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Features from your Advisors

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SHARED KNOWLEDGE OF MORINGA LEADS FUTURE UCCE RESEARCH EFFORTS

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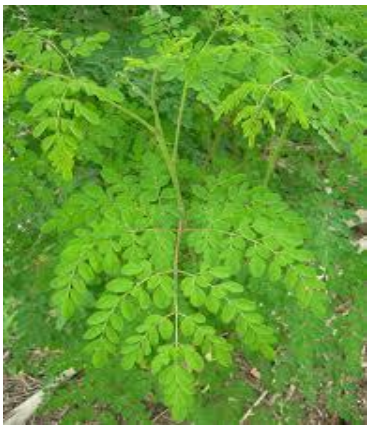
The Moringa tree (also known as the drumstick tree, miracle tree, horseradish tree, ben oil tree, etc.) is a nutrient rich, fast growing, drought tolerant tree that has been praised for its long list of benefits to both human health and livestock productivity. The moringa tree's ability to adapt to hot, dry environments suggests that it could flourish in the Imperial Valley. While it is widely grown throughout the world, production in the Imperial Valley is small, but growing.



Young Moringa plant

To address the increasing number of moringa producers in the low desert region of California, UCCE Imperial held a moringa roundtable. Numerous current and potential growers of moringa gathered at UCCE Imperial County office through a hybrid meeting system (in person and through Zoom) on July 18th to discuss the current knowledge surrounding moringa production and future research needs to help improve moringa production in the Imperial Valley.

The roundtable began with updates from UCCE Imperial County advisors on current research and nutrient analysis of moringa. Table 1 shows nutrient values of moringa grown in the Imperial Valley. As can be seen from the data, moringa grown in the valley has greater crude protein and lower acid detergent fiber and neutral detergent fiber compared to other commonly fed livestock forages. The finding also suggests that moringa may be more digestible than other feeds and offer less bulk for livestock. Other discussion topics presented by the advisors were (1) why moringa in the low desert, and (2) current and future moringa research in the low desert.

Table 1: Nutrient composition of Imperial Valley grown moringa

Component	Composition (DM basis)
Dry matter (%)	17.8
Crude protein (%)	24.1
ADF (%)	18.4
NDF (%)	23.9
TDN (%)	68
NE_m (mcal/kg)	1.56
NE_g (mcal/kg)	0.96
Calcium (%)	2.64
Phosphorus (%)	0.59
Magnesium (%)	0.59
Potassium (%)	2.55
Sodium (%)	0.102
Iron (ppm)	467
Zinc (ppm)	34
Copper (ppm)	13
Manganese (ppm)	22
Molybdenum (ppm)	<1

Following the advisor updates, roundtable discussion tapped into questions and answers and the extensive knowledge pool of the participants, finalizing with an assessment of grower's current management practices. Below are the results of he assessment/survey and the potential future research that may take place due to the feedback or needs assessment gathered from the growers at the roundtable discussion.

(1) <u>Purpose of Moringa Production:</u> Most participants currently use or plan to use moringa for personal purposes, whether that was for human consumption, livestock feed, and/or seed and seedling production or for multiple purposes. Ten percent of respondents were unsure of how they would like to use moringa but did want

to begin growing moringa sometime soon. One respondent was interested in growing moringa for commercial seed and seedling production.

(2) Current Management Methods: Participants are growing moringa in a variety of ways/media, including in their yard or in containers. Soils where they grew moringa ranged from commercial potting soil to sandy loam or a heavy clay soil. The irrigation methods growers used are the most variable management methods among participants. Methods of moringa irrigation included drip, flood, and manual/hand irrigation. Some participants stated that they have never directly watered their moringa plants but assumed that the plants are getting residual water from the irrigation of nearby trees or tap into the shallow ground water. Timing of irrigation is also greatly variable, ranging from daily to every other week in the summer and every 3-4 weeks in the winter.

(3) Invertebrate Pests: The majority (86%) of participants currently growing moringa have not had any issues with invertebrate pests. Fourteen percent of participants observed invertebrate pests that included mites. One participant expressed concern about the interaction between moringa and bees as there had been an issue with bees dying around moringa trees. Through conversations with other moringa producers outside the roundtable as well as review of current literature, it was shown that moringa can be an effective plant for honey production and does not seem to have a negative impact on bee health.

(4) Vertebrate Pests: None of the participants currently growing moringa experienced issues with vertebrate pests in the Imperial Valley. There were reports of some birds and rabbits in other moringa growing regions.

(5) Weeds: 71% of participants that were growing moringa did not have any issues with weeds around their moringa trees. Participants indicated that the moringa trees grew so fast, hence weeds were not able to compete with the trees. Twenty-nine percent of participants had grass weeds around their moringa trees.

6) Concerns and Research Needs: Most attendees expressed the lack of regional information on growing moringa. Participants also expressed their needs and suggested that they will benefit from the following

research findings and education for their future moringa production. Below is a list of all topics brought to light by participants.

- Food safety
- Best uses of moringa
- Moringa market outlets
- Availability of seeds and seedlings
- Best adapting varieties
- Potential production cost and profit
- Heat/cold tolerance of varieties
- Salinity tolerance
- Best soils for production
- Container growing
- Pests, diseases and their control
- Commercializing opportunities
- Best planting density
- Water use and irrigation
- Effects on underground pipes
- Fertilization including composting
- Pruning and managing crop size
- Harvest methods and timing
- Nutrient quality for livestock
- Use for sheep and goats.

The two most important concerns and needs that came out of the discussion were: (1) the need to identify moringa varieties that would best suit the different goals of the participants including human and livestock consumption, and (2) Best management practices including irrigation, fertilizer, soil type, etc. and identifying suitability for other desert regions of California.

The Future of Moringa

UCCE Imperial County advisors plan to make use of the feedback that evolved from the roundtable discussion and develop research projects to address the needs of the growers. Primary focus will be given to the two main concerns expressed by the participants. Participants felt that they are going home with valuable information obtained from the roundtable discussion. Some attendees (teachers from local high schools) suggested that they will incorporate moringa into their high school agriculture education programs.

As advisors working on moringa, we hope to develop a more robust information system to meet the future needs of the clientele. If you have any questions or would like to discuss moringa production further, please feel free to reach out to Oli Bachie (obachie@ucanr.edu) or Brooke Latack (bclatack@ucanr.edu). If you would like to participate in our moringa sampling for analysis of nutrient composition of moringa grown in the low desert region of California, please reach out to Brooke Latack (bclatack@ucanr.edu).

BUYING LIVESTOCK DRUGS IN CALIFORNIA

Morgan Doran, UCCE Livestock & Natural Resources Advisor
Dr. Gabriele Maier, Professor of Extension, Beef Cattle Herd Health and Production, UC Davis
Dr. Roselle Busch, Professor of Extension, Sheep and Goat Herd Health and Production, UC Davis

July 12, 2023

A livestock producer recently contacted UCCE regarding a problem he was having getting livestock dewormers shipped to a California address from out-of-state online retailers. Three different online retailers told him that they don't have a license to ship the products to California. This was a headscratcher since the same retailers have previously shipped the same products to California.

The problem triggered an exploration into the regulation of livestock drugs in California, which is helpful to understand the issue encountered with the online retailers.

Below is a brief description of how livestock drugs are regulated in California, with many references to lists published by the California Department of Food and Agriculture (CDFA), and a final suggestion on what to do if you encounter the same denial to sell a dewormer or other livestock drug.

Here are the basics of California Livestock Drug Regulations

When you buy livestock drugs from a store or an online retailer you usually don't know or need to know the regulatory process that permits such transactions, unless you are buying an antimicrobial drug that requires a prescription. Drugs that don't require a prescription are classified as either a "livestock drug" or a "restricted livestock drug." Here are the different livestock drug classifications and their corresponding regulations:

1. **Livestock Drug** – does not have any restrictions to sell or purchase
2. **Restricted Livestock Drug** – the drug retailer is required to have an approved retailer license issued by CDFA to sell the drug in California
3. **Restricted Livestock Drug, Rx** – the retailer has the same requirement as with a Restricted Livestock Drug and the buyer must have a veterinary prescription to purchase the drug

Some restricted livestock drugs are further classified as Type A VFD (Veterinary Feed Directive) or Type A Non-VFD, but most livestock producers don't need to worry about Type A livestock drugs unless they are a confined animal feeding operation (CAFO).

Here you can download a complete list of CDFA Approved Livestock Drug Registrations and their classifications.

More on the Drug Classifications

Most drugs for livestock fall under the "Livestock Drug" classification and include drugs such as antiseptics, topical medications, pain relievers, vitamins, minerals, nutrients, insecticides, and many more.

Drugs in the "Restricted Livestock Drug" category include hormones, dewormers, coccidiostats, medicated feed additives and a handful of other drugs. Here you can find a list of "Restricted Livestock Drugs." Purchasing "Restricted Livestock Drugs" in California is typically not a problem unless the retailer does not have an approved retailer license with CDFA.

Drugs classified as "Restricted Livestock Drug, Rx" include medically important antimicrobial drugs such as penicillin, oxytetracycline, sulfamethazine and others. Here is a list of "Restricted Livestock Drugs, Rx" that were available without a prescription prior to 2018 in California." These are drugs that require a prescription from your veterinarian to be purchased in the state of California, as mandated by the Livestock: Use of Antimicrobial Drugs law (FAC § 14400 – 14408). Other livestock drugs, including antimicrobials such as tulathromycin or gamithromycin have always required a prescription and will continue to do so in the future. If you do not have a veterinarian's prescription, then you must establish a veterinary-client-patient relationship (VCPR) with a veterinarian so that the veterinarian knows you and your livestock operation and has confidence in your animal care practices and ability to properly use and administer the prescription drugs.

Why Did the Retailers Decline Selling the Dewormer Products

While one of the retailers clearly does not have a retailer license to sell restricted livestock drugs in California,

the other two retailers do have an approved retailer license. When we contacted the two retailers who do have an approved retailer license, they both indicated that the purchases were denied due to a website error and

suggested that the purchaser call their customer service phone number to order the restricted products. Given this response we suspect there may be confusion or glitches among some out-of-state online retailers on selling restricted livestock drugs in California. A contributing factor may be recent changes made across the nation regarding medically important antimicrobials. On June 11, 2023, the US Food and Drug Administration implemented GFI # 263 and all medically important antimicrobials in the nation now require a prescription from a veterinarian. The rest of the country essentially now follows what California has already been practicing since 2018. The drugs that were previously "Restricted Livestock Drugs, Rx" are now Federally labeled as Rx drugs and no longer require a special designation for sale to California residents. It did not, however, change the label status of other "Restricted Livestock Drugs" in California.

If you find yourself in a similar situation in which an online retailer declines the sale of a dewormer product or other restricted livestock drug, you can first check if the retailer has an approved retailer license using this CDFA Restricted Livestock Drug Licensee list. If the retailer is listed as having an approved license then you should call their customer service number to order the product and let them know of the website error so that it can be corrected.

You can find all the referenced lists of restricted livestock drugs, licensed retailers and information about the Livestock Drug Program in California at this CDFA website https://www.cdfa.ca.gov/is/ffldrs/LivestockDrug.html.

SUMMER BLACK STEM AND LEAF SPOT (*Cercospora medicaginis*), AND *Stemphullium* LEAF SPOT

Michael D. Rethwisch, Field Crops Farm Advisor, UCCE Riverside County, Palo Verde Valley Office

With recent rains and high humidity, summer black stem and leaf spot can be a major defoliating disease of low desert alfalfa hay during this time of year. It is typically worse on first year alfalfa due to the higher density of stems and associated higher levels of humidity which favor disease development, which can result in high levels of defoliation and other effects on stems. Field experimental data from a first year stand in 2021 noted a 600 lb./acre loss due to this disease in a single cutting when an effective fungicide was not applied in the August/September period.

Leaf spots develop prior to lesion development on stems. Leaf spots are initially brown (Fig. 1) and then

Figure 1. Alfalfa stems and leaves infected with summer black stem and leaf spot. Note the initial brown infections on leaves with diffuse yellowing surroundings (top center), greyish appearing somewhat circular areas on leaves as disease develops (left center), and lesions on stems (mid-center right)

become fairly distinctive with a somewhat circular shape and ash-grey in color surrounded by a diffuse yellow margin (Figs. 1-2). These symptoms and the disease progression are noted in the accompanying chart.

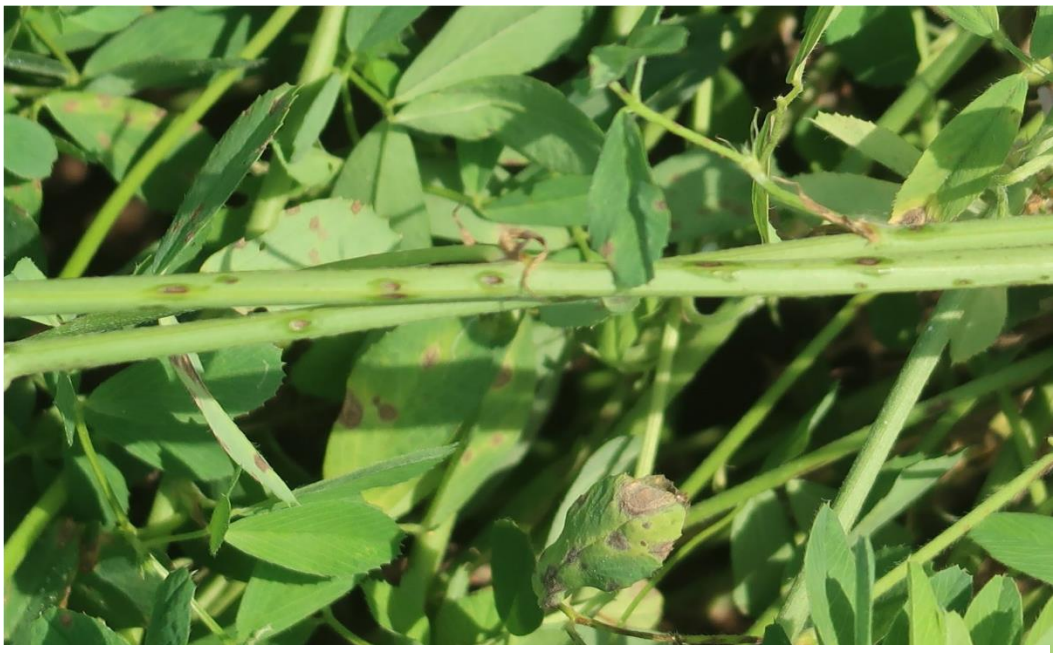


Fig. 2. Leaf in bottom center showing greyish coloration associated with summer black stem and leaf spot. Multiple lesions are developing on stems.

Another disease that can be encountered is *Stemphyllium* leaf spot, sometimes called target spot. While more likely to cause problems in spring production, it has occasionally been noted in low desert alfalfa during the summer. This disease usually has a dark area around the lesion (Fig. 3), but can sometimes have several such areas that can form a 'target'.

Figure 3. Lesions of Stemphyllium leaf spot have a dark border.

DIFFERENTIATING SUMMER BLACK STEM AND LEAF SPOT FROM *Stemphylium*

Symptoms	**Summer Black Stem and Leaf Stop**	**Stemphylium Leaf Spot/ Target Spot**
Initial lesions	Small brown leaf spots on both sides of leaf, reported to be sometimes areas with a wavy margin	Small, oval, dark brown spots. Usually seen in the spring but have been noted during summer months
Halo around early spots?	Usually, with faint yellow coloration	The slightly sunken spots later enlarge and often become zoned.
Disease Progression	The spots soon enlarge to form roughly circular, reddish to smoky brown lesions with an indefinite margin and 1/8 to 1/4 inch (2-6 mm) in diameter.	The slightly sunken spots later enlarge and often become zoned. They are light and dark brown, often surrounded by a pale yellow "halo"
Spores/Later Leaf Lesions	As spores on the surface of the spot are produced, the color of the spot appears gray or silvery.	They are light and dark brown, often surrounded by a pale yellow "halo"
Stem Lesions	Brown to black lesions appear on the stem	Black areas appear on the stems and petioles. Stems and petioles may be girdled in wet weather, causing the foliage beyond to wilt and die

Alfalfa Fungicides Targeting Summer Diseases of Low Desert Alfalfa

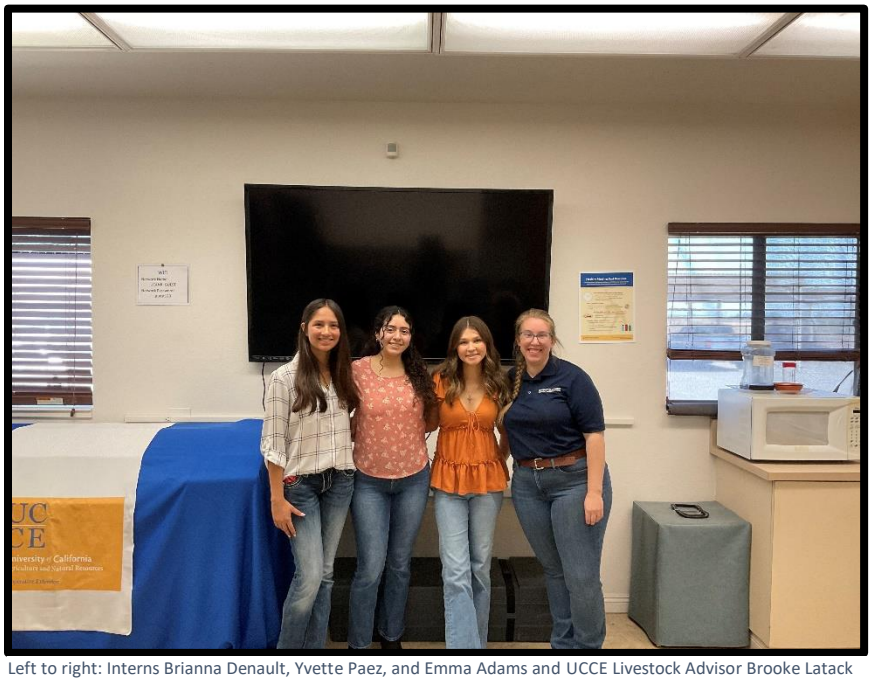
Michael D. Rethwisch, Crop Production and Entomology Advisor, UCCE-Riverside

Active Ingredient	*Products*	*Labeled Rates (oz./acre)*	*Labeled Common Desert Alfalfa Diseases*				*Aerial Application Allowed?*	*PHI (days)*
			Summer Black Stem & Leaf Spot (Cercospora)	*Stemphyllium*	*Common Leaf Spot*	*Additional diseases?*		
Azoxystrobin	Quadris	15.5	Yes	Yes	Yes	Yes, see label	Yes	14
Boscalid	Endura	6.5 for hay, 11.0 for seed			Yes	*Phoma*; Suppression of powdery mildew, *Sclerotinia*	Yes	14
Boscalid + Pyraclostrobin	Pristine	12-18	Yes	Yes	Yes	Yes, see label	Yes	14
Copper Hydroxide	Kocide 2000 Kocide 3000	24 12	Yes			Lepto leaf spot	Yes	0
Copper Hydroxide + Copper Oxychloride	Badge SC Badge X2	12-24	Yes			Lepto leaf spot	Yes	0
Flutriafol	TopGuard Terra*	7.5-12.0				Cotton root rot *(Phymatotrichopsis)*	Yes	14
Fluxapyroxad + Pyraclostrobin	Priaxor Xemium	6.9	Yes	Yes	Yes	Yes, see label	Yes	14
Fluxapyroxad + Mefentrifluconazole + Pyraclostrobin	Revytek*	8.0-13.0	Yes	Yes	Yes	Yes, see label	Yes	14
Penthiopyrad	Fontelis	24		Yes		Powdery mildew, *Sclerotinia*	Yes	14
Picoxystrobin	Aproach	6.0-12.0		Yes	Yes	*Phoma*, Lepto leaf spot	Yes	14
Pyraclostrobin	Headline	9.0	Yes	Yes	Yes	Yes, see label	Yes	14
QST 713 strain of *Bacillus subtilis*	Serenade ASO*	64-128				*Sclerotinia*, spring black stem*(Phoma)*, Bacterial wilt	Yes	0

*Not currently registered for usage in California on alfalfa

Aug. 2023

UCCE IMPERIAL LIVESTOCK PROGRAM SUMMER PRESENTATIONS



Left to right: Interns Brianna Denault, Yvette Paez, and Emma Adams and UCCE Livestock Advisor Brooke Latack

On July 13th, the three student interns currently working with the UCCE Imperial Livestock Program presented on topics related to the beef industry. Each student chose a topic that interested them and created their presentation through independent work throughout the summer.

First to present, Emma Adams presented on the history and process of tanning hides. She detailed the significance and widespread use of both vegetable and brain hide preservation methods. Emma graduated from Imperial High School in 2023. During her time attending Imperial High School, she was a four-year FFA member and discovered the love she has for working with livestock, mainly from raising a feeder calf she named Waylan her senior year. Because of this, she hopes to become a large animal veterinarian and possibly own some livestock of her own. Emma is currently enrolled at Imperial Valley College working toward getting her degree in Agriculture Business. In her future she hopes to attend Oklahoma State University or University or Arizona to pursue becoming a veterinarian.

Next, Yvette Paez presented on marbling in beef. Yvette discussed the biological processes that lead to marbling and the management practices that may increase or decrease marbling in beef. Yvette is a 2023 high school graduate of Southwest High School. She was a member or 4-H and FFA raising chickens, rabbits, goats,

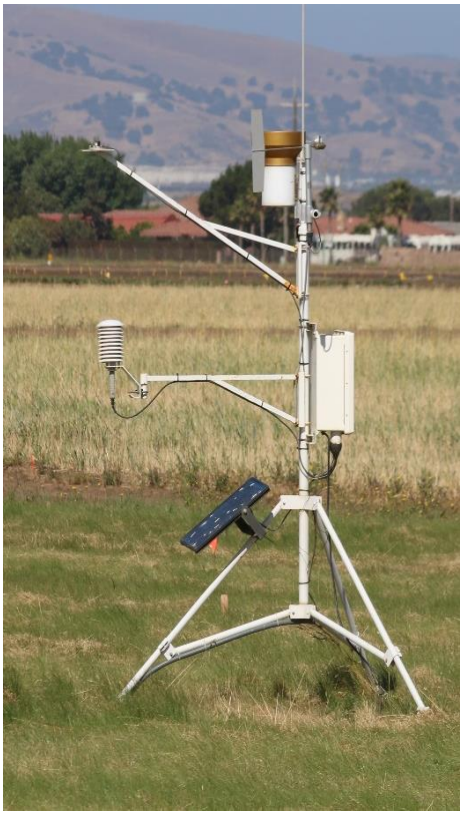
lambs, and a feeder calf. She is currently attending Imperial Valley College to major in Biology. She plans to transfer to UC Davis to get a bachelor's degree in animal science. She plans on attending the School of Veterinary Medicine to get her DVM. Her dream career is to be a veterinarian.

The final presentation was an overview of Bovine Spongiform Encephalopathy (BSE) by Brianna Denault. Brianna covered the history and devastation the disease has caused in the cattle industry as well as current occurrences still happening throughout the world. Brianna is a 2023 graduate of Imperial High School. During high school she was involved in FFA where she raised market swine and a production steer. She is currently attending Imperial Valley College majoring in Agriculture Business. After earning her associate's degree, she plans to attend Cal Poly San Luis Obispo for her bachelor's degree in Ag Education. Once she finishes her degree, she plans to come back and become an agriculture teacher in the Imperial Valley.

All three presentations were very thoughtfully detailed, and the presenters were able to educate the audience on the topics presented. We look forward to the future of all three interns as they finish up their summer internship here at UCCE Imperial and move toward their goals working in the agriculture industry.

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 is 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 including Calipatria (CIMIS #41), Seeley (CIMIS #68), and Meloland (CIMIS #87). Data from the CIMIS network are available at: http://www.cimis.water.ca.gov. Estimates of the average daily ET_o for the period of September 1 to November 30 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	September		October		November	
	1-15	16-30	1-15	16-31	1-15	16-30
Calipatria	0.26	0.23	0.21	0.18	0.13	0.11
El Centro (Seeley)	0.26	0.25	0.22	0.18	0.14	0.12
Holtville (Meloland)	0.26	0.24	0.20	0.16	0.13	0.11

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/.