



California Farm Equipment Magazine

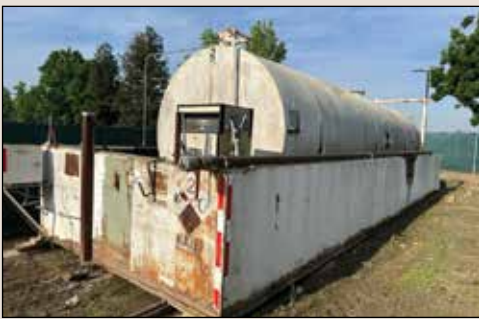
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Solutions for a changing world!

UC ANR offers scholarships for agriculture students, May 13 deadline



Three scholarships are being offered for students studying agriculture.

By Pamela S Kan-Rice
Assistant Director, News and Information Outreach

Three scholarships are being offered for students studying agriculture.

Applications and nominations of outstanding students pursuing careers in agriculture will be accepted through May 13, 2024, for UC Agriculture and Natural Resources scholarships and awards.

Students, faculty and colleagues are encouraged to take advantage of these opportunities to honor academic excellence and provide additional support for undergraduate and graduate students.

Bill and Jane Fischer Vegetation Management Scholarships for students enrolled at ANY accredited California university, with preference given to graduate students. The recipient of the \$1,000 (multiple awards possible) will be selected from students who are enrolled in fall 2024 pursuing degrees in vegetation management, weed science or agriculture specializations plant science, soils and plant nutrition, agricultural engineering, agricultural botany, plant pathology, plant protection and pest management, or agricultural economics. Students apply directly.

Howard Walton Clark Prize in Plant Breeding and Soil Building is for students enrolled at UC Berkeley, UC Davis

or UC Riverside. The \$5,000 (multiple awards possible) will be awarded to a promising student who will be enrolled as a senior in fall 2024 in the College of Agriculture and/or Natural Resources with demonstrated scholastic achievement and talent for independent research with reference to either plant breeding (leading to new/improved crops and new/improved varieties using appropriate tools) or soil building (leading to improving soil quality related to soil productivity and sustainability as a resource). Nomination by faculty member required.

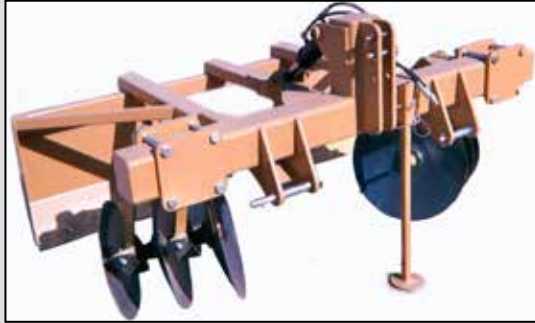
Knowles A. Ryerson Award in Agriculture is for students enrolled at UC Berkeley and UC Davis. \$2,500 (minimum one award for each campus) given to an international undergraduate student who will be enrolled in fall 2024 in the College of Agriculture and/or Natural Resources, in any curriculum, preferably after completion of the junior year. The award is based on high scholarship, outstanding character and promise of leadership. Nomination by faculty member required.

More information about the application process can be found on at <https://ucanr.edu/anrscholarships>.

For questions, please contact Andrea Ambrose, UC ANR director of advancement, at apambrose@ucanr.edu.

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New Upgrades for Farmall Utility A Tractors - A variety of new upgrade options are now available for Farmall A utility tractors, which will enhance fuel capacity and overall productivity in almond orchards. The benefits of these upgrades include:

Robust protection: Additional factory-fitted protections, component guards and three rear hydraulic remotes with flow control ensure producers and their equipment are better protected from branches, limbs and tree nuts.

Longer runtimes: Increased fuel tank capacity provides an 8-12 hour runtime before refueling, resulting in improved productivity.

Greater stability: A new front ballast provides additional weight for greater balance and a smoother ride.

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Young orchard water and nutrient management workshops offered in Modesto, Merced, Fresno, Bakersfield



UC Cooperative Extension researchers will discuss best irrigation and nutrient management practices tailored specifically for young orchards in the San Joaquin Valley.

By Pamela S Kan-Rice
Assistant Director, News and Information Outreach

Growers invited to discuss young almonds, pistachios, walnuts, olives and citrus orchards starting May 9

To help growers manage irrigation and nutrients for young and immature orchards, UC Cooperative Extension is offering workshops in Modesto, Merced, Fresno and Bakersfield.

The workshops will feature presentations by various experts and researchers focusing on best irrigation and nutrient management practices tailored specifically for young orchards in the San Joaquin Valley. They will cover almonds, pistachios, walnuts, olives and citrus.

“Attendees will gain insights into the irrigation and nutrient needs of young orchards, which are different from those applicable to mature orchards, and learn strategies for adjusting these practices as orchards mature,” said Moneim Mohamed, UC Cooperative Extension irrigation and soils advisor for Stanislaus, San Joaquin and Merced counties. “This knowledge aims to ensure healthier

tree development, better resource use and more resilient orchards in the face of climate change.”

Growers, certified crop advisers and other agricultural professionals are encouraged to attend. Workshop attendees may request one-on-one assistance from a UCCE farm advisor.

Speakers include UCCE advisors Mohamed, Mae Culumber, Tobias Oker, and Cameron Zuber, UCCE specialist Giulia Marino, Andre Dacache of UC Davis, Charles Hillyer and Shawn Ashkan of Fresno State.

The Young Orchard Irrigation and Nutrient Management workshops will be held in four locations:

Modesto

May 9 (8 a.m.–12:30 p.m.)

UC Cooperative Extension, Room HI, 3800 Cornucopia Way
Register at <https://ucanr.edu/orchardsmodesto>

Merced

May 14 (8 a.m.–12:30 p.m.)

UC Cooperative Extension, 2145 Wardrobe Ave.
Register at <https://ucanr.edu/orchardsmerced>

Fresno

May 22 (8 a.m.–12:30 p.m.)

Fresno State, 5370 N. Chestnut M/S OF 18
Register at <https://ucanr.edu/orchardsfresno>

Bakersfield

June 5 (8 a.m.–12:30 p.m.)

UC Cooperative Extension, 1031 South Mount Vernon Ave.
Register at <https://ucanr.edu/orchardsbakersfield>

Workshops are free and include coffee breaks, lunch, workshop materials along with the presentations. Registration is required.

These workshops are supported by a grant from California Department of Food and Agriculture and sponsored by Almond Board of California, California Pistachio Research Board, WiseConn Engineering and Irrrometer Company, Inc.

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

Telephone: 559-627-2182

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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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Finding the “Silver Lining” in Cotton Gin Waste

Cotton gin waste, also known as cotton gin trash, is a byproduct of the cotton ginning process and occurs when the cotton fibers are separated from the seed boll. For cotton gin waste, the treasure is its hidden potential to transform silver ions into silver nanoparticles and create a new hybrid



Credit: Sunghyun Nam

material that could be used to add antimicrobial properties to consumer products, like aerogels, packaging, or composites.

Silver nanoparticles are highly sought-after products in the nanotechnology industry because of their antibacterial, antifungal, antiviral, electrical, and optical properties. These nanoparticles have an estimated global production of 500 tons per year and are widely applied to consumer goods such as textiles, coatings, paints, pigments, electronics, optics, and packaging.

In a study published in ACS Omega, researchers from the United States Department of Agriculture (USDA)'s Agricultural Research Service (ARS) revealed the ability of cotton gin waste to synthesize and generate silver nanoparticles in the presence of silver ions.

“Our method not only lets cotton gin waste act as chemical agents for producing silver nanoparticles, which makes it cost-effective and environmentally friendly but also enables embedding the nanoparticles within the cotton gin waste matrix,” said Sunghyun Nam, research engineer at ARS's Cotton Chemistry and Utilization Research Unit in New Orleans. “By embedding them in the cotton gin waste, these materials acquire antimicrobial properties.”

Nam said the researchers used a simple heat treatment of cotton gin waste materials in water containing silver ions that produced silver nanoparticles without the need for additional chemical agents.

This finding is significant since making silver nanoparticles usually requires chemical agents which can be costly and pose environmental concerns. Embedding nanoparticles into a material can also be challenging.

Developing nanoparticle embedding technology is not new for Nam and her team. They previously developed washable antimicrobial wipes by using raw cotton fiber that produced silver nanoparticles inside the fiber. The embedded silver nanoparticles can continue to kill harmful bacteria wash after wash.

Large quantities of cotton gin waste are generated annually, and the cotton ginning industry is always seeking new sustainable processes that upcycle crop residue.

“Our research paves the way for new material applications of cotton gin waste that can protect against microbial contamination,” said Nam.

A provisional patent application on the self-embedding silver nanoparticle biomass waste compositions has recently been filed.

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Understanding cattle grazing personalities may foster sustainable rangelands



To better understand individual grazing patterns, researchers went to the UC Sierra Foothill Research and Extension Center in Browns Valley and tracked 50 beef cows fitted with GPS collars. File photo by Ray Lucas

By Emily C. Dooley, UC Davis

Not all cattle are the same when it comes to grazing. Some like to wander while others prefer to stay close to water and rest areas.

Recognizing those personality differences could help ranchers select herds that best meet grazing needs on rangelands, leading to better animal health and environmental conditions, according to a new paper from the University of California, Davis, published in the journal *Applied Animal Behaviour Science*.

"Cattle can actually be beneficial for the rangelands," said lead author Maggie Creamer, who recently earned her Ph.D. in animal behavior at UC Davis. "Vegetation in rangelands actually need these kinds of disturbances like grazing."

Ranchers can add elements to the rangeland such as water, mineral supplements and fencing to influence where cattle graze, but little research has been done on how those efforts affect individual cows. Considering personalities could save money.

"If you're spending all this money to add a management tool in order to change the distribution of your animals, that's a huge cost to ranchers," said Creamer. "Thinking about other tools, or selecting certain animals with these grazing traits, might be a better way to optimize the distribution on rangeland rather than spending a bunch of money for something that may ultimately not pan out for all your animals."

Effects of grazing

Livestock graze on an estimated 56 million acres in California, and healthy rangelands host native vegetation and

animals, foster nutrient cycling and support carbon sequestration.

Uneven grazing can degrade water quality, soil health and habitats. Optimizing grazing — including the even spread of cow pies — can improve the ecosystem while also reducing fuel loads for wildfires.

To better understand individual grazing patterns, researchers went to the UC Sierra Foothill Research and Extension Center in Browns Valley and tracked 50 pregnant Angus and Hereford beef cows fitted with GPS collars.

The research

The cattle, which were tracked from June to August over two years, had access to 625 acres of grasslands and treed areas ranging in elevation from 600 to 2,028 feet. In the second year, a new watering site was added at a higher elevation.

Across the two years, the cows showed consistent and distinct grazing patterns even when water sources changed. Age and stage of pregnancy did not affect patterns, though cattle tended to clump near water and rest sites on hotter days.

The cows that ventured into higher elevations and farther from watering sites had more variability in their grazing patterns than those that stayed at lower elevations near water. That suggests it may be harder for non-wanderers to adjust to some landscapes.

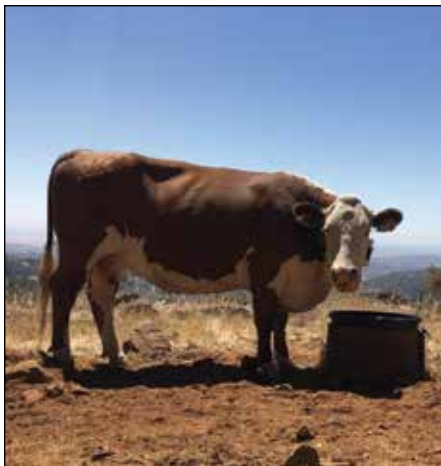
"Thinking about the topography of your rangeland and your herd of cows can benefit both the animals and the sustainability of the land," said Creamer, who next month begins work as a postdoctoral scholar in North Carolina.

Gauging personalities

Keying in on personality type may sound difficult, but the researchers also found some clues as to how to pinpoint the wanderers and homebodies. Unlike cattle at feedlots, the breeding cow population, especially on rangelands in California and other western states, live largely "wild" lives and are rarely handled, save for vaccinations and weaning.

Research due to be published later this year found that paying attention to individual cow reactions during those events can help determine personalities. The cows that appeared more passive during those handling interactions tended to be nomadic.

"We found that you can maybe predict those hill climbers if you kind of look at how they act when the veterinarian or rancher handle them," said senior author Kristina Horback, an



A cow at the Sierra Foothill Research and Extension Center in Browns Valley being tracked as part of research on cattle grazing personalities. Photo by Maggie Creamer, UC Davis

associate professor in the Department of Animal Science at UC Davis.

Informing practices

For ranchers, the findings could be invaluable, said Dan Macon, a livestock and natural resources Cooperative Extension advisor in Placer and Nevada counties for UC Agriculture and Natural Resources.

"Any time we can improve our understanding of cattle behavior, particularly at the individual level, it can improve how we handle livestock and manage the landscape," he said.

Macon said that during the recent drought, it was hard to get cattle into higher country, but if ranchers could have selected the nomads, it may have saved money in terms of ranch labor and other efforts.

"If you ask a rancher who has been attentive to their cattle over many years, they know the personalities," Macon said.

For Creamer and Horback, the research opens new doors into understanding herd behavior and dynamics, one that could be a cheaper alternative to high-tech solutions.

"Animal science tends to look overlook the mind of the animal when searching for solutions to challenges," Horback said. "It's always been a direct line to genetics for immunity or nutrition, but nothing about the mind of the animal. And that's such a loss. There's so much we can learn from behavior in the end."

The Russell L. Rustici Rangeland and Cattle Research Endowment supported the research.

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UC Davis Ranks Near Top of World in 2 Subjects

QS World University Rankings Recognizes Campus as No. 2 for Veterinary Science, Agriculture



The College of Agricultural and Environmental Sciences manages approximately 150 greenhouses and related facilities for research and teaching on the UC Davis campus. The campus is ranked second in the world for agriculture and forestry by the QS World University Rankings by Subject 2024. (Joel Mackendorf/UC Davis)

by Julia Ann Easley

The University of California, Davis, continues to be recognized for its global leadership in the fields of veterinary science, and agriculture and forestry, in the QS World University Rankings by Subject 2024, released today (April 10).

Quacquarelli Symonds, or QS, considered one of the most influential international authorities on university rankings, placed UC Davis second in the world in both subjects. The campus was also first in the nation in the two.

Since veterinary science was added to the rankings in 2015, UC Davis has been first in the world five times and is No. 2 for a fifth time. The campus was No. 1 in agriculture and forestry in the first three years the subject was ranked and has held the No. 2 spot since 2016.

UC Davis was ranked 35th in the world in the broad category of the life sciences and medicine. The campus was also ranked in each of the other broad categories of the rankings: natural sciences; engineering and technology; arts and humanities; and social sciences and management.

In addition to being top-ranked in veterinary science and agriculture and forestry, the university had top-50 rankings in five other subjects:

- environmental sciences, 23rd
- geophysics, tied for 42nd
- biological sciences, 43rd

- geology, tied for 47th
- development studies, tied for 49th

“These rankings underscore that UC Davis is the global leader in veterinary science and agriculture,” said Chancellor Gary S. May. “They also show that the campus provides a world-class education across academic disciplines, while conducting impactful research that advances understanding and solutions to the planet’s most pressing challenges.”

Students at work in a greenhouse

The College of Agricultural and Environmental Sciences manages approximately 150 greenhouses and related facilities for research and teaching on the UC Davis campus. The campus is ranked second in the world for agriculture and forestry by the QS World University Rankings by Subject 2024. (Joel Mackendorf/UC Davis)

The rankings consider reputation among academics; reputation among employers; the citations and impact of academic papers from a university; and the diversity of a university’s international research network. In all, the 2024 rankings analyzed programs in 55 subjects at 4,982 institutions and ranked 1,559 universities across the world. This year, QS did not provide national rankings.

The School of Veterinary Medicine, which is celebrating its 75th anniversary in 2023-24, has more than 700 students pur
UC Davis Ranks continued on next page

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Sarah Michalak, a resident at the UC Davis School of Veterinary Medicine, performs a one-year anniversary checkup on Mija, a dog that was treated for antifreeze poisoning. The campus is ranked second in the world for veterinary science by the QS World University Rankings by Subject 2024. (Michael J. Bannasch/UC Davis)

UC Davis Ranks

continued from previous page
suing the doctor of veterinary medicine and other professional and graduate degrees, and offers the nation's largest veterinarian house officer program with more than 40 specialties.

The school's hospital treats more than 50,000 patients each year, and more than \$64 million in annual research funding to the school is applied to benefit animal, human and planetary health.

The College of Agricultural and Environmental Sciences has more than 7,600 undergraduates in 27 majors and 1,030 graduate students in 22 graduate groups and programs. The college's researchers receive more than \$165 million in research funding. UC Davis is among the most published and cited U.S. research universities in agricultural sciences, animal science and plant sciences, environment and ecology, food science and nutrition, and soil sciences.

UC Davis and rankings

A world-class university, UC Davis is highly ranked for how it transforms students' lives, the impact of its research, the excellence of its academic programs, its sustainability and more. The university performs self-evaluations and also appreciates the value of third-party assessments. However, ranking methods vary, change over time and can be subjective. UC Davis focuses on those rankings that most closely align with its mission and values — including serving the public good, inclusiveness and equity, and social mobility — and in national rankings looks most closely at its standing among public universities. UC Davis encourages prospective students and their families to weigh rankings among other factors in their college decision, talk with counselors and UC Davis admissions advisors, and, if possible, visit the campus.

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Les Slunecka

Element Six Key Account Manager for Agriculture & Forestry

The agriculture industry is facing growing pressures to improve the efficiency and productivity of farming, stemming from a necessity to cut costs, maximize output, and improve sustainability. No easy feat, this challenge requires innovative materials, technology, and processes to be solved.

Unlocking the potential of tungsten carbide

Tungsten carbide shares many of the remarkable properties of diamond, boasting unparalleled strength, toughness, and resistance to wear and high temperatures. These outstanding qualities make it an ideal material solution for industrial machinery.

Rewind seven decades and Element Six, a world leader in design, development, and production of superhard material solutions, was setting about manufacturing the material and engineering its end products to maximize performance and efficiency for targeted applications.

Element Six has consistently invested in proprietary technology and pioneering expertise to deliver ever-better end-products in the field. Today, the extreme hardness and strength of tungsten carbide make it suitable for many applications, ranging from percussive drilling to tunnelling, within industries such as agriculture, forestry, recycling, and mining.

An over 70-year long journey of innovation now culminates with the delivery of cutting-edge solutions that can unlock new levels of performance in farming, enhancing the productivity and sustainability of related practices.

Transitioning from asphalt to agriculture

Element Six's tungsten carbide has been hugely successful in improving the industrial art of road planing. Its custom-designed tools offer improved productivity for engineers, working faster and longer, and with far greater efficiency.

The latest Element Six Mastergrade™ road picks can extend tool life expectancy by up to 50%. This cuts time-consuming pick changes, leading to a greater return on manpower and machine assets, increasing productivity and reducing operating costs.

This is largely because Element Six can expertly implement variations within the grain size and binder content using its proprietary 'nano-technology', manipulating the material to display different characteristics and performance, each uniquely suitable for the desired application.

Having proved its mettle on the roads, it made sense to apply the technology in other industries where machinery is subjected to intense abrasion and impact, including agriculture.

Similarly to road planing, farming relies on efficient and precise cutting of tough ground at high speeds, which tungsten carbide tools can more easily achieve compared to alternative materials.

With tight deadlines to meet, time is money, so minimizing the downtime and maintenance issues of equipment is crucial. Tungsten carbide tools can extend tool life by factor 8-10 vs. standard steel tools, meaning less time-consuming pick changes and more farming.

Boosting productivity in the fields- Tungsten carbide is well suited and readily available for the agriculture industry to make use of to optimize cutting and tillage operations in crucial applications such as fertilizer placement and seeding.

The material's exceptional hardness and strength translate into higher operational speeds and improved efficiency, meaning operators can complete their tasks faster, be that planting, harvesting or processing.

Machinery equipped with Element Six tungsten carbide delivers superior cutting performance, even in challenging soil conditions, as the hardness and strength of tungsten carbide enable precise, clean cutting, resulting in improved seedbed preparation, reduced soil compaction, and enhanced seed-to-soil contact.

Meeting the challenge of sustainability- As important as productivity is for the agriculture industry, sustainability is also a major consideration. By minimizing soil erosion, reducing fuel consumption, and curbing greenhouse gas emissions, the efficiency offered by tungsten carbide tools can also help mitigate the environmental impact of industrialized agriculture. All these features, combined, provide a better return on investment and effort to the farmer.

Investing in progress- While the transition to tungsten carbide tools represents an ongoing journey in the farming and agriculture industry, the material's long-term benefits for both productivity and sustainability are undeniable. While manufacturers like Element Six continue to innovate and refine their offerings, the agriculture industry stands to reap the rewards of enhanced efficiency and reduced environmental footprint.

To find out more, contact Les Slunecka at Les.Slunecka@e6.com



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Solving High Soil Salts Problems - Mitigation

Virtually all of Agriculture worldwide has reduced yields from reduced plant health caused by high soil salts (Na, Cl, K, & Nitrate). David Knaus (Apical-Ag) reports that 90% of the samples sent to him for analysis have a high salts problem. It is well established that every crop is damaged by high salts and conversely is improved by lowering the salts level. Using full spectrum soil biology is a viable mitigation approach that is affordable and effective.

Soil Salts are measured in Ec (Electrical Conductivity) or ds/m (Deciseimens/ Meter). Irrigation water quality is often expressed as total soluble salts (tds), an international convention being that 1 ds/m is equivalent to 640 mg/L of mixed salts. Low salts soils would be under 2 ds/m. Severe salts level would be over 8 ds/m.

The conventional proposals for mitigation of high salts level has remained the same for a hundred years. These are 1) Deep tillage to allow flushing high salts soils with low salts irrigation water, 2) Flushing the root zone with low salts water, 3) Growing cover crops, and 4) Incorporating plant residue into the plant growth zone. A key problem with this approach is the absence of low salts water that is needed to perform the soil flush. These proposals are viable and beneficial but miss a key mechanism.

A protocol that is far more effective and viable is to replenish the soil biology (bacteria, fungi, protozoa, nematodes, microarthropods, etc) found in a fully healthy soil matrix and increase the organic matter in the soil. Dr. Ingham (Soil Food Web Lab) has educated the agriculture community about the importance of a complete soil food web biology in the root zone.

Most farmers understand the importance of healthy soil and that the absence of soil biology gives dead soil. Organic matter feeds the soil food web biology. When one bacteria divides into two, the division requires seven carbon atoms and one nitrogen. When one fungi grows from one to two lengths, this requires 30 carbons and 1 nitrogen. Keeping sufficient organic matter is key to maintaining healthy soil biology.

In 1881, Charles Darwin wrote about earthworms, Darwin on Humus and the Earthworms: the Formation of Vegetable Mould Through the Action of Worms With Observations on Their Habits. Darwin declared how valuable was the presence of earthworms. The earthworms provide the most complete and diverse soil biology for soil health in the earthworm castings (a polite term for earthworm poop). Earthworms will not survive in dead soil. The earthworms require healthy soil biology to survive. Using earthworm castings to replenish the biology is key. Once the soil biology is replenished, earthworms will become present.

California Vermiculture has learned over the past 25 years, there is a major difference in the efficiency of earthworm castings depending on what feed mix the earthworms are given. If the earthworms are fed beef or dairy manures, the level of the chitin recyclers and cellulose recyclers are only 1% of the potential. Since these recyclers provide the vast majority of nutrition delivery to any plants, this makes a great difference in the plant yield. Using properly fed earthworm castings as a key component of a mix to produce a balanced brew microbial

solution (incorrectly called "Tea") can be used to replenish the complete soil food web. The mix that California Vermiculture developed, reviewed and approved by CDFA-OIM (California Department of Food & Agriculture Organic Input Material) as organic.

Note that this mix is NOT just earthworm castings. The mix must be correct to produce a balance of bacteria and fungi growth. The Soil Food Web Lab can perform testing to confirm the mix is correct. The mix must be aerated in water with no chlorine at 65-85F for 12-24 hours. This can provide a multiplication of the biology several billion times. The brewing equipment requires both fine bubbles, 1-2 mm for sufficient aeration and coarse bubbles over 10mm to provide mechanical impact strength.

The organic matter in the soil needs to be about 2%. The Earthworm Castings Solution (Tea) can be used to mitigate high salts soils. The salts remediation will happen quite rapidly with only 120 gallons/acre. The results will be very evident and dramatic. Let's look at a few real-life applications.

Low Salinity (ECe*=2 to 4 dSm-1)	Natural salinity; often seasonally dry Irrigation salinity; can be waterlogged after irrigation	Cropping salt tolerance	Low-moderate
Moderate Salinity (ECe= 4 to 8 dSm-1)	Dryland salinity; often seasonally waterlogged	Crop-pasture rotations	Moderate-high salt tolerance
High Salinity (ECe > 8 dSm-1)	Discharge areas; can be seeping or dry according to season	Grazing or revegetation	Halophytes

AVOCADOS

Avocado trees have a low tolerance to high salts. Soil salts ECe above 4 ds/m cause real problems for avocados. The irrigation water available in north San Diego County can be above 18 ds/m due to the high tds from the Colorado river water. The photo shows avocado leaves burned due to the high salts. The second picture shows new leaves 30 days after 60 gallons/acre application of WG Solution.



The response of the fruit production is significant. The left picture shows avocado production with no WGS at 125 lbs/tree. With 120 gpa the fruit drop decreased from an estimated 80% to under 20% first season. This resulted in a yield increase from 120 lb/tree to over 1,000 lb/tree.



Salt Problems

continued from previous page

BLUEBERRIES

Remediation of High Salts (37 ds/m/ low moisture retention



(7%) and no structure to 1 ds/m salts 33% moisture retention, and real soil structure using 60 gpa WGS took 60 days. Before high salts remediation, blueberry seedlings would not grow.

The picture shows after the salts remediation, blueberry seedlings grew to over 6 ft the first season using only 60 gallons per acre.

SALT WATER LAKE SOIL REMEDIATION

Even weeds won't grow in salt water. Millions of acres of farmland around the world have become non productive as the salts levels have approached seawater salinity. This WGS application has shown remediation of saltwater soil.

Near Wasco, CA, the saltwater lake evaporated over 20 years ago. Nothing would grow, not even weeds. A land developer asked, "could this saltwater soil be remediated?" This application proved it can. Twelve 5 gallon buckets of this salty soil were dug. Pistachio seedlings were used since pistachio trees are the most salt resistant. Six seedlings were planted in the harvested salt water soil. Five of the six seedlings died right away. Only one grew and after 60 days was only five inches tall.

The organic matter was under 1% so the equivalent of 1 ton/acre of earthworm castings/compost mix was added, then irrigated with 20% WGS water. All six plants began rapid growth with beautiful red new growth. In 60 days, all six of these seedlings were 40" tall. The picture shows the growth difference as presented to the developer. Three board members had planted pistachio seedlings in harvested high salts lake soil. None had survived. Only the seedlings planted in soil with the WG/WGS protocol survived and thrived.



The ability to remediate salty soils without the necessity of finding large amounts of clean (low salts) water for flushing means:

1. Any crop with a soil sample salts level above 4 ds/m will be able to see crop health and yield increase by replenishing the soil biology.
2. Any crop with high salts irrigation water can reverse the damaging effects by replenishing the soil biology.
3. Cropland that has been removed from production due to high soil salts level can be brought back to production by increasing the organic matter to over 1% and replenishing the soil biology.

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New UC study estimates costs for growing strawberries on the Central Coast



The strawberry cost study provides growers with a baseline to estimate their own costs.

By Pamela S Kan-Rice

Assistant Director, News and Information Outreach

A new study that can help growers and other readers estimate costs and potential returns for growing strawberries on California's Central Coast was recently released by UC Agriculture and Natural Resources, UC Cooperative Extension and the UC Davis Department of Agricultural and Resource Economics.

"This study provides growers with a baseline to estimate their own costs, which can help when applying for production loans, projecting labor costs, securing market arrangements, or understanding costs associated with water and nutrient management and regulatory programs," said Brittney Goodrich, UC Cooperative Extension specialist and study co-author.

The cost study models a management scenario for a 50-acre farm, 45 acres of which are planted to strawberries, located in Santa Cruz, Monterey or San Benito counties. The remaining acres are for the irrigation system, roads and buildings. The study describes the cultural practices used in strawberry production and harvest, including land preparation, soil fertility and pest management, irrigation and labor needs.

The 19-page study shows costs for each operation, material inputs and costs, and cash and non-cash overhead costs in a variety of formats for one production and harvest cycle. A ranging analysis is also included and shows potential profits or losses over a range of prices and yields.

The new study, titled "2024 Sample Costs to Produce and Harvest Strawberries" can be downloaded from the UC Davis Department of Agricultural and Resource Economics website at <https://coststudies.ucdavis.edu>.

For a detailed explanation of the assumptions and calculations used to estimate the costs and potential returns for each crop, readers can refer to the narrative portion of each study.

For more information, contact Mark Bolda, University of California Cooperative Extension farm advisor, at mpbolda@ucanr.edu, or Jeremy Murdock in the Department of Agricultural and Resource Economics at jmmurdock@ucdavis.edu.

IntelliSense™ Bale Automation From New Holland Revolutionizes Large Square Baler Industry



New Holland is steering toward autonomous baling with the introduction of IntelliSense™ Bale Automation. The first technology of its kind, IntelliSense Bale Automation pushes the boundaries of baling innovation and transforms the way customers and operators approach large square baling by delivering a complete automated baling system.

“With laser precision and real-time adjustments, the IntelliSense Bale Automation system changes the way we navigate fields,” says Brad Littlefield, precision marketing manager, dairy and livestock segment for New Holland. “For large square baling operations, it’s an indispensable asset for their future by improving bale harvesting while helping them meet the operational demands of the evolving agricultural landscape with confidence.”

Lasering in on Windrows With Precision

At its core, IntelliSense Bale Automation provides operators with a complete automated baling system focused on feedrate and swath guidance. It achieves this by combining two operator-assisted baling modes:

SmartSteer™ swath guidance acts as autosteering for precise navigation of the tractor and baler along the windrow. This mode allows hands-free driving when the swath is detected. Steering automation can be turned off and on at any time by the push of a button or movement of the steering wheel.

IntelliCruise II™ controls tractor speed, responding dynamically to variation in material feedrate into the baler. The operator sets the number of slices per bale target and the maximum speed limit. Once set, the baler will continuously adjust the forward speed to achieve the bale slices target.

The cornerstone of IntelliSense Bale Automation is the industry’s first LiDAR (light detection and ranging) technology. Installed on the front end of a tractor cab roof, it emits laser pulses to calculate distance based on

reflections from the windrow. The LiDAR measures swath cross-section and speed input to prevent overloads and forecast swath changes by detecting 19–26 feet ahead of the tractor, even in low-light or nighttime conditions. The LiDAR processor determines swath position and shape, relaying this information to the tractor’s ISOBUS steering.

Four Fenceposts Driving Profitability in the Field

With the IntelliSense Bale Automation system, New Holland aims to increase four elements critical to operations and operators: baling productivity, bale quality, fuel efficiency and operator comfort.

Increased baling productivity

The system increases operational productivity by ensuring constant high capacity without exceeding the limit. Baler blockages are prevented, ensuring continuous workflow and maximizing production time.

Improved bale quality

Bale quality is elevated by the system’s ability to eliminate crop leftovers. It also helps maintain a uniform bale shape through regular chamber filling and consistent weight to achieve a standardized bale weight at the desired target level.

Reduced fuel consumption

IntelliSense improves fuel efficiency by optimizing throughputs to reduce fuel consumption, while ensuring the tractor operates at peak performance.

Enhanced operator comfort

Operator comfort and use are central focuses of the system. Less experienced operators can maximize their output by relying on the automated guidance and feedrate control functions of the system. Traditional baling machinery in low-light environments can pose challenges for operators, affecting visibility and potentially compromising overall efficiency. Another standout benefit of IntelliSense’s LiDAR Technology is reducing operator fatigue during long harvesting days, especially at nighttime.

“The IntelliSense Bale Automation system is not only focused on output and the bottom line but stands out for its prioritization of operator well-being and safety,” Littlefield says. “At the heart of our design is a commitment to putting operators first and creating technology that addresses their most important needs for a seamless and productive experience.”

The IntelliSense Baler Automation system is compatible with Class 3 ISOBUS tractors — specifically, the T7 LWB, T7 HD and T8 from New Holland — and model year 2022 and model year 2023 New Holland BigBaler Large Square Balers.

Starting in 2025, customers will have the opportunity to place orders for the IntelliSense Bale Automation system as a factory-fit option. Immediate integration for the system is available now as a New Holland dealer-installed accessory option.

See the IntelliSense Bale Automation System at World Ag Expo

Stop by the New Holland booth in the South Exhibits, corner of O Street and South Street at the World Ag Expo, February 13–15, in Tulare, California, for a first look at the IntelliSense Bale Automation system. For more information, visit agriculture.newholland.com or contact your local New Holland dealer.

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Zero-Emission Medium and Heavy-Duty Vehicle Pilot Loan Program

The California Air Resources Board (CARB) is pleased to announce the upcoming launch of the pilot Zero-Emission Heavy-Duty Vehicle Air Quality Loan Program in conjunction with California Pollution Control Financing Authority through their California Capital Access Program (CalCAP).

The new pilot program will support financing opportunities for medium- and heavy-duty zero-emission vehicles. As an "Independent Contributor" to CalCAP, CARB will contribute a percentage of an enrolled loan into a "loan loss reserve" account for each participating financial institution.

With these funds available, lenders are better equipped to lend to businesses that need a little extra assistance and typically offer more favorable terms than the business would qualify for otherwise.

Fleet and Lender Qualifications

The pilot program will be offered statewide. Eligible small fleets may apply for a loan through a participating lender who will then submit an enrollment application directly to CalCAP.

Eligibility requirements include:

- Fleet size of 20 or fewer medium- and heavy-duty vehicles
- Purchased vehicle(s) must be:
 - Zero-emission
 - On-road
 - Gross Vehicle Weight Rating over 8,500 pounds (Class 2b through Class 8)
 - New or Used
- A warranty purchase is eligible when combined with a vehicle purchase

For Financial institutions to learn more about the program email calcap@treasurer.ca.gov.

Background - An initial funding allocation of \$5 million was provided in the CARB Fiscal Year 2022-2023 Funding Plan to create the pilot ZE Heavy-Duty Vehicle Air Quality Loan Program. The pilot will help program staff learn about what small business fleets need to transition to zero-emission vehicles by analyzing project data and evaluating deployment success. Staff will also monitor pilot participation in disadvantaged and low-income communities and solicit input from lenders and borrowers to understand how the program has influenced purchasing behaviors.

Contact - If you have questions about the webinar, please contact Brandon Rose. If you require a special accommodation or need this document in an alternate format (i.e., Braille, large print) or another language, please contact Siamak Asnaashari, as soon as possible. TTY/TDD/Speech to Speech users may dial 711 for the California Relay Service.

THE NEW MT2 and MT2E



LS Tractor USA proudly announces the launch of its latest new tractor models – the MT2 and MT2E, available in Cab and ROPS. This cutting-edge tractor is set to redefine homesteading experiences with its combination of reliability, performance, and a sleek new design.

Reliability Unmatched - Building on our legacy of providing reliable tractor solutions, the new MT2 and MT2E series is engineered to deliver unmatched performance in the field. Customers can expect the introduction of new valuable tools designed to enhance both reliability and efficiency. The latest enhancements include a new instrument panel, delivering insights into the tractor's performance and indicating the need for maintenance. Additionally, another feature is designed to optimize fuel efficiency, resulting in reduced operating costs.

Tested and Proven - Prior to release, the New MT2 and MT2E models undertook more than 1,000 hours of testing in various environmental conditions all over the United States. From clearing bush in Ohio, to testing the increased digging depth in Michigan, and assessing the new loader lift capacity in North Carolina, making these models a reliable choice for a wide range of tasks in every corner of the country.

Powerful Performance - The heart of the new MT2 and MT2E series lies in its powerful engine, designed to tackle the toughest challenges. Introducing an increase in loader lift capacity by 16-22% and a 30% boost in backhoe digging force. This new machine empowers users to achieve more in less time, optimizing their productivity.

Modern Aesthetics, Timeless Durability - Not just a workhorse, the New MT2 and MT2E Series introduces a modern and sleek aesthetic and is paired generously with customer-considered comfortability. The newly incorporated sleek features include an updated hood design, boasting a 20% increase in the open grill space, modern LED headlamps, expanded tire sizes and options, and enhanced seat comfortability, ensuring a comfortable working experience throughout the day.

Testimonials: "I am proud to introduce our latest product, the New MT2 and MT2E. It embodies our commitment to innovation, quality, and exceeding customer expectations. This achievement reflects the hard work and dedication of our entire team, and I am confident it will make a significant impact in the market." – CEO of LS Tractor USA, Mike Kim.

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*Compared to similarly equipped 2023 and earlier MT2 models.

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USDA Seeks Partnerships to Expand Conservation on Grazing Lands



The U.S. Department of Agriculture (USDA) is investing up to \$22 million in partnerships that expand access to conservation technical assistance for livestock producers and increase the use of conservation practices on grazing lands. USDA's Natural Resources Conservation Service (NRCS) is accepting proposals through its Grazing Lands Conservation Initiative (GLCI) until Sunday, May 26, 2024.

"Privately owned grazing lands cover nearly 30 percent of the national landscape, which means we have a tremendous opportunity to address climate change and conserve natural resources through voluntary, private lands conservation," said NRCS Chief Terry Cosby. "NRCS enlists a wide variety of conservation practices to help livestock producers. These partnerships will also help us expand the footprint of conservation on grazing lands and could help better reach underserved producers."

Project proposals for GLCI Cooperative Agreements will identify and address barriers to accessing grazing assistance for producers. These partnerships are encouraged to include outreach and support for reaching underserved producers. Projects must address one or more of the following priorities:

Local natural resource concerns.

Climate-smart agriculture and forestry practices and principles.

Encourage existing and new partnerships through emphasizing equity in advancing the resource needs of underserved communities.

Identify and implement strategies to quantify, monitor, report on and verify conservation benefits associated with grazing management systems.

Utilize Indigenous Traditional Ecological Knowledge, where applicable.

Through GLCI, NRCS will use partnerships to increase technical assistance for farmers and ranchers engaged in grazing activities. This will increase knowledge and expertise in working with underserved producers to increase their participation in new and existing grazing coalitions. GLCI aims to expand and establish new peer-to-peer networks for grazers and direct financial support for mentors working with new, beginning or transitioning grazers.

Eligibility is limited to single individuals or the following en-

tity types based in any of the 50 States, the District of Columbia, the Caribbean Area (Puerto Rico and the U.S. Virgin Islands), and the Pacific Islands Area (Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands):

Nonprofit organizations having a 501(c)(3) status with the Internal Revenue Service (IRS) (other than institutions of higher education)

Farmer or rancher organizations

State and local conservation governmental agencies

Agricultural Extension Services

Native American Tribal governments (federally recognized)

Native American Tribal organizations (other than federally recognized Tribal governments)

Land grant universities including 1890 or 1994 land grant institution (7 U.S.C. 3222 et seq.), Hispanic-serving institution (20 U.S.C. 1101a), or other minority-serving institution, such as a historically Black college or university (20 U.S.C. 1061), a Tribally controlled college or university (25 U.S.C. 1801), or Asian American and Pacific Islander-serving institution (20 U.S.C. 1059g)

For more information and to apply, visit the funding opportunity on [grants.gov](https://www.grants.gov). Applications are being accepted now through Sunday, May 26, 2024.

More Information

GLCI was developed as a coordinated effort to identify priority issues, find solutions and effect change on private grazing land, enhancing existing conservation programs. GLCI also supports the National Grazing Lands Coalition to help state grazing coalitions boost participation from underserved producers; host a Triennial National Grazing Lands Conference; and to act as navigators for grazers seeking additional resources.

USDA is reviving and revitalizing GLCI to leverage partner capacity, expertise and technical assistance to expand the footprint of well-managed grazing systems across the country. While some states have been able to use annual funds to support similar agreements, this new structure and additional funding provides a more strategic and comprehensive approach to support grazing systems, reach new and underserved producers and address climate change.

For more information about NRCS's grazing lands efforts, visit the NRCS website.

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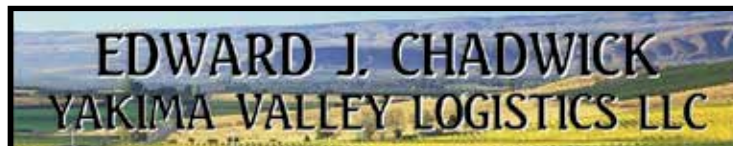


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UPCOMING EVENTS

MAY 2024

20: California Association of Winegrape Growers Foundation for the 5th Annual Scholarship Golf Tournament. The scholarship is specifically for the children whose parent/guardian is employed by a CA winegrape grower. The Wild-horse Golf Club, Davis, CA.

JUNE 2024

2-6: American Agri-Women Legislative Fly-In. Join us in D.C. and have our voices heard! We develop our policy positions each year at our Mid-Year Meeting to present at our annual Legislative Fly-In to Washington, D.C. each June. Embassy Suites by Hilton Crystal City, Arlington, VA. For more information visit: www.americanagriwomen.org/events

26-27: California Cattlemen's Association Mid-Year Meeting. Attend and be active in setting CCA policy. Come discuss issues with fellow producers and hear updates. Your voice helps develop policy that provides direction for your organization. Nugget Casino Resort, Sparks, NV. For more information Visit: <https://calcattlemen.org/events/>

JULY 2024

16-17: Advanced Cheesemaking. This two-day practical, hands-on course will take place at the Dairy Products Technology Center, Cal Poly, San Luis Obispo. Registration: <https://dairy.calpoly.edu/short-course-symposia!@>

SEPTEMBER

12: 2nd Annual Innovation Workshop & State of the Industry at Fresno State. Registration: www.cdic.net

OCTOBER 2024

8-9: Hispanic, Italian and Mediterranean Cheeses. This practical course will feature international cheese varieties and will take place at the Dairy Products Technology Center, Cal Poly, San Luis Obispo. Registration: <https://dairy.calpoly.edu/short-course-symposia>

NOVEMBER 2024

14-17: American Agri-Women 2024 50th National Convention. Come celebrate our 50th anniversary in Fond du Lac, Wisconsin! Details coming soon, stay tuned! For information visit: www.americanagriwomen.org/events

DECEMBER 2023

4-6: 108th Annual CCA/CCW Convention. Grand Sierra Resort and Casino 2500 E 2nd St, Reno, NV, United States
More details to be updated in the coming months.

To list your special event in California Farm Equipment send details to CFEM, PO Box 1128, Visalia, CA. 93279. or email to: info@cfemag.com.

California Dairy Innovation Center Announces Q2-Q3 2024 Schedule of Dairy Products & Innovation Training Opportunities

The California Dairy Innovation Center (CDIC) will be hosting Spring and Summer training programs for processors, producers, dairy industry professionals, entrepreneurs, educators, and students as well as health professionals. The courses, which have no pre-requisites, will be held at a variety of California locations and are open to all participants.

The schedule of courses includes:

Dairy Foods Technology 101 will take place May 30, 2024, in Novato, Calif.

This course is a free educational event open to all California dairy processors and end-users, dairy entrepreneurs, producers, faculty and students in food science, agribusiness, and related fields, as well as qualified suppliers to the industry. It is ideal for individuals who are early in their careers in dairy products processing, entrepreneurs, and employees in production, operations, management, sales and marketing, research and development, and quality assurance roles within the industry.

This course aims to educate attendees on the intricate processes behind dairy products creation, from the fundamentals of milk production to key unit operations for fluid milk, cream, butter, cheese, cultured products and concentrated or dried dairy products, as well as sensory science and food safety. Led by industry experts, participants can expect to learn about the science involved in turning dairy milk into classic as well as innovative dairy products, gain a solid understanding of processes and the importance of these steps to ensure quality and safety. Attendees will have the chance to engage in interactive demonstrations, ask questions, and network with fellow participants who share their passion for dairy.

No pre-requisites are required. To receive a detailed program, information on area hotels, and to register, send name (or that of any participating employees), title(s), company name, phone number and email(s) to vlagrange@cmab.net or nvanbuskirk@cmab.net by May 25th. Full program details about the workshop can also be found on the CDIC website at cdic.net.

Yogurts, Fermented Milks and Probiotic Dairy Products, which will take place June 20-21, 2024, at UC Davis is a collaboration between the CDIC, UC Davis, Dairy Council of California, and the California Dairy Research Foundation. During the course, attendees will learn from leading experts who possess extensive experience and expertise in dairy science, nutrition, and food innovation. This course will not only cover the fundamentals of processing but will also highlight the latest nutrition research and product innovations shaping the sector, market trends and opportunities.

During the course, attendees can expect to delve into such topics as:

- Latest research on the nutritional benefits of probiotics and fermented milk products.
- Market trends, types of fermented milks and market opportunities for California processors.
- Fundamental principles of milk fermentation and yogurt production.
- Innovations in processing technologies and product development, including lactose-free, clean label and reduced sugar products.

The course is designed for dairy industry professionals, dietitians and nutritionists, food scientists, researchers, educators, and individuals interested in expanding their understanding of fermented dairy products. With a blend of lectures, hands-on demonstrations, and lab tours on campus, participants will gain practical insights and valuable knowledge that can be applied in both academic and industry settings. The event is modular, and registration covers all three sessions, meals and refreshments, and a networking reception. For more information, please contact vlagrange@cmab.net or nvanbuskirk@cmab.net.

There are no pre-requisites required. Registration (free for health professionals) and additional information can be found at <https://www.eventbrite.com.au/e/short-course-yogurt-fermented-milks-and-probiotic-dairy-products-tickets-867978094847>.

CDFA Awards Funding For 2024 Pet Lover's License Plate Program To Support Spay/Neuter Services

The California Department of Food and Agriculture has awarded a total of \$327,406 from the Pet Lover's License Plate program for seven projects to help stop pet overpopulation.

Funded projects will support spay and neuter services provided by municipalities and non-profit organizations throughout California. The funds will support low cost services for pets of residents in high-poverty areas and underserved communities, as well as projects that focus on frequently-sheltered dog breeds like pit bulls and chihuahuas.

Additionally, funds will be utilized to reduce feral cat colonies through trap, neuter and release programs.

The Pet Lover's License Plate Grant Program is funded with proceeds generated through the sale of specialized license plates through the California Department of Motor Vehicles (DMV).

You can help support the Pet Lover's License Plate program by purchasing a special interest license plate at your local DMV office or online.

The screenshot shows the website interface for California Farm Equipment Magazine. At the top, there are navigation links: Home, About, Contact, Advertise with us, Create an account, and Sign in. Below the navigation is a main banner for Garton Tractor, featuring a blue tractor and a red implement. The banner text reads: "California's Agriculture Equipment Dealer", "Family owned and operated since 1954", and "GARTON TRACTOR WITH 10 LOCATIONS TO SERVE YOU". To the right of the banner is a dropdown menu with options: World Ag Expo, Garton Tractor Inc, Linder Equipment Company, N & S Tractor, and Empire Agriculture. Below the banner is a "Classifieds" section with a "View classifieds" link. It displays four items: Kubota M6L-111SDS 114HP Orchard Cab Tractors (\$67,500), Demries Narrow Vineyard Clod Crusher (\$1,890), Clemens Vine Trimmer Other (\$24,900), and Woods RCS Rotary Mower Other (\$2,500). To the right of the classifieds is a "Current Magazine" section with a "View Current Issue" button and a "View Past Issues" button. Below the classifieds is a "Latest News" section with a "Read more" link, showing two articles: "Farm Smart program instills" (Feb 21, 2023) and "DNA Research Finds Low Genetic" (Feb 21, 2023).

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Organizations

Almond Board of California
.....www.almonds.com

California Assn. of Winegrape Growers
.....www.cawg.org

California Cattlemen's Association
.....www.calcattlemen.org

California Dairy Research Foundation
.....www.cdrf.org

California Poultry Federation
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California Raisins
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California Rangeland Trust
.....www.rangelandtrust.org

California Strawberries
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.....www.fweda.com

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.....www.dwr.water.ca.gov

Universities

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Connecting California's forest landowners with California Tree School

By Grace Nguyen-Sovan Dean

Forest Stewardship Communications Specialist

While trees and forests are often emblematic of constancy in a fast-paced world, our state's forests are actually changing before our eyes. Since 2020, the UC ANR Forest Stewardship Education (FSE) program has been helping California's forest landowners be proactive about the inevitable shifts their forestland will experience. The Forest Stewardship and Post-Fire Forest Resilience workshop programs use an online educational format, which guide landowners through the basics of creating forest management plans and managing post-fire landscapes, respectively. Now, the FSE team is piloting a new program to engage a wider audience of forest landowners and community members passionate about trees.

This spring, the Forest Stewardship and UC ANR Fire Network teams are holding the first California Tree School, where individuals attend multiple in-person classes on the forestry topics they are most curious about. "The existing online programs are very focused on forest management plans and post-fire activity, and [Tree School] lets us tackle other topics," said UC ANR forest and natural resources advisor Susie Kocher.

A one-stop shop for continuing forestry education

California Tree School was inspired when Forest Stewardship Academic Coordinator Kim Ingram, Post-fire Academic Coordinator Katie Reidy and Kocher attended Oregon State University Extension's Tree School event in Clackamas County, Oregon. OSU Tree School is a day-long experience comprised of classes that cover the different dimensions of forestry: constructing a house from your own timber, carbon cap and trade, and buying portable sawmills are just a small sampling of the options for attendees. OSU Tree School students ranged from forest landowners to community college students, contributing to a space which would facilitate community connections as well as learning.

Kocher described the experience as a "a great one-day, one-stop shop to keep up-to-date on what we [forest landowners and professionals] should know." Excited by the breadth of opportunities offered at OSU's Tree School, Ingram, Kocher and Reidy were inspired to bring the format to California.

"It's our time to discuss the whole ecosystem," noted Reidy. "Tree School is bringing in the trustworthy, reliable group of experts who can provide more information on the questions pertaining to landowners' specific goals."

California Tree School will be offered in two locations this spring, with CA Tree School- Hopland taking place on May 4, and CA Tree School- El Dorado on June 1. Similar to OSU's Tree School, attendees are expected to be a mix of forest landowners, natural resource professionals and interested community members.

Connecting statewide professionals; personalizing forestry education

Tree School offers attendees the opportunity to focus on subjects that pertain to their specific learning needs. This personalized approach is a new foray for the Forest Stewardship team, but is something that Ingram says workshop participants have been wanting for some time.



Forest Stewardship workshop participants at an El Dorado County field day. Credit: K.Ingram.

"Our participants never think they learn enough. They are always asking for more information, and this Tree School gives us the chance to expand on things we might not have had a chance to go over in the workshop series," remarked Ingram. Additionally, Tree School instructors had creative freedom when it came to developing their classes, from the topic to the class format. This is evident when browsing through each session's class catalog. CA Tree School attendees choose four classes to attend, meaning they can build their first burn pile, understand the ins and outs of regional wildlife, paint outdoors and learn how to aid statewide reforestation efforts all in one day.

"I felt that Tree School created a sense of trust around complex topics," noted Reidy about her experience last year in Oregon. For CA Tree School, the Forest Stewardship team aims to do the same. This meant recruiting from throughout the UC ANR network and other organizations, including CALFIRE and CARCD (California Association of Resource Conservation Districts), to bring trusted voices to the community.

"What's exciting about Tree School is that we are bringing natural resource professionals from all around to engage everyone at the same time, and all in one place," noted Ingram.

The team is excited to see all the connections that will be made between community members and professionals during this pilot year, and "if this is successful and we can bring it back next year," commented Kocher, "we are definitely interested in partnering with more people and expanding our outreach."

Making CA Tree School an in-person experience was important to the team, as much of the education is hands-on. Additionally, Kocher sees enhanced potential for building personal connections: "In person, you have this opportunity for people to identify as part of a community," noted Kocher, "So I'm excited for people to hang out with each other."

Encouraging an informed community

"You can't separate the emotional from the physical, and there are a lot of topics in forestry like wildfire and economics that can be a bit of a downer," said Ingram. "I'm excited to help create a positive learning environment, and one that encourages folks to turn to UC Cooperative Extension for these resources."

"Our main goal here is to get science out there," concurred Reidy. "The more exposure people have to science, the more confident they feel in themselves and their wants and needs."

Scientists Gain Insight into a Buzzing Spring Pollinator that Plays a Significant Role



Photo by Jack Dykinga

The USDA's Agricultural Research Service (ARS), in collaboration with the Ecological Forestry Applications Research Centre in Spain and North Dakota State University, conducted a comparison of the physiological and molecular processes involved in the summer and winter dormancy of *Osmia lignaria*, also known as blue orchard bee or orchard mason bee.

This analysis of gene expression is believed to be the first to compare the dormancy periods of this species in their natural habitat, and more importantly, it led to sequencing the first draft genome of this important pollinator for the almond industry.

According to the U.S. Forest Service, North America has 140 species of *Osmia*. *Osmia lignaria*, a solitary bee, follows a one-year lifecycle that includes two periods of dormancy. During summer, the bee develops to the prepupal stage (the stage of larva after its final molt), pauses, then finishes to developing to the adult stage before winter. Adult bees slow their metabolic activity while overwintering [second dormancy]. When spring arrives, adult bees emerge from dormancy and become highly active in pollination. Although this species does not produce honey, it is very effective in pollinating almond trees due to cross-pollination among different varieties, which leads to higher crop yields.

Osmia ribifloris on a barberry flower. *Osmia ribifloris* is one of several relatives of the blue orchard bee (*Osmia lignaria*). These bees are effective polli-

nators for almond trees due to the way they cross-pollinate among different varieties, leading to higher crop yields. (Photo by Photo by Jack Dykinga)

"This species inhabits a wide latitudinal range in North America, with populations in the north having different developmental rates and lengths of dormancy periods than those in southern populations," said Alex Torson, a computational biologist with ARS' Insect Genetics and Biochemistry Research in Fargo, North Dakota.

"In the future, we can use the genome presented in this study to start comparing the genomes of individuals from these different geographic populations. If these differences in development and dormancy can be traced to their genetics, then we could develop managed populations from different geographic locations, and time the characteristics of those populations with peak floral blooms for different types of crops."

By aligning their emergence with the timing of crops, it would allow for better management and pollination, as this bee species emerges in the spring and is a significant pollinator of almond trees due to how it pollinates.

Understanding how this lifecycle occurs has become increasingly important due to changes in environmental conditions. A better understanding of the evolutionary relationships among populations of this species will be critical for developing managed populations we can use for pollination services.

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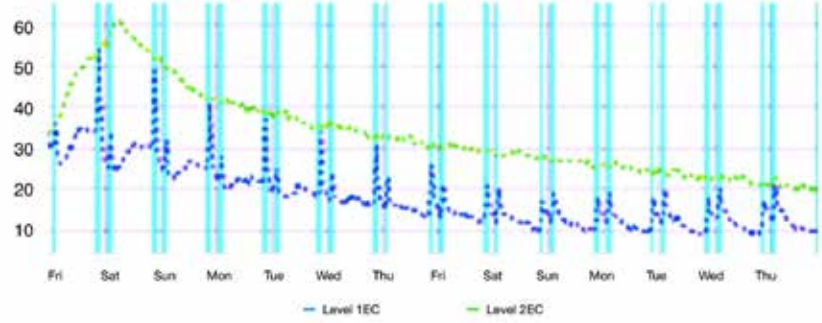
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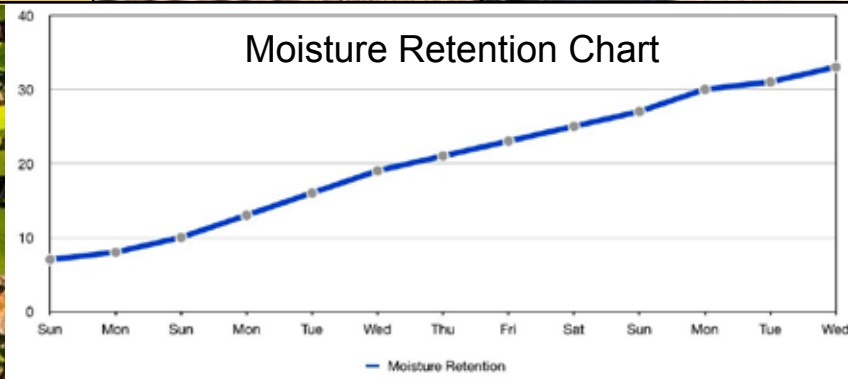
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