Imperial County Agricultural Briefs

UC CE | UNIVERSITY OF CALIFORNIA Agriculture and Natural Resources

Features from your Advisors

October 2022 (Volume 25 Issue 9)

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EVALUATION OF DRIP IRRIGATION IN ORGANIC SPINACH PRODUCTION AND DOWNY MILDEW MANAGEMENT

Ali Montazar, Irrigation & Water Mgmt Advisor, UCCE Imperial, San Diego and Riverside Counties
Michael Cahn, Irrigation & Water Resources Advisor, UCCE Monterey County
Alexander Putman, Assistant Cooperative Extension Specialist, UC Riverside

Introduction. This study aimed to evaluate the viability of drip irrigation for organic baby spinach production and the management of spinach downy mildew over a three-year period. Four trials were conducted in fall 2018, winter 2019, winter 2020, and winter 2021 at the UC Desert Research and Extension Center (UC DREC) in Holtville, while this article reports the winter 2021 trial. In this trial, strip and standard planting methods and germination by drip were particularly evaluated versus sprinkler irrigation as control treatment.

Field experiment. The field experiment was carried out in winter 2021 at the UC DREC in a silty clay soil (Fig. 1). Untreated Viroflay spinach seeds were planted at a rate of 2,950,000 per acre on January 7th. The experiment was arranged in a randomized complete block with four replications (each replication had three beds). Beds were 200 ft. long and on 80 in. center spacing. Irrigation treatments were sprinkler and drip with three driplines per bed. For drip treatment, strip and standard plantings (Fig. 2), and germination by drip (Fig. 3) were tested. Both strip and standard plantings were also tested in sprinkler treatment. The driplines had an emitter spacing of 8 in. and an emitter flowrate of 0.13 gph @8 psi, and were installed at a depth of 1.5 in.

Fig. 1. 2021 UC DREC organic baby spinach trial.

True 6-6-2 (a homogeneous pelleted fertilizer) was applied at a rate of 100 lbs. of N/acre pre-plant fertilizer and 40 lbs. N/acre as top dress before first irrigation. True 4-1-3 (a liquid fertilizer from True Organic Products) was applied as complementary fertilizer over the crop season through injection into irrigation systems, at a rate of 100 lbs. N/acre. Following crop ET and using soil moisture data, the trial spinach fields were irrigated more

than crop water requirements to make sure there was no water stress the entire crop season. However, this led to over-irrigation at some points in early and mid-crop season according to our data.

Standard planting Strip planting

Fig. 2. Standard and strip planting treatments.

Plant density measurement was conducted on January 25th. The number of germinated plants were measured in three samples areas (each 2 feet length) in each bed. Yield biomass measurements at different times (37, 42, 47, 51 days after seeding) were carried out from three sample areas of 6 ft^2 (3 ft × 2 ft) per replication and treatment. The bed located in the center of each replication in each of the treatments was selected as the sample bed (four sample beds per treatment, for a total of 24 sample beds). Fresh weight was measured in order to determine biomass accumulation. The statistical significances were performed using general linear mixed model in SAS statistical analysis package.

Fig. 3. A view of plots irrigated by sprinkler and drip during the first irrigation event after seeding.

Downy mildew incidence was assessed on March 3rd by randomly selecting 3 locations in each bed for each plot and assessing the number of plants with downy mildew symptoms in a 3ft. length of bed at that position. The

number of plants was converted to percent incidence by dividing by the number of plants in each segment, which in turn was calculated from the plant density evaluation.

Results.

Plant density: No significant difference was observed between plant population of sprinkler and drip germinated plots with the same planting methods. While the average plant density was 689 plants per 2 ft. length of bed in sprinkler germinated plots, the average plant density was 673 plant per 2 ft. length of bed in the drip treatments (Fig. 4). Lower plant density was observed in the strip planting method when compared with the standard planting method, while the seeding rate of strip planting was also 7% less.

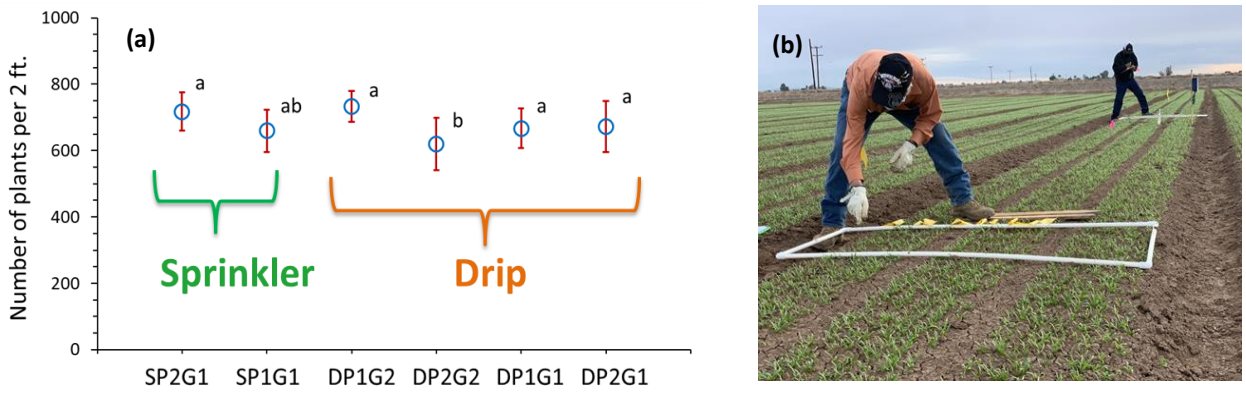


Fig. 4. Spinach plant density counted on January 25th in different treatments (a), research staff count the number of plants germinated in 2 feet length of each bed (b). The error bars show the standard deviation values. S: Sprinkler; D: Drip with 3-dripline (all drip beds have three driplines); P1: standard planting; P2: strip planting method; G1: germination by sprinkler (one week using sprinkler); G2: germination by drip (using drip for germination).

Canopy cover over the season: The percentage of canopy cover was assessed for each of the treatments (Fig. 5). Although there were not accurate measurements of canopy cover during the first two weeks after planting, the data show that the canopy cover of drip irrigated plots was slightly behind in time (2 to 5 days) in compared with sprinkler irrigated plots. This result was also observed in the earlier trials.

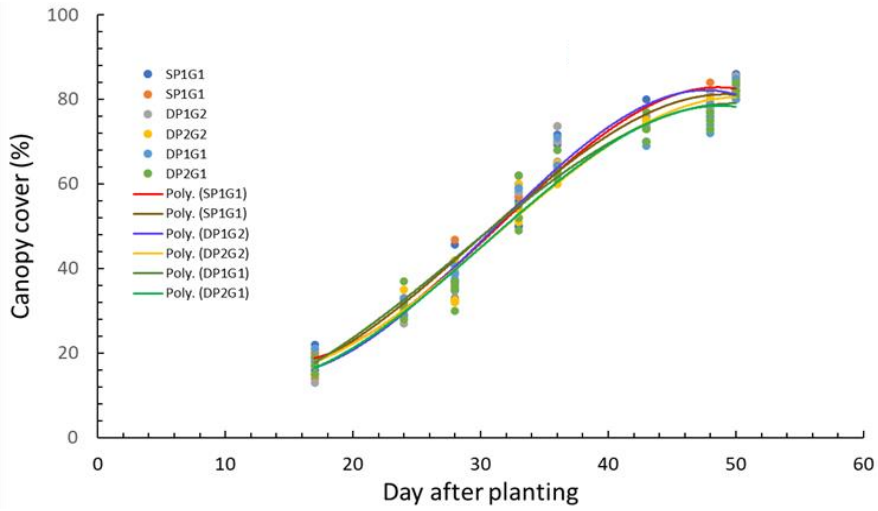


Fig. 5. Canopy crop curve over the crop season in the different irrigation treatments.

Total N content of plant tissue: No N deficiency was observed in both drip and sprinkler irrigated plots during the crop season. The mean total N content of plant tissue was 4.53% and 4.37% on day 35 after seeding in drip and sprinkler irrigated plots, respectively (Fig. 6). Yellowing of leaves in between driplines wasn't observed in this trial. The new fertigation strategy (top dress before the first irrigation) could be a reason for well-developed canopy and lack of nitrogen deficiency in drip irrigated plots specifically in beds with standard planting. While a slight yellowing issue was still observed in a few beds with standard planting method, this symptom was not observed in any beds with the strip planting method. Figure 7 shows crop growth status in the drip strip and standard planting on 42 days after seeding.

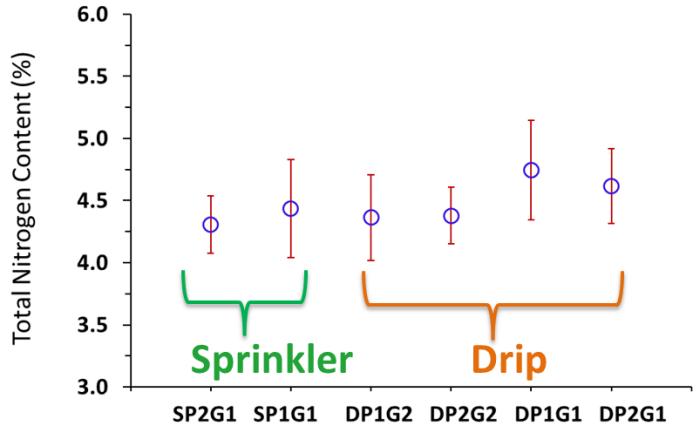


Fig. 6. Total Nitrogen Content of Plant Tissue (Day 35). The error bars show the standard deviation values.

Fresh yields over time: The results of canopy development clearly demonstrate that a longer crop season for spinach should be expected in drip irrigated fields. In this trial, the fresh yields in the drip treatments on day 51 was compared with of the fresh yields in the sprinkler treatments on day 47 (Fig. 8). A 1-6% less yield was observed in drip irrigate plots.

Fig. 7. Visual comparison of drip treatments (strip and standard planting method) on the date of 41 days after seeding.

Statistically, no significant yield difference was found between the sprinkler treatments and most drip treatments (Table 1). An average of 2% yield difference was observed as a result of planting method in sprinkler irrigated plots. This yield difference was 4% resulting the impact of planting method in drip irrigated plots.

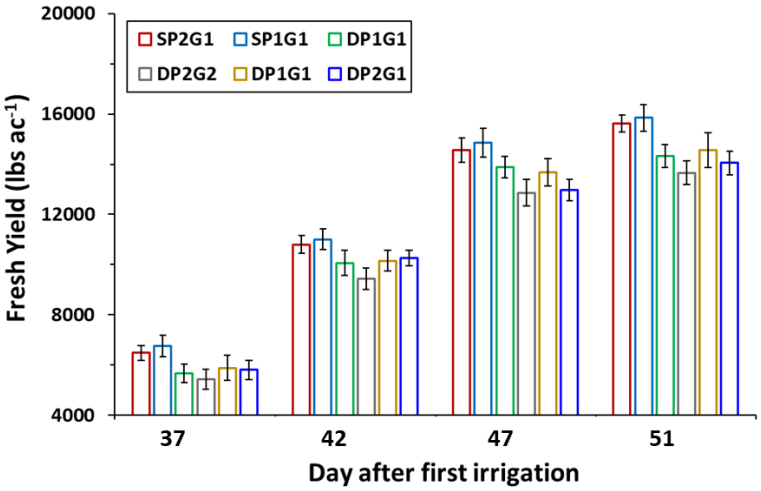


Table 1. Mean spinach fresh yields in different treatments.

Treatment	Fresh yield (lbs. /ac)
SP1G1	14,850 [a]
SP2G1	14,570 [a]
DP1G2	14,327 [a]
DP2G2	13,631 [b]
DP1G1	14,562 [a]
DP2G1	14,052 [ab]

Fig. 8. Spinach fresh yields on different days after first irrigation. The error bars show the standard deviation values.

Downy mildew: Disease pressure was generally low in most parts of the trial, but there were hot spots with >1% incidence in plots irrigated with sprinklers. Although most treatments were not statistically different, there was a clear numerical trend of lower downy mildew incidence in drip irrigated plots by a factor of at least 4 (Fig. 9). This difference was driven by the lack of hot spots in drip irrigated plots. Reducing downy mildew in drip-irrigated spinach is a solid result that was observed in this trial and the previous trials. It can be considered as one of the main benefits of utilizing drip in spinach.

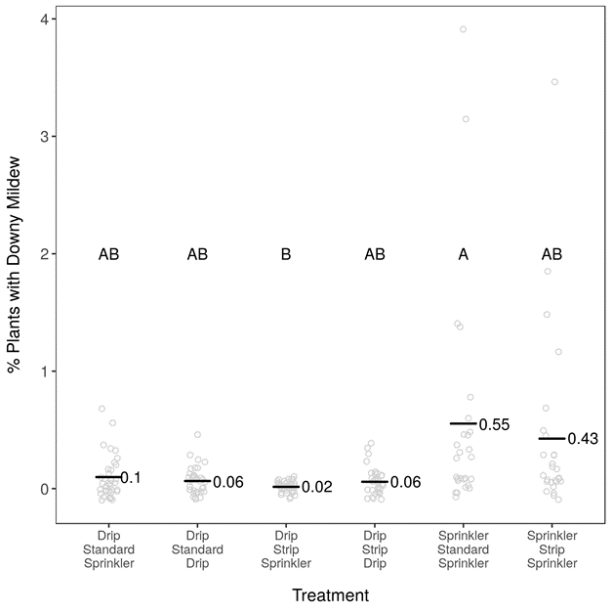


Fig. 9. Raw data of treatment means and mean separation of plants with downy mildew.

The likely mechanism for this effect is a reduction under drip irrigation of leaf wetness, which is critical for infection and sporulation by the downy mildew pathogen. The leaf wetness measurements in the three winter trials conducted in 2019-2021indicate that sprinkler irrigated crop canopies remained wet for 22% - 26% more time than crop canopies under drip irrigated plots.

Conclusions: This project demonstrated the potential for drip irrigation to produce organic spinach, reduce/manage downy mildew, and use for germinating seeds. Strip planting method could be an effective approach to overcome nitrogen management issue in organic spinach under drip. To date, no yield improvement has observed utilizing drip in spinach, while there is potential for conserving water and fertilizer. Economic feasibility of drip technology in spinach is very site specific, however, a grower case study in Imperial County showed that drip irrigation could be economically feasible in spinach production.

INTERACTIONS OF Priaxor® Xemium® Fungicide AND Sefina® Inscalis® Insecticide ON FALL ALFALFA INSECTS, ALFALFA YIELDS AND QUALITY

Michael D. Rethwisch, Field Crops Farm Advisor, UCCE Riverside County, Blythe Office
Carla A. Pryor, Lab Helper, UCCE Riverside County, Blythe office

Previous insecticide trial work in the Palo Verde Valley conducted on first year alfalfa during the fall had noted a high level of diseased stems, thought partially due to increased humidity in the foliage at this time of year combined with high insect (whitefly) feeding pressures in a very solid stand of alfalfa. A small alfalfa yield increase was noted from a few insecticide treatments, especially Sefina® Inscalis®, which provided excellent control of whiteflies but yield increases may have been obscured by the disease pressures in these plots.

These observations have resulted in the following questions that needs answering due to lack of local data: What is the effect of a fungicide on alfalfa yields and quality when applied to first year alfalfa during the fall, and are there any interactions when applied with an insecticide?

A field experiment was initiated in fall 2021 to answer these questions. A first year field of 'UC-Cibola' alfalfa that averaged 7.7 inches in stem height was chosen for the experiment. This field had abundant, but perhaps not economically damaging, numbers of adult three-cornered alfalfa hoppers but populations of other insect pests were below current treatment thresholds. The field had been irrigated 3 days prior to the October 9 application, providing humidity in field plots.

Treatments were applied with a battery powered sprayer equipped with a boom and four (4) 8002-VS nozzles calibrated to deliver 20.4 gpa. Each plot was 25' x 28' in size. A Latin square experimental design was utilized with four (4) replications of treatments. Purified bottled water was used for these treatments. Treatments compared to untreated alfalfa were the insecticide Sefina® Inscalis® at 10 oz./acre, the fungicide Priaxor® Xemium® at 4 oz./acre, and a combination of the two pesticides.

Premium MSO (Methylated Spray Oil) *(Modified Vegetable (Seed) Oil and Surfactant)*, marketed by Helena Agri-Enterprises LLC, was used as the surfactant for each pesticide treatment. Premium MSO consists of 100% modified vegetable (seed) oil and alkyl phenol ethoxylate, and contains Soyoil®. It was used at a rate of 0.46% v./v. (12.07 oz./acre).

Plots were sampled at 4, 7, and 10 days post treatment (October 13, 16, 20). Sampling of plots consisted of ten (10) pendulum sweeps of a 15" diameter sweep net sweep net in each plot, utilizing a different area of plot vegetation on each sample date so that resulting insect collections would not be effected by previous sampling.

The field was commercially treated with a pyrethroid insecticide between October 20-24, thus additional sampling was not conducted. The commercial application created an approximate 12 day time period for resulting differences in insect feeding between Sefina® Inscalis® treated plots and untreated plots (October 9 to approximately October 22) rather than a typical period between insecticide application and harvest.

Vegetation was deeply sampled (~10-15 inches of terminal growth), thus collecting many insects located deeper in the canopy than at growing tips, and sampling foliage that may not have received insecticide coverage due to intercept of such by upper foliage.

After sweeping, net contents were transferred to plastic containers for freezing to kill insects, stop aphids from reproducing, and to stop potential interactions (such as predation) between insect species. After freezing, containers were removed and insects were then separated to species, counted, and numbers recorded. Adult and immature stages of several species were recorded separately.

Yield data were collected on November 4, 2021, by placing a PVC frame square (26" x 26" interior = 4.69 sq. ft.) in the center of each plot. After the frame was dropped, alfalfa stems were straightened to an upright orientation both inside and outside of frame to ensure accuracy of harvested stems. Stems remaining within the frame were cut with a serrated knife about at approximately 2 inches above the soil line, similar to a commercial harvest. Harvested foliage was then transferred to paper bags for drying prior to weighing and calculating yields.

Data for fungicide activity was not collected. It had been expected that leaflets within each of the harvested squares would serve as an indicator of fungicidal activity and efficacy, however, very few leaflets were noted on the ground within any of the harvested squares.

After drying and weighing, NIR (Near InfraRed) analyses were then conducted on each sample to obtain quality data (Stanworth Crop Consultants, Blythe, CA).

RESULTS

Some foliar damage from MSO when used with Priaxor® Xemium® but not with Sefina® Inscalis® (Fig. 1). This was noted on October 13 (4 days post treatment) but was not evident 2 days earlier (October 11), and less evident at 7 days post treatment. Damage consisted of a slight yellowing of upper foliage. The reason this

occurred in all Priaxor® Xemium® containing treatments but not Sefina® Inscalis® is unknown, but indicates an interaction between these particular fungicide and surfactant products.

Fig. 1. Some phytotoxicity (slightly yellowed upper foliage) was noted when Premium MSO was applied in all treatments that contained Priaxor® Xemium®, but not when used solely with Sefina® Inscalis®.

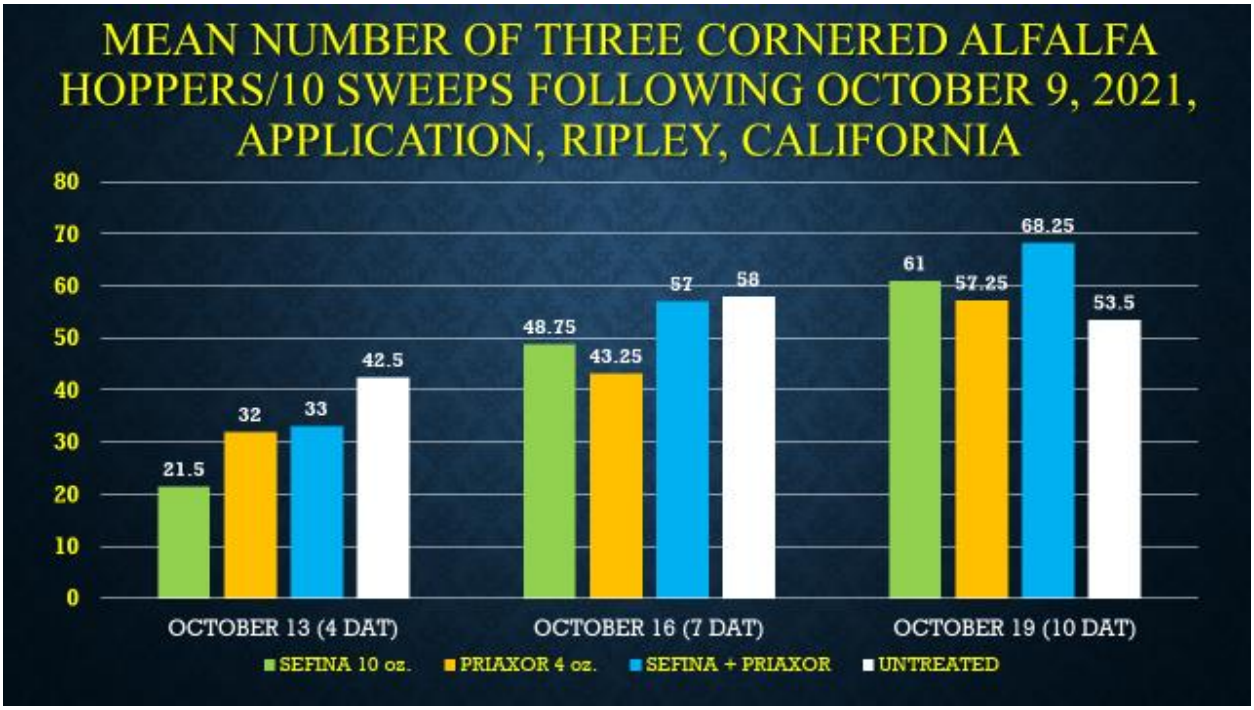
Sefina® Inscalis® targets insects with piercing-sucking mouthparts. During this experiment the only insects with these types of mouthparts that were abundant were adult three-cornered alfalfa hoppers and *Empoasca* spp. leafhoppers (expected to be *E. mexara*).

Three-cornered alfalfa hoppers increased in numbers in the 10 days following treatment application, with numbers in untreated alfalfa increasing by at least 1.0/sweep from the 4.25/sweep noted on October 13. Fewest adult threecornered alfalfa hoppers at 4 days post treatments were noted from alfalfa treated with Sefina® Inscalis® only (2.15/sweep) with this being about 50% fewer than collected from untreated alfalfa.

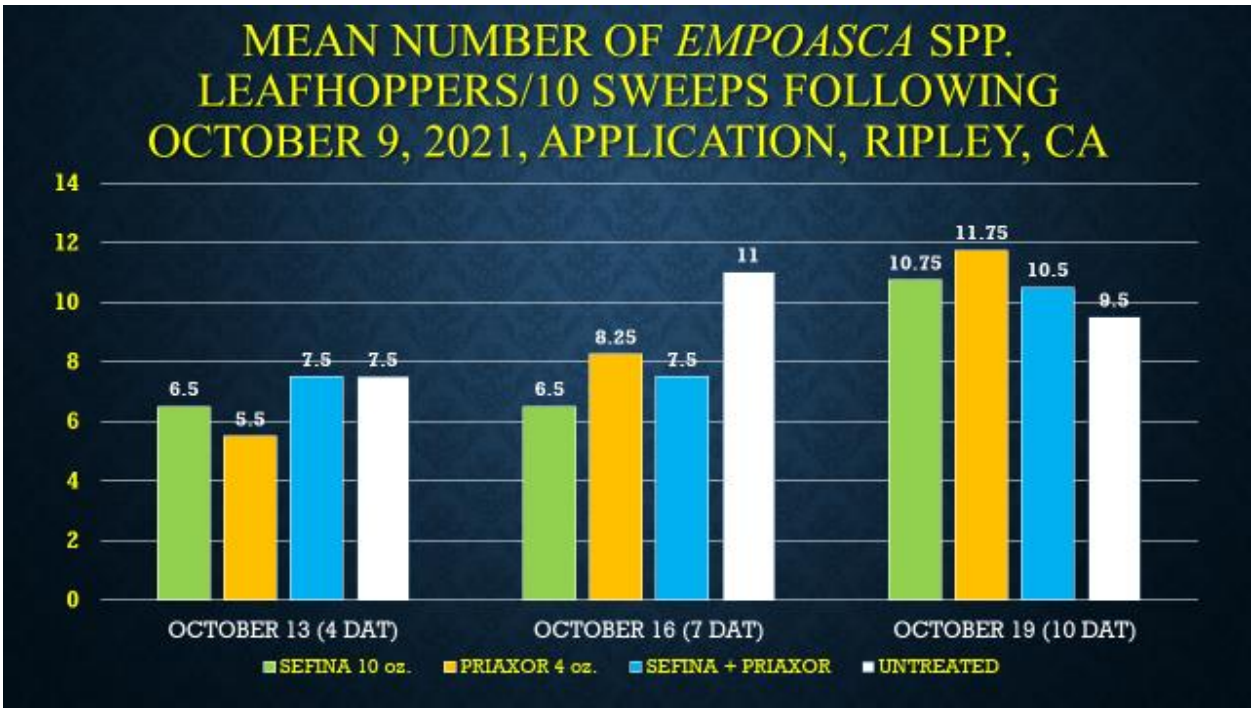
Numbers of three cornered alfalfa hoppers for the two (2) treatments Priaxor® Xemium® (even the one including Sefina® Inscalis®) were very similar with slightly more three-cornered alfalfa hoppers collected from alfalfa treated with the combination treatment. This was also more evident from subsequent sample dates.

At 7 days post treatment fewest three-cornered alfalfa hoppers were surprising noted from the Priaxor® Xemium® alone treatment (4.3/sweep) with higher numbers of this insect noted from both treatments that included the Sefina® Inscalis® insecticide. Highest mean numbers three-cornered alfalfa hoppers were also noted from insecticide treated plots at 10 days post treatment.

The reason for the increased numbers of adult three-cornered alfalfa hoppers in insecticide treated plots is unknown, however, some insecticide affecting alfalfa growth and/or other attributes (plant volatiles) that can increase attractiveness to insects. Additional research is needed to verify the results noted in this experiment regarding three-cornered alfalfa hoppers following application of Sefina® Inscalis®



Leafhopper populations were lower than three-cornered alfalfa hoppers during this experiment, with means never exceeding 1.2/sweep. No significant differences were noted, although treatments containing Sefina® Inscalis® had fewest *Empoasca* spp. leafhoppers at 7 days post treatment, but not at 4 days after application.



Alfalfa yield and quality was affected by the treatments (Table 1). A trend towards higher yields (50+ lbs./acre) was noted from treatments containing Priaxor® Xemium®. This was also accompanied by a significant increase in hay quality *(17 points in RFV, 1.0 in TDN)*, higher protein levels and higher energy levels (M Cal). The reason for this is unclear as disease was not evident at harvest, and the phytotoxic symptoms noted would be expected to decrease rather than increase yields. Priaxor® Xemium® does contain a strobiluron active ingredient (pyraclostrobin), and plant health attributes beyond fungal control have been attributed to this fungicide class.

Table 1. Mean alfalfa hay yields and quality parameters at harvest on November 4 following application on October 9, 2021, Ripley, CA.

Treatment and rate/acre	Hay yields (lbs./acre)	Data from 90% dry matter analyses						100% DM TDN*	Relative Feed Value*
		% Crude Protein	% ADF	% NDF	% Lignin	% Fat	M Cal		
Priaxor Xemium 4 oz.	1,796 a	22.1 a	22.9 a	26.2 a	1.58 a	4.43 ab	0.670 a	57.0 a	221 a
Sefina Inscalis 10 oz.	1,733 a	21.3 a	23.2 ab	27.2ab	1.46 b	4.69 ab	0.668 ab	56.7 ab	212 ab
Priaxor Xemium 4 oz. + Sefina Inscalis 10 oz.	1,784 a	21.8 a	22.8 a	26.2 a	1.50ab	4.40 b	0.675 a	57.0 a	221 a
Untreated	1,738 a	20.9 a	24.2 b	28.0 b	1.42 b	4.81 a	0.653 b	56.0 b	204 b
P value	*0.63*	*0.073*	*0.0297*	*0.0188*	0.0068	0.0473	0.0089	0.0303	*0.022*

'* Reported at 100% dry matter

UC Master Gardener Program

Press Release

Want to become a UC Master Gardener of Imperial County Volunteer?

The University of California Cooperative Extension - Imperial County Master Gardener Program will begin accepting applications for the next training course, which will begin in January 2023. The application period will open on Monday, September 26th, 2022, and remain open until Friday, November 18th, 2022. We are seeking 50 adults in Imperial County who have the time and desire to help educate others, love to grow plants, and want to learn more about horticulture.

UC Master Gardener volunteers go through a 15-week training course that meets from 9:00 am to 12:30 pm on Saturdays, generally from January into early June. There is a class fee of $130 to cover textbooks and other expenses. Classes are scheduled to be held at the UC Cooperative Extension - Imperial County. The address is 1050 E. Holton Road, Holtville, CA 92250. Some select classes will be taught via Zoom.

The classes taught by UCANR advisors provide a basic introduction to horticulture and pest management. Topics include botany, soils and fertilizers, irrigation, entomology, plant pathology, weed management, vertebrate pests, and the culture of vegetables, fruit trees, and woody ornamentals. Students who successfully complete the training course and pass a final exam are certified as UCCE Master Gardeners.

UC Master Gardener volunteers help UCCE provide County residents with research-based information in the areas of home gardening, noncommercial horticulture, and pest management. In exchange for their training, new UC Master Gardeners volunteers agree to complete at least 50 hours of volunteer service in approved activities within one year of being certified. After the first year, veteran Master Gardeners agree to complete a minimum of 25 hours of volunteer service and 12 hours of continuing education annually to remain active in the program.

The application will be on the Imperial County Master Gardener program website:
https://ucanr.edu/sites/ImperialCountymg/Become_a_UC_Master_Gardener_Volunteer/

Want to learn more?
Below is a list of all the public informational sessions:

Thursday, September 22, 2022 via
Zoom
10:00 am-11:30 am

Thursday, September 29, 2022
Imperial Public Library
200 W 9 Th St, Imperial, CA 92251
5:30 pm-6:30 pm

Wednesday, October 5, 2022
Best S.T.E.P. Forward
210 N Railroad Ave, Calipatria, CA 92233
5:30 pm - 7:00 pm

Wednesday, October 12, 2022
Calexico City Library
850 Encinas Ave, Calexico, CA 92231
5:30 pm - 6:30 pm

Tuesday, October 18, 2022
Boys & Girls Club of America- Brawley
165 S Plaza St, Brawley, CA 92227
6:00 pm - 7:00pm

Thursday, October 20, 2022
UC -Cooperative Extension Imperial County
1050 E. Holton Road, Holtville 92250
5:30 pm – 6:30 pm

Monday, November 7, 2022
via Zoom
5:30 pm-6:30 pm

There you will learn more about the volunteer program and how to apply. Attendance is not required to apply. The UC Master Gardener Coordinator and UC Advisor will review all applications, interview applicants, and determine who is accepted into the program. More informational sessions might be added to get the updated list please visit our website or social media accounts on Facebook and Instagram.

Kristian M. Salgado
University California Cooperative Extension- Imperial County
Community Education Specialist 2 (CES2) Master Gardener Program Coordinator
760-604-3185

SEPTEMBER 2022 CATTLECAL NEWSLETTER UPDATE

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

The September edition of the CattleCal Newsletter covered information on research and activities completed this month, the career and research of Jennifer Heguy, UC Cooperative Extension dairy advisor and county director, and a look at a research paper on the use of beef semen on California dairies.

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/

September CattleCal podcast episodes:

- **Career Call**
  In the career call of the month, Brooke Latack and Pedro Carvalho called Jennifer Heguy, University of California Cooperative Extension Dairy Advisor and County Director, to discuss her life in animal agriculture.

- **Research Call**
  Brooke Latack and Pedro Carvalho call Jennifer Heguy again to discuss her recent survey addressing the use of byproducts in rations on California dairies.
-
- **Feedlot Research Call**
  In this episode, join Pedro Carvalho and Brooke Latack as they discuss a study looking at a survey of California dairies about the use of beef semen on dairy cattle.

- **Quiz Zinn**
  In this episode, we asked Dr. Richard Zinn a question from our listeners about the use of molasses in feedlot Holstein steer diets.

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

UC CE | University of California
Agriculture and Natural Resources | Cooperative Extension

Moringa Awareness and Production Workshop

Join UC Cooperative Extension for a *FREE* workshop

Thursday, October 13, 2022
9:00 – 11:00 AM
UCCE Cooperative Extension
1050 E Holton Rd
Holtville, CA 92250

Topics Include:

- Moringa production potential in the low desert
- Moringa for human consumption
- Moringa nutrition for livestock
- Group discussion of moringa production – things that are working well, concerns, knowledge gaps, potential research

Who should attend:

- Anyone currently producing or interested in producing moringa, particularly as a livestock feed.
- Livestock operators interested in feeding moringa.
- Consultants and allied industry professionals.

PC: C Waterman, 2020

Register at: **http://ucanr.edu/desertmoringa**

For more information contact Brooke at (442) 265-7712 or bclatack@ucanr.edu.

UC CE | University of California
Agriculture and Natural Resources | Cooperative Extension

Moringa Awareness and Production Workshop

Thursday, October 13, 2022
9:00 – 11:00 AM

9:00 – 9:05 **Welcome**
Brooke Latack, UCCE Imperial, Riverside, and San Bernardino Counties

9:05 – 9:20 **Production potential of Moringa in the Low Desert**
Dr. *Oli Bachie, UCCE Imperial, Riverside, and San Diego Counties*

Learn about the production potential for Moringa in the low desert area.

9:20 – 10:00 **Moringa for Human Consumption**
Dr. Carrie Waterman, Assistant Professional Researcher, Institute for Global Nutrition, UC Davis

Learn about the history, uses, and benefits of Moringa as well as the cultivation, consumption, processing, and preservation for human consumption. This training is supported by a CDFA specialty crop grant.

10:00 – 10:15 **Nutritional Impact of the Feeding of Moringa to Livestock**
Brooke Latack, UCCE Imperial, Riverside, and San Bernardino Counties

Learn about the nutritional qualities of moringa for livestock compared to other commonly fed forage crops as well as potential issues and benefits of feeding moringa to livestock.

10:15 – 11:00 **Discussion**
All participants

This is a chance for all participants to discuss what has been working, challenges in production, knowledge gaps, and potential research that would help local producers. We welcome all participants to bring questions and comments that will help us move forward as we continue to develop moringa as a functional crop for Southern California both for human and livestock consumption.

Save the Date...

33rd Annual Fall Desert Crops Workshop

Hybrid (In-Person & Virtual)

Nov. 30th, 2022

(7:30am-12pm)

For additional information on the workshop, please contact organizers Oli Bachie, obachie@ucanr.edu and 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

UC CE

IMPERIAL COUNTY CALIFORNIA 1907

Presented by:

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

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	October		November		December	
	1-15	16-31	1-15	16-30	1-15	16-31
Calipatria	0.21	0.18	0.13	0.11	0.09	0.09
El Centro (Seeley)	0.22	0.18	0.14	0.12	0.10	0.09
Holtville (Meloland)	0.20	0.16	0.13	0.11	0.09	0.08

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/.