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Features from your Advisors

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CONSIDERATIONS ABOUT ADAPTING DEFICIT IRRIGATION STRATEGIES IN DESERT ALFALFA

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

Fig. 1. A well-irrigated healthy alfalfa field in the low desert region.

Introduction. Alfalfa has unique drought tolerance mechanisms that make it biologically suited to deficit irrigation or reduced water supplies. The ability of alfalfa to sustain temporary droughts without significant stand loss is due to specific characteristics of deep roots, high water use efficiency, salinity tolerance, and ability to grant partial yields with less irrigation water applied than required. Perhaps this ability was one of the reasons that the following quotation appeared during the gold rush.

"Gold could not always be found with pick and shovel, it could without fail be found by alfalfa roots" - Cobum, 1908, describing the early history of alfalfa during the gold rush.

With limited water supplies in the Southwestern U.S. and the Colorado River water constraints, deficit irrigation strategies in alfalfa can help growers meet water conservation objectives. Four basic deficit irrigation strategies may be considered for alfalfa fields including:

Triage: cease irrigating some fields while fully irrigating others, or watering only some portions of fields.
Starvation diet: deficit-irrigate the entire field during the crop season so that less water per irrigation or fewer irrigation events are applied than crop water needs or standard practices.
Partial-season irrigation: fully irrigate fields for the early cuttings, then cease irrigation pathway through the season (skipping all irrigation events over the summer period or by the following crop season).
Moderate summer deficit irrigation: skipping some of the irrigation events over the summer period.

Seasonal yield pattern and water use efficiency. Summer deficit irrigation strategies in alfalfa are primarily feasible due to the seasonal yield patterns of the crop, with heavy yields occurring during spring to early summer, and light yields during the summer period. Our recent study in the Palo Verde Valley suggested that approximately 72-74% of total desert alfalfa seasonal production occurred by mid-July (Fig. 2). The study also demonstrated that the average alfalfa water use efficiency (WUE) over the first four cuttings of year was nearly 55% greater than that of WUE over the last four cuttings of year. The higher WUE in spring and early summer can be related to higher yields and lower crop water use during this period.

As a general strategy, it is advisable to consider the seasonal production patterns of alfalfa and maximize production during early growth periods and allow water deficits during periods of relatively low yield and quality, e.g., the summer harvest cycles.

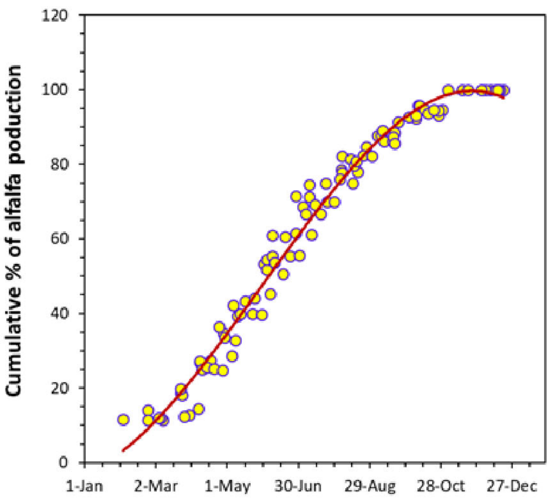

Fig. 2. Cumulative percentage of alfalfa production over the season. A three-year yield data (2019-2021) from four commercial fields in the Palo Verde Valley was adopted for this analysis.

Implementing deficit irrigation in the low desert. In the desert region, yield and plant stand losses, soil water depletion, and salt build-up due to water deficits could be considerable in alfalfa fields if one doesn't follow an optimal irrigation strategy or conduct severe deficit irrigation (Fig. 3). Economically, although yield losses due to water deficits can be important, the costs of re-establishment of the plant stand are not often trivial and could be a major risk associated with severe deficit irrigation strategies.

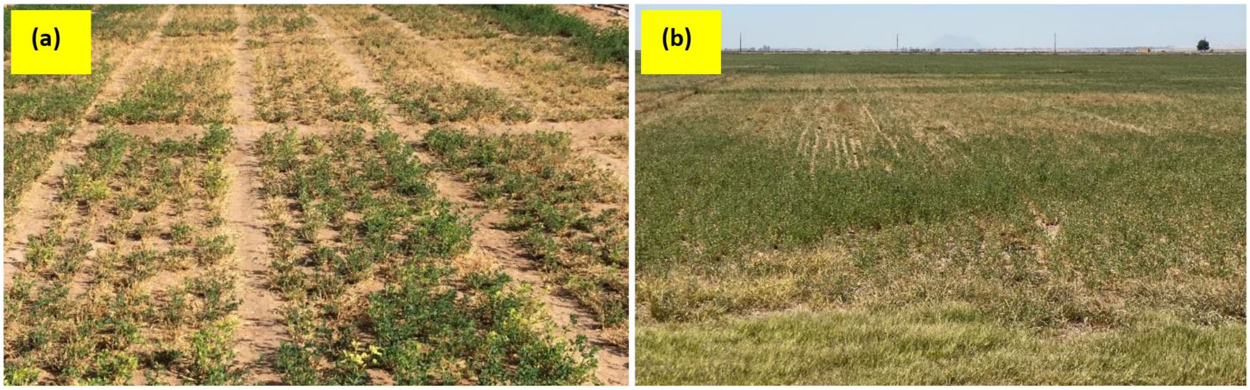

Fig. 3. (a) Alfalfa plant stand status in late October two weeks after first irrigation following severe summer deficit irrigation in the low desert. The plot was under subsurface drip irrigation at the Desert Research and Extension Center (DREC) in Holtville and received only 25% of crop water needs during summer 2020 (July through September). Significant plant stand loss and soil water depletion were observed in this experimental plot. (b) A commercial alfalfa field in Westmorland under summer deficit irrigation. The picture demonstrates the field on August 30, 2022, after skipping two irrigation events, one in July and the other in August (in other words, 50% water cuts during July and August).

While a combination of triage, and partial-season or moderate summer deficit irrigation strategies are the most appropriate approach, moderate summer deficit irrigation may be the most economical choice for deficit irrigation of individual fields in the low desert. The results of the alfalfa research trial fields in the Palo Verde Valley suggested an average of 4-6% seasonal yield reductions resulting from nearly 40% summer deficit irrigation (1 ac-ft/ac or 40% less water applied than standard grower practice over the summer period) (Fig. 4). Insignificant soil water depletion, noncrucial salt accumulation, and trivial impact on plant stands and hay quality were observed adapting this deficit irrigation practice. Following this deficit irrigation strategy, one may lose 0.5-0.6 t/ac alfalfa dry matter yields due to conserving 1 ac-ft/ac water.

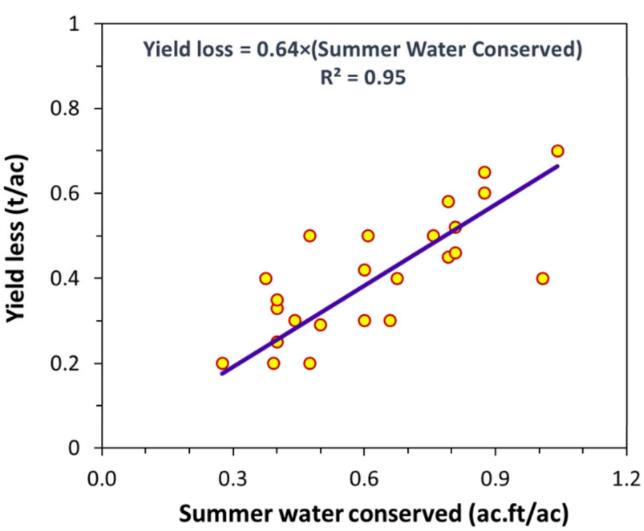

Fig. 4. Alfalfa field yield loss as a function of summer water conserved due to moderate summer deficit irrigation strategies in the Palo Verde production system. A three-year data set from trials conducted under two different summer deficit irrigation strategies in four various commercial fields were adopted for this analysis.

A severe summer deficit irrigation strategy with no irrigation events over a two- or three-month summer period, may have a different trend of yield loss. Our recent three-year study at the DREC (alfalfa trial under subsurface drip irrigation) suggested that cutting 75% crop water demands during the summer (90-day period) may reduce an average of 13% seasonal yields and nearly 9% plant stand densities. Yield and plant stand losses, soil water depletion, and salt build-up due to the summer water deficit were meaningful at this research trial. Salinity build-up was less likely to occur if the field was a flood irrigated field.

According to the seasonal alfalfa yield pattern (Fig. 2), a severe summer water deficit (likely 1.9-2.2 ac-ft/ac water cuts) may cause 19-21% seasonal yield losses in the low desert. A portion of the water cuts need to be applied as excessive water in the fall after switching to regular grower irrigation practice to refill the soil profile and leach salts accumulated in the soil. The amount of this excessive water depends on soil type and condition, and contribution to the crop water needs from the water table (as capillary movement of water upward from the water table), while it could be nearly 25% (or even more) of the total water cuts.

Considerations on implementing deficit irrigation practice. Alfalfa fields with a predominant soil texture of sandy-to-sandy loam are not likely appropriate volunteer fields for severe water deficit strategies. These fields might occasionally experience moderate water stress around cuttings, even under standard grower practice, particularly over the summer season.

Filling the crop root zone, without exceeding the soil's available water holding capacity, based on soil moisture sensor technology would be an effective early-season alfalfa irrigation strategy. Such practice may allow alfalfa to take full advantage of the available water and promote rapid early season growth, when the yield potential is highest, and when soil and water temperatures are not likely to be high enough to stress the crop and limit crop productivity.

Growers should ensure that fields have a full profile of water at the beginning of the season, irrigate fields fully by early to mid-July, then start deficit irrigation regimes. Determining the soil water available through soil moisture monitoring before staring the practice and during the summer is highly recommended. Soil salinity and depth of water table may affect alfalfa survivability during severe deficit irrigation. Greater yield and plant stand losses may result from water deficit practices in the salt affected fields.

The optimal deficit irrigation strategy in the low desert depends on water availability, water conservation incentives programs, hay price, and individual farming operations. Both severe and moderate summer deficit irrigation strategies can be considered as feasible and effective water conservation tools in the region. It seems developing a water conservation program that include both severe and moderate summer deficit irrigation in alfalfa could be reasonable. It enables growers to choose the optimal practice considering their farming operations. For instance, an operation that has already adapted multiple water conservation technologies or has more efficient on-farm water delivery system might decide to integrate those practices with moderate summer deficit irrigation. A grower could adapt severe summer deficit irrigation for alfalfa fields that are not equipped with any other water conservation technologies and/or a higher water table is available.

ROOT LEACHATE AND REDUCED-RISK NEMATICIDE TREATMENTS AFFECTED MELON PLANT GROWTH PARAMETERS IN LOW DESERT GROWING CONDITIONS

Philip Waisen, Vegetable Crops Advisor, UCCE Riverside and Imperial Counties
Ana Resendiz, Climate Smart Agriculture CES, UCCE Imperial County

Introduction

Cantaloupe is a $32.8 M industry in the desert of which Imperial and Riverside counties contributed 84% and 16%, respectively in 2021 (Imperial and Riverside Counties Ag. Commissioners Reports, 2021). In the desert, melons are planted in January-February or July-August to harvest from June-July or October-November (Waisen, 2022). Melons can be grown on plastic mulch and using drip irrigation. Root-knot nematodes (*Meloidogyne* spp.) are economically important parasites of melons. These nematodes generally cause a problem on coarse-textured soils in the southern desert valleys. When the nematode is present at planting time it stunts the young plants and causes severe galling of the roots impairing nutrient and water uptake. Plants infected in the very early stages of growth remain stunted and unproductive and seldom bear marketable melons. Therefore, management of root-knot nematodes while the plants are young right around the time of transplanting is critical to reduce economic crop loss.

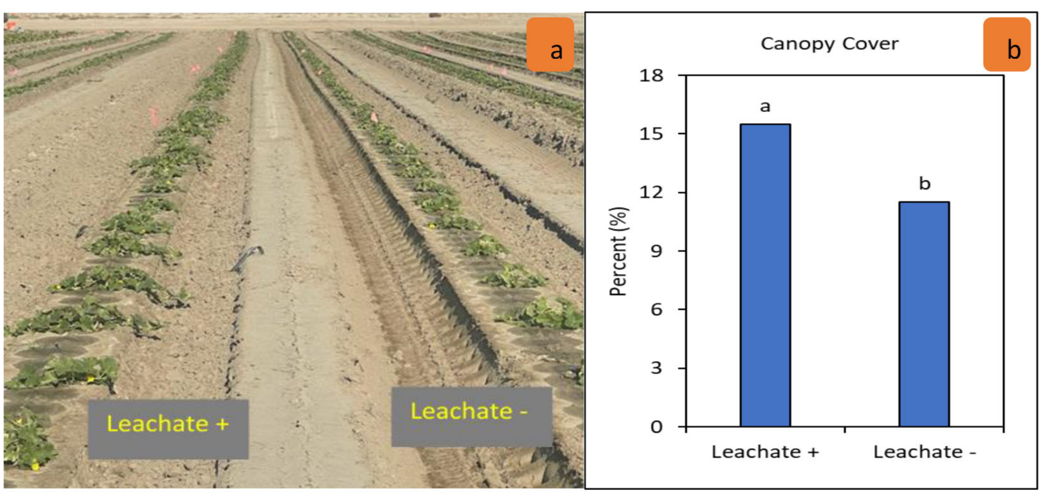

Figure 1. Showing a) visual differences of melon plants affected by root leachate treatment and b) canopy cover affected by root leachate treatments. Bars represent means (*n*=120) and those followed by the same letter(s) are not different, according to the Tukey test.

It is important to note that root-knot nematodes survive extreme soil temperatures in the desert as eggs and become problematic right when the plants are planted. Thus, this study was guided by the hypothesis that the application of a known host's root exudate as a pre-nematicide and pre-plant treatment would stimulate hatch of surviving nematode eggs. The idea is to subject juveniles, the most susceptible stages, to pre-plant nematicide application. The objective of this study was to examine the effects of root leachate and nematicide treatments on plant growth parameters.

Materials and Methods

A field trial was conducted at Coachella Valley Agricultural Research Station (33°31'17.0"N 116°09'04.9"W), Thermal, CA (Fig. 1a). Melon 'Impac' was transplanted on 36-inch beds at 3 ft apart or at a planting density of 4,840 plants/acre on May 8, 2023. Treatments were arranged in a randomized complete block design in a split-plot experiment. Main plot treatments included with and without tomato root leachate application; tomato root leachate was prepared by drenching potted tomato plants. Prepared root leachate was applied through the drip system a week before nematicide treatment or planting. Subplot treatments included six nematicide treatments including Majestene® (Heat-killed *Burkholderia*) applied at 256 fl oz/ac, Nimitz® (fluensulfone) at 112 fl oz/ac, Velum® One (fluopyram) at 13.6 fl oz/ac, one-time application of Salibro™ (fluazaindolizine) at 31 fl oz/ac, two applications of Salibro a month apart at 15.5 fl oz/ac. An untreated control treatment was included and the treatments were replicated four times. Nimitz was applied a week before planting and the remaining nematicides were applied at the time of planting. Nematicides were applied directly on the beds using a CO_2 pressurized sprayer adjusted to 40 psi. Plant growth parameters including leaf nitrogen content, chlorophyll content, and percent canopy cover were recorded on June 3, 2023. Leaf nitrogen content and chlorophyll content were measured from the third maturing leaf using a Chlorophyll Meter (Amtast USA Inc., Lakeland, FL) and percent canopy cover using Canopeo App. (Fig. 2). Nematode data are still under investigation.

Data analysis was done using Statistical Analytical Software version 9.4 (SAS Institute Inc., Cary, NC). Leaf nitrogen content, chlorophyll content, and percent canopy cover data were checked for normality using Proc Univariate in SAS. Wherever necessary, data were normalized using log10 (x+1) and subjected to a two-way analysis of variance using Proc GLM in SAS. Leaf nitrogen content and chlorophyll content data had no significant interactions between root leachate and nematicide treatments thus the data were pooled and analyzed ($P > 0.05$). Percent canopy cover data had a significant interaction between root leachate and nematicide treatments, thus data were analyzed separately ($P \leq 0.05$). Means were separated using the Waller–Duncan *k*-ratio (*k*=100) *t*-test whenever appropriate and only true means were presented.

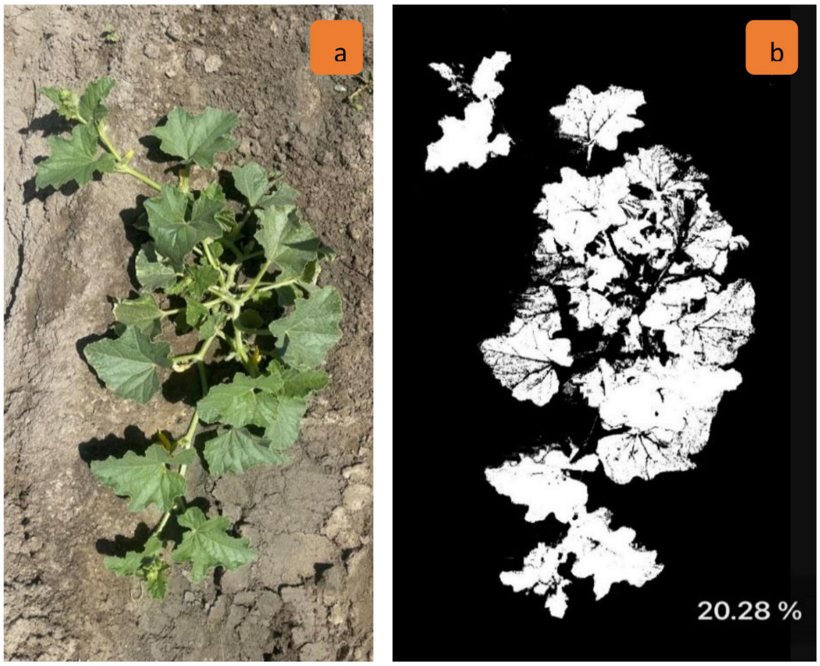

Figure 2. Showing a) an original image of the melon plant and b) a percent assessment of the canopy cover using Canopeo App one month after planting.

Results and Discussion

As of this progress report, only melon plant growth parameters are presented, and no yield or nematode data are available yet to report. Root exudate treatments did not affect leaf nitrogen content and chlorophyll content (data not shown). Also, no significant interaction was detected between root exudate and nematicide treatments (data not shown). Nematicide treatments, however, affected these plant growth response variables (Fig. 3). Majestene and Salibro II significantly increased leaf nitrogen content (Fig. 3a; $P \leq 0.05$). Similarly, chlorophyll content was also increased by Majestene and Salibro II (Fig. 3b; $P \leq 0.05$). The only plant growth parameter that had significant interaction between root leachate and nematicide treatments was canopy cover (Fig. 4; $P \leq 0.05$). Without root leachate treatment, Salibro II significantly increased melon canopy cover one month after planting compared to untreated control treatment (Fig. 4a; $P \leq 0.05$). With root leachate treatment, Majestene treatment significantly increased canopy cover (Fig. 4b; $P \leq 0.05$). Putting together, root leachate application significantly increased the percent canopy cover (Fig. Fig.1b; $P \leq 0.05$). These observations appeared to be associated with root leachate treatment promoting rhizosphere microbial activity through feeding beneficial microbes with carbon supplement. Majestene being a biologically derived product, it could be compatible with microbial activity associated with root leachate treatment. We have previously reported that Salibro was compatible with soil health or microbial activity and Velum had non-target impacts on beneficial microbiota

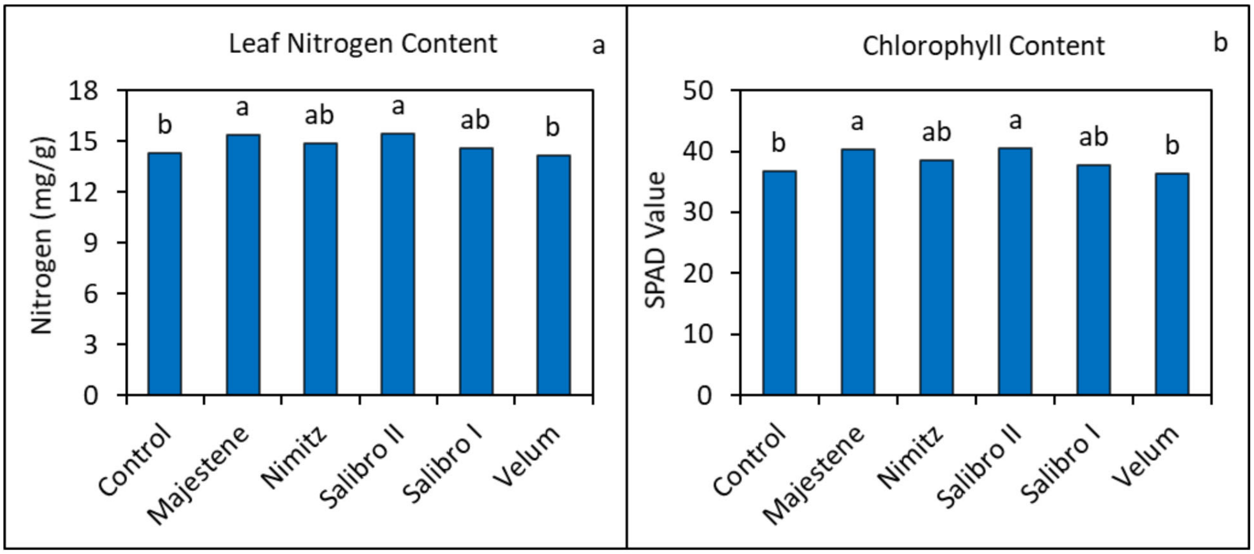

Figure 3. Showing melon a) leaf nitrogen content and b) chlorophyll content one month after planting. Bars represent means (n=20) and those followed by the same letter(s) are not different, according to the Waller–Duncan k-ratio (k=100) t-test.

(Waisen, 2023). Thus, Salibro treatment could be improving these plant growth parameters and Velum did not. Apart from promoting rhizosphere microbial activity via carbon supplement, it is likely that root leachate could be boosting plant growth with supplemental plant nutrients. Although Nimitz is known to have minimal impact on beneficial microbiota (Waldo et al., 2019), it is known to have phytotoxic effects on plants, which may be impacting plant growth here because Nimitz was applied five days before transplanting.

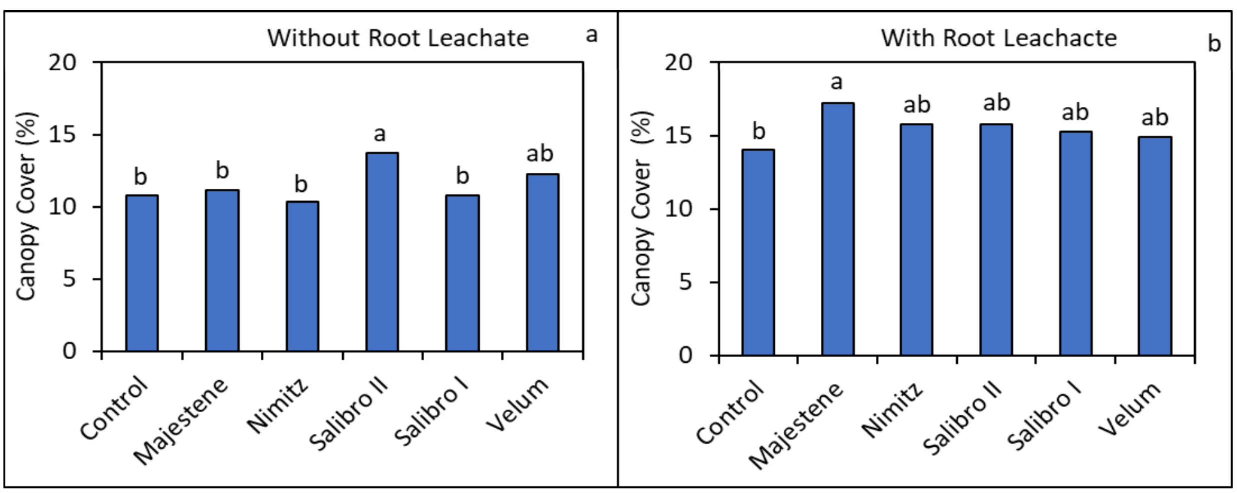

Figure 4. Showing percent canopy cover of melon affected by a) without root leachate and nematicide treatments and b) with root leachate and nematicide treatments. Bars represent means (n=20) and those followed by the same letter(s) are not different, according to the Waller–Duncan k-ratio (k=100) t-test.

Overall, application of root leachate as a pre-nematicide and pre-plant treatment is a novel strategy and it is interesting to see that plant growth parameters were being affected positively and these results could be through either carbon supplement, nutrient supplement, and/or suicidal hatching and killing of surviving nematode eggs. Going forward, it will be interesting to observe effects of root leachate and nematicide treatments on cantaloupe yield, root-knot nematode, and beneficial nematode.

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SEASIDE PETUNIA, *Calibrachoa parviflora*, FOUND IN AREA ALFALFA FIELD

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

On May 9, 2023, an area PCA checking alfalfa in the southern Palo Verde Valley found a weed he did not recognize. Neither did I or a weed scientist with whom I shared pictures. Dr. Allison Colwell, curator of the UC Davis for Plant Diversity, was able to identify this plant as being seaside petunia, *Calibrachoa parviflora*, and indicated that Jim Andre of Sweeney Granite Mountains Desert Research Center (and herbarium) agreed with her identification.

Figure 1. Unusual plant found growing on south side of beds in a commercial alfalfa field

This finding was unusual in that it was growing on the south side of the beds being used for alfalfa production, and was established about halfway up the bed (Fig. 1). It was not found on north sides of beds indicating that it needed direct sunlight. Seaside petunia is reported to like sunshine, water and open ground. It is described as a short lived perennial.

Seaside petunia is also more spreading than upright, and has leaves that smooth edges, appear to alternate and not have petioles, with leaf tips that are more rounded than sharp pointed (Fig. 2). It is also very unusual in that it was rooting in multiple places from stems that were in contact with the soil (Fig. 2).

Figure 2. Close-up of plant showing leaves and multiple rooting aspect.

Is this plant species new to the Palo Verde Valley? Not really. There have been several findings of this over the past half century that are recorded with CalFlora, with the first of these being June 1, 1974, by Les Ede, who was the University of California Cooperative Extension Palo Verde Valley Farm Advisor at that time who found it in citrus plots. It was also been found in downtown Blythe in March 2010, as well as south of Palo Verde in 1996 growing along-side agricultural fields just west of the Colorado River.

There are also numerous other findings of this species in Imperial County and throughout California. What makes this finding unique are two things:

1) It is thought that this is the first time world-wide that this species has been found in an alfalfa field.
2) A large enough area was infested (over 1 acre) that it necessitated a herbicide application.

Figure 3. Flower buds with five (5) leaf-like structures forming a star-burst from the flower bud base. Leaves show a roughness under microscopic examination that is not evident at first glance.

Figure 4. Close-up of a damaged seaside petunia flower, showing the overall shape and some characteristics associated with typical petunias.

IF YOU CAN'T TEACH AN OLD DOG NEW TRICKS, CAN OLD "DOGS" TEACH US SOMETHING?

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

With local alfalfa hay prices still hovering near the $300/ton mark, there may be some 'old dog' experiments and products that can provide economic gain based on experimental results that are not well known or have been forgotten over the years. Several University of California and University of Arizona Cooperative Extension replicated research trials have been conducted in the low desert over the past 25+ years have evaluated products such as HydraHume, Asset RS, and several products containing fractionates from kelp (*Ascopyllum nodosum*) for the effects on alfalfa (yields and quality). In these experiments, products were applied via several methods, depending upon the experiment (sub-surface drip irrigation, flood irrigation, foliar).

While most of these experimental results have been made available across various outlets, they are not easily accessible in a single collective document for growers and other industry professionals. Some 'old dog' experimental results may have been shelved/put to the side when conducted as alfalfa hay was $77/ton and products did not necessarily provide profit. The economics may be now different as alfalfa hay prices are 4x higher now in comparison to when some trials were conducted.

The following short synopses reviews provide a quick historical summary of crop responses to products evaluated by University of Arizona and University of California Cooperative Extension personnel over the past 25+ years.

Comparison of Aerial Applications of Foliar Triggrr, Cytokin and 20-20-20. Parker Valley, 1996.

A single application of products was made to each of two fields of alfalfa, one in 1st year of production (4 replications, 50% of way through cutting cycle) and the other in 3rd year of production (3 replications, 30% way through cutting cycle). Products and rates used: Foliar Triggrr @ 8 oz./acre, Cytokin @ both 8 and 16 oz./acre, and Cytokin @ 16 oz./acre + 5 lbs./acre of 20-20-20.

No statistical differences were noted for yields or quality parameters, although all treatments did result in higher numerical yields in the June and July harvests. Highest yields in the 1st year field were noted from the 8 oz./acre rate of Cytokin (0.2 tons more than untreated over June and July cuttings), followed by application of Foliar Triggrr (336 lbs./acre more hay over same cuttings). Largest yield increases (almost 0.3 tons/acre) were noted in the 3rd year field, with highest yields from May and June cuttings associated with Cytokin applications, with the 16 oz./acre rate having highest yields (6,843 lbs. hay/acre vs. 6,275 lbs./acre from these two cuttings for untreated alfalfa).

These data suggest that the age of alfalfa stand interacts with the product/rate. This is logical as plant hormone levels being produced by the plant plants would be expected to differ/decline by age of stand (production year).

Report available at: *https://repository.arizona.edu/handle/10150/202434*

Comparison of Soil Sunburst applied to 1 or 2 consecutive alfalfa cuttings of first year alfalfa. Parker Valley. 1996.

Soil Sunburst was applied via flood irrigation waters at the rate of 32 oz./acre to first year alfalfa (Cuf-101) in the first irrigation following cutting in May and June. Treatments did not result in yield increases but hay quality was higher (relative feed value for June 8 cutting 145 for treated vs. 131 untreated, slightly higher in August 6 cutting).

https://repository.arizona.edu/bitstream/handle/10150/202452/370110-071-074.pdf?sequence=1&isAllowed=y

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Application timing for Soil Triggrr for the June alfalfa cutting. Parker Valley, 1997.

Soil Triggrr was applied at the rate of 10 oz./acre via flood irrigation waters to a third year stand of alfalfa to determine if irrigation timing (1st = June 8) vs. 2nd irrigation = June 17) had any effect on alfalfa response. A very slight increase was noted (<40 lbs./acre) in the June harvest, with no difference for irrigation timing. Soil Triggrr contains only 0.004% kinetin as active ingredient (a very much smaller amount than most other products which contain kinetin), and this may have been too low of an amount for 3rd year alfalfa. Yield data collected for only one cutting.

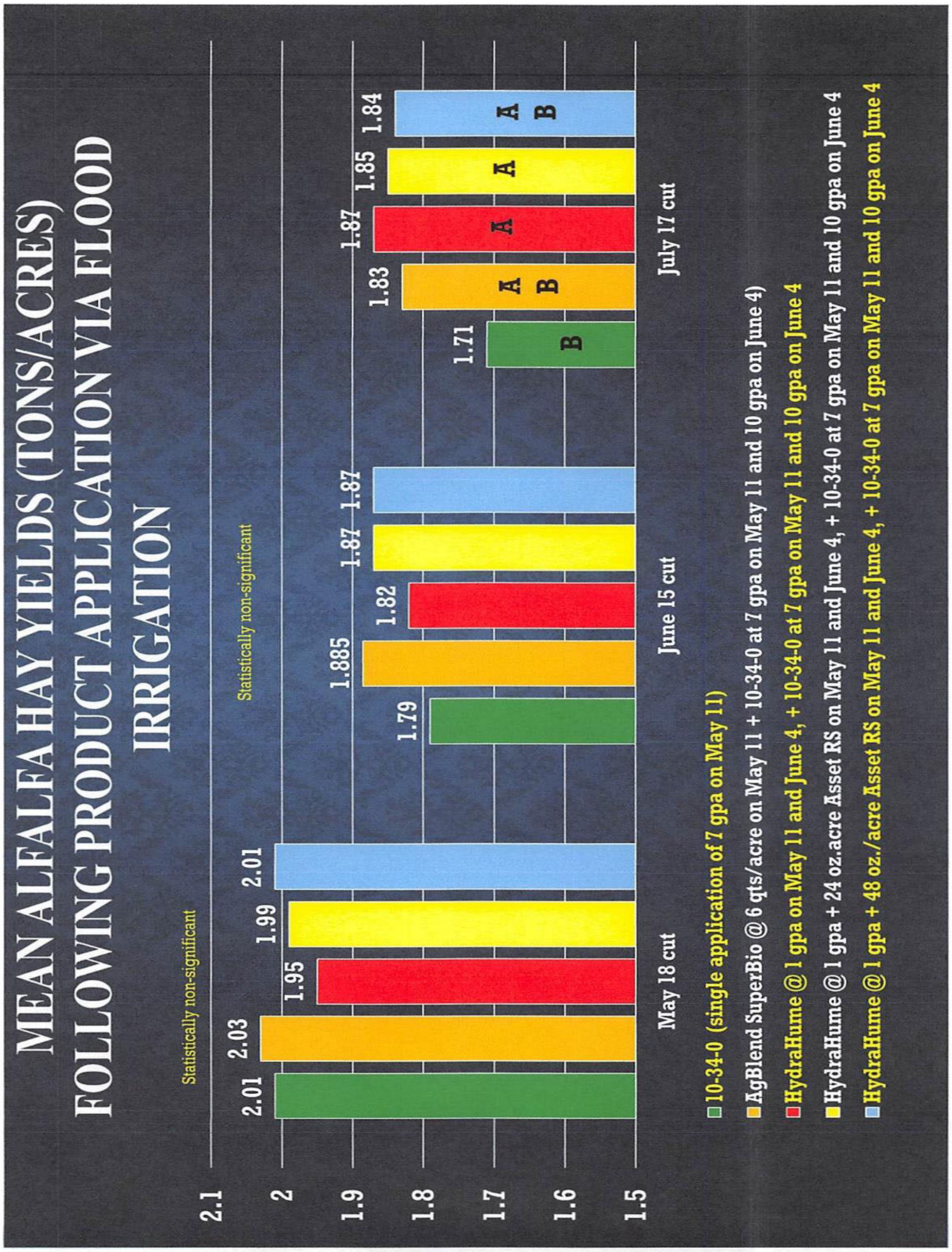
Available at: *https://repository.arizona.edu/handle/10150/202453*

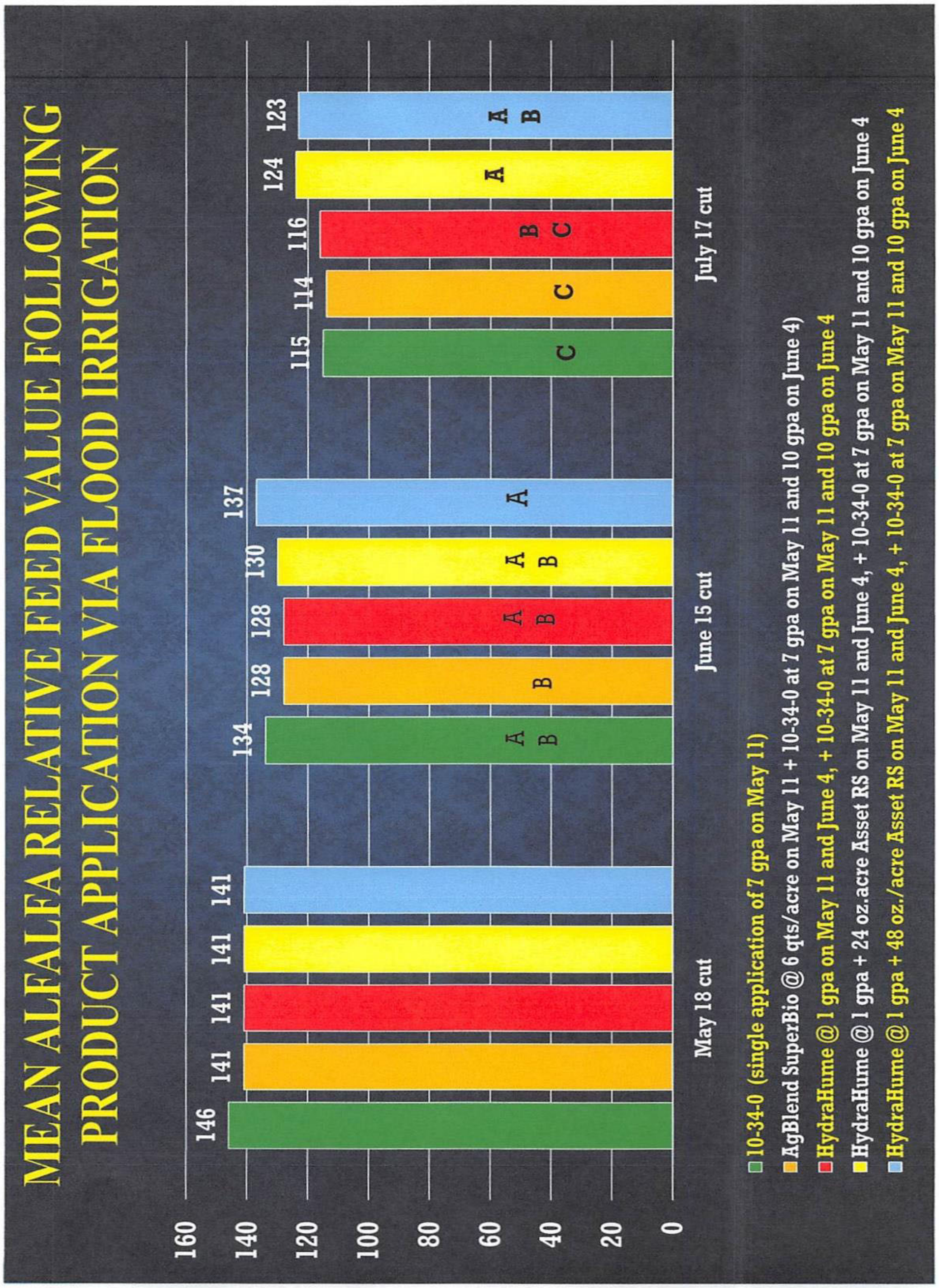
Comparison of 10-34-0 with HydraHume, Asset RS and SuperBIo AgBlend applied via flood irrigation. 2004. Palo Verde Valley

An experiment in a first year alfalfa field evaluated a single application of 7 gallons/acre of 10-34-0 applied in surface irrigation waters on May 11 (7 days prior to cutting on May 18) and compared it with the addition of 1 gallon/acre of HydraHume by itself, and HydraHume plus Asset RS at 24 and 48 oz./acre applied over two cuttings (2nd cutting with 10 gpa 10-34-0, applied on June 4). AgBlend SuperBio was also applied, but just once.

The SuperBio AgBlend and HydraHume/Asset RS treatments with two applications of 10-34-0 had numerically/statistically higher yields in both the June and July cuttings when compared with the single application of 10-34-0. It is difficult to determine if yield increases were solely due to addition of product or differences in 10-34-0 levels.

Addition of Asset RS did result in increased alfalfa quality levels in the July cutting, even though the last product applications had previously been made 43 days prior to this cutting.





(full report available at: *https://www.researchgate.net/publication/277750377_Comparison_of_Hydra-Hume_AssetR_RS_and_SuperBioR_AgBlend_on_Late_Spring_and_Early_Summer_Alfalfa_Yields_and_Quality*

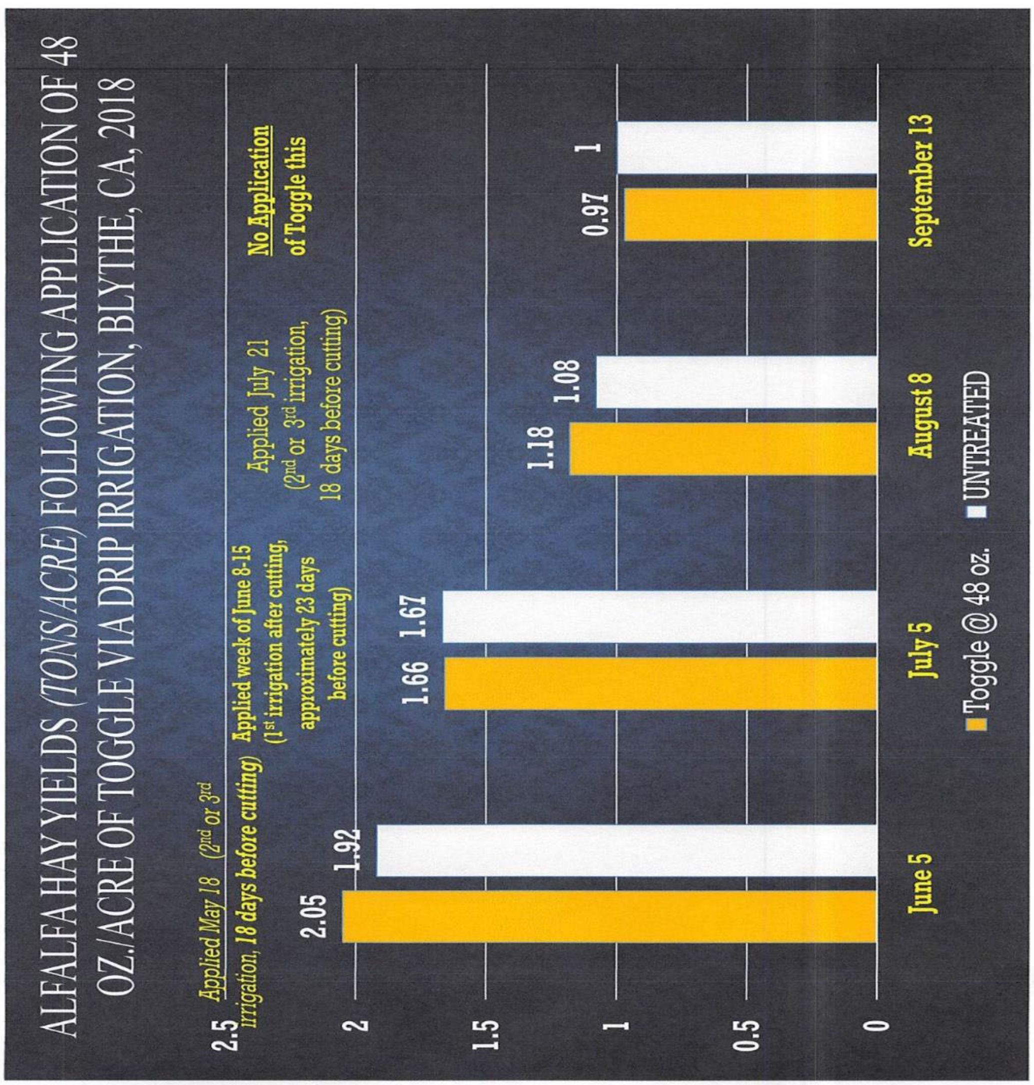
Toggle applied via sub-surface buried drip irrigation. Palo Verde Valley, 2018

This trial evaluated Toggle applied via sub-surface (buried) drip irrigation.   Product was applied once per cutting at 48 oz./acre from May-July. Frequency of irrigation events between cuttings are not available. Results from the very large block replicated trial indicated that:

1). Treatment was only effective on the cutting on which it was applied

2). Treatment was effective when applied at 18 days prior to cutting, but was not effective at 23 days prior to harvest

3). Yield increases (when occurring) were ≥0.1 tons of hay/acre per cutting.



REQUEST FOR PARTICIPATION

Cuong (Jimmy) Huu Nguyen, Food Safety and Organic Production Advisor, UCCE Imperial County

Take part in shaping the future of farming! The University of California Cooperative Extension Food Safety Technical Support Team, together with local partners, urgently needs your input, Imperial farmers, and specialty crop producers. By participating in this survey, you have the power to identify challenges and interests, driving the enhancement of Extension programming efforts. This vital needs assessment will guide educators in developing or improving programs that cater to your specific needs. Your voice matters!

Act now and seize this opportunity to make a difference. The survey is completely voluntary and confidential, requiring only 30 minutes of your time. If preferred, we can send you printed surveys by mail upon request. For any queries or further information, please reach out to Jimmy Nguyen, Food Safety and Organic Production Advisor, at cgnguyen@ucanr.edu or 760-604-5687.

Your valuable participation in this survey will directly contribute to the improvement of our programs, ensuring you receive the most cutting-edge farming information available nationwide. Join us in shaping the future of agriculture today!

Link to the survey: https://ucanr.co1.qualtrics.com/jfe/form/SV_ex1aiqpsl76fGhU

SEEDS FOR BEES

Project *Apis m.*

Photo by Kathy Keatley Garvey

What is *Seeds for Bees*?

Seeds for Bees encourages the use of **cover crops** to increase the density, diversity, and duration of bee forage in California. Seeds For Bees provides growers with free or subsidized cover crop seeds designed by Project *Apis m.*, along with technical support.

Cover crops can be defined as any non cash crop grown in addition to the primary cash crop.

Applications will be accepted through August 31

Benefits of cover crops

- Increasing organic matter content in the soil
- Increasing water infiltration
- Reducing erosion
- Providing a natural weed control

Critical factors of cover crops

- Determine objectives and function
- Site specification
- Timing

Program details:

- You can be awarded for receiving free seeds
- If not awarded, applicants can purchase discounted seeds
  - 1st-year enrollees are eligible for a $2,500 discount on their seed purchase.
  - 2nd-year enrollees are eligible for a $1,500 discount on their seed purchase.
  - Shipping is always free for all Seeds for Bees orders
- The application should take less than 20 minutes
- Seed mixes are designed to bloom when natural forage is scarce but managed and native bees are active

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IMPERIAL VALLEY CIMIS REPORT AND UC WATER MANAGEMENT RESOURCES

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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.cimis.water.ca.gov/. Estimates of the average daily ET_o for the period of May 1st to July 31th 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 inch per day

Station	June		July		August	
	1-15	16-30	1-15	16-31	1-15	16-31
Calipatria	0.31	0.32	0.32	0.31	0.30	0.28
El Centro (Seeley)	0.34	0.36	0.33	0.31	0.30	0.28
Holtville (Meloland)	0.33	0.34	0.32	0.31	0.30	0.28

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/.

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