that are more heat-tolerant.

“In recently published work, one of the farmers in the Central Valley told us, ‘When you really see so much difference in a short amount of time in your immediate area...we would have to look at that and say, well, we’re going to have to adapt varieties because this is a 20- or 25-year planting and we’re going to have to find crops or varieties that will adapt to that,’” Pathak said.

Another farmer told us, “Knowing what’s going to happen or at least having a good idea, if you know something’s going to be become or won’t be viable, then

See Key Climate continued on next page

Key Climate

continued from previous page

obviously you're going to try to phase that out, and phase in something that's better suited."

Pathak added, "The new agro-climatic indicators on CalAgroClimate provide a reality check on how conditions are changing in short and long-term, what it means for farmers and to assist them on deciding what they need to do to be adaptive. These tools will greatly benefit farmers and agricultural clientele in assessing risks and making informed decisions."

Other collaborators include Steven Ostoja and Lauren Parker of the US-DA California Climate Hub, Prakash Kumar Jha of UC Agriculture and Natural Resources and Robert Johnson and Shane Feirer of UC Agriculture and Natural Resources' Informatics and Geographic Information Systems.

Definitions of AgroClimatic Indicators:

Frost Days are days in a year with minimum temperature below or equal to 32F.

Last Spring Freeze is the latest day in spring when minimum temperature is below or equal to 32F.

First Fall Freeze is the earliest day in fall when minimum temperature falls to 32F or below.

Freeze-Free Season is the time between the last spring and first fall freeze, represented by the number of consecutive days in a year without freezing temperatures.

Tropical Nights are number of nights when temperatures exceed 68F.

Hot Days are the days per year with maximum temperature exceeding 100 °F.

Extreme Heat Days are the number of days per year with maximum temperatures warmer than the 98th percentile of historical summer maximum temperature for the selected location.

Heatwaves are events that occur when extreme heat lasts for at least three consecutive days.

Diurnal Temperature Range is the difference between daily maximum and minimum temperatures.

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Soy Waste

continued from page 2

tional litters containing sodium bentonite clay.

The latest tests, published in a 2023 issue of Bioresource Technology Reports, showed that the soybean hull-based formulation similarly reduced dust and odor and worked as well or better than four commercial biobased litters, including in categories such as absorbency. Another feature that separated the soy-hull formulation from most of the other litters tested was its ability to tamp down the growth of certain molds and bacteria, which the researchers attribute to the AIC. Future tests will evaluate its potential to inhibit the protozoan parasite *Toxoplasma gondii*, which can infect humans, cats and other animals.

Vaughn welcomed collaboration with private industry and said exploring cat litter formulations made from a variety of agricultural wastes gives potential manufacturers greater flexibility in the face of crop threats like disease or pests, infrastructure issues or distribution considerations, for example.

Putting Flood Waters to Work: State Expedites Efforts to Maximize Groundwater Recharge

The Department of Water Resources (DWR) is implementing an emergency program to divert high river flows away from flood-prone Central Valley communities and into groundwater recharge basins. DWR is working with local agencies and equipment vendors to provide funding and secure much-needed temporary diversion equipment, including pumps and siphons, and will support their deployment by local agencies.

The first set of temporary pumps and siphons were deployed by Fresno Irrigation District on April 25, as seen in this video. The district is reducing downstream flood impacts in the Tulare Lake Region and expanding groundwater recharge efforts by diverting water from Kings River reaches to existing recharge facilities or working agricultural lands.

Here's more information on how much water these pumps will divert:

The pumps being deployed are equipped with flow meters and range in diversion capacity from 5 to 50 cubic-feet per second (cfs) of water from high-flow rivers. One cfs is equivalent to a basketball-sized quantity of water passing every second. A single pump operating at 5 cfs for 24 hours moves approximately 10 acre-feet of water per day.

One acre-foot is about 326,000 gallons of water or the size of a football field with one foot of standing water. Most crops require roughly three acre-feet of water per year for every acre, and one acre-foot can supply nearly three households for an entire year.

There are 15 temporary pumps currently in the planning and deployment phase in and around the Central Valley.

Operating these pumps to divert water for the next four months could capture upwards of 55,000 acre-feet in spring runoff, alleviating flood impacts to communities and bolstering the amount of water stored underground.

"In times of emergency, it's critically important that state and local agencies roll up our sleeves to coordinate and communicate what is needed," said Paul Gosselin, DWR Deputy Director of Groundwater Management. "Based on feedback from local agencies, DWR acted quickly to secure this needed equipment so agencies could expand their capacity to divert high river flows and increase groundwater recharge."

The state is maximizing opportunities to capture and divert water from this year's record snowpack, providing multiple benefits – diverting high flows from rivers that would otherwise drain to the flood-prone Tulare Lake Basin, using recently fallowed or open and working lands, and pumping and spreading water to recharge historically depleted groundwater basins.

Expediting groundwater recharge is a key water resilience strategy of the Newsom Administration's Water Supply Strategy: Adapting to a Hotter, Drier Future and is helping local agencies bring historically depleted aquifers into balance. The Governor's Executive Orders (EO) N-4-23 and N-6-23 are streamlining flood diversions from these intense storms and spring runoff this year, while upholding habitat and wildlife protections. Many local agencies have been able to use the EO and so far, more than 90,000 acre-feet of waters have been diverted under the EO.

DWR's Temporary Flood Diversion Equipment and Groundwater Recharge program and the actions by the Newsom Administration to support groundwater recharge are providing significant benefits towards protecting communities impacted by possible flooding and mitigating groundwater depletion over the past decades.

These kinds of state-local partnerships are key to developing innovative solutions to the challenges of a changing climate and building resiliency to protect the state's water supplies and communities.

California Farm Equipment

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Publisher Joe L. Neyer III
Associate Publisher Mona L. Neyer

Subscription Rate: Anywhere in the U.S. is \$18 for one year and \$36 for three years, payable in advance.

Website: californiafarmequipment.com
Email: info@cfemag.com

Postmaster: Please send "Address Service Requested" corrections to California Farm Equipment, Post Office Box 1128, Visalia, CA 93279

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Subscriptions

For a one year subscription \$18.00 and for a three year subscription \$36.00. Out of the country one year \$75.00 except for Canada and Mexico \$50.00.

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New Report Finds 97% of Fruits and Vegetables Sampled in California Meet Pesticide Safety Standards

The California Department of Pesticide Regulation (DPR) today released a report finding that 97% of fruits and vegetables sampled within the state in 2021 met federal pesticide safety standards.

The 2021 California Pesticide Residue Monitoring Program Report shows that 97% of domestically grown and imported produce samples collected in 2021 had either no detectable pesticide residues or had residues within the allowable federally-established tolerances. In addition, more than 98% of produce samples labeled as "grown in California" had no residues or tolerances that exceeded allowable levels. These results, compiled annually, are consistent with the department's last several years of produce residue monitoring, and reflect the strength of California's pesticide regulatory program and compliance with it.

The 2021 report's findings are based on 3,444 produce samples collected by the department at approximately 500 locations.

The pesticide residue monitoring program supports DPR's mission to protect people and the environment. Federally established tolerances identify the maximum allowable residue level of a specific pesticide on food that provides a 'reasonable certainty of no harm.'

"DPR's produce monitoring program is the largest and longest-running state program for testing fruits and vegetables for illegal pesticide residues," DPR Director Julie Henderson said. "With a focus on food eaten by children, as well as the state's diverse ethnic communities, this program helps protect all Californians from pesticide residues on both domestic and imported produce."

DPR scientists throughout the year visit food distribution centers, stores and outdoor markets to collect samples of foreign and domestically grown produce. The samples are tested by California Department of Food and Agriculture labs for more than 500 pesticide residues and breakdown products.

U.S.-grown produce continues to have significantly fewer illegal pesticide residues than imported produce. Imported produce accounted for nearly 77% of illegal pesticide residue samples. Of the imported commodities sampled, cactus pads and fruit originating from Mexico continue to show high percentages of illegal pesticide residues.

When illegal residues are detected, DPR investigators trace the suspect crop through its lines of trade – from store shelves, to shippers, importers or growers. Tainted products and crops are quarantined and subject to reconditioning, such as washing to remove residues, or potential destruction. In addition to potentially losing their inventory, growers and distributors whose produce exceeds tolerances can face fines and other penalties.

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operated by the 2nd and 3rd generations of Caseys, they are excited to be welcoming the first member of the 4th generation in July 2023. Garrett and Kathy Casey and their sons, Nicholas (outside sales rep/account manager) and younger brother Nathan (service coordinator/mechanic) are proud to be working together to keep the company in the family in honor of the founding owner Jerry Casey. Jerry worked alongside the mechanics for years and was well respected within the company and industry as well. He wanted nothing more than to see the company continue to thrive under the leadership of his children

Kaweah Equipment Co., originally known as Kaweah Lift Service, was founded by Jerry Casey, Cathleen Casey, and Don Dirksen back in 1981. In 1983, Don Dirksen was bought out by the Casey family. Jerry and Cathy then incorporated that same year to create Kaweah Lift, Inc.

In 1985 the company became a dealer of the Linde brand, introducing the first hydrostatic forklift to the Central Valley. In 2008 Jerry Casey's youngest son Garrett Casey and his wife Kathy Casey took the reins of running the business. They since have expanded the company into a multiline dealership; adding brands such as Yanmar Ag and Construction, Cushman utility carts, Baoli forklifts, Wacker Neuson construction and light equipment just to name a few. To this day they have not stopped growing and expanding their services offered, now stocking a full line of Genie aerial equipment and PTR Balers and trash compactors. Kaweah Equipment Co is a well-diversified company that strives to meet most if not all their custom-

and grandchildren.

Carrying on the value of "Our employees come first"; Kaweah Equipment Co functions like one big family and it is evident to our customers when visiting our facility. Ru-



ben Gomez (service manager) pulls together a team-like atmosphere while also keeping the customers' best interest in the forefront. He works very closely with Marcelino Medina, (parts manager who is new to the team), building a great comradery with every other department within the company. The front office is staffed with all women who work together like friends more than coworkers, all with the same goal in mind; to take care of each other, their customers, and the company as a whole.

Kaweah Equipment Co is now expanding their reach from the Central Valley to the Central Coast, establishing service techs and an office in the area. Always focused as a team on quality work and effective growth, the future is bright for the next generations to come.

Here's to the next 40 years of hard work and excellence!

ers' needs.

Along with the growth of the company, the Casey family has continued to grow as well. Currently owned and



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USDA Forecasts Smaller Almond Crop

The 2023 California Almond Subjective Forecast published by the U. S. Department of Agriculture's National Agricultural Statistics Service (USDA-NASS) estimates that the crop harvested in 2023 will come in at 2.50 billion pounds, 3 percent below last year's 2.57 billion pounds.

Forecasted yield is 1,810 pounds per acre, down 90 pounds from 2022 and the lowest since 2005.

"A lower crop estimate was not unexpected considering all that growers dealt with last year and during this year's bloom," said Richard Waycott, president and CEO of the Almond Board of California (ABC). "The cold, wet weather kept bees in their hives and reduced the hours they could pollinate orchards. In the past three years, growers have faced high costs, shipping issues, drought and more. But the water picture is better, at least for this year, shipping continues at record levels and global demand continues to grow. California's almond farmers are prepared to meet that global demand."

The report said: "Record rainfall and unprecedented stormy conditions impacted pollination. Limited bee flight hours were reported in all growing regions. There were reports of downed trees due to high winds and oversaturated soil. Yields are expected to be the lowest in years, with variation observed across varieties and orchard locations. Colder than normal temperatures continued through March and April, resulting in a delayed crop."

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Exploring the complexities of cannabis farming in rural areas



Researchers interviewed 14 cannabis farmers to identify major themes around their relationships with land use, and used those themes to generate predictors for models of land use change. Photo by Hekia Bodwitch

The researchers interviewed 14 cannabis farmers to identify major themes around their relationships with land use, and used those themes to generate predictors for models of land use change. Most of the interview-derived drivers were significantly associated with cannabis distribution and development, including parcel size, human footprint, distance to the nearest cannabis farm, the density of local cannabis production, clearable land cover, farm zoning, elevation, roughness, and distance to rivers. The interview data also provided insights into the relationship of cannabis with social and environmental dynamics.

"We gained many insights from the

By UC Berkeley Department of Environmental Science, Policy and Management

Land use change in agricultural frontiers can have far-reaching social and environmental implications, such as habitat loss, water contamination, or worker demographic shifts — particularly when it involves the rapid expansion of a new industry such as cannabis production. A recent study published in *Landscape and Urban Planning* offers an interdisciplinary perspective on the drivers of cannabis production in rural areas, using interviews with farmers and spatial modeling to uncover key factors.

Led by researchers from UC Berkeley's Department of Environmental Science, Policy, and Management (ESPM) and the Cannabis Research Center, the article "Where money grows on trees: a socio-ecological assessment of land use change in an agricultural frontier" provides a social-ecological systems approach for assessing drivers of cannabis production in Southern Oregon, using interviews with farmers and spatial modeling to uncover key factors.

"Unlike other crops, we have less understanding of where and how cannabis is grown, making it an important area of ongoing research," said Van Butsic, a professor of cooperative extension in ESPM and the senior author of the study.

interview data," said lead author and ESPM postdoctoral scholar Phoebe Parker-Shames. "For example, we knew from previous research that cannabis development tends to be clustered, but we understand a little better now that this is related to the ways in which cannabis farmers rely on each other to share knowledge, labor, and navigate uncertainty during difficult policy changes."

One of the major themes that emerged from the interview data was the environmental stewardship values of the farmers. "There is a large untapped potential for education and management outreach to target farmers who got into this industry in part because of their ability to connect with the land," Parker-Shames said. "The farmers we spoke to had a genuine desire to learn best practices in an industry without a lot of formal standards for production. I'm grateful that they were willing to share their experiences and insights with us."

Additional Berkeley co-authors include ESPM professor Justin Brashares and alumni Hekia Bodwitch (PhD '17 ESPM). The study's findings provide valuable insights into the drivers of cannabis production and the environmental stewardship values of cannabis farmers, which can inform environmental policy, regulation, and best practices for sustainable cannabis production.

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Contestants Vie For Dairy Princess Title and Role as Industry Ambassador District 4 Looks to Crown 2023 Dairy Princess on June 15

Two young women will compete for the prestigious title of Dairy Princess during the District 4 Dairy Princess contest on June 15, 2023, at the Turlock Ballroom starting at 6:00 p.m. This year's contestants are Morgan Oliveira of Hilmar and Brooklyn Silva of Los Banos.

Morgan is the daughter of Joe and Marilena Oliveira. Morgan was raised on her family's dairy, Oliveira Dairy, where she grew up playing with the cotton seed and feeding calves. She began showing dairy cattle with her local 4-H group when she was nine. She has her own herd of registered Holstein and Jersey cattle and exhibits them at shows across the state. Morgan was active in the Hilmar Future Farmers of America program, has served as the Central Region Future Farmers of America South Vice President, and is the California Future Farmers of America State Sentinel. She is a recent graduate of Hilmar High School and will attend Cal Poly San Luis Obispo in the fall to major in Agriculture Communications.

Brooklyn is the daughter of Brett and Celeste Silva. She is a junior at Los Banos High School and was born and raised on her family's farming and dairy operation, Silview Holsteins. Brooklyn has been showing dairy cattle at the local county fair since she was 9 years old. She is a member of the Los Banos Future Farmers of America program and is on the dairy judging team. Brooklyn is on the Los

Banos High School Volleyball team, is a member of Ducks Unlimited, and is the President for the Our Lady of Fatima Student Government.

The young lady crowned as Dairy Princess will represent the dairy industry in Alameda, Alpine, Amador, Calaveras, Contra Costa, El Dorado, Mariposa, Merced, Monterey, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Stanislaus, Tuolumne, and Yolo counties. She will serve the area as an ambassador for the dairy industry with various audiences. The newly selected princess and her alternates will participate in a mandatory training, provided by the California Milk Advisory Board (CMAB), where they will receive professional development coaching.

The contest is sponsored by the District 4 Dairy Princess Committee and the California Milk Advisory Board. The contest will start at 6:00 p.m. followed by heavy hors d'oeuvres. To purchase tickets for the contest, please contact Linda Teixeira at 209-402-8305.

California is the nation's leading milk producer, and produces more butter, ice cream and nonfat dry milk than any other state. California is the second-largest producer of cheese and yogurt. California milk and dairy foods can be identified by the Real California Milk seal, which certifies they are made with milk from the state's dairy farm families.

Air Force Veteran Finds Meaning in New Career with USDA Rural Development



Veteran Tray Middlebrooks works as a loan officer at USDA's Rural Development in South Carolina. USDA photo by Stephanie Bittiker

streamline the loan application process. His day-to-day work involves helping individuals and families in rural communities work towards their own goals, which he finds a rewarding use of his experience.

He believes veterans can bring great experience to the government, including leadership, a strong work ethic, reliability and integrity. He wants fellow veterans to know that they, too, can be successful in the federal workforce by using the skills they gained in the military, such as the ability to work well with others

By Mariela Castaneda, USDA Office of Partnerships and Public Engagement in Equity Initiatives

Veteran Tray Middlebrooks grew up in Merritt Island, Florida, and Manassas, Virginia. After college, he wanted to follow a reliable and purposeful path forward. He went on to serve 10 years of active duty as an Air Force medic stationed in Nevada and Florida followed by three years in the Florida reserves.

Post-service, Tray found it challenging to secure permanent, fulltime employment. He found a temporary position working for the U.S. Small Business Administration, but his goal was to secure a permanent federal position.

Fortunately, Tray met USDA Military Veterans Agricultural Liaison (MVAL) Monshi "Ram" Ramdass. Ram helped Tray narrow his search and navigate the federal application process, helping him be successful. "I kept on applying and kept on applying," Tray said. "I am here today because Ram did not give up on my career placement."

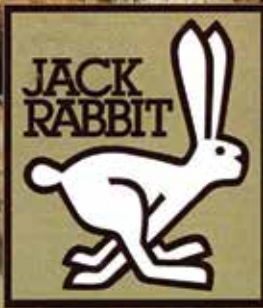
Today Tray is a loan specialist with USDA's Rural Development in South Carolina. He is the team lead for his area and serves on a planning committee to help

to achieve common goals. "You can apply your military experience to a government position that will allow you to continue to serve your country in a new way," he said. "We know how to work, replicate, teach and lead to reach team goals."

His boss agrees.

"Tray has brought a wealth of knowledge and excellent leadership skills to our agency," said USDA Rural Development South Carolina State Director Dr. Sandra Glover. "I believe his military experience helped him perfect those skills, which he uses daily when helping individuals from diverse backgrounds apply for home loans or grants under our Single-Family Housing Programs, working with lenders or entrepreneurs interested in our Business and Cooperatives Programs, or connecting with leaders from surrounding rural communities and providing them information about our Community Facilities Programs or Water and Environmental Programs."

USDA welcomes veterans like Tray and the many skills they can bring to the agency. Email Veterans@usda.gov or visit USDA's Veterans Information page for information about employment, education and entrepreneurship.



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Lambs grazing on pastures after wildfire show no significant adverse effects

Hopland REC turns 2018 River Fire devastation into research opportunity



Ewes and lambs graze in February 2021 on a Hopland Research and Extension Center pasture that was burned in the 2018 River Fire. UC Davis researchers analyzed meat, wool, soil, plant and water samples to assess the risk of metal contamination in sheep grazed on recently burned pasture regrowth.

Photo: Valerie Eviner

By Saoimanu Sope Communications Specialist

The destructiveness of wildfire flames is easy to see, but dangers may lurk in the ashes they leave behind. A group of UC Davis scientists studied lambs at the UC Hopland Research and Extension Center, investigating whether pastures regrown after a wildfire cause toxic metal residues in grazing animals. The results, published in *California Agriculture* journal, showed that grazing on regrown pastures did not significantly alter the metal content of the lambs' meat and wool. That's good news for ranchers and consumers from a food safety perspective.

In 2018, the River Fire burned six miles north of Hopland, scorching two-thirds of the land at Hopland REC, including areas in its sheep station. Since Hopland REC conducts ecological and agricultural research, they had data and some meat samples from the sheep flock that lived on site before the River Fire occurred.

"A bunch of researchers came together to brainstorm how we could take advantage of this unfortunate event," said Sarah Depenbrock, assistant professor and agrono-

mist in the Medicine and Epidemiology department of UC Davis School of Veterinary Medicine.

Burning has played a role in agricultural processes for many years, but wildfires in California are creating a new fire landscape that interests researchers like Depenbrock. "The problem, now, is that these big wildfires probably interact with agricultural land differently than routine prescribed burns," she said.

Large, older plants on lands that have not recently burned may contain high concentrations of metals, sequestered over years of growth. Mercury is an example of a potentially dangerous metal that can be sequestered in living things over time. These metals may be distributed in ash after the vegetation burns so the scientists examined lambs that had grazed on Hopland REC's recently burned pastures, during the first plant regrowth.

Uncertain results raise more questions

The researchers compared meat from lambs that grazed on regrown pastures in 2019, after the River Fire, to frozen meat samples that were collected the year

before the fire. Lead, mercury, arsenic, molybdenum, cadmium, beryllium, cobalt and nickel were not detected in any animal samples. There were, however, a few (3 out of 26) samples that tested positive for the non-essential



A view of Hopland Research and Extension Center in October 2018, after the River Fire, before pasture regrowth. Photo by Jennie Lane

(potentially toxic heavy metals) chromium and thallium in the group grazing after the fire.

Due to the small number of samples testing positive, researchers could not determine statistically if this contamination was associated with grazing the burn regrowth. The concentrations of chromium and thallium found may or may not be potentially toxic, depending on the specific forms and how much meat a person consumes.

Another aspect of the study included testing lambs' wool to determine if it is a good method of judging the mineral content of its meat. "In general, we learned that it wasn't well-correlated with most meat metal content of interest, which is worth knowing. However, because we did not identify many of the non-essential metals of particular toxicologic concern, such as lead or mercury, in any animal samples we could not determine if testing wool would be useful for those metals, as they are in other species," said Depenbrock. She also notes that the wool from animals whose meat tested positive for chromium and thallium, did not test positive for these metals in their wool.

As the challenges in managing wildfires persist, so does the risk of contamination of food products stemming from grazing livestock.

"We didn't get striking evidence that tells us, when there's a fire, it means everything is contaminated with heavy metals," said Depenbrock. "But it does raise the question that maybe we should be doing a little bit of surveillance to see if this is spurious or common. And we should be finding a way to screen grazing herds."

Recommendations to manage copper concerns

"It's a very small study, but it was quite interesting to find that copper was actually lower in the postfire grazing group, which makes me wonder," Depenbrock said.

Diseases associated with copper deficiency are a ma-

ajor concern in sheep. For example, congenital swayback can result in stillbirth or an animal's inability to stand on its own due to incurable changes to the spinal cord. Other adverse effects include reduced growth rate, anemia, wool defects and fiber depigmentation, and osteoporosis with higher risk of spontaneous fractures. Copper excess can also cause serious and sometimes fatal disease.

Many of the forage sources, grazing areas and rangelands in California are copper deficient, while some feed sources have excess copper. Screening and monitoring livestock herds for trace minerals including copper is crucial.

To test for copper, she advises livestock owners to obtain mineral concentrations from the organs of euthanized or dead animals. Samples from the liver and kidney are the most valuable organs to identify a potential problem in the herd. UC Davis Veterinary Medicine's California Animal Health and Food Safety (CAHFS) labs do this testing routinely.

Second, monitor and record mineral supplementation and, third, maintain updated health records to make informed decisions regarding supplementation based on a herd or flock's known problems. For example, if a producer is not accustomed to supplementing copper, Depenbrock highly recommends working with a veterinarian to start out (as there are numerous copper supplement products of varying concentration on the market), to



Burn regrowth at the Hopland Research and Extension Center, December 2018. Researchers did not detect lead, mercury, arsenic, molybdenum, cadmium, beryllium, cobalt or nickel above reporting limits in any meat or wool samples. Photo by Sarah Depenbrock

determine a testing or screening plan, and review health records for problems potentially associated with copper.

To read the full text of the study, visit <https://calag.ucanr.edu/Archive/?article=ca.2022a0016>.

Burn regrowth at the Hopland Research and Extension Center, December 2018. Researchers did not detect lead, mercury, arsenic, molybdenum, cadmium, beryllium, cobalt or nickel above reporting limits in any meat or wool samples.



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Sustainability Plans for 12 Groundwater Basins Approved

The Department of Water Resources (DWR) announced the approval of groundwater sustainability plans for 12 non-critically overdrafted groundwater basins located across California. The approved basins include Big Valley, Shasta Valley, Scott River Valley, East Side Aquifer, Forebay Aquifer, Langley Area, Monterey, Upper Valley Aquifer, San Jacinto, Upper Ventura River, San Luis Obispo Valley and Santa Margarita.

“We are impressed with the effort that local agencies have put into their groundwater sustainability plans. Since the plans in these 12 basins were adopted in 2022, the local agencies immediately began implementation and embraced groundwater sustainability. We look forward to supporting local agencies while they continue to improve their planning efforts,” said DWR Deputy Director of Groundwater Management Paul Gosselin. “We expect these plans to adapt over time to changing conditions. The climate-driven weather extremes we are experiencing amplify the need for long-term groundwater management planning to ensure a safe and reliable groundwater supply that can be accessed during both wet years and the driest years without causing negative impacts.”

DWR has now made determinations for 36 groundwater basins. Of the 36, a total of 30 basins are approved, including the 12 basins released. Six basins are deemed inadequate and have transitioned to the State Water Resources Control Board intervention process. Additionally, DWR approved nine basins with alternatives to groundwater sustainability plans in July 2017. The 12 basins approved today are among the non-critically overdrafted basins that submitted their plans to DWR in January 2022. Other groundwater sustainability agencies (GSAs) in 47 basins that were required to submit plans in 2022 and currently have plans under review by DWR should anticipate additional determination releases throughout 2023.

The cornerstone of the Sustainable Groundwater Management Act

(SGMA) is local control of groundwater basins. The law calls for local agencies to create GSAs and work with groundwater users to develop and implement plans to achieve the sustainability goals of groundwater basins over a 20-year period. These plans are expected to present a roadmap for how local agencies will reliably provide groundwater to their communities over the long-term.

DWR is charged with evaluating all plans to determine whether the plans substantially comply with the groundwater sustainability plan regulations and law, based on best available science and information, and whether implementation of the plans is reasonably likely to achieve the basin’s sustainability goal over the 20-year planning timeline of SGMA.

The release of assessments for these 12 approved basins provides direction to the local GSAs, including recommended actions, to ensure the basins remain on a path to long-term sustainability. Plans will be updated over time as new data and information becomes available and as conditions change in groundwater basins. DWR will review annual reports from the GSAs and assess updated plans every five years to determine if the GSAs are on track to meet their basin’s long-term sustainability goal.

DWR continues its extensive planning, technical and financial assistance, to support GSAs and local communities. As part of DWR’s assistance efforts, a new drinking water well guidance document and online toolkit have recently been released and are available on DWR’s Drinking Water Well Resources webpage. These resources support local efforts to improve water supply reliability for Californians and communities who rely on groundwater wells for drinking water and household purposes, and support and assist GSAs as they implement and prepare for periodic updates of their plans to ensure they fully consider and appropriately engage drinking water well users during SGMA implementation.

Celebrate California Avocado Month In June With Chef Brooke Williamson

California Avocado Commission enlists the culinary talents of Los Angeles-based chef Brooke Williamson for a month long celebration of California avocados

The California Avocado Commission invites avocado lovers to celebrate California Avocado Month this June. Grown in the Golden State from San Diego to Monterey by about 3,000 growers, California avocado season generally runs from spring through summer, making June a perfect time to explore every delicious opportunity to sink your teeth into them.

Widely known as a winner of Bravo's Top Chef, the first winner of Food Network's Tournament of Champions, and most recently as one of the three titans on the Food Network's new cut-throat competition Bobby's Triple Threat, Chef Brooke Williamson joins CAC in celebrating California Avocado Month by developing two fresh and unique California avocado-inspired dishes for summer. Born and raised in Los Angeles, and a keeper of a fruitful home garden herself, Chef Williamson has an appreciation for in-season produce, which helps shape and inspire her menu both at work and at home.

"As a SoCal native, fresh and locally sourced ingredients, like inseason California avocados, are indispensable in my kitchen, especially during the warm summer months," said Chef Williamson. "I love the versatility of the fruit, and how it adds dynamic flavor, color and texture to virtually any dish. Whether you're cooking up a vibrant seafood dish or baking your favorite dessert, California avocados pair beautifully with other ingredients, taking your recipes to the next level."

Chef Williamson's love of California-inspired cuisine is highlighted in her Braised Short Rib on California Avocado Tahini Puree, which pairs melt-in-your-mouth short ribs with tangy, velvety California Avocado Tahini Puree for a satisfying and flavor-packed dish you'll crave all summer long, and beyond. For those with a sweet tooth, Chef Williamson's California Avocado Chocolate Mousse Layer Cake features cool and creamy California Avocado Mousse sandwiched between layers of decadent chocolate cake for the perfect make-ahead dessert.

Additionally, her Braised Short Rib on California Avocado Tahini Puree recipe will debut at her popular beachside restaurant in Playa del Rey, Playa Provisions, during the month of June for a limited time for fans of Chef Williamson and California avocados alike to experience in person.

California avocados are not only a key ingredient in Chef Williamson's featured recipes, but they are also a heart-healthy superfood that provides naturally "good" fats and are sodium-, cholesterol- and trans fat-free. One-third of a medium avocado (50 g) has 80 calories and contributes nearly 20 vitamins, minerals and phytonutrients, making it a nutrient-dense choice. California avocado fans are invited to make Chef William-

son's California avocado creations themselves, check out other seasonal recipes, tips and tricks and more by visiting CaliforniaAvocado.com, and following along on Facebook at [Facebook.com/CaliforniaAvocados](https://www.facebook.com/CaliforniaAvocados), and on Twitter and Instagram at [@CA_Avocados](https://www.instagram.com/CA_Avocados).

Braised Short Rib on California Avocado Tahini Puree

Recipe created by Chef Brooke Williamson for the California Avocado Commission

Serves: 4

Prep time: 45 minutes

Cook time: 3 hours

Total time: 3 hours 45 minutes

CALIFORNIA AVOCADO TAHINI PUREE

Ingredients

- 2 ripe, Fresh California Avocados, seeded, peeled and cubed
- 6 Tbsp. tahini
- 4 cloves garlic, minced
- ½ cup chopped fresh Italian parsley
- ½ tsp. salt
- ½ tsp. pepper
- ¼ cup lemon juice
- 4-6 ice cubes
- ½ cup olive oil

BRAISED SHORT RIB ON CALIFORNIA AVOCADO TAHINI PUREE

Ingredients

- 2 lbs. boneless beef short ribs
- ½ tsp. salt
- ½ tsp. pepper
- 3 Tbsp. avocado oil
- 1 large yellow onion, peeled and diced
- 1 cup diced carrots
- 1 cup diced celery ribs
- 6 cloves garlic, smashed
- 1 cup dry red wine
- 2-4 cups beef stock (as needed to cover short ribs by 2/3)
- 2 Tbsp. brown sugar
- 30 thyme sprigs
- 2 bay leaves
- ¼ cup fresh Italian parsley, plus more for garnish
- California Avocado Tahini Puree (see make-ahead recipe above)
- ½ cup dry and crumbly feta cheese

CALIFORNIA AVOCADO TAHINI PUREE

Instructions:

1. Add the avocado, tahini, garlic cloves, parsley, salt, pepper, and lemon juice to the bowl of a food processor. Pulse to combine the ingredients and then let the food processor run for 1-2 minutes. Remove the lid and scrape

See California Avocados page 22

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USDA Offers Assistance to Help Organic Dairy Producers Cover Increased Costs

The U.S. Department of Agriculture (USDA) announces assistance for dairy producers with the new Organic Dairy Marketing Assistance Program (ODMAP). ODMAP is established to help mitigate market volatility, higher input and transportation costs, and unstable feed supply and prices that have created unique hardships in the organic dairy industry. Specifically, under the ODMAP, USDA's Farm Service Agency (FSA) is making \$104 million available to organic dairy operations to assist with projected marketing costs in 2023, calculated using their marketing costs in 2022.

"Organic dairy producers have faced significant and unique increases in their marketing costs, compounded by increases in feed and transportation costs and the limited availability of organic grain and forage commodities," said FSA Administrator Zach Ducheneaux. "Without assistance, many organic dairies, particularly small organic dairies, will cease production, which not only impacts the domestic supply and consumption of organic milk but also the well-being of many rural communities across the country. This program will keep our small organic dairies in operation as they continue to weather a combination of challenges outside of their control."

FSA will begin accepting applications for ODMAP on May 24, 2023. Eligible producers include certified organic dairy operations that produce milk from cows, goats and sheep.

Adam Warthesen, co-chair of the Organic Trade Association's Organic Feedstuffs Relief Task Force, and Senior Director of Government and Industry Affairs for Organic Valley said: "With unprecedented organic feed costs and inflationary pressures over the last couple of years, resources like ODMAP are really going to matter as farmers plan for the rest of this year."

Britt Lundgren, Senior Director of Sustainability and Government Affairs at Stonyfield, said: "The costs facing organic dairy today are uncommon and putting serious strain on operations. USDA is right to step in and offer support, and this is a good first step. The alternative is we lose family farmers. We look forward to working with USDA to cover more of the actual costs organic dairies are facing."

Lia Sieler, Executive Director of Western Organic Dairy Producers Alliance, said: "We welcome the monetary resources allocated to dairy farmers through ODMAP with much anticipation. Input costs have been at an unprecedented high with no foreseeable changes and farmers are struggling to keep up with these high costs at their current pay price for the specialty products they produce. Farmers are struggling to continue producing a quality, safe and nutritious product with the current costs of doing business. We thank USDA with the help of many members of Congress for stepping in, hearing our voices and working diligently to get money pushed out as quick as

possible to help alleviate some of this pain. Our work is not done, but this is a major win for our industry in a time of such uncertainty."

Chris Adamo, Vice President of Public Affairs and Regenerative Agriculture Policy with Danone North America, said: "Recent increases to cost of feed and overall inputs have significantly impacted organic dairy farms, and on behalf of Horizon Organic, we are grateful for USDA's thoughtful work and strong support for the farms that supply our customers' milk."

How ODMAP Works

FSA is providing financial assistance for a producer's projected marketing costs in 2023 based on their 2022 costs. ODMAP provides a one-time cost-share payment based on marketing costs on pounds of organic milk marketed in the 2022 calendar year.

ODMAP provides financial assistance that will immediately support certified organic dairy operations during 2023 keeping organic dairy operations sustainable until markets return to more normal conditions.

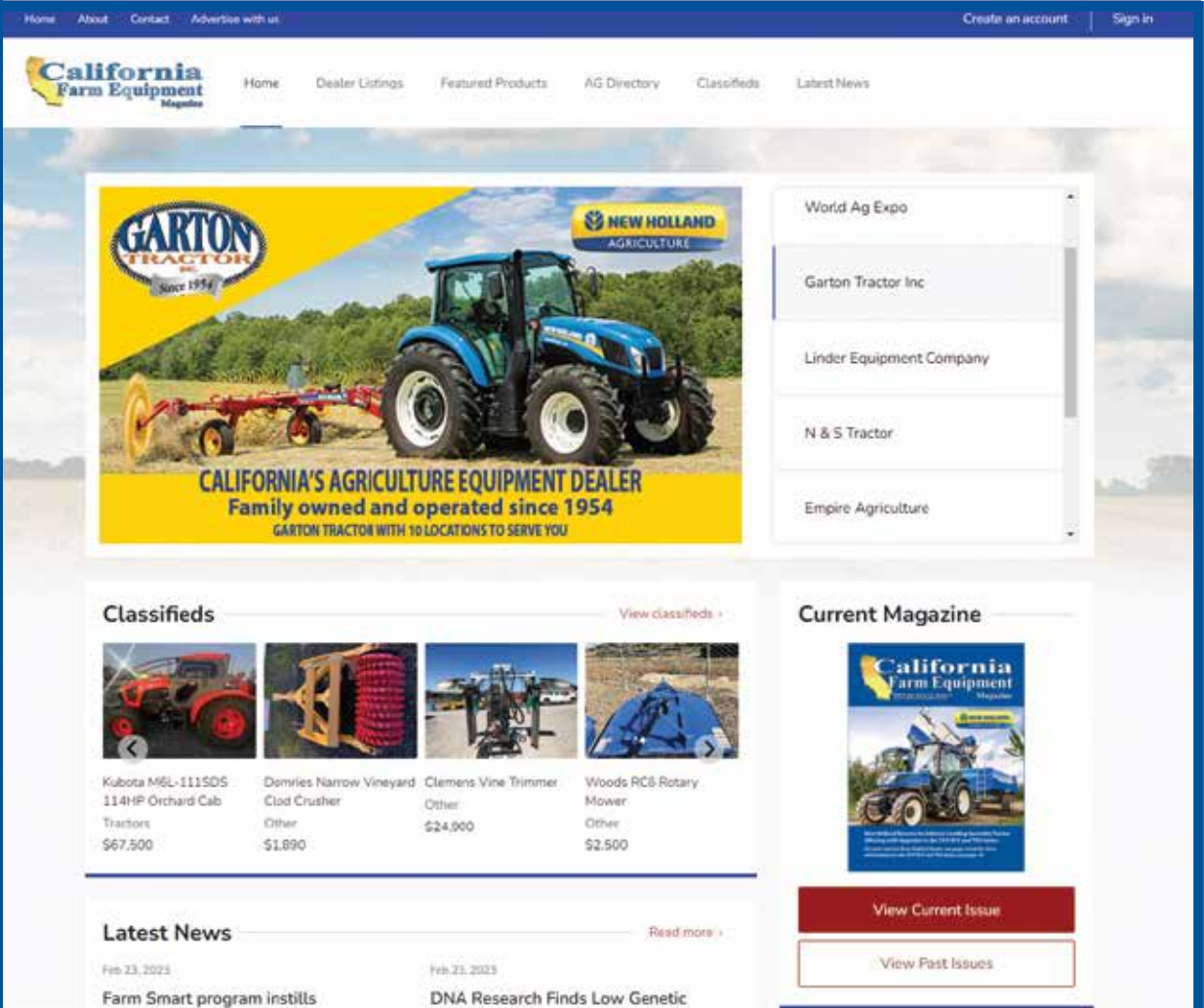
How to Apply: FSA is accepting applications from May 24 to July 26, 2023. To apply, producers should contact FSA at their local USDA Service Center. To complete the ODMAP application, producers must certify to pounds of 2022 milk production, show documentation of their organic certification, and submit a completed application form.

Organic dairy operations are required to provide their USDA certification of organic status confirming operation as an organic dairy in 2023 and 2022 along with the certification of 2022 milk production in hundredweight.

ODMAP complements other assistance available to dairy producers, including Dairy Margin Coverage (DMC) and Supplemental DMC, with more than \$300 million in benefits paid for the 2023 program year to date. Learn more on the FSA Dairy Programs webpage

More Information: To learn more about USDA programs, producers can contact their local USDA Service Center. Producers can also prepare maps for acreage reporting as well as manage farm loans and other programs by logging into their farmers.gov account. If you don't have an account, sign up today.

USDA touches the lives of all Americans each day in so many positive ways. In the Biden-Harris administration, USDA is transforming America's food system with a greater focus on more resilient local and regional food production, fairer markets for all producers, ensuring access to safe, healthy and nutritious food in all communities, building new markets and streams of income for farmers and producers using climate smart food and forestry practices, making historic investments in infrastructure and clean energy capabilities in rural America, and committing to equity across the Department by removing systemic barriers and building a workforce more representative of America. To learn more, visit usda.gov.



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KIOTI Tractor Awards 5-Paw Status to Top-Performing Dealers

Seventy-three dealers across North America recognized for excellence in customer experience

KIOTI Tractor, a division of Daedong-USA, Inc., recently awarded 73 dealers across North America with 5-Paw status, achieved through the 2022 5-Paw Dealer Excellence Program, the company's top customer experience honor. Launched 15 years ago, the 5-Paw Dealer Excellence Program recognizes exemplary KIOTI dealers who provide top-quality buying experiences and premier service to their customers.

"Our expansive dealer network plays a crucial role in the customer journey with the KIOTI brand, and we are grateful for their dedication," said Peter Dong-Kyun Kim, president and CEO of Daedong-USA, Inc. KIOTI Tractor Division. "These dealers demonstrate KIOTI's commitment to providing the highest level of service and enhancing the machine-owning experience for our customers."

To qualify for 5-Paw status, KIOTI dealers are assessed annually on their mastery of service, sales, operations, parts support, marketing, and customer relations.

As a reward for their achievement, dealers who meet or exceed these qualifications receive exclusive benefits, as well as the right to use and display KIOTI's exclusive 5-Paw logo. This logo represents a dealer's dedication to outstanding ownership experience and top-level service for each customer who purchases a KIOTI tractor, utility vehicle or zero-turn-radius mower. A select number of dealers in the KIOTI network receive this distinction. Of all dealers across North America who achieved 5-Paw status, over 50 qualified as Certified 5-Paw Dealers and 20 qualified as Premier 5-Paw Dealers, which is the program's highest possible honor.

"Since its inception in 2008, the 5-Paw program has allowed us to celebrate dealers who exceed our customers' needs. Each of this year's honorees is deserving of this recognition, and we look forward to another great year together," Kim continued.

To learn more about KIOTI Tractor or to find your local dealer, visit kioti.com.

California Avocados

continued from page 18
the sides of the bowl.

2. Add the ice cubes to the mixture, then cover and turn the processor back on. Add the olive oil in a steady stream through the feed tube while the machine is running. Remove the lid, taste and reseason if necessary.

BRAISED SHORT RIB ON CALIFORNIA AVOCADO TAHINI PUREE

Instructions:

1. Preheat oven to 325 F. Trim the short ribs of any visible fat and pat dry with a paper towel. Season the short ribs with salt and pepper. Heat a Dutch oven that is large enough to accommodate the short ribs (approximately 8 qt.) over medium high heat. Add avocado oil to coat the bottom of the Dutch oven and sear the ribs on all sides until nicely caramelized and browned. Remove the short ribs from the pot onto a clean plate or bowl. Add the diced onion, carrot and celery to the Dutch oven and turn the heat to medium low.

2. Cook the vegetables until they begin to soften, and the onion starts to turn translucent. Take advantage of the moisture that the vegetables release to scrape up all the brown bits on the bottom of the pan from searing the short ribs. After the vegetables have slightly softened, add in the garlic. Turn the heat up slightly and cook until the garlic is fragrant and golden brown.

3. Add the red wine to the pot to deglaze, stirring frequently to evaporate and loosen any stubborn stuck bits at the bottom of the pan. When the red wine is fully

evaporated, add 2 cups of beef stock, brown sugar, thyme sprigs, bay leaves, parsley and heat to just below a simmer.

4. Nestle the short ribs into the stock, vegetables and aromatics so that liquid comes up the sides by $\frac{3}{4}$. The amount of stock you will need will vary depending on the size of your Dutch oven. If you need to add more stock to make this measure, add it now, if you are slightly above this measure - do not worry - you will reduce this sauce at the end, just make sure the short ribs are not fully submerged.

5. Cover the Dutch oven with the lid and place into the preheated oven. Cook for 3 hours, turning the ribs every 45 minutes until they are fully fork tender.

6. When the ribs are perfectly tender, take them out of the oven and allow them to cool naturally in the sauce until cool enough to touch. Transfer the short ribs to a clean bowl and allow to cool slightly.

7. Strain the braising liquid into a small pot and cook over medium heat until reduced, thickened and glossy. While the liquid is reducing, shred the cooled short rib meat. Add the shredded short rib meat back into the reduced braising liquid and mix thoroughly. Taste and reseason with salt and pepper as needed.

8. To plate, divide the tahini puree evenly between each serving in shallow bowls or plates. Spread out the puree with the back of a spoon. Top the puree with a saucy spoonful of the braised short rib. Garnish with dry, crumbly feta and fresh Italian parsley leaves.



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UPCOMING EVENTS

JUNE 2023

5: 2023 Agri-Pulse Food & Ag Issues Summit. California Dept. of Food and Agriculture Secretary Karen Ross, California Dept. of Water Resources Director Karla Nemeth and Senator Anna Caballero, D-Merced, are just three of the confirmed speakers who will discuss key issues. Sacramento, CA.

12-13: The California Poultry Federation (CPF) Summer Board Meeting and Golf Tournament. The Cliffs Resort, 2757 Shell Beach Rd., Pismo Beach, CA. Please visit cpif.org for all information and links.

20-21: 2023 Salinas Biological Summit. The 2023 Salinas Biological Summit will provide an opportunity for growers to increase their awareness of available biological solutions to address their soil and plant needs, as well as a chance for agricultural businesses to learn about the disruptive science and start-up activity lead by innovators in the crop protection space. CSU Monterey Bay's Salinas City Center, Salinas, CA. For more information, please contact: Ann Donahue at (949) 302-7600 or adonahue@wga.com

SEPTEMBER

19-21: FIRA USA 2023 hits the ground with farming robots in Salinas, CA. The California Rodeo Salinas is set to become the hub of agricultural innovation as it hosts the 2023 edition of FIRA USA. The three-day event will bring together the AgTech automation community for a showcase of the latest robotic farming solutions, exhibitions, presentations, discussions, and networking opportunities.

JANUARY

23-25: 2024 Unified Wine & Grape Symposium. Program features sessions and a two-day trade show. Safe Credit Union Convention Center, Sacramento, CA.

FEBRUARY 2024

13-15: World Ag Expo® is one of the largest Agricultural Expositions in the world with more than 1,200 exhibitors on 2.6 million square feet of exhibit space! The show offers a wide range of agricultural-related exhibitors and seminars. While you can learn more about innovative agricultural projects, you can also network, try, and buy. See the future of agriculture at World Ag Expo®! For more information go to: worldagexpo.com

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Time is of the Essence: 100 Years of Data Identify the Right Time to Regenerate Perennial Grasses



1935 quadrat is covered in black grama grass (left), versus the same quadrat in 2016 in which grass has been entirely lost to bare ground, surrounded by mesquite shrubs (right). (Image courtesy of Brandon Bestelmeyer).

Perennial grasses are economically and biologically important in the Southwest U.S. region, but the abundance of these plants can change dramatically over time. There is concern that declines in grasses are becoming more common. Why grass cover changes, however, is poorly understood.

Scientists at the ARS's Jornada Experimental Range and Army Research Laboratory in N.M. used 100 years of measurements of perennial grass growth from their Long-Term Agroecosystem Research site to identify how climate controls abrupt changes in grass cover. The study showed that both periods of extreme loss and recovery have occurred.

The long-term datasets, which go back to 1915, were recently used to construct models to understand the correlation between multiple timescales of climate fluctuations and the dynamics of grass cover, land degradation, and land restoration.

"We modeled years of dynamics of the grass community in correlation to climate drivers such as El Niño–Southern Oscillation, North Atlantic Oscillation, and the Pacific Decadal Oscillation Index. We found that perennial grass cover variations during the 20th century were closely tied to the Pacific Decadal Oscillation index," said research ecologist Erica

M. Christensen.

The Pacific Decadal Oscillation (PDO) is a phenomenon where there are fluctuations in the ocean and atmosphere that affect the temperature and precipitation patterns in the region. This index goes through two phases — positive and negative — which each last for about 20 to 30 years.

According to the model, grasses do well under a positive PDO phase, and opportunities for increases in grass cover may occur with the return of a positive PDO phase in forthcoming years.

Recent observations, however, indicate that land degradation, including shrub encroachment and associated soil erosion or increased temperatures, may be preventing the expected increases in grass cover with PDO.

The team of scientists hopes land managers can use predictions from these models to time restoration actions to coincide with the positive PDO phase.

"The next positive PDO phase might be the best opportunity to invest in restoration practices, such as shrub removal or erosion control, to allow grasses to capitalize on relatively favorable conditions," said research leader Brandon Bestelmeyer.

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California Citrus Mutual takes leading role in keeping HLB out of state's groves

Farm Credit has supported advocacy group's efforts on behalf of industry for over 20 years

California Citrus Mutual, the advocacy arm of the state's \$3 billion a year citrus industry, works on behalf of growers on a wide range of issues, including water supply, labor and tariffs that limit exports to China and other nations.

But one of its most important roles is helping lead the fight to prevent a tiny insect known as the Asian citrus psyllid from getting a foothold in California's 255,000 bearing acres of oranges, mandarins, lemons and grapefruit, said Citrus Mutual's president and CEO, Casey Creamer.

"It's wiping out the Florida citrus industry as we speak, so we're now the No. 1 state by default. We advocate for funding to help find the cure," Creamer said.

"We're a small organization with a staff of six and some consultants, but annually we bring back funding on HLB alone (from the federal and state governments) totaling over \$70 million a year. That's something nobody else is going to be doing besides us."

The tiny insect damages citrus trees by eating their leaves but is especially dangerous because it can carry bacteria from an infected tree to a healthy one, causing citrus greening disease. Also known by the Chinese name huanglongbing (HLB) – the disease first causes fruit to remain green and taste bitter, and eventually kills the tree.

For more than 20 years, Farm Credit organizations in California have come together to support Citrus Mutual as part of our broader support of agricultural advocacy efforts, said Kevin Ralph, California State President at AgWest Farm Credit.

"Since Citrus Mutual was founded in 1977, it has established itself as a leading advocate for the state's citrus industry, and its work on preventing the spread of HLB and supporting research to find a cure for the disease has been immensely important," Ralph said.

"Together, Farm Credit contributed nearly \$1 million to farm-related nonprofits last year and we will continue to support these organizations as they engage in work to help our state's farmers and ranchers feed the nation."

Farm Credit organizations supporting Citrus Mutual are AgWest Farm Credit, American AgCredit, CoBank and Fresno Madera Farm Credit. These organizations are part of the nationwide Farm Credit System – the largest provider of credit to U.S. agriculture.

Fighting HLB is vital for California's growers. By 2005, just seven years after the psyllid was first found in Florida, HLB had spread to most of the Sunshine State's commercial citrus groves. Since then, the industry has shrunk by two-thirds, resulting in over \$8 billion in economic losses and tens of thousands of lost jobs.

Fortunately, there has been progress. Researchers at the University of California, Riverside, are working on a promising method of using peptides from an Australian



The tiny Asian citrus psyllid spreads a bacteria called HLB to citrus trees. The bacteria makes the citrus fruit inedible and eventually kills the tree.

citrus tree that is resistant to the disease that can be injected or sprayed onto American citrus trees to allow the trees to survive infestation. Citrus Mutual helped obtain funding for that research as well, Creamer said.

Keith Hesterberg, President and CEO of Fresno Madera Farm Credit, said Citrus Mutual's work is particularly important in the Central Valley, which is home to 80% of the state's citrus groves.

"We've seen how devastating this disease has been to Florida's farm economy, and it's encouraging that research is progressing to find a potential cure," Hesterberg said. "Education and research like this is a top priority for Farm Credit's philanthropic efforts on behalf of the industry."

Most citrus production occurs in the Sierra foothills from Madera south to Kern County, with significant production in Ventura and Santa Barbara counties and in Riverside and San Bernardino counties.

Creamer said sponsorships such as Farm Credit's help support the entire Citrus Mutual organization and is particularly important to the success of its annual educational conference, which is free for members to attend. This year's conference in March attracted about 1,000 people who were able to get the latest information about water, labor law, international trade and, of course, HLB.

"It's the sponsors who put the conferences on. We couldn't hold them without the help of our industry allies," Creamer said. "And besides its sponsorship support, Farm Credit continues to service our members and protect their viability, keeping them afloat in tough times. That's incredibly important."

Women in Ag Tech to Launch with First Official Meeting at Tech Hub LIVE 2023



Share experiences and learn from innovative industry leaders to advance your business and your agronomic program. Engage in meaningful, solutions-based discussions with the thought leaders across agriculture sectors.

The newly formed Women in Ag Tech will hold its first official meeting on July 24, 2023 at Tech Hub LIVE (techhublive.com) in Des Moines, Iowa.

The group aims to provide women in agriculture technology with a platform to connect, engage, and build a community. Those who are interested are encouraged to complete the online interest form [here](#).

Women are currently underrepresented in the ag tech industry, as is the case in many other technology-related fields.

However, the number of women in ag tech is growing, and many organizations and initiatives have emerged to support and advance women in this industry.

Despite these efforts, there is still much work to be done to achieve gender parity in the ag tech industry. Women still face many of the same challenges as in other technology fields, including unconscious bias, lack of representation in leadership roles, and pay inequality.

Women in Ag Tech is a crucial initiative for advancing and advocating for women in ag tech. The developments related to Agriculture 4.0 and ongoing expansion of digital agriculture make the initiative particularly timely.

The priorities for Women in Ag Tech include:

Advocate for women and others

whose influence is not fully recognized or are underrepresented in the ag tech industry.

Raise awareness and participate in outreach activities.

Actively mentor and encourage future women in ag tech.

Build an active community for women in ag tech.

Align and collaborate with professionals and organizations in allied industries.

Women in Ag Tech will hold its first official meeting at Tech Hub LIVE on July 24th from 2 – 5 p.m. at the Hilton Des Moines Downtown. Those who are interested are encouraged to complete the online interest form, which will help further shape the initiative, identify challenges and expectations, and provide insight into whether they would want to meet up in person at Tech Hub LIVE this summer.

Tech Hub LIVE is the premier event advancing tech-enabled agriculture. Powered by the CropLife Media Group, the nation's leading voice for the ag retail industry, in collaboration with the Global Ag Tech Initiative and AgriBusiness Global brands, Tech Hub LIVE is the must-attend event for those developing and deploying the latest ag technologies to advance agribusiness.

For more information, search #TechHubLIVE on social media or visit techhublive.com.

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