



Imperial County

Agricultural Briefs



Features from your Advisors

April 2018 (Volume 21 Issue 4)

Table of Contents

TAILWATER RECOVERY SYSTEM: SIMPLE OR COMPLEX WATER MANAGEMENT PRACTICE?.....	Ali Montazar	-56-
AGRONOMIC CROPS & IRRIGATION WATER MANAGEMENT FIELD DAY FLYER & AGENDA.....		-59-
ANNOUNCEMENT: 2018 GUIDELINES PRICE INCREASE.....		-62-
RHODES GRASS: FORAGE OPTION IN CALIFORNIA’S LOW DESERT?	Cary Blake	-63-
DESERT LIVESTOCK RESEARCH UPDATE	Brooke Latack	-67-
IMPERIAL VALLEY CIMIS REPORT AND UC WATER MANAGEMENT RESOURCES	Ali Montazar	-70-

TAILWATER RECOVERY SYSTEM: SIMPLE OR COMPLEX WATER MANAGEMENT PRACTICE?

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

Water running off the lower end of a field as part of normal irrigation practices is referred to as tailwater. Tailwater return systems are applicable typically to surface irrigation systems in which significant amounts of irrigation water runs off the end of the irrigated field. For surface irrigation, tailwater is necessary to adequately irrigate the lower end of a field since sufficient time is required to allow the desired amount of water to infiltrate the soil. Without tailwater, the lower end of the field will not receive enough water and will potentially suffer a water shortage and crop yield reduction. Figure 1 demonstrates unhealthy stressed plants at one quarter lower end of an alfalfa field because of low water distribution uniformity and insufficiently applied water. The main advantages of using a tailwater return system are:

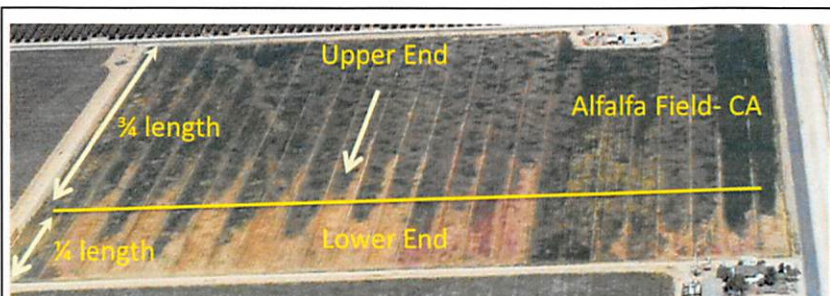


Figure 1. Check flood irrigated alfalfa field in the low desert

- Minimizing environmental impacts of tailwater leaving the irrigated field
- Improving irrigation efficiency and conservation of water since tailwater is beneficially reused as irrigation water
- Removing standing water, which may result in crop loss, weed, and mosquito infestations (this advantage was seen in check flood-irrigate alfalfa fields)

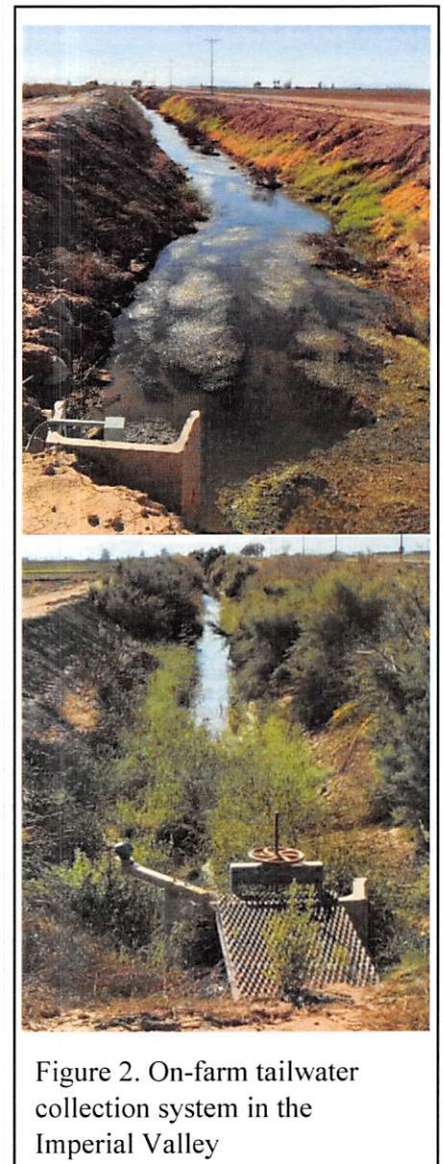


Figure 2. On-farm tailwater collection system in the Imperial Valley

Tailwater recovery systems are extremely effective in the capture and reuse of irrigation water and may improve the irrigation system efficiencies about 25 to 30 percent. The system also has a significant impact on improving water quality through trapping of sediments, and collection and reuse of runoff waters that may contain nutrients and other chemicals. Sediments with phosphorus or other nutrients and chemicals can be collected, contained and may be recycled. The effectiveness of trapping sediments depends on system design and is directly related to retention times. Conservation through reduction in field runoff may reduce the flow of agricultural drain, and as a result may improve the water quality of downstream reaches of rivers, streams, or waterways.

A tailwater recovery system consists of ditches or pipelines to collect tailwater and deliver water to a storage reservoir (typically below the grade of the irrigated land), and a pumping and pipeline system that conveys the water to irrigated fields for reuse. Most commonly, either an electrical motor or a diesel engine is used as the power unit for the return flow pump. The steps required to implement a tailwater recovery system are: (1) construction of the tailwater collection system, (2) construction of the storage reservoir, (3) construction of the tailwater irrigation water delivery system, and (4) application of the tailwater for irrigation of crops or other uses.




Figure 3. Circulation collected water around field through tailwater recovery system

Like all irrigation system components, a tailwater recovery system requires maintenance for continued smooth operation. Periodic cleaning and re-grading of collection facilities, removal of debris from trash racks and structures, removal of sediment from traps and/or storage facilities, and routine maintenance of all mechanical components will be necessary. Where additional storage is required to provide adequate retention time for the breakdown of chemicals in runoff water, storage facilities should be sized accordingly.

Tailwater recovery systems appear to be a simple water management practice, but in fact it is a very complex practice because of many factors contributing to and/or affecting tailwater and its quality. The quality of tailwater could be quite variable than the quality of the applied water. In some instances, tailwater quality may be considerably degraded because of dissolved mineral salts, sediments, and agricultural chemicals. Pesticide residues may be present in tailwater, but the concentration of pesticides is highly variable both in time and location. It is recommended that the discharge of a tailwater reuse system be minimized during and immediately after the application of agricultural chemicals (pesticides, fertilizers, etc.) to prevent additional pollutants from being discharged into receiving waters.

Mitigation of the impacts of irrigation tailwater can be accomplished by both technical and managerial methods. However, on-farm tailwater and other usable collected irrigation water return should be reused whenever this practice is a cost-effective method for improving water quality and water conservation. Sometimes, under certain condition, it may be more operationally efficient to capture and reuse water at larger spatial levels (e.g., irrigation or water district) than farm or field scale.



Agronomic Crops & Irrigation Water Management Field Day

For more information you can contact Ali Montazar amontazar@ucanr.edu and Oli Bachie obachie@ucanr.edu or the office at (442) 265-7700

More Information to follow regarding the event; topics, agenda, CEU's, etc.

No Cost to Attend!!

Wednesday, April 18th,
7am - 12pm

UC Desert Research & Extension Center (DREC)
1004 E Holton Road Holtville, CA 92250



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University of California Cooperative Extension Imperial County

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Agronomic Crops and Irrigation Water Management Field Day

When: Wednesday April 18, 2018 (6:30 AM to 12:15 PM)
Where: University of California Desert Research and Extension Center
 1004 E. Holton Rd., Holtville, CA 92250

Registration: 6:30 AM to 7:00 AM

To pre-register for field day please send an email in advance to aiestrada@ucanr.edu with full name of attendee(s).

Agenda

Field demonstration (7:00 AM - 8:40 AM) **each field demonstration is limited to 7 mins**

Stop	Field Demonstration Title
Stop 1, Area 60	Wheat varieties for the low desert- <i>Oli Bachie, UCCE Agronomy Advisor, Imperial County; and Mark Lundy, UCD Agronomy Specialist</i>
Stop 2, Area 80	Update on sunflower research in Imperial Valley- <i>Khaled Bali, Statewide UCCE Irrigation Water Management Specialist; Ali Montazar, UCCE Irrigation and Water Management Advisor; and Oli Bachie, UCCE Agronomy Advisor</i>
	Evaluation of residual herbicides for weed control in low desert alfalfa- <i>Pratap Devkota, UCCE Weed Science Advisor</i>
Stop 3, Area 90	Alfalfa variety performance for the low desert- <i>Dan Putnam, UCD Statewide Alfalfa and Forage Extension Specialist</i>
	Alfalfa improvement for future California Environments and pest management- <i>Charles Brummer, Director of the Plant Breeding Center, UCD</i>
Stop 4, Area 90	Water and Nitrogen Effects on Onion Yield and Quality Under Drip and Furrow Irrigation- <i>Jairo Diaz, Director of Desert Research and Extension Center</i>
	Evaluation of weather-based models for management of onion downy mildew- <i>Alexander Putman, Assistant Cooperative Extension Specialist, Department of Microbiology and Plant Pathology, UCR</i>
Stop 5, Area 70	Automation of flood irrigation- <i>Khaled Bali, Statewide UCCE Irrigation Water Management Specialist; Peter Moller, Rubicon water; and Ronnie Leimgruber, Leimgruber Farms</i>
	Lidar and Drone Technology: Agricultural and Surveying applications- <i>Mark Roberson, Benton Line, and Samuel Zamora; Environmental Consultant Group</i>
	Coded varieties and nematicides for cyst nematode management- <i>Oli Bachie UCCE Agronomy Advisor, Imperial County; and Becky Westerdahl, UCD Professor/Extension Specialist</i>

Indoor Workshop (8:55 AM - 12:15 PM) **each presentation is limited to 15 mins**

Time	Presentation Title
8:55 – 9:10	Crop water-use studies for the low desert cropping system - <i>Ali Montazar, UCCE Irrigation and Water Management Advisor</i>
9:10 – 9:25	Impacts of climate change and potential adaptations for California Agriculture - <i>Tapan Pathak, Specialist in Climate Adaptation in Ag, UC Merced</i>
9:25 - 9:40	Resource-efficient irrigation of alfalfa- <i>Daniele Zaccaria, Agricultural Water Management Specialist in Cooperative Extension, UCD</i>
9:40 – 9:55	Water and Nitrogen Effects on Onion Yield and Quality Under Drip and Furrow Irrigation- <i>Jairo Diaz, Director of Desert Research and Extension Center</i>
9:55 – 10:10	Low- lignin trait in alfalfa: what is the potential? - <i>Dan Putnam, UCD Statewide Alfalfa and Forage Extension Specialist</i>
10:10 – 10:25	Causes of sugarbeet seedling mortality and emergence failure in the Imperial Valley- <i>Steve Kaffka, UCD Extension Agronomist and Director of California Biomass Collaborative</i>
Break (10:25 – 10:40)	
10:40 – 10:55	Problematic weeds of the low desert region and their Identification- <i>Pratap Devkota, UCCE Weed Science Advisor</i>
10:55 – 11:10	Management of downy mildew of vegetables in the Imperial Valley- <i>Alexander Putman, Assistant Cooperative Extension Specialist, Department of Microbiology and Plant Pathology, UCR</i>
11:10 – 11:25	Alfalfa and sorghum pest management for 2018? - <i>Ayman Mostafa & Kyle Harrington, Associate Agriculture Area Agent, Program Coordinator Field Crop IPM, The University of Arizona Maricopa County Cooperative Extension</i>
11:25 – 11:40	Insecticide resistance in agronomic crop pests: What have we learned in 2018? - <i>Michael Rethwisch, UCCE Crop Production and Entomology Farm Advisor</i>
11:40 – 11:55	Alfalfa selfing and pollinator management- <i>Oli Bachie, UCCE Agronomy Advisor</i>
Industry update (20 mins)	
11:55 – 12:15	<i>Flow Control Drip Tape- Inge Bisconer, Technical Marketing and Sales Manager, and Fred Ahnert, District Sales Manager, The Toro Company, Ag Business</i>
	<i>AquiMax: A Tool for Soil Moisture Management- Bardia Dehghan Manshadi, RDI Agronomist, Exacto, Inc AquiMax Soil Moisture Management Technology</i>
	<i>On-Farm Water Balancing to Maximize Conservation- Harry Ferdon, Regional Sales Manager (Southern & Central California), SWIIM System</i>

Lunch Sponsor: The Toro Company

For additional information on the field day, please contact organizers Ali Montazar, amontazar@ucanr.edu, Oli Bachie, obachie@ucanr.edu, or Pratap Devkota, pdevkota@ucanr.edu; or call us at (442) 265-7700

Approved Continuing Education Units: CA DPR - 2.5 hrs. (#M-0631-18), AZ Dept. of AG - 1.5 hrs. (#18360) & CCA - 4.5 hrs. (CA 55866)

Please feel free to contact us if you need special accommodations.

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Imperial County



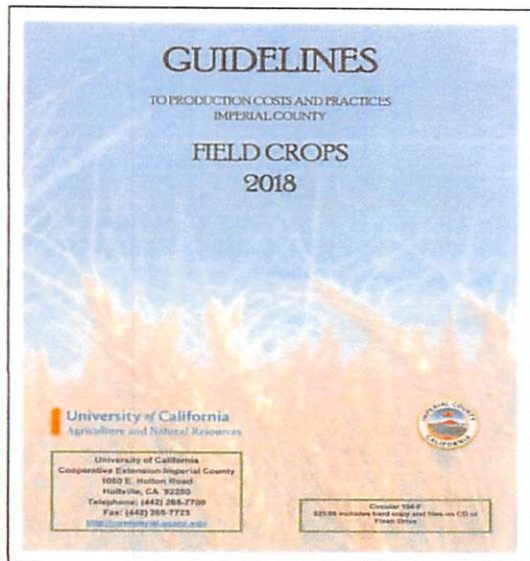
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The price of the Guidelines will be increasing beginning July 1, 2018.

Until then they can still be purchased for \$25.00 each.



2018 Field Crops Guidelines

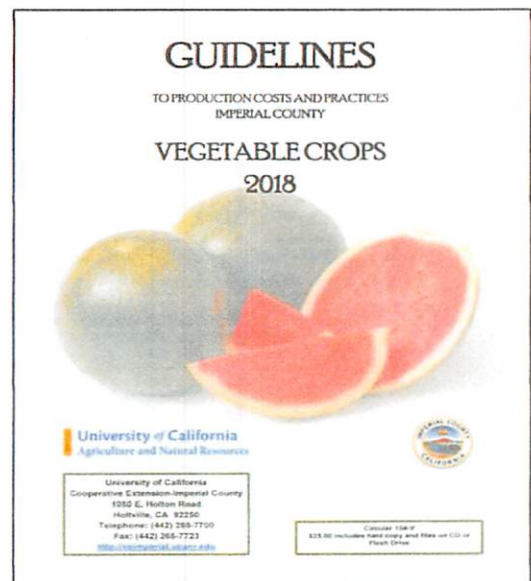
\$40.00/book

As of July 1, 2018

2018 Vegetable Crops Guidelines

\$40.00/book

As of July 1, 2018



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**RHODES GRASS: FORAGE OPTION IN CALIFORNIA’S LOW DESERT?
NEW PERENNIAL FORAGE GRASS FOR LOW DESERT PRODUCTION.**

Article written by Cary Blake, reprinted from Western Farm Press, February 15, 2018

After two-and-a-half years of a University of California experimental forage field trial in the state’s southernmost county, Imperial, initial trial results suggest that Rhodes grass (*Rhodes gayana*) could be a solid new perennial forage crop for low desert growers.

“In the trial, Rhodes grass has been highly adaptable, easy to establish, highly drought tolerant, no pest and disease issues so far, and produced large amounts of biomass with high nutrient value as a hay for livestock feed,” said Dr. Oli Bachie, director, UC Cooperative Extension (UCCE) Imperial County at Holtville.



Rhodes Grass at UCCE’s research trial

Bachie discussed details of the trial during the 28th annual Fall Desert Crops Workshop held in December at Imperial, Calif. The workshop is sponsored by Western Farm Press with support from commercial sponsors –

Platinum Level, BASF and Bayer CropScience, and Gold Level, ADAMA, Alforex Seeds, Gowan USA, and Westbridge Agricultural Products.

“Rhodes grass is a huge biomass plant for the low desert.” Bachie told the crowd.

His Rhodes grass trial suggests the perennial grass could be a good cropping grass rotated with alfalfa, Bermudagrass, and Kleingrass. The goal of the trial is to determine if Rhodes grass could grow well in California’s low desert and be a profitable option for growers. The grass is native to Africa and grown in tropical and subtropical regions.

The 0.4 acre Rhodes field trial, including four replications, is located at the UC Desert Research & Extension Center at Holtville. The trial includes two varieties, Reclaimer and Gulfcut – both proprietary varieties from the family-owned-and-operated company Selected Seeds Limited, based in Australia.

Crop benefits

The Rhodes crop benefits, Bachie says, include high salt tolerance, which is a real plus for the moderately saline and alkaline soils in the irrigated Imperial Valley. Keys to quality Rhodes hay includes precise fertilizer applications with no skimping on the amount, and cutting the crop (with a standard swathe) when 5 percent to 10 percent of the heads are at the boot stage. Any later and plant quality falls.

The best planting dates in Southern California are September through March when the daily temperature averages 60 degrees Fahrenheit or higher, says Bachie.

Rhodes grass seeds are about three-eighths-of-an-inch long with an average seeding rate at about 18 to 20 pounds/acre – either broadcast or shallow drilled. Seed can germinate within seven days, depending on the temperature, and can cover the ground three months after sowing. Mature plant height is two to four feet.

Seeds should be watered up with a sprinkler and then switched to a border-flood system. In Bachie’s trial, total annual water use for Rhodes was less than the average alfalfa water use in the county (about six acre feet).

Yield

The stand can produce forage six months after sowing. Bachie says the highest yield is obtained during the second year of cultivation but decreases in Year 3. He believes a good stand can last about five years.

Bachie harvested Rhodes grass five times a year starting in May, and then monthly for the next four months. Yields from the trial averaged 19 tons of hay per acre annually from Reclaimer and Gulfcut combined.

Production costs per acre in Imperial County are unknown as the crop is just experimentally grown. Several county commercial forage growers have planted Rhodes grass in trials on their farms, including plantings near Holtville and Brawley. One grower said he plans to grow Rhodes grass as a commercial crop this year.

Diploid grasses

Both varieties grown in the trial are diploid grasses which, according to the Selected Seeds website, have a fast response to moisture and temperature, and provide good water use efficiency.

Bachie said the Rhodes grass crude protein level was 12 percent to 14 percent, lower than alfalfa's average at 7 percent to 19 percent, yet higher than the levels from Bermuda and Klein, or corn silage grown in the county.

Imperial County could be the only known region in the Far West testing Rhodes grass. Several forage leaders in Arizona were not aware of Rhodes grass plantings in the state – field trials or commercial plantings.

Rhodes grass is commercially grown in Texas and Florida.

Australian roots

Stan Paynter, agronomist and international sales specialist with Selected Seeds Ltd., based at Pittsworth Qld, Australia, and Paynter have teamed on the UCCE Rhodes grass trial to learn whether the grass could be a valid option in the California low desert.

Paynter said Rhodes grass is widely adapted from soils of pH 4.5 to 8.5, and salt tolerant up to 12 decismens per meter. The plant has looping stolons about 8 feet to 12 feet long, which drop down to create roots above ground.

“The stolons can spread and fill in patchy areas of the field where the plant doesn't establish itself,” Paynter noted.

The grass is not adapted to low pH acid soils. He says Rhodes grass is easier to take out of the field for rotation to a crop other than Bermudagrass.

“With Bermuda, you can still fight it for several years, where with Rhodes grass you disk it (under) and you’re back into the next crop in less time.”

Variety differences

On the Reclaimer variety, Paynter said it was bred for its aggressive stolon growth habit, plus some cool season tolerance. It has tender, slender, and leafy stems. Gulfcut has a finer stem and a more erect growth habit with finer leaves and stems, a plus for hay production. Both varieties can be grown for cattle pastures and grazing.

At Selected Seeds, Reclaimer is the top seller but there’s little difference between the two varieties. Paynter quipped, “We don’t know whether Gulfcut is the ‘ugly sister’ or ‘Cinderella.’ It’s sitting quietly but Reclaimer is the one people are using.”

Selected Seeds tests over a wide geographical area across the world suggested the use of about 50 pounds per acre of nitrogen, 6 pounds/acre of phosphorus, 430 pounds/acre of potassium, 4 pounds/acre of magnesium, and 9 pounds/acre of calcium. Actual needed nutrients can vary by location.

Rhodes grass is extremely tolerant of high desert heat. Said Paynter, “The hotter it gets the more it grows.” In the Southern California desert, the plant basically shuts down during the winter months.

DESERT LIVESTOCK RESEARCH UPDATE

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

At the 2018 Desert Agriculture and Natural Resources Symposium held on February 28, I presented an update on desert livestock research. This article will provide an opportunity for those who did not attend the symposium to hear about some of the past achievements in desert livestock research.

The Sonoran Low Desert encompasses Imperial County, western Arizona, and north-western Mexico. This area represents two-million head of cattle on feed, of which about 25% are located in Imperial County. The county's livestock research is provided by the University of California Desert Research and Extension Center (DREC) with over 200 acres of fields and a research feedlot. The center provides an excellent tool for researchers to explore the impacts of the low desert climate on livestock productivity. Livestock researchers took advantage of this facility and performed a wide range of research on important livestock species in the Imperial Valley.

Winter grazing of alfalfa fields with sheep is a significant practice in the Imperial Valley. Former University of California Cooperative Extension (UCCE) advisors have worked on the benefits of sheep grazing practices on weed and pest control at DREC. These researchers have assessed what plants sheep selectively grazed within the fields. They observed that sheep were selecting weeds before grazing alfalfa in the fields. They also observed that sheep grazing was as effective as the herbicide in controlling weeds.¹ In another study, researchers looked at the effect sheep grazing had on crop insect pressure. It was found that sheep would consume alfalfa infested with weevils and larva, making sheep grazing as effective as insecticides used for weevil and aphid control.² These studies were extremely important as quality and quantity of hay can be greatly impacted by the presence of weeds and insects, which can ultimately affect economic productivity of crops. These studies allow an opportunity for the current livestock program to incorporate current issues in sheep grazing by expanding on previous research findings. Understanding the research and knowledge needs of producers in the community is critical to shaping research to benefit the community.

There has been substantial feedlot beef research at DREC, much of which has had a substantial impact on practices implemented by feedlot managers. Feed processing is an important step in ensuring that animals are receiving the maximum benefit while mitigating nutrient and energy loss. In multiple studies looking at the benefit of steam flaking corn, it was found that corn feed value increased by 18%, with more NE_g than dry rolled corn. It was also found that the direct measure of starch concentration in feces was indicative of the adequacy of steam flaking corn as density and thickness of flakes played a role in nutrient use.³ Along with feed quality, the revision of energy requirements for feedlot steers and heifers is critically important to understand how production variables of incoming calves can impact the productivity of the animal. This included the impact of increasing dietary NE on DMI (\downarrow), G:F (\uparrow), dressing percentage (\uparrow), and yield grade (\uparrow) as well as the impact of increasing initial shrunk weight on ADG (\uparrow), DMI (\uparrow), shrunk final weight (\uparrow), G:F (\downarrow), and dressing percentage (\downarrow). Understanding the required energetics of feedlot cattle allows managers to make more precise decisions to benefit the organization through increased predictability of the animals being produced.⁴

Other studies regarding implant strategies (weight of animal at implant, duration of implant, etc), available energy of feed on arrival, amino acid supplementation, effects of B-vitamins and yeast as supplements, and methods to mitigate heat stress have been studied to understand the production benefits as they are extremely important issues in low desert feedlot production.

Understanding of the research and current needs of the livestock industry is important for the development of the livestock program. I will make a concentrated effort to comb through the previous research and disseminate the information in a newsletter targeted to reach feedlot producers. Additionally, conducting a needs assessment of current management practices and issues impacting local livestock producers will be the aim of the University of California Cooperative Extension livestock program in a direction to best provide maximum research and problem-solving benefits to the local producers. In the coming months I will be reaching out to livestock producers to better understand the needs of the area as well as initiating the circulation of the feedlot newsletter.

For additional information contained in this article, please refer to:

1. Bell, C. E. and Guerrero, J. N. (1997). Sheep grazing effectively controls weeds in seedling alfalfa. *California Agriculture*, 51(2):19-23.
2. Natwick, E. T., Guerrero, J. N., Lopez, M. I., and dos Santos A. R. (2003). Lamb grazing and Egyptian alfalfa weevil control.
3. Zinn, R. A., Owens, F. A., and Ware, R. A. (2002). Flaking corn: Processing mechanics, quality standards, and impacts on energy availability and performance of feedlot cattle. *J. Anim. Sci.*, 80:1145-1156.
4. Zinn, R. A., Barreras, A., Owens, F. A., and Plascencia, A. (2008). Performance be feedlot steers and heifers: Daily gain, mature body weight, dry matter intake, and dietary energetics. *J. Anim. Sci.*, 86:2680-2689.

IMPERIAL VALLEY CIMIS REPORT AND UC WATER MANAGEMENT RESOURCES

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

The reference evapotranspiration (ET_0) 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_0 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_0 for the period of April 1st to June 30th 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_0) in inch per day

Station	April		May		June	
	1-15	16-30	1-15	16-31	1-15	16-30
Calipatria	0.22	0.25	0.27	0.29	0.31	0.32
El Centro (Seeley)	0.24	0.28	0.29	0.31	0.34	0.36
Holtville (Meloland)	0.23	0.27	0.29	0.31	0.33	0.34

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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