UNIVERSITY OF CALIFORNIA
Agriculture and Natural Resources

Palo Verde Valley Update

Fall 2021

In this issue

Fall in the Palo Verde Valley is the transition time for temperatures, day length, crops and pests. It is the time when irrigation needs are lessened, alfalfa, broccoli and dehydrator onions are being planted, cotton is being defoliated, and we are thankful we have survived another hot summer.

This issue of the Palo Verde Valley Update includes the following articles:

Thank you to each of you for your support of the University of Cooperative Extension during the past 12 months. As many of you know, there have been a number of research projects conducted in the past 2 years including alfalfa insecticide, herbicide and fungicide work, and biostimulants and heat mitigation experiments in various crops. Results from these projects will be forthcoming in future Palo Verde Valley Updates.

Dehydrator onion responses to biostimulants applied at planting and early emergence in the Palo Verde Valley, 2020-2021 production season

Michael D. Rethwisch, Kassandra W. Allan, Nathan Tribby

Boosting dehydrator onion yields and doing so economically is of importance for growers, processors and the general public, as potential yield boosts can result in greater water use efficiencies and potentially reducing irrigated acres.

A replicated small plot field trial was initiated in the early winter of 2020, with biostimulant products being initially applied to dehydrator onions as emergent plants were able to be visually rowed (Fig. 1). Products included in this trial were Acadian Liquid Seaweed Extract (LSC), Ocean Organic's Guarantee Complex, and Penergetic P and Penergetic K.

The same products, rates and similar application timings relative to crop development were used as in the previous year's experiment (2019-2020 growing season) although the 2020 initial application was not prior to sprinkler applied germination water as in 2019. Other differences included a much heavier soil type (Holtville silty clay in 2020-2021 vs. Cibola fine sandy loam/Rositas fine sand in 2019-2020), and a different dehydrator onion variety.

Applications after the emergence application were made at either 3rd leaf for the Penergetic treatment, or at fifth (5th) leaf for the LSC and Guarantee Complex.

Yields were obtained in July 2021 via a single bed harvestor which harvested 15 bed feet from each of 6 replicated blocks. Onions were weighed, and yields calculated. As the harvestor was occasionally not deep enough to harvest the entire onion and leaving some parts of onion bulbs in the bed, the lowest yielding plot was eliminated for each treatment. Yields were statistically analyzed using a means separation and a Student's T test (JMP Pro 16.0.0).

Yield data (Fig. 1) indicated that tall treatments resulted in numerically higher yields from the 2021 harvest, with the top treatment in this experiment being two applications of two (2) quarts/acre of Acadian Liquid Seaweed Concentrate (19.17 tons/acre). This was the only treatment that resulted in statistically higher than untreated onions (14.67 tons/acre) when evaluated using 5 replicates of data. Second highest yielding treatment was the Penergetic treatment combination (17.25 tons/acre).

Both of these treatments provided only about 0.5 tons/acre increase in the previous year's experiment (Fig. 2). Guarantee Complex applied at 1 qt./acre had the highest numerical yield in 2020, approximately 1 ton/acre more than untreated onions. This level of increase was also noted for 2021 yields for this product relative to untreated dehydrator onions.

The reasons for differences in yield increases relative to untreated dehydrator onions are still unclear but soil type, pre-germination vs. emergence application, onion variety and/or temperature at application (mid.-Nov. 2019 vs. late Dec. 2020) are thought to be potential factors.

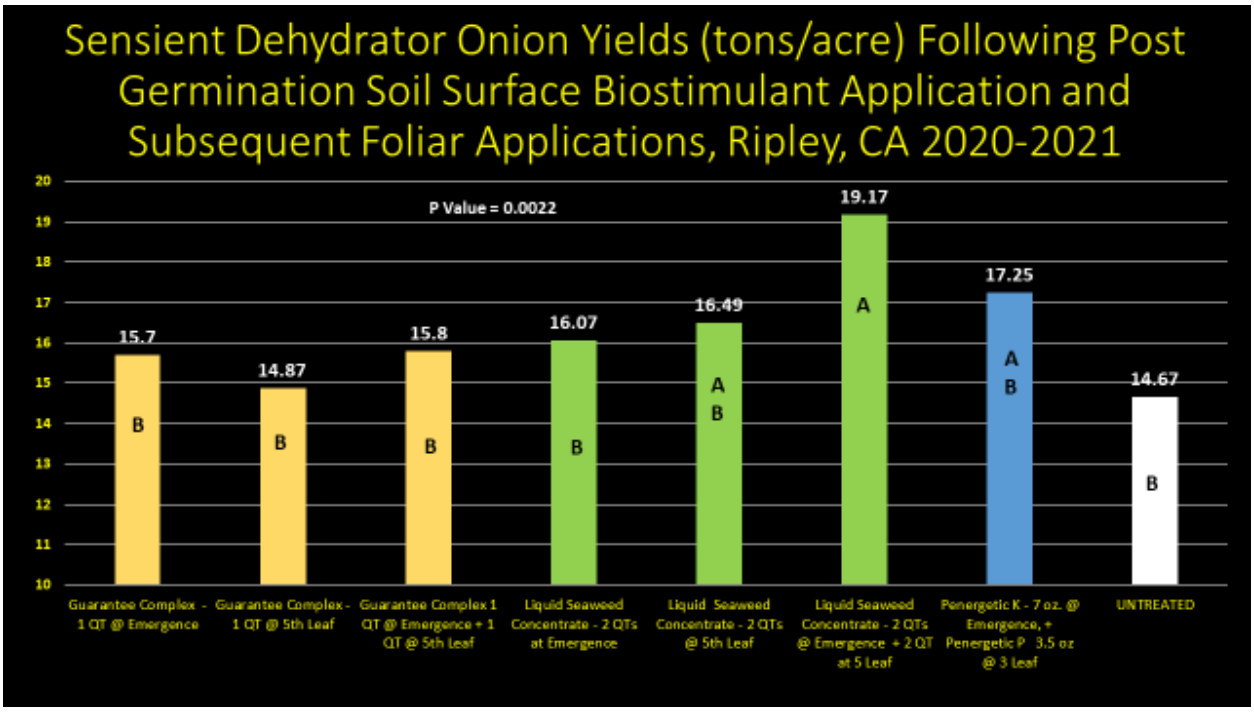

Fig. 1. Dehydrator onion yields following biostimulants applied December 24, 2020, shortly after emergence when rows of emerged onions could be visually noted.

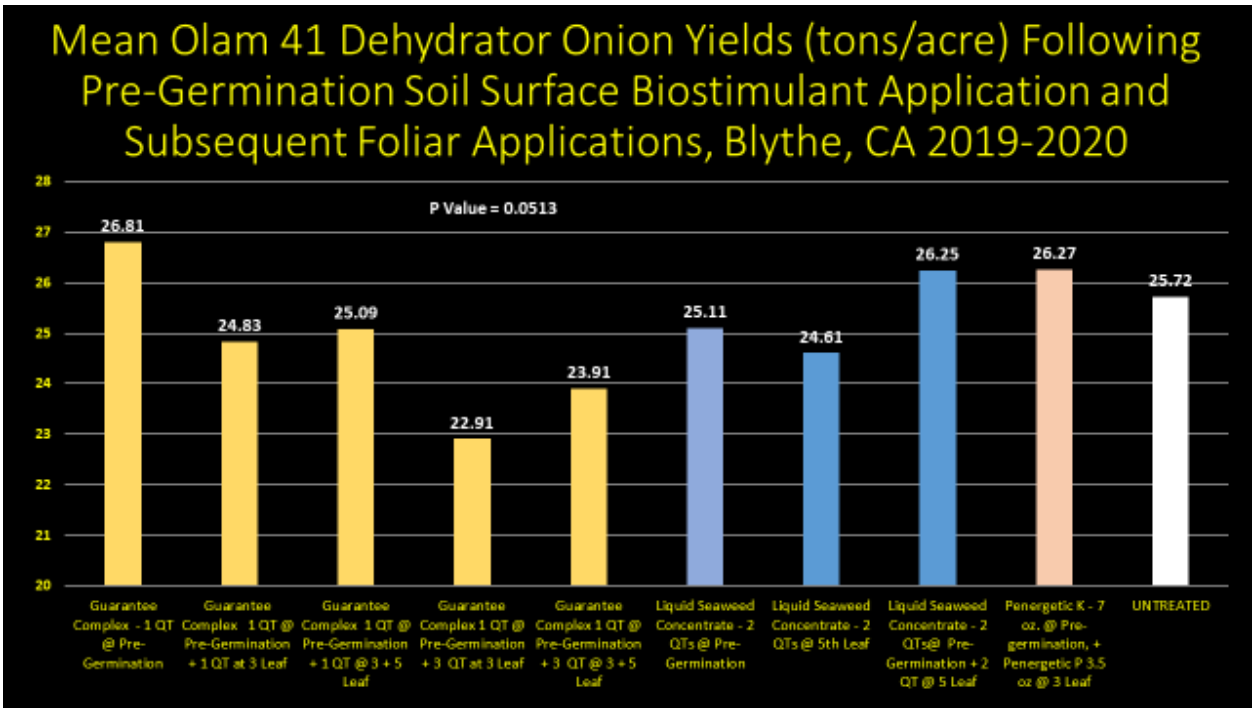

Fig. 2 . Dehydrator onion yields from summer 2020. Broadcast application made to soil prior to germination water being applied via sprinkler irrigation. Soil type was a lighter soil compared to that of the 2020-2021 experiment, which was a Holtville silty clay.

Alfalfa Leaftier Found for the First Time in Low Desert Alfalfa

Apurba Barman[1], John Palumbo[2] and Michael Rethwisch[3]
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Alfalfa hay fields in the Imperial Valley of California and Yuma County, Arizona, have been found to be infested by larvae of the alfalfa leaftier *Dichomeris acuminatus* (Staudinger, 1876), a caterpillar pest not previously reported to damage alfalfa in the United States. There were numerous reports of this new caterpillar pest from multiple alfalfa fields throughout the low desert since mid-September based largely on their distinct feeding symptoms, which result in 2 leaves folded or 2-3 leaves tied together to create a shell-like structure, hence the name 'alfalfa leaftier'. Caterpillars feed on leaf tissues living within these structures (Fig. 1).

Fig. 1. Damage symptoms in alfalfa crops infested by alfalfa leaftier: leaf folding, loss of green tissues in leaf (leaf sclerotization). (Photo: Apurba Barman)

Although not previously reported to damage alfalfa in the U.S., this insect has been found in Hawaii, Florida, Mississippi, and in Southern California (San Diego County) (Moth Photographers Group 2021). It does have a very wide distribution, being reported from wide range of tropical and semi-tropical countries across the globe (northern Africa, most of southern Europe, Australia, India, China, Japan, India, Sri Lanka, as well as many islands). Host plants in additional to alfalfa include various legumes such as sesbania, soybean (*Glycine max*), pigeon pea (*Cajanus cajan*), and white clover (*Trifolium repens*) (Park and Hodges 1995; Ponomarenko 2006; Robinson et al., 2010; Meena et al., 2018).

Fig. 2. Adult alfalfa leaftier moth, showing size relative to a penny. (Photo: Apurba Barman)

Adult alfalfa leaftier moths, being in the same family as pink bollworm moths (Gelechiidae), are fairly small and are about 8 mm long (Fig. 2), slender, with pale yellowish to orange colored wings that have several dark markings. The wing markings and other structures, which can be used to help identify the moth are shown in figure 3.

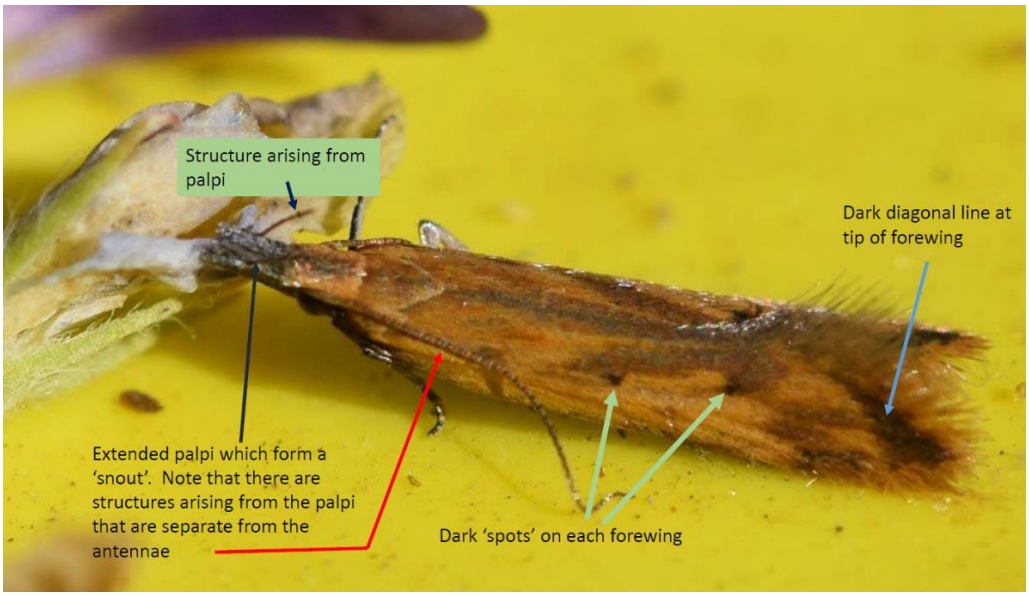

Fig. 3. Adult alfalfa leaftier moth showing markings and other structures important for identification. (Photo: John Palumbo; Illustrations: Michael Rethwisch)

Females deposit individual eggs on the upper surface of leaves, and are usually pale red in color, small, round with smooth surface. (Fig. 4). Caterpillars are usually light green in color during their early instar stages and may turn yellowish in color towards the last instar, when ready for pupation. Caterpillars are small and somewhat tapered on both ends, with a shiny, black head and a dark, sclerotized first thoracic segment (Fig. 5). Full grown caterpillars can be up to 8 mm long and mostly stay inside the rolled leaf and covered with silken thread as they are ready for pupation. Pupae are usually orange to black in color and about 6 mm long (Fig. 4).

Fig. 4. Egg (inside the blue circle and compared with alfalfa seed), caterpillar, pupa, and adult stage of alfalfa leaftier infesting alfalfa, Imperial Co., CA. (Photo: Apurba Barman)

Fig. 5. Alfalfa leaftier caterpillar. Note the completely sclerotized first thoracic segment and leg, as well as 5 sets of prolegs. (Photo: John Palumbo)

Alfalfa hay crops infested with alfalfa leaftier are evident from a distance as the terminal portion of plants are likely to have folded leaves, and often left with dried, white, lower epidermis of the leaves from feeding by the caterpillars. Damage can depend on the number of caterpillars present on the stem and the growth stage of the crop. Under low pest pressure, the damage symptom is usually restricted to the terminal of a plant. However, presence of several caterpillars (3-4 per stem) can result in significant damage to leaves throughout the plant. Based on our observations this fall, heavy infestation of alfalfa leaftier can significantly reduce the hay yield/quality, however, the levels of these reductions have not yet been documented under U.S. low desert alfalfa production conditions.

Being a new pest for the low desert, no economic thresholds have been established. Anecdotal observations suggest that economic damage from this caterpillar pest appears to be significant if densities exceed one caterpillar per plant. Verification of this level is still needed.

As crops can be infested as early as new leaves appear, fields should be scouted for this caterpillar pest beginning early in the regrowth cycle. During this limited time since the appearance of this pest in the low desert, pest control advisers have treated infested fields with Intrepid® and Prevathon® and found satisfactory control. Further work to evaluate other insecticide products is currently ongoing.

Efficacy of beneficial insects against alfalfa leaftier in the low desert still needs to be studied. Predation of larvae may be greatly restricted due to the sheltering behavior of caterpillars within the rolled leaf structures, however, exposed eggs may be highly susceptible to predation and parasitism.

References:

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Ponomarenko, M.G. 2006. Subfamily Dichomeridinae (Lepidoptera, Gelechiidae): Phylogeny, classification, and position in the system of gelechiid moths. *Entomological Review* 86: 449-456.

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Is Your Alfalfa Field Decorated for Halloween?

October is the month associated with Halloween and is the month that many people get into the Halloween spirit by decorating their offices and homes. One type of decoration that is often used is spider webs or 'cobwebs', the latter being a spider's web that is old and covered with dust in some definitions.

Cobwebs get their name from the Middle English word for spider which is "coppe", derived from the Old English word for spider: atorcoppe (which means poison head). The term attercop is rarely used these days, although it was reportedly used by J.R.R. Tolkien in *The Hobbit* in 1937.

While some people decorate their residences to the extreme for the season, it appears that some alfalfa fields in the low desert also are being 'decorated' (Fig. 1).

Fig. 1. An alfalfa field in the Palo Verde Valley, October 2020.

When closely examining these 'decorated' fields, it was easy to see that the decorations are not 'cobwebs', because they are not old and dusty. What was more surprising is that the decorations shown in Figure 1 were not spider webs either, although they were indeed made by spiders. To be technically correct, a spider web is a structure made by a spider to capture prey, which was not the situation in these fields.

So, what is really happening in this field? A collection of the spiders in this and other fields in October found that the vast majority of spiders were wolf spiders (Family Lycosidae), which ranged in size from very, very small 'spiderlings' to about half-grown. While not identified to species, these spiders appear to belong to the genus *Pardosa*, which is the common genus of wolf spiders in alfalfa from New Mexico to northern California and usually of all spiders found in alfalfa in these area.

Wolf spiders are hunting spiders, and do not spin webs, but they are able to create 'spider silk'. It is this spider silk that is being noted during October in multiple alfalfa fields, and it is being used for 'ballooning'.

Ballooning is done by small spiders and spiderlings. To balloon the spider climbs to a high point, turns to face the wind, initiates a 'tiptoe' posture in which it stands on the ends of its tarsi, elevates its abdomen, and releases a few strands of silk known as draglines. The spider detects the strength and direction of the wind with sensory hairs on its legs. It then lifts its body up holding on to the surface with just two front legs, and waits until a very light breeze (usually less than 10 feet/second) carries it up and away.

As can be seen in Figure 1, there are distinct linear concentrations of spider silk

across the field that correspond to tallest alfalfa stems, consistent with spiderlings moving to the highest points for "take-off".

While some wolf spiders are known to be airborne via ballooning in the spring, the spider silking in alfalfa fields in the Palo Verde Valley has only been noted in the fall. The effect of silking and ballooning is not necessarily restricted to alfalfa fields, as there usually plenty of pick-up truck antennas that also collect the airborne silk (and probably a few spiderlings as well).

Although local motorists may not appreciate their vehicles being naturally decorated with spider silk at this time of year, alfalfa growers usually benefit from the redistribution of these predatory animals which hunt and feed on insects found in their fields.

UPCOMING MEETINGS with California CEUs

There have been several inquiries about California CEU opportunities for those individuals still needing such before reaching the end of 2021. Here is a listing of known meetings open to the public that should be somewhat easy to attend (either in the area or via distance) and/or of interest to local production agriculture

Meeting Name/Location	**Date**	**CEUs Laws**	**CEUs other**	**Fee?**	**Phone # for additional information**	**In person or distance?**
Pesticide Applicators Professional Association (PAPA)/ **PAPA zoom webinar**	Nov. 10	2.0	1.0	Yes	831-442-3536	Distance
University of California Weed Research and Information Center /**Weed Management in Agronomic Crops for a Changing Environment Webinar**	Nov. 15	0	2.5	Yes	530-400-6611	Distance
Pesticide Applicators Professional Association (PAPA)/ **PAPA zoom webinar**	Nov. 10	1.0	2.0	Check with organizer	831-442-3536	Distance
Western Alfalfa & Forages Symposium (Reno)/ **Pest Management Session**	Nov. 17	0	3.0	Yes	916-505-1821	In Person
University of Arizona La Paz County Extension/ **Alfalfa Production meeting** (Parker)	Dec. 1	0.5 expected	2.5 expected	No	928-669-9843 Preregistration requested	In Person
UCCE – Imperial County/ **Low Desert Fall Crops Workshop**	Dec. 9	0.5 expected	3.0 expected	Check with organizer	442-265-7700 Preregistration required?	Both

2021 Western Alfalfa & Forage Symposium

The 2021 Western Alfalfa & Forage Symposium will in an in-person event this year, being held November 16-18 at the Grand Sierra Resort in Reno, NV. The first day is an optional agricultural educational tour in Northern Nevada. Areas of emphasis during the symposium include water availability, pest management, alternative forages, and soil health and fertility. There will also be multiple posters with additional research data on display.

Costs are $100 for the tour only, $340 for the symposium sessions, and $415 for all symposium activities. Registration and additional information, including housing, is available at **https://calhaysymposium.com/. CEUs from both Arizona and California (3.0 other) are both expected to be available or have already been confirmed.**

There will not be a California Alfalfa Symposium or Western Alfalfa & Forage Symposium in 2022. Instead, there will be a World Alfalfa Congress, and for those of us in the desert southwest it will be almost in our backyard, being held November 14-17, 2022, at the Town and Country Resort in San Diego, CA. Hope to see you at one or both of these events.

Day One - Tuesday, November 16, 2021

6:30 a.m. – 7:00 p.m. Symposium and Exhibitor Registration

7:30 a.m. Continental Breakfast (Tour Participants Only)

8:00 a.m. – 4:00 p.m. Exhibitor/Poster Set-Up

8:00 a.m. – 5:15 p.m. Agricultural Educational Tour in Northern Nevada

Overview: Tour stops will include a large western dairy production operation, a specialized goat dairy, Frey Ranch Distillery, the Derby Dam and Newslands Water Project, and a hay export operation.

5:00 p.m. – 7:00 p.m. Symposium Welcome Reception

DAY Two - Wednesday, November 17, 2021

Session I. 8:00 a.m. – 10:00 a.m. Economics and Water Trends:

• 8:10 a.m. Status of the Western Forage Industry, Josh Callen, The Hoyt Report, Twin Falls, ID

• 8:35 a.m. Current Trends and Challenges for the Western Dairy Industry. Paul Sousa, Western United Dairies, Turlock, CA

• 9:00 a.m. International Trade Dynamics in Hay and Impacts on Markets. Dan Sumner, University of California, Davis, CA

• 9:25 a.m. Water Situation in West and Impacts on Forages. Jason Kelley, USDA-ARS, Parlier, CA

• 9:50 a.m. Discussion

• 10:00 a.m. Break

Session II. 10:30 a.m. – 12:00 p.m. Water, Climate Change, and the Environment

• 10:30 a.m. The Important Role of Alfalfa in an Uncertain Water Future. Dan Putnam, University of California, Davis, CA

• 10:55 a.m. Key Role of Forages in Climate-Smart Agriculture. Josh Gamble, USDA-ARS, St. Paul, MN

• 11:20 a.m. Rethinking Methane – Livestock's Path to Climate Neutrality. Frank Mitloener, University of California, Davis, CA

• 11:45 a.m. Discussion

12:00 p.m. – 1:00 p.m. Symposium Lunch

1:30 p.m. – 5:00 p.m. Symposium Breakout Sessions

Breakout 1: Pest Management *(CEUs available from California and other states for this section)*

• 1:30 p.m. Burn-Down Strategies for Alfalfa Weed Control Earl Creech, Utah State University, Logan, UT

• 1:50 p.m. Residual and Postemergence Weed Control in Seedling Alfalfa. Albert Adjesiwor, University of Idaho, Kimberly Research & Extension Center

• 2:10 p.m. Toxic Plants that Contaminate Hay and Other Forages in the Western United States. Bryan L Stegelmeier, Research Veterinary Medical Officer USDA ARS, Logan Utah

• 2:30 p.m. Managing Pocket Gophers in Alfalfa. Roger Baldwin, University of California, Davis, CA

• 2:50 p.m. Discussion

• 3:00 p.m. Break

• 3:30 p.m. Grasshoppers: To Treat or Not to Treat? Greg Abbot, USDA-APHIS, Logan, Utah

• 3:50 p.m. Alfalfa Weevil Management & Resistance Issues. Ian Grettenberger, University of California, Davis, CA and Kevin Wanner, Montana State University, Bozeman, MT

• 4:10 p.m. Blue Alfalfa Aphids in the Western US - Management Challenges and Successes Vary by Location. Michael Rethwisch, UCCE, Blythe, CA

• 4:30 p.m. Using Drones to Control Pests in Alfalfa. Rachael Long, UCCE, Woodland, CA and Ken Giles, University of California, Davis, CA

• 4:50 p.m. Discussion

Breakout 2: Water Management

• 1:30 p.m. Innovative Technologies for Water Conservation in Flood Irrigation Systems. Khaled Bali, University of California, Kearney Research and Extension Center, Parlier, CA

• 1:50 p.m. Optimizing Overhead Irrigation Systems. Matt Yost, Utah State University, Logan, UT

• 2:10 p.m. Alfalfa on Subsurface Drip Irrigation (SDI) – Pros and Cons. Doug Larson, Ag Water Chemical, Fresno, CA

• 2:30 p.m. Alfalfa and Groundwater Management Strategies to Address Drought and Limited Water Supplies. Helen Dahlke, University of California, Davis, CA

• 2:50 p.m. Discussion

• 3:00 p.m. Break Breakout 3: Alternative Forages

• 3:30 p.m. Sugar Beets and Safflower as Alternative Winter Forages. Steve Kaffka, University of California, Davis, CA

• 3:50 p.m. Double Cropping Both Winter and Spring Canola as Silage and Grain. Steve Fransen, Washington State University, Prosser, WA

• 4:10 p.m. Hemp Production and Animal Feed Potential. Serkan Ates, Oregon State University, Corvallis, OR

• 4:30 p.m. Winter and Summer Annual Small Grain Forage Crops. Guojie Wang, Oregon State University, Corvallis, OR

• 4:50 p.m. Discussion

5:00 p.m. – 7:00 p.m. Exhibit Reception, Poster Presentations, and CAFA Auction

Day Three – Thursday, November 18, 2021

Soil Health and Fertility, Forage Systems, and the Future of Forage Crops

• 8:00 Using Hay Tests Samples to Maximize Economic Returns from P and K Fertilization. Steve Norberg, Washington State University, Pasco, WA

• 8:25. Recycling and Management of Manure in Forage Crops. Eric Young, USDA-ARS, Marshfield, WI

• 8:50 Soil Health: Beyond Organic Matter and Carbon. Robert Dungan, USDA-ARS Kimberly, ID

• 9:15 Regeneration Nation: Alfalfa's Role in Sustainable Agriculture. Emily Meccage, FGI International, Muncy, PA

• 9:40 Discussion

• 9:55 BREAK

• 10:25 Grazing Cover Crops, and Opportunity for Forage Producers. Darrin Boss, Montana State University, Havre, MT

• 10:50 Management of Forages with High Nitrates. Hayes Goosey, Montana State University, Bozeman, MT

• 11:15 Perspectives and Future of Research/Cooperative Extension (Multi-State Discussion of Priorities and Linkages Within Western States). Steve Fransen, Washington State University, Prosser, WA

• 12:15 p.m. Adjourn Symposium

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