


Imperial County *Agricultural Briefs*

UC Cooperative Extension | University of California Agriculture and Natural Resources

Features from your Advisors

November 2021 (Volume 24 Issue 10)

Table of Contents

OCTOBER 2021 CATTLECAL NEWSLETTER UPDATE……………………….Brooke Latack -175-

LEACHING SALTS AS AN EFFECTIVE TOOL TO SUSTAIN LAND PRODUCTIVITY IN THE LOW DESERT……………………………………………………………….…Ali Montazar -177-

LETTUCE FUSARIUM WILT – SAMPLES NEEDED……..……………….………Alex Putman -181-

SAVE THE DATE – 32ND ANNUAL FALL DESERT CROPS WORKSHOP FLYER………….. -182-

EFFECTIVE AND SAFE DESICCANTS FOR ALFALFA SEED PRODUCTION ……………………………………………………………………….Apruba Barman and Oli Bachie -183-

ALFALFA LEAFTIER FOUND FOR THE FIRST TIME IN LOW DESERT ALFALFA ……………………………………….….Apurba Barman, John Palumbo, and Michael Rethwisch -186-

A PARTNERSHIP TO SUPPORT THE DATE INDUSTRY ……………………………………………………Thomas Perring collaborated with Ali Montazar -190-

IMPERIAL VALLEY CIMIS REPORT AND UC WATER MANAGEMENT RESOURCES ..….……….……………………………………………………………………….....Ali Montazar -191-

OCTOBER 2021 CATTLECAL NEWSLETTER UPDATE

Brooke Latack, Livestock Advisor – Imperial, Riverside, and San Bernardino Counties

The October 2021 edition of the CattleCal newsletter covered information on the effect dry rolling corn on the performance of calf-fed Holstein steers, the career and research of South Dakota State University Professor Warren Rusche, and a look at a study looking at delayed implanting in feedlot Holstein steers.

If you would like to subscribe to the CattleCal newsletter, please visit this site and enter your email address: http://ceimperial.ucanr.edu/news_359/CattleCal_483/

October CattleCal podcast episodes:

- **Bonus Episode**
  In this episode, we discuss some research updates on the research we are conducting at our facilities at the Desert Research and Extension Center.

- **Quiz Zinn**
  In this episode, we asked Dr. Richard Zinn a question from our listeners related to the benefits and drawbacks of dry-rolled corn.

- **Career Call**
  In the career call of the month, Brooke Latack and Pedro Carvalho called Dr. Warren Rusche. Zach is an animal science professor at South Dakota State University.

- **Research Call**
  Brooke Latack and Pedro Carvalho call Dr. Warren Rusche again. Zach shared information on his work looking at the impact of feeding hybrid rye as a replacement for corn in feedlot diets.

- **Feedlot Research Call**
  In this episode, join Pedro Carvalho and Brooke Latack as they discuss a study looking at the effect of delayed implanting on performance of calf-fed Holstein steers.

The podcast can be found at https://open.spotify.com/show/6PR02gPnmTSHEgsv09ghjY?si=9uxSj3dYQueTEOr3ExTyjw or by searching "CattleCal podcast" in Spotify. It is free to listen!

If you have burning questions about cattle management and would like your questions featured on our Quiz Zinn episodes, please send questions to cattlecalucd@gmail.com or DM your question to our Instagram account @cattlecal.

If you have any questions or comments or would like to subscribe to the newsletter, please contact:

Brooke Latack (UCCE Livestock advisor) – bclatack@ucanr.edu
Pedro Carvalho (CE Feedlot Management Specialist) - pcarvalho@ucdavis.edu
CattleCal: cattlecalucd@gmail.com

LEACHING SALTS AS AN EFFECTIVE TOOL TO SUSTAIN LAND PRODUCTIVITY IN THE LOW DESERT

Ali Montazar, Irrigation and Water Management Advisor, UCCE Imperial, Riverside, and San Diego Counties

Irrigation water and soil salinity. Salt management is a critical component of agriculture in the low desert region. Successful crop production cannot be sustained without maintaining an acceptable level of dissolved salts in the crop root zone. Salts reduce the osmotic potential of water, increase the energy that plants use to extract moisture from soil, and make them more susceptible to wilting. In addition to contributing to the water stress, some constituents of salts such as sodium, chloride and boron, are toxic to plants if they accumulate in the leaves and stem. High sodium levels can also reduce water infiltration rates into soil. Soil irrigated with a high bicarbonate water may reduce availability of micronutrients such as iron, copper, manganese, and zinc. Salts can also affect irrigation equipment by plugging emitters or by corroding metal fittings.

While different crops can tolerate different levels of salinity in irrigation water and soil (Tables 1-2), many factors influence a plant's tolerance to salinity including:

- soil types and drainage characteristics within the crop root zone, which influence leaching and salt accumulation
- plant salinity threshold (salt-tolerant or salt-sensitive)
- climate – particularly the amount and seasonality of rainfall to leach salts from soils
- Other factors include rootstock or variety, irrigation method (gravity, overhead sprinkler, and drip), stage of plant growth and irrigation management.

Table 1. Irrigation water salinity tolerances for different crops of the low desert region (dS/m)		
Crop	100% yield potential	90% yield potential
	EC water	EC water
Alfalfa	1.3	2.2
Wheat	4.0	4.9
Sudan grass	1.9	3.4
Bermuda grass	4.6	5.7
Sugar beet	4.7	5.8
Spinach	1.3	2.2
Onion	0.8	1.2
Lettuce	0.9	1.4
Carrot	0.7	1.1
Broccoli	1.9	2.6
Pepper	1.5	2.2
Cabbage	1.2	1.9
Cantaloupe	1.5	2.4
Sweet corn	1.1	1.7
Date palm	2.7	4.5
Lemon	1.1	1.6
Grape	1.0	1.7
Adapted from FAO Irrigation and Drainage Paper 29 (1985)		

Table 2. Soil salinity tolerances levels for different crops of the low desert region (dS/m)		
Crop	100% yield potential	90% yield potential
	EC soil	EC soil
Alfalfa	2.0	3.4
Wheat	6.0	7.4
Sudan grass	2.8	5.1
Bermuda grass	6.9	8.5
Sugar beet	7.0	8.7
Spinach	2.0	3.3
Onion	1.2	1.8
Lettuce	1.3	2.1
Carrot	1.0	1.7
Broccoli	2.8	3.9
Pepper	1.5	2.2
Cabbage	2.2	3.6
Cantaloupe	2.2	3.6
Sweet corn	1.7	2.5
Date palm	4.0	6.8
Lemon	1.7	2.3
Grape	1.5	2.5
Adapted from Ayers and Westcott (1976)		

Crops can often tolerate higher levels of salinity if calcium, magnesium, sulfate, and/or bicarbonate represent a significant portion of salinity in the water. This is because calcium and magnesium tend to precipitate out of the soil solution as the soil dries. Plants can often tolerate higher salinity levels in climates with low evapotranspiration demands, such as near the coast, but not in the low desert region. Also, mature plants are usually more tolerant to salinity than seedlings. In the desert, there is a high potential of salt accumulation due to high evapotranspiration, heavy soil types, insufficient annual rainfall, and water quality of the Colorado River (Figures 1-2).

Figure 1. A highly salt-affected date palm near to the Salton Sea. An average soil electrical conductivity (EC_e) of 26 dS/m was observed at the topsoil (2 ft.) of this date palm.

Figure 2. A lettuce field in Westmorland right after germination and switching from sprinkler irrigation to furrow irrigation. Salt accumulation could be initiated from germination and be continued by the harvest. Many vegetables, short cool-season crops, may not show toxicity symptoms to sodium and chloride. An average EC_e of 3 dS/m was observed at the topsoil (1 ft.) the lettuce field at the late season 2020-2021.

Leaching salt as a management tool. Salts that accumulate in soils must be leached below the crop root zone to maintain soil productivity. Leaching is an effective management tool for controlling salinity. Water is applied more than the total amount used by the crop and what is lost through soil evaporation. The strategy is to keep the salts in solution and flush them below the root zone. Excess water for salinity management in the low desert region can be always considered beneficial water use. A 3-inch annual rainfall of the region is insufficient to accomplish salinity management. To determine the amount of additional irrigation water to drain salt from the effective crop root zone more accurately, one needs to look at the soil characteristics, water distribution uniformity of irrigation system, and soil salinity tolerances levels for individual crops (Table 2).

We need to keep in mind that leaching salt, along with an effective drainage system, can remove salt from the soil and maintain high land productivity over time. Figure 3 demonstrates soil electrical conductivity of the soil profile (48-in) in 14 different locations at a surveyed dehydrated onion field in Westmorland. The data clearly shows a wide range of salinity measure from 2.5 to 6.7 dS/m at the topsoil (0-6-in) and from 2 to 10.6 dS/m at the deeper depths (36-48-in). Given a 1.2 dS/m as the salinity threshold of short-rooted onion crop, yield quality and quantity of this field could be impacted by salinity hazard. It appears that some of the drainage tiles do not work effectively at this field, and as a result, salts were moved down and accumulated at the deeper depths. The results of salinity surveys of this field and five other commercial fields at the region during the summer of 2021 revealed a high content of sodium (Na) and calcium (Ca) at the root zone. The calculated sodium absorption ratio (SRA) values indicate that the soils were not sodic at the time. Under these circumstances, applying calcium-based amendments such as gypsum would not be very effective. Gypsum is typically applied to manage sodium hazard by adding Ca into the soil and displacing Na with Ca. Applying gypsum along with leaching may be an effective solution for sodic soils while it doesn't appear to be a solution for this individual field. Maintaining drainage systems and leaching salts are highly recommended for such fields.

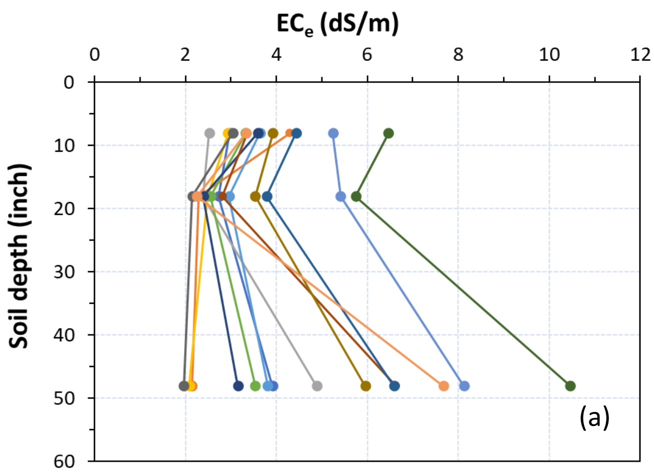
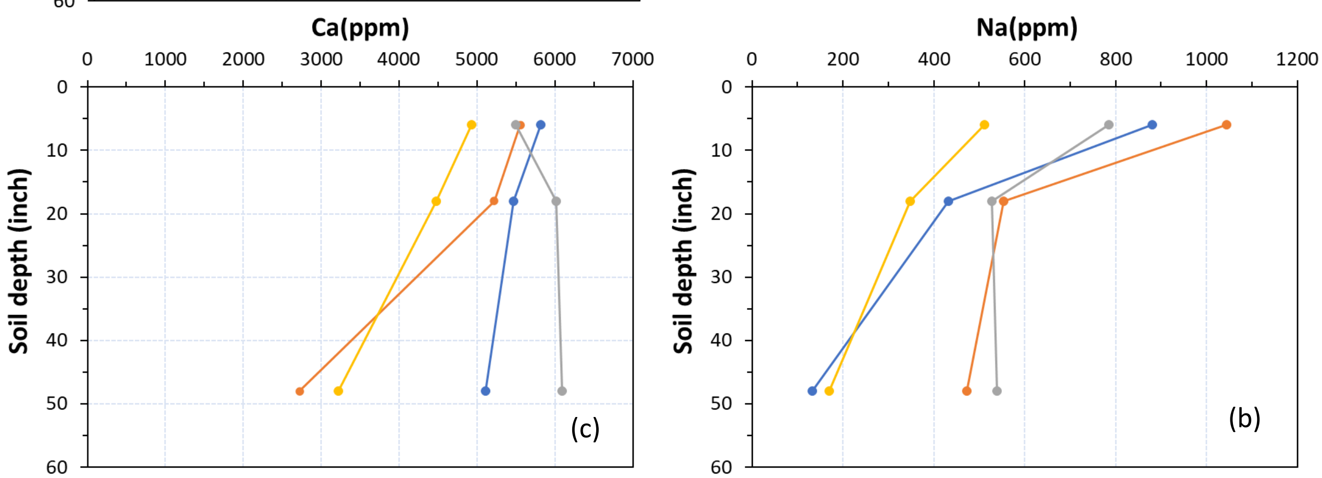


Figure 3. EC_e value (a), calcium (b) and sodium (c) contents of soil profile at a dehydrated onion field in Westmorland. The salinity survey was conducted in June 2021, nearly 40 days after field harvest. Field was under furrow irrigation the entire crop season after germination. Predominate soil texture is silty loam. PPM means parts per million.



Samples wanted for research on

Lettuce Fusarium wilt

WHAT we are looking for	Samples of lettuce plants affected by Fusarium wilt
WHERE we are looking	Imperial County (including Bard/ Winterhaven area) and Huron, other regions of California also welcome
WHY we are doing this	To monitor for emergence of new pathogen races
HOW you can help	If you are a grower or PCA and you have Fusarium wilt in your lettuce crop, contact us and we will survey your field and collect samples

Contact: Alex Putman, UC Riverside (951-522-9556, aiputman@ucr.edu)

Collaborators:
Jim Correll, Univ. of Arkansas
Stephanie Slinski, Yuma Center for Excellence in Desert Agriculture

Funded By:
California Leafy Greens Research Program
2021-2022

Save the Date...

32nd Annual Fall Desert Crops Workshop

Hybrid (In-Person & Virtual)

Dec. 9th, 2021

(8am-12pm)

For additional information on the workshop, please contact organizers Oli Bachie, obachie@ucanr.edu, Apurba Barman akbarman@ucanr.edu or Ali Montazar, amontazar@ucanr.edu, or call us at (442) 265-7700

More details regarding pre-registration link, speakers/topics and CEU's to follow.

Application for CE units will be made with CA Department of Pesticide Regulation, AZ Department of Ag & Certified Crop Advisors

Presented by:
University of California Cooperative Extension Imperial County
1050 E. Holton Rd, Holtville, CA 92250 (442) 265-7700 office
http://ceimperial.ucanr.edu

EFFECTIVE AND SAFE DESICCANTS FOR ALFALFA SEED PRODUCTION

Apurba Barman, Area Low Desert IPM Advisor, UCCE Imperial County
Oli Bachie, Director, UCCE Imperial County & San Diego County; Agronomy Advisor, UCCE Imperial, Riverside & San Diego Counties

Commercial production of seed alfalfa crop relies on desiccants to facilitate alfalfa seed harvesting. However, descants could affect seed qualities, including viability and germination for future cropping systems. We tested Sharpen® herbicide (BASF Corporation) as a potential desiccant for California's low desert alfalfa seed production and evaluated its effects on seed germination relative to the standard grower's desiccation practice using Diquat 2L Herbicide.

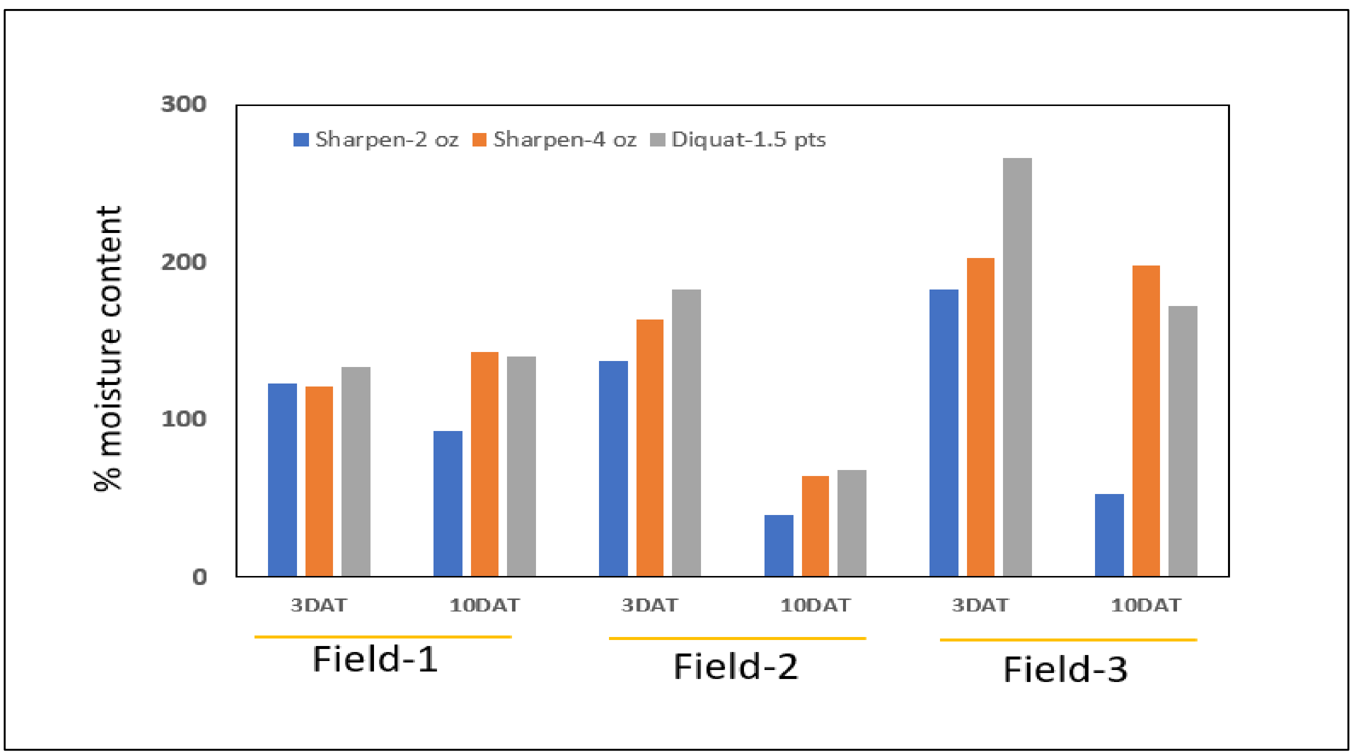
The herbicide was tested at three commercial growers' fields having their regular alfalfa seed production protocols and field managements. Each alfalfa field was managed independently by the respective grower. We implemented two doses of Sharpen as treatments, (1) @ 2 oz, (2) @ 4oz and (3) one dose of Diquat at 1.5 pts (current industry standard) with four replications for each treatment in a randomized complete block design (Fig. 1). Each plot contained four (4) - 40-inch beds and 15 feet long. A single application of each treatment was made near seed maturity stage using a CO_2 backpack sprayer calibrated to deliver spray volume of 18 gallons per acre. Plant samples were collected from each plot at 3 and 10 days after treatment (3DAT and 10DAT, respectively).

Fig.1: Pictures from the three alfalfa fields during the time of treatment application.

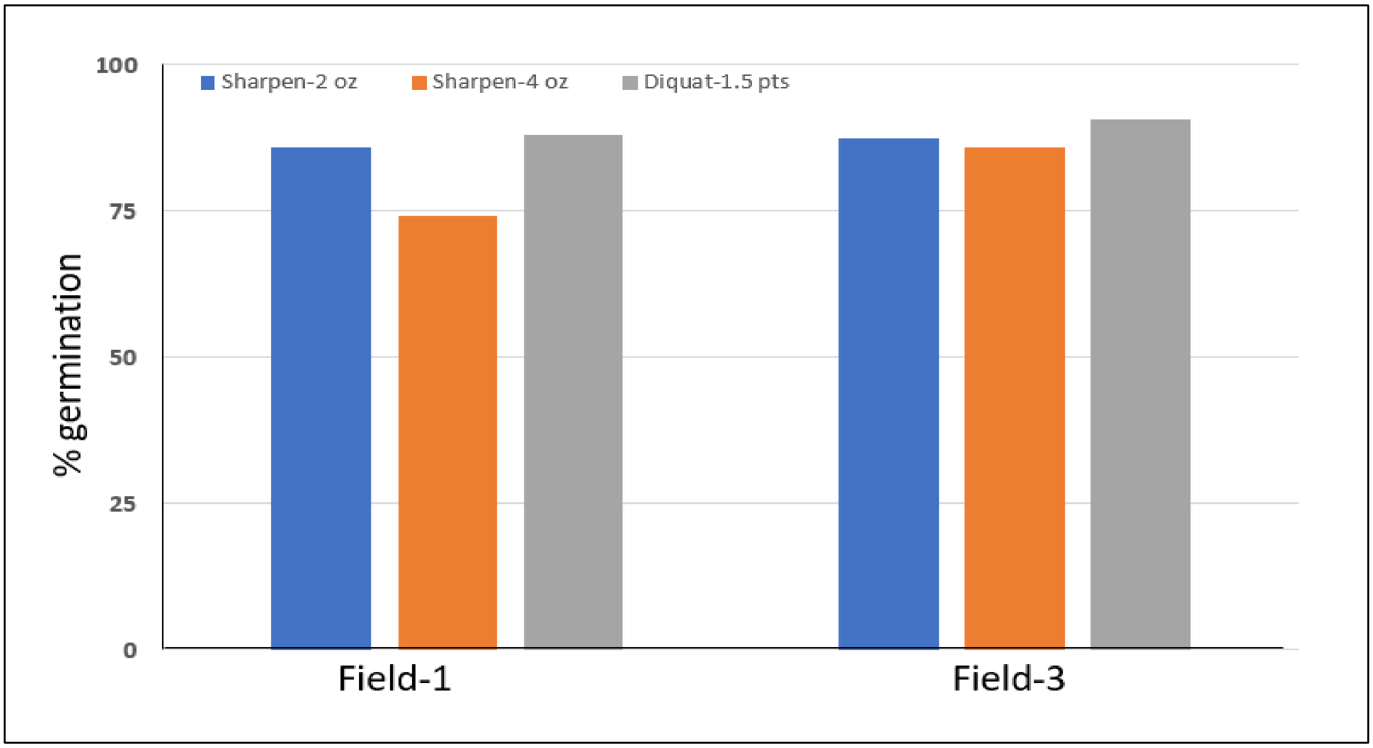
Both wet and dry weight of alfalfa samples were measured to determine crop moisture contents, a proxy for the level of desiccation due to the respective treatments. Plant samples were also collected 10 DAT for seed extraction. Seeds from each treatment samples were mechanically separated from the mature and dried pods. Germination test on the collected seeds from each treatment plot was conducted by placing 100 healthy seeds (based on coloration and shape) on a wet paper towel, wrapped, and kept under room temperature for 72 hours (Fig. 2). Germination percentage was calculated based on the number of seeds that germinated with visible sprouting or root development. Data were analyzed using one-way ANOVA and mean separation was performed using Tukey's HSD test at 0.05 alfa (α) level.

Fig. 2: Alfalfa field at time of sampling for seed extraction (left), preparation for seed germination test (middle), and germinating seeds on a towel after 72 hrs (right).

Results: No significant differences were observed among the treatments in terms of their alfalfa desiccation abilities (measured by percent moisture content) and facilitation for harvest (see the first graph).



The treatment, Sharpen @ 2 OZ appears to be similar to other two treatments in drying-up the plant materials, especially 10 days after the treatment (statistically non-significant).



No germination test was conducted for field 2. Germination test for fields treated with sharpen 2 oz (field 1) and Diquat (field 3), suggests that there were no treatment effects on seed viability as shown by the germination test (Figure 2). Germination of collected seeds from all treatments ranged between 85 to 90 percent and there were no statistically significant differences in seed germination among the treatments (see the second graph).

Please, note that this is a preliminary finding, hence confirmation of efficacy for desiccation and effects on subsequent seed germination would need to be tested further for full recommendation. If you need further information, please contact Apurba Barman (email) / or Oli Bachie (obachie@ucanr.edu) or call 760-265-7700

ALFALFA LEAFTIER FOUND FOR THE FIRST TIME IN LOW DESERT ALFALFA

Apurba Barman, Area IPM Advisor, UC Cooperative Extension-Imperial County
John Palumbo, University of Arizona, Yuma Agricultural Center
Michael D. Rethwisch, Crop Production & Entomology Advisor, UCCE Riverside County – Palo Verde Office

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 ranges 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 addition 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,).

Adult alfalfa leaftier moths, being in the same family as pink bollworm moths, 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. 2. Adult alfalfa leaftier moth, showing size relative to a penny. (Photo: Apurba Barman)

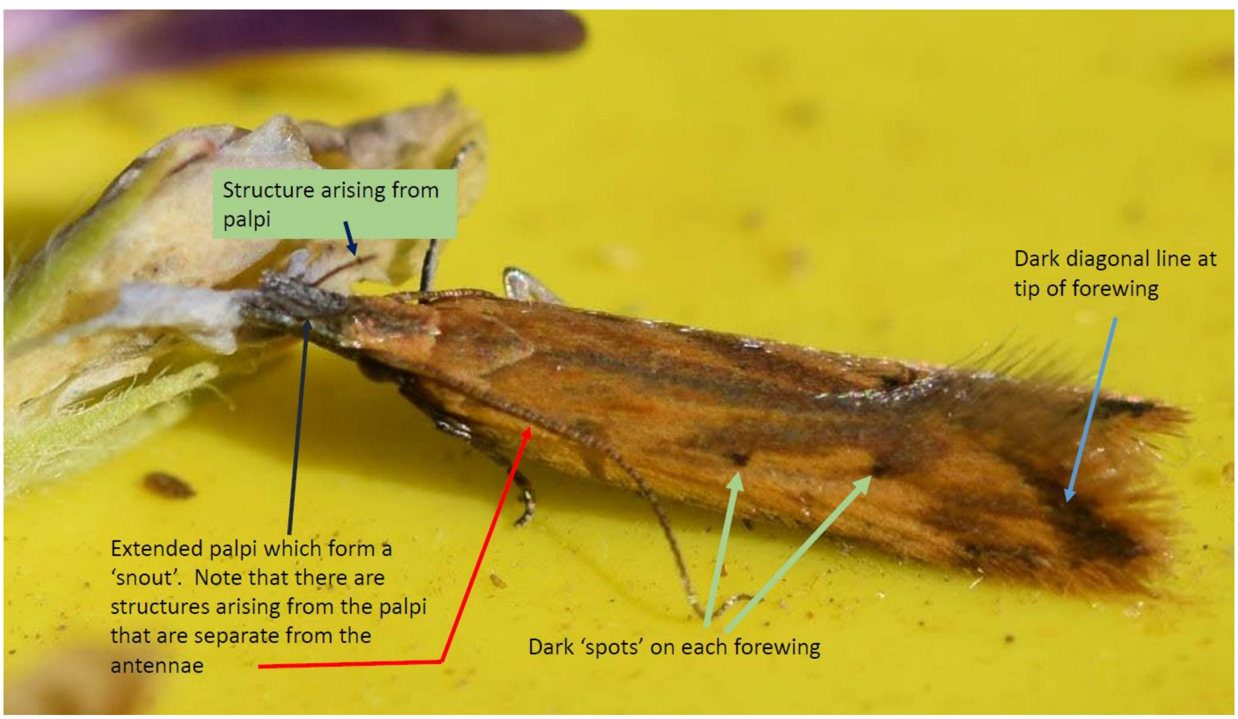


Fig. 3. Adult alfalfa leaftier moth showing markings and other structures important for identification. (Photo: John Palumbo; Illustrations: Michael Rethwisch)

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 are 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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A PARTNERSHIP TO SUPPORT THE DATE INDUSTRY

UC Riverside Professor of Entomology Thomas Perring collaborated with Ali Montazar, Cooperative Extension Irrigation and Water Management Advisor, to understand the water needs of date palms as a means of reducing skin separation in their fruit.

"When the skin separates, it makes the fruit worth about a quarter of the value, so it's a huge economic problem for the date industry," said Perring. His research team had determined that amounts of water at certain times of the fruit ripening process could either lead to or reduce skin separation, but they didn't know how much water dates really need. "Ali came in and started a project in which he constructed huge towers so he could look at the water balance of trees and the evaporation from trees, the solar radiation that's coming down on them and all these environmental parameters that impact how much water a date palm needs. We didn't have that! So that's been really critical."

Montazar had reached out to Perring just a few months after joining UC ANR. Perring introduced him to a colleague from the USDA and connected him with growers, and from there they began working on the date problem. They also have participated in field days and workshops together and bring in professors and their graduate students to present on their research projects.

"Since I came to this position, I have started several projects, so in some of those projects AES academics are part of my project; for some others, I'm part of their project," said Montazar. "We need each other is what I'm thinking, because the resources each of us have are different, the capabilities we have are different, the connections we have are different."

Another benefit of collaborating has been putting together resources to complete the work. "The six (flux density measurement) towers cost about $100k and we were funded by CDFA, so thankfully we have the tools and equipment and can continue this work," said Montazar.

Montazar actively supports graduate students from UC Riverside and UC Davis by introducing them to Imperial Valley growers, loaning them tools and working directly with them. He feels it is essential to expose them to the "real world" of agriculture, where they can work on concrete problems. He is committed to providing real-world scenarios for research based on grower input, such as providing grower data to assist UC Riverside academics with data modeling.

IMPERIAL VALLEY CIMIS REPORT AND UC WATER MANAGEMENT RESOURCES

Ali Montazar, Irrigation & Water Mgmt Advisor, UCCE Imperial & Riverside County

The reference evapotranspiration (ET_o) is derived from a well-watered grass field and may be obtained from the nearest CIMIS (California Irrigation Management Information System) station. CIMIS is a program unit in the Water Use and Efficiency Branch, California Department of Water Resources that manages a network of over 145 automated weather stations in California. The network was designed to assist irrigators in managing their water resources more efficiently. CIMIS ET data are a good guideline for planning irrigations as bottom line, while crop ET may be estimated by multiplying ET_o by a crop coefficient (K_c) which is specific for each crop.

There are three CIMIS stations in Imperial County include Calipatria (CIMIS #41), Seeley (CIMIS #68), and Meloland (CIMIS #87). Data from the CIMIS network are available at: http://www.cim is.water.ca.gov. Estimates of the average daily ET_o for the period of October 1 to December 31 for the Imperial Valley stations are presented in Table 1. These values were calculated using the long-term data of each station.

Table 1. Estimates of average daily potential evapotranspiration (ET_o) in inches per day

Station	November		December		January	
	1-15	16-30	1-15	16-31	1-15	16-31
Calipatria	0.13	0.11	0.09	0.09	0.09	0.10
El Centro (Seeley)	0.14	0.12	0.10	0.09	0.10	0.11
Holtville (Meloland)	0.13	0.11	0.09	0.08	0.09	0.10

For more information about ET and crop coefficients, feel free to contact the UC Imperial County Cooperative Extension office (442-265-7700). You can also find the latest research-based advice and California water & drought management information/resources through link below:
http://ciwr.ucanr.edu/.