Imperial County Agricultural Briefs

Features

From your Farm Advisors

July, 2008

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IRRIGATION SCHEDULING- SPRINKLER IRRIGATION SYSTEMS

Khaled M. Bali - Water/Irrigation Management Advisor

Sprinkle irrigation is the application of pressurized water in the form of a spray. It is mainly used for seed germination and for irrigating some vegetable crops in the Imperial Valley. Hand-move systems are commonly used in the Imperial Valley and throughout California. Sprinkle irrigation was mainly used in the Valley for seed germination, however, in the last few years, more growers have been using sprinkler irrigation to germinate and grow vegetable crops in the Valley. Sprinkle irrigation is suitable for most crops and has been used locally to meet crop water needs over the entire season in some crops.

One of the advantages of sprinkle over surface irrigation is the ability to apply water uniformly at low rates. Application rates for commercial crops vary from 0.10 to 0.30 in/hr. The application rate depends on nozzle size, sprinkler spacing, and operating pressure. Frequent irrigations of low application rates are needed on light or sandy soils. The application rate should not exceed the basic intake or infiltration rate on heavy soils to prevent surface runoff. Table 1. can be used for maximum application rate values for hand-move systems. The application rate of the system needs not to exceed the values presented in Table 1 to prevent runoff. Reducing or eliminating surface runoff increases the efficiency of the system (water and energy savings) In general, soil infiltration rates decreases after the initial irrigation. If water is filling up your runoff ditch and you have runoff in your drop box, it is time to turn the system off.

The amount of water applied with a sprinkler system depends on the application rate and on the length of irrigation. The application rate needs to be determined first before any irrigation-scheduling question can be answered. Application rate can be simply determined using the catch can method or a simple procedure in which you run your system for a specific period of time (15 to 30 minutes), determined the amount of water that has been used (using a flow meter) and then calculate the application rate. The application rate (AR) can be calculated from

$$AR = 720\ V/(T\ A)$$

Where AR is the application rate (inches per hour), V is the volume of water applied (acre-feet), T is the time of application (minutes), and A is the area of application (acres).

Example: What is the application rate of a sprinkler system where 0.5 ac-ft of water was applied over 40 acres in 60 minutes.

V= 5 ac-ft

T= 60 min.

A= 40 ac.

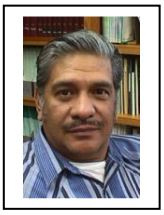
AR= 720 x 0.5/(60 x 40)

AR= 0.15 in/hr

If you need to apply 0.75 inches of water to meet the crop water demands over a specific period of time, then you need to run your system for 5 hours (0.75 inches/ 0.15 inches per hour). Irrigation time should be adjusted to account for irrigation efficiency/uniformity. Note that if you change the spacing between sprinklers and/or laterals, the application rate needs to be adjusted to account for the new configuration.

Table 1. Maximum application rates for sprinklers (Slope less than 5%)

Soil Texture	Maximum Application Rate (in/hr)
Sandy soils	1.50
Sandy loam soils	0.75
Silty loam soils	0.50
Clay and clay loam soils	0.150



Older Alfalfa Stands
Juan N. Guerrero – Livestock Advisor

Very soon many older alfalfa fields will have to be evaluated as to whether they should be removed or not. There are several points to consider. Economics certainly has to be considered. Should a productive, good

yielding field, at current hay prices, be removed to chase higher priced crops, i.e. wheat? Is the field still productive? Good production records will certainly help make that decision. If a third or fourth year field is still yielding > 8.5 tons/ac, then the field should certainly be considered for an additional year.

However, stacks sometimes get mixed, and exact yields for a specific field may not always be accurately calculated.

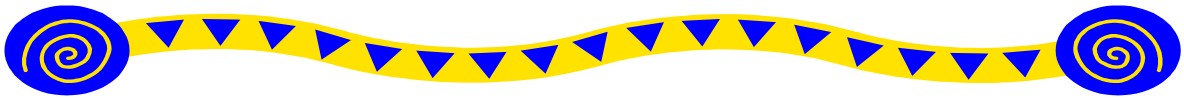
Steve Orloff, farm advisor from Siskiyou County, in the 1994 proceedings of the California Alfalfa Symposium, suggested that stand evaluation is a good measure of field productivity. A stand should be replaced when the stand is < than 3-5 plants/ft². That is easy enough to do. However, as we all know, not all plants in a field are equal. Some plants are vigorous with numerous stems and some individual plants have only one or two weak stems. Orloff cites Dan Undersander of Wisconsin who suggests that instead of plants/ft², stems/ft² should determine stand strength (viability). During July or August, in third and fourth year fields, stems/ft² should be counted. If < 40 stems/ft² are present in the field; then the field should be considered for removal (Table 1). If the field has > 55 stems/ft², then plant density is not limiting yield.

It will soon be that time of year to decide whether or not to remove an older alfalfa field; Table 1 may help make that decision.

Table 1. Stem density recommendations.

Stems/sq. ft.	Result
>55	Stem density is not limiting yield
40–55	Some yield reduction expected
<40	Consider replacing stand

Source: D. Undersander *et al.* Alfalfa stand assessment: Is this stand good enough to keep?



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Management of Cucurbit Yellow Stunting Disorder Virus (CYSDV)

Eric Natwick and Robert Gilbertson – County Director/Entomology Advisor

In the fall of 2006, cucurbit yellow stunting disorder disease, caused by the whitefly-transmitted crinivirus *Cucurbit yellow stunting disorder virus* (CYSDV) was identified for the first time in California and Arizona. Cucurbit yellow stunting disorder (CYSD) caused considerable damage to the fall melon crop in 2006 and again in 2007. Infected cucurbit plants initially show a chlorotic spotting, followed by a striking interveinal chlorosis (yellowing) in which the veins remain more or less green. Leaves will often roll downward and become brittle. Plants infected during early development may have reduced fruit set and size. Fruits on infected plants may appear normal, but often have reduced levels of sugars, resulting poor marketability. The disease symptoms can be confused with abiotic factors such as nutrient deficiency.

So far, CYSD has only caused economically important damage to fall harvested melons and squash that are planted from mid- to late-summer. It is critical to establish a cucurbit host-free period from the start of summer until the fall crops are sown. This would include immediate destruction of spring melons and squash following harvest and control of volunteer melon and squash seedlings throughout the summer. Sanitation is very important; remove and destroy old crops/volunteers on a regional basis.

CYSDV is thought to have a fairly narrow host range, primarily consisting of cucurbits. Cucurbits that were infected in the 2006 outbreak in California included cantaloupe and honeydew melon, watermelon and various types of squash. However, it has now been found in romaine lettuce in Imperial County. CYSDV will infect Romaine but it is yet to be determined if this is a bridge to help the virus pass through the winter season when cucurbit crops are not present.

CYSDV is not a seed-borne virus, nor is it spread by touch or mechanical transmission. The primary way the virus is spread, short distances, is by the whitefly vector, *Bemisia tabaci* biotype B (also known as the silverleaf whitefly [*B. argenitfolii*]). It does not take many whitefly adults to efficiently spread the virus. Once acquired by the whitefly, the virus can persist in the vector for up to 9 days; it does not replicate in the insect, nor is it passed through the eggs to progeny insects.

The virus is primarily spread over long distances through the movement of infected plants, especially cucurbit transplants. As it can take weeks for disease symptoms to develop, infected symptomless plants could be unknowingly transported. The virus also can be moved long distance by virus-carrying whiteflies on cucurbits and perhaps other plants. Finally, it is generally believed that migratory forms of whiteflies can move long distances (upto 6 miles per day) and this may be facilitated by wind currents.

Based on our knowledge of the virus and the whitefly vector, a number of management strategies can be proposed to minimize the damage to fall melons and squash:

1. Select the best varieties or use virus- and whitefly-free transplants
2. Plant immediately after any cucurbit (host)-free period
3. Avoid planting new fields near older fields (especially those with CYSDV-infected plants)
4. Apply a soil application of a neonicotnoid insecticide (imidacloprid, dinotefuran, or thiamethoxam) before direct seeding or at transplanting
5. Monitor whitefly populations throughout the growing season and implement insecticide application as needed. Rotate insecticide classes to minimize development of insecticide resistance-e.g., bifenthrin, nicotinoids, insect growth regulators (pyriproxyfen and buprofezin)
6. Plants can be covered with floating row covers of fine mesh (Agryl or Agribon)
7. Practice good weed management in and around fields to the extent feasible.

CIMIS REPORT

Khaled Bali and Steve Burch*

California Irrigation Management Information System (CIMIS) is a statewide network operated by California Department of Water Resources. Estimates of the daily reference evapotranspiration (ET_o) for the period of May 1 to July 31 for three locations in the Imperial County are presented in Table 1. ET of a particular crop can be estimated by multiplying ET_o by crop coefficients. For more information about ET and crop coefficients, contact the UC Imperial County Cooperative Extension Office (352-9474) or the IID, Irrigation Management Unit (339-9082). Please feel free to call us if you need additional weather information, or check the latest weather data on the worldwide web (visit http://tmdl.ucdavis.edu and click o California Irrigation Management Information System (CIMIS) is a statewide network operated by California Department of Water Resources. Estimates of the daily reference evapotranspiration (ET_o) for the period of June 1 to August 31 for three locations in the Imperial County are presented in Table 1. ET of a particular crop can be estimated by multiplying ET_o by crop coefficients. For more information about ET and crop coefficients, contact the UC Imperial County Cooperative Extension Office (352-9474) or the IID, Irrigation Management Unit (339-9082). Please feel free to call us if you need additional weather information, or check the latest weather data on the worldwide web (visit http://tmdl.ucdavis.edu and click on the CIMIS link).

Table 1. Estimates of daily Evapotranspiration (ET_o) in inches per day

Station	June		July		August	
	1-15	16-30	1-15	16-31	1-15	16-31
Calipatria	0.39	0.40	0.39	0.38	0.35	0.32
El Centro (Seeley)	0.36	0.38	0.38	0.37	0.32	0.29
Holtville (Meloland)	0.38	0.39	0.39	0.38	0.34	0.31

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