University of California
Agriculture and Natural Resources
UC Cooperative Extension

October 2019

TEHAMA, GLENN, COLUSA, AND SHASTA COUNTIES
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Water & Land Resource Manager

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Full color articles and photos are available on our Website: cetehama@ucanr.edu

IRRIGATION SEASON WINDS DOWN AND WE NEED YOUR HELP

By Allan Fulton

IRRIGATION SEASON WINDS DOWN

It's late October, many crop harvests have been completed while others are underway or still waiting to begin. It is the time of year, when irrigation needs can take second seat to harvest activities not to mention days are shorter and temperatures are cooler so irrigation seems less critical. However, after the crop is harvested in perennial tree fruit and nut crops, the remainder of the season represents a time for the trees to photosynthesize and store carbohydrates reserves for next year's bloom and early push of vegetation. Adequately re-hydrated orchards following harvest are also less risk to cold injury and winter kill in the late fall and winter. So, there remains good reason to finish the irrigation season well until sufficient rainfall has occurred to justify suspending irrigation.

Table 1 on the next page is an example of a recent weekly Crop ET report that is provided for the northern Sacramento Valley area. This weekly report provides estimates of crop water use or ET (evapotranspiration) for the primary perennial orchard crops grown in our local area. These ET levels should be supplied by irrigation unless rainfall occurs at sufficient levels to supply the need. If you have been receiving or following these weekly reports on a weekly basis you will notice that these reports are sensitive to changes in crop stage, weather, and seasons. For more in depth information on how to access and use these reports please refer to http://www.sacvalleyorchards.com/et-reports/. This website also provides simple calculators to help relate these crop water estimates to the designed output of specific drip, microsprinkler, and solid set sprinkler irrigation systems.

Table 1
Weekly Crop ET Report

WEEKLY ET REPORT
(Estimated Crop Evapotranspiration or ETc)
10/11/19 through 10/17/19

Crops (Leafout Date)	Tehama County - Gerber South			Butte County - Biggs			Butte County - Durham			Colusa County - Williams		
	Past Week of Water Use	Accum'd Seasonal Water Use	Next Week's Estimated ETc	Past Week of Water Use	Accum'd Seasonal Water Use	Next Week's Estimated ETc	Past Week of Water Use	Accum'd Seasonal Water Use	Next Week's Estimated ETc	Past Week of Water Use	Accum'd Seasonal Water Use	Next Week's Estimated ETc
Pasture [ETo]	0.86	46.65	0.70	0.84	43.10	0.74	0.81	41.14	0.68	0.87	46.07	0.72
Olives Table *	0.65	35.20	0.54	0.64	32.60	0.57	0.61	31.15	0.53	0.66	34.88	0.55
Olives High Density *	0.51	27.97	0.42	0.50	25.83	0.45	0.48	24.68	0.40	0.51	27.61	0.43
Citrus *	0.56	30.47	0.47	0.55	28.06	0.50	0.54	26.79	0.46	0.57	30.05	0.48
Almonds (3/10) *	0.86	46.01	0.65	0.84	42.36	0.69	0.81	40.50	0.63	0.87	45.22	0.67
Cling Peaches (3/20) *	0.86	38.54	0.65	0.84	35.32	0.69	0.81	33.88	0.63	0.87	37.48	0.67
Pistachios (4/19) *	0.86	41.06	0.65	0.84	37.31	0.69	0.81	35.86	0.63	0.87	39.75	0.67
Prunes (4/5) *	0.63	40.02	0.47	0.61	36.67	0.50	0.60	35.00	0.46	0.64	39.12	0.48
Walnuts (4/14) *	0.57	39.24	0.42	0.56	36.00	0.45	0.53	34.46	0.40	0.58	38.18	0.43
Urban Turf Grass	0.65	39.08	0.54	0.64	36.24	0.57	0.61	34.64	0.53	0.66	38.67	0.55
Past 7 days precipitation (inches)		(0.02)			(0.00)			(0.00)			(0.00)	
Accumulated precipitation (inches)		(5.64)			(4.93)			(8.30)			(2.88)	

Accumulations started on March 10, 2019 or on the approximate leafout date for a specific orchard crop as indicated in parentheses. Criteria for beginning this report are normally based on the season's last significant rainfall event where the soil moisture profile is estimated to be near its highest level for the new season. However, we had significant rains in April this year.
* Estimates are for orchard floor conditions where vegetation is managed by some combination of strip applications of herbicides, frequent mowing or tillage, and by mid and late season shading and water stress. Weekly estimates of soil moisture loss can be as much as 25 percent higher in orchards where cover crops are planted and managed more intensively for maximum growth.

PAST WEEKLY APPLIED WATER IN INCHES, ADJUSTED FOR EFFICIENCY [1]

Crops	Tehama County - Gerber South			Butte County - Biggs			Butte County - Durham			Colusa County - Williams		
System Efficiency >>	70%	80%	90%	70%	80%	90%	70%	80%	90%	70%	80%	90%
Olives Table	0.9	0.8	0.7	0.9	0.8	0.7	0.9	0.8	0.7	0.9	0.8	0.7
Olives High Density	0.7	0.6	0.6	0.7	0.6	0.6	0.7	0.6	0.5	0.7	0.6	0.6
Citrus	0.8	0.7	0.6	0.8	0.7	0.6	0.8	0.7	0.6	0.8	0.7	0.6
Almonds (3/10)	1.2	1.1	1.0	1.2	1.1	0.9	1.2	1.0	0.9	1.2	1.1	1.0
Cling Peaches (3/20)	1.2	1.1	1.0	1.2	1.1	0.9	1.2	1.0	0.9	1.2	1.1	1.0
Pistachios (4/19)	1.2	1.1	1.0	1.2	1.1	0.9	1.2	1.0	0.9	1.2	1.1	1.0
Prunes (4/5)	0.9	0.8	0.7	0.9	0.8	0.7	0.9	0.8	0.7	0.9	0.8	0.7
Walnuts (4/14)	0.8	0.7	0.6	0.8	0.7	0.6	0.8	0.7	0.6	0.8	0.7	0.6

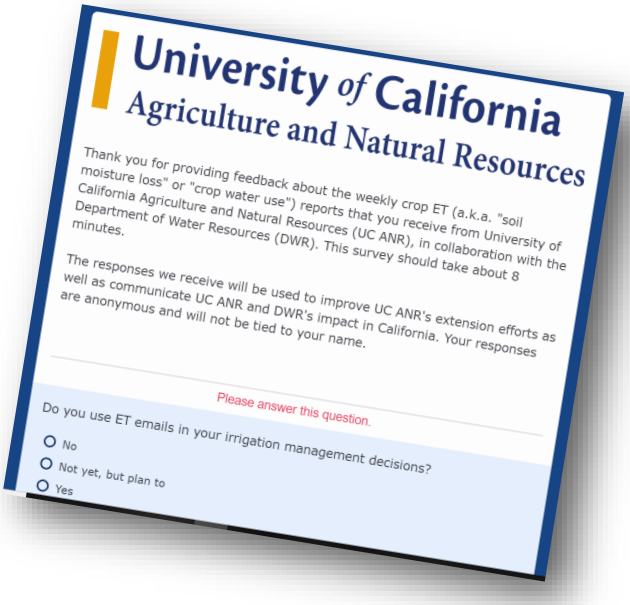
1 The amount of water required by a specific irrigation system to satisfy evapotranspiration. Typical ranges in irrigation system efficiency are: Drip, 80%-95%; Micro-sprinkler, 80%-90%; Sprinkler, 70%-85%; and Border-furrow, 50%-75%.
For further information concerning all counties receiving this report, contact the Tehama Co. Farm Advisor's office at (530) 527-3101 or the Glenn Co. Farm Advisor's office at (530) 865-1153.
This same information and source is now available in the ET Reports section of the sacvalleyorchards.com website. Same information, just in a different format.

WE NEED YOUR HELP

University of California Agriculture and Natural Resources (UC ANR) and the Department of Water Resources (DWR) need your help to understand how our Weekly Crop ET Reports (a.k.a. "Soil Moisture Loss Reports" or "Crop Water Use Reports") are helping California's irrigators, and how we can improve these reports and other irrigation-related extension efforts to better serve you.

Please give us your feedback by completing the following survey: **https://ucanr.co1.qualtrics.com/jfe/form/SV_50GEq3JrdyVOt3n**

Your responses are anonymous and will not be tied to your name. This survey should take about 8-10 minutes. Participants will be eligible to win a $20 Home Depot gift card – after you submit the survey, click on the link to provide your information for the gift card drawing. For questions on the survey, contact kjarvisshean AT ucanr.edu.



WATER USE BY YOUNG DEVELOPING PRUNE TREES

Allan Fulton

WATER NEEDS BY FRENCH PRUNE, MATURE ORCHARDS

Seasonal evapotranspiration (ET) from mid-March through November for economically viable, mature prune orchards (canopy with more than 60 percent shading at solar noon) is on the order of 42.0 inches or 3.5 acre-feet per acre annually. The monthly amounts average 1.3, 4.3, 6.6, 7.9, 8.1, 6.9, 4.6, 2.5, and 0.3 inches per acre for March, April, May, June, July, August, September, October, and November, respectively. Not all of the ET by prunes must be supplied by irrigation as significant amounts can be supplied by winter rainfall that is stored in the soil and carries over to the growing season and by rainfall that occurs in the spring when the trees are growing. Refer to UC ANR Publication 8520 titled Drought Strategies for California Prune Production (https://anrcatalog.ucanr.edu/pdf/8520.pdf, 2015).

WATER NEEDS DURING ORCHARD DEVELOPMENT YEARS

There has been a knowledge gap when the question arises as to how much water to give young prune trees as a newly planted prune orchard develops. As a first approximation, a reasonable estimate might be to irrigate young prune trees similar to young almond trees or perhaps young peach trees. To fill the void created by this knowledge gap, a research study was initiated in 2011 and conducted through the 2017 growing seasons to assess the amount of water used by a newly planted prune orchard until it approached maximum water demand.

RESEARCH METHODS

The study was performed in a newly planted French Prune orchard northeast of Chico, CA. French prune planted on a 17 by 14 foot tree spacing was evaluated using a residual energy balance method of measuring crop evapotranspiration (ET). Figure 1 shows the field instrumentation. Incoming solar radiation coming into the orchard is measured with a net radiometer, heat transfer in and out of the orchard by wind is measured with a sonic anemometer and thin wire thermocouple, and heat transfer to and from the orchard soil is measured with buried soil heat flux plates and thermocouples. All of these thermodynamic processes are measured at a very high frequency (approximately every 0.1 second) and recorded to a sophisticated datalogger. From these data, latent heat flux or the residual energy left over to convert water to water vapor is measured and evaporation from the orchard floor and transpiration from the orchards canopy is calculated. This method was used for several seasons as the trees in the orchard grew but the above ground sensors had to be raised by extending the scaffolding to maintain the sensors 1.0 meter above the orchard canopy. Figures 2 shows how the orchard development progressed by 2017.

Figure 1. Field instrumentation used in newly planted prune orchard to measure crop ET.

Figure 2. Photo showing prune orchard development in 2017 season.

FINDINGS FROM FIELD RESEARCH

Tables 1 and 2 provide the average daily water use or crop ET measured in this specific orchard during the first seven years of orchard development. Table 1 expresses daily estimates as inches per acre and Table 2 expresses daily estimates in gallons per tree. Both tables show daily water use is lowest during the first season of transplanting and the water use progressively increases each subsequent season. By the seventh year, average daily water use is approaching levels for a mature orchard. Regardless of tree age, crop ET was measured to be the highest during the months of June and July each year.

Table 1. Average daily crop ET expressed **in inches** for French Prune measured during the first seven years of orchard development.

Average Daily ET by month and year (inches)							
Year	2011	2012	2013	2014	2015	2016	2017
Month	1st Leaf	2nd Leaf	3rd Leaf	4th Leaf	5th Leaf	6th Leaf	7th Leaf
March	NA[1]	NA	NA	NA	NA	NA	0.10
April	NA	0.07	NA	NA	0.14	NA	0.12
May	NA	0.09	NA	0.17	0.10	0.18	0.20
June	NA	0.11	0.10	0.13	0.13	0.22	0.26
July	0.06	0.11	0.17	0.13	0.14	0.23	0.27
August	0.05	0.10	0.15	0.11	0.12	0.18	0.18
September	0.05	0.08	0.07	0.08	0.09	0.13	0.12
October	0.03	NA	0.02	0.05	0.03	0.05	0.07
November	0.05	NA	0.01	NA	0.01	0.04	0.02

[1] NA denotes that data acquisition was not successful. Weather conditions and problems with the Eddy Covariance system (power and datalogging failure) contributed to the data gaps.

Table 2. Average daily crop ET expressed in **gallons per tree** for French Prune measured during the first seven years of orchard development.

Average Daily ET by month (gallons per tree per day) 183 trees per acre.							
Year	2011	2012	2013	2014	2015	2016	2017
Month	1st Leaf	2nd Leaf	3rd Leaf	4th Leaf	5th Leaf	6th Leaf	7th Leaf
March	NA	NA	NA	NA	NA	NA	14.3
April	NA	9.9	NA	NA	20.0	NA	17.2
May	NA	13.7	NA	25.1	15.4	27.2	29.0
June	NA	16.5	15.3	19.0	18.6	33.0	38.3
July	9.2	15.6	25.5	19.7	20.1	34.1	40.1
August	7.1	14.7	22.1	16.9	17.9	26.7	27.0
September	7.3	11.5	10.0	11.2	12.8	18.6	18.2
October	4.0	NA	2.4	7.5	5.1	7.8	9.7
November	6.7	NA	0.7	NA	1.6	5.4	3.3

Free Hands-on Water Measurement Workshops

Friday, November 8, 2019
24250 Hogs Back Rd
Edwards Ranch
Red Bluff, CA

University of California Cooperative Extension - Shasta and Tehama Counties

AGENDA

10:00 a.m.	Introduction and Welcome, Allan Fulton, Tehama County Cooperative Extension
10:05 a.m.	Measuring Flow in the field ***Josh Davy, Tehama Co. Cooperative Extension***
10:20 a.m.	Understanding how Weirs and Flumes Work ***Allan Fulton, Tehama Co. Cooperative Extension***
10:40 a.m.	Automating Measurement with a Pressure Transducer ***Larry Forero, Shasta/Trinity Co. Cooperative Extension***
11:00 a.m.	Downloading the Data ***Shasta and Tehama Co. Cooperative Extension Staff***
11:30 a.m.	Managing and Distilling the Data to determine Flow and Volume ***Shasta and Trinity Co. Cooperative Extension Staff***

Noon Adjourn

Registration is required to help us plan for equipment. Registration is limited to 20 participants.

Mail or fax this form to Larry Forero or Sara Jaimes, Shasta County Cooperative Extension, 1851 Hartnell Ave, Redding, CA 96002. Fax number is 530-224-4904. Please register by Wed., November 6, 2019. For more information, please call Sara at 530-224-4900.

Name _____ Telephone #_____

Address _____ No. Attending __

City _____ State _____ Zip _____

Or:

Call or email
Tehama County Cooperative Extension
530-527-3101
aefulton@ucanr.edu

Shasta County Cooperative Extension
530-224-4900
lcforero@ucanr.edu

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http://cetehama.ucanr.edu

SWEEP Grant Opportunity Workshop

Wednesday, November 13, 2019

Red Bluff, CA

Co-sponsored by
University of California Cooperative Extension
California Department of Food and Agriculture

Why: Apply for CDFA funding- State Water Efficiency and Enhancement Program (SWEEP). Receive up to $100,000 in grant funding to improve your on-farm water and energy efficiency practices through the grant funding program. During the workshop UCCE Climate Smart Community Education Specialist and UC ANR irrigation specialists will:

- Provide a comprehensive review of SWEEP and summary of other future CDFA Climate Smart Grant programs
- Guide you through the required water savings and greenhouse gas reduction calculations
- Show you how to assemble a strong grant proposal

When: **Wednesday, November 13, 2019** **8:30 AM – 10:30 AM**

Where: Tehama County Agricultural Commissioner Office,
Walnut Conference room,
1834 Walnut Street, Red Bluff, CA 96080

Presenters: Dana Brady, Community Education Specialist, UCCE-Glenn County
Allan Fulton, Irrigation and Water Resources Advisor, Tehama County
Khaled Bali, Irrigation Specialist, UC Kearney Agricultural Research and Extension Center
Daniele Zaccaria, Agricultural Water Management Specialist, UC Davis

Registration: To register **RSVP by Monday, November 11, 2019**. Email clmcclain@ucanr, call (530) 527-3101, or register online at : https://ucanr.edu/survey/survey.cfm?surveynumber=28583

Questions: Contact Dana Brady at dmbrady@ucanr.edu.

Grant info: Applications are due December 16, 2019 online at **https://www.cdfa.ca.gov/oefi/sweep/**
SWEEP provides grants to implement irrigation systems that reduce greenhouse gases and save water on California agricultural operations. Eligible system components include (among others) soil moisture monitoring, drip systems, switching to low pressure irrigation systems, pump retrofits, variable frequency drives and installation of renewable energy to reduce on-farm water/energy use.

Free One-On-One Technical Assistance to Apply for Grant Funds

Need help in developing and /or submitting your project proposal? Schedule your free one-on-one Technical Assistance session, contact your local UC Cooperative Extension Office for additional information at (530)-865-1105.

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

AB 589

Water Measurement Trainings

Water diversion: Monitoring & Reporting

Senate Bill 88 requires all water right holders - who have previously diverted or intend to divert more than 10 acre-feet per year (including riparian and pre-1914 claims), or are authorized to divert more than 10 acre-feet per year (under a permit, license, or registration) - to measure and report the water they divert.

Assembly Bill 589 allows any diverter, as defined, who has completed a course on measurement devices and methods administered by the University of California Cooperative Extension, including passage of a proficiency test to be considered a "Qualified Individual" who may install and maintain measuring devices or implement methods of measurement that are used for their own annual diversions as required by the California State Water Resources Control Board.

This training is being presented by UC Cooperative Extension:

Sonoma County Farm Bureau 3589 Westwind Blvd Santa Rosa 95403 **Sign-in**: 7:00am to 8am **Program**: 8am to 11:30am	**UCCE Mendocino County** 890 N. Bush St Ukiah 95482 **Sign-in:** 12:30 to 1pm **Program:** 1pm to 4:30pm

What to bring: Pencil, calculator (phone with calculator), and coffee/water as it will not be provided.

What is supplied: Three-ring binder with hand outs.

Instructors:

- Dr. Khaled Bali, UC Irrigation and Water Management Specialist, UC Kearney Agricultural Research and Extension Center
- Larry Forero, UC Livestock and Natural Resources Advisor, Shasta and Trinity Counties
- Allan Fulton, UC Irrigation and Water Resources Advisor, Tehama, Colusa, Glenn and Shasta Counties
- Dr. Daniele Zaccaria, UC Water Management Specialist, UC Cooperative Extension

If you are interested in traveling to either of these trainings, please contact the Tehama Cooperative Extension office by November 4, 2019, by Phone (530) 527-3101 or email: clmcclain@ucanr.edu or aefulton@ucanr.edu.
We will contact you to confirm your registration.

Tehama Growers Meeting / Continued Education Hours Workshop

Tehama County Department of Agriculture Continuing Education for Private Applicators, QAL,QAC,PCA and other License Holders

Monday, November 18, 2019

Tehama District Fairgrounds

4.0 hours C.E. Credits

7:30 - 8:00	Registration
8:00 - 8:05	Welcome Address from Agricultural Commissioner
8:05 - 8:30	Label Rates and Review of Labels for Effective Non-crop/Rangeland Weed Management (*Josh Davy/Tehama UCCE*)
8:30 - 9:00	PPE Requirements-Pesticide Label vs Worker Protection Standards (*Ryan Knight/ Tehama Ag Dept*)
9:00 - 9:30	Pollinator Protection/ Nozzle Selection and Proper Use of drift agents (*David Stoffel/ Tehama Ag Dept*)
9:30 -10:00	Break- Vendor/Trade Show
10:00-11:00	Pesticide Laws and Regulations at the Legislative Level (*Jim Houston/CA Farm Bureau*)
11:00-11:30	Weed Control for Orchard Crops (*Brad Hanson/ UCCE*)
11:30-12:30	Respirator Requirements (*Emma Colson/DPR*)
12:30- 2:30	Lunch/Trade Show - Vic Woolery Famous Tri-Tip Sandwiches

**** Coffee, Donuts & Lunch Provided by: Nationwide Insurance***

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C.E. Credits: 3.0 hrs Laws & Regs; 1.0 hrs Other

Please Register by calling the Tehama County Department of Agriculture at (530) 527-4504 or email your RSVP to: MVieyra@tehamaag.net

Deadline for Registration is October 25, 2019

Post-Harvest Almond and Walnut IPM Workshop

Join a panel of your Sacramento Valley Area IPM and Farm Advisors to hear about the latest

research updates, 2019 field observations, and discuss key production and pest management issues in almonds and walnuts as we wrap up the season and look toward 2020!

To request specific topics or for more information, please contact UC IPM Advisor Emily Symmes at (530) 538-7201 or ejsymmes@ucanr.edu

Friday, November 22nd, 2019

8:00 – 11:00am

Chico Veteran's Memorial Hall

554 Rio Lindo Avenue

Chico, CA 95926

Complete agenda and additional details will be available on the events page at sacvalleyorchards.com

Northern Sacramento Valley Almond & Walnut Meeting

NORTH VALLEY Nut Conference

January 21, 2020 @ 7:00 am – 1:00 pm

Location: Glenn County Fairgrounds
221 E Yolo St.Orland, CA 95963

Date: January 21, 2020

Time: 7:00am—1:00 pm

Organizer: West Coast Nut

Phone: 559-352-4456
Email: info@jcsmarketinginc.com
Website: https://www.wcngg.com

For more information go to: https://www.wcngg.com/register/
WCN Trade Shows

25TH ANNUAL

Tehama Walnut Day

FRIDAY - FEBRUARY 7, 2020

7:45 AM - 1:00 PM

RED BLUFF ELKS LODGE, 355 GILMORE ROAD, RED BLUFF, CA 96080

ON-LINE Registration available in December at
http://cetehama.ucanr.edu

DPR and CCA Continuing Education hours will be requested

2020

17th Annual

TEHAMA PRUNE DAY

Friday - February 21, 2020

Red Bluff Elks Lodge
355 Gilmore Road, Red Bluff, CA 96080

DPR and CCA Continuing Education hours will be requested

Meeting details will be coming soon –On line registration will be available in December at
http://cetehama.ucanr.edu

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Agriculture and Natural Resources

Water & Land Management

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