UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

HIGH DESERT CROP NOTES

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In this issue:

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Alfalfa Blister Beetles Appear in Barstow Fields

A few fields located in the Barstow area were found in July with this pest that can contaminate forage and cause the death of feeding animals.

DAMAGE

Blister beetles (Scientific Names: *Epicauta* spp., *Lytta* spp) do not cause widespread feeding damage to alfalfa; however, they contain a chemical, cantharidin, that is toxic to livestock. Cantharidin is contained in the hemolymph (blood) of the beetles and may contaminate forage directly when beetles killed during harvest are incorporated into baled hay or indirectly by transfer of the hemolymph from crushed beetles onto forage. As the name implies, handling these insects may result in blisters, similar to a burn, on the hands or fingers. Blister beetles have been a serious problem in alfalfa in the northern United States, the Midwest, and the south for many years, but until recently have not been a problem in California.

Alfalfa contaminated with blister beetles in the southern Owens Valley has been linked to the death of several dairy cows. At this point, it is not known if blister beetles are widespread or confined to the Owens Valley. Likewise, it is not known if the problem is likely to spread and hence become a common occurrence in California alfalfa. In the meantime, growers and PCAs are advised to be on the lookout for blister beetles and to contact their farm advisor for advice if these insects are found.

DESCRIPTION OF THE PESTS

Blister beetles are narrow and elongate and the covering over the wings is soft and flexible. They may be solid colored (black or gray) or striped (usually orange or yellow and black) and are among the largest beetles likely to be found in a sweep net sample in alfalfa.

MANAGEMENT

There are no known predators or parasites that effectively control blister beetles. Blister beetles are attracted to blooming alfalfa. Therefore, to reduce the incidence of blister beetles in alfalfa, cut hay before bloom. If beetles are found, remove the conditioner wheels from the swather in order to prevent crushing beetles. Also, these beetles are found on the edge of the field or congregated in groups within the field. Skip such areas when cutting or pick up the bales for these areas separately and isolate them from the rest of the field. No treatment thresholds have been established for blister beetles.

This article was adapted from the UC Pest Management Guidelines:
http://www.ipm.ucdavis.edu/PMG/r1301911.html

Special thanks for Tim Hays, who has identified this issue.

Do we really need *Scientific* Irrigation Scheduling?

The following article written by UCCE Farm Advisor Blake Sanden is mainly focused to permanent crops, however, most of the irrigation concepts discussed can be applied for other crops.

At first thought this sounds like a dumb question. Of course we need to schedule irrigations… just like we schedule lunch; we get hungry, plants get thirsty. End of story. But how many of you skip lunch, or delay it? How often? So here's the connection: if you don't irrigate until you see the crop stress you've waited too long. If you just keep irrigating every three days with microsprinklers (Hey, that's a schedule, right!?) from May to August without checking the soil/plant water status it's like eating that foot long sub sandwich every day for lunch and never stepping on the scale! Neither extreme is healthy for you or the crop.

Now, more than ever we need to know how to use available information and technology for optimal water use.

Process & Planning

Okay, so I need more than just a calendar to do the best job of irrigation. But what's this *"scientific"* thing? Does that mean I have to have a bunch of sensors, loggers and all that stuff? Not at all. In fact, the dictionary meaning of **science** is NOT 'using a bunch of gizmos/technology' but defined as: **"systematic knowledge of the physical or material world gained through observation and experimentation."** Wow, sounds pretty close to the definition of a good farmer! Being *scientific* simply means being consistent in how you record and analyze your observations so that you can develop a system for making the best decisions. This is where gizmos/technology are helpful, as they are tools to collect and analyze data/observations. Some of the most useful gizmos are strictly mechanical.

You can actually do scientific scheduling with no electronics at all; just your hands, a soil probe/auger, regular walks through the field, a notebook and a flometer or weir to record your actual applied water. This was all we had 40 years ago. You don't even need a computer in the office! But most of us are farming too much acreage to know each field this intimately and we get tired of pounding/twist-ing soil probes and augers down to 5 feet.

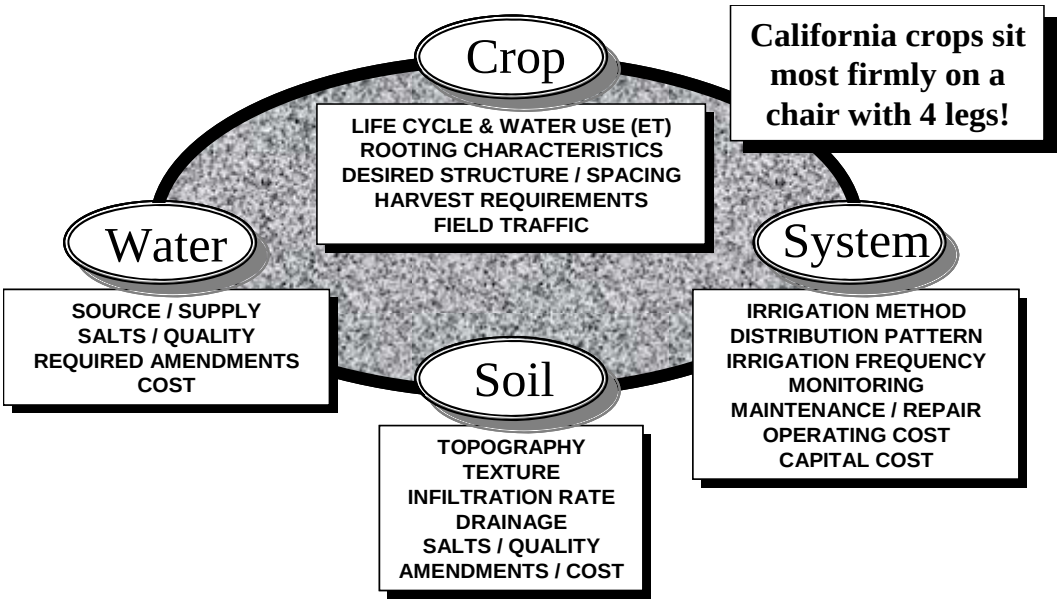

Fig. 1. Factors impacting crop production and irrigation scheduling / management.

This is where electronic sensors, loggers and automated computer programs are helpful. These devices will automatically collect the data and can do the number crunching that saves you a lot of hand calculation. The only problem is that they're dumb.

They don't think, they're usually stuck in one location without the ability to "look around" at the rest of the block. In other words, you can collect a whole bunch of numbers but it's still up to the grower/manager to take those numbers and trends and turn it into systematic knowledge for truly optimal scheduling.

Figure 1 (above) shows the multiple factors that need to be accounted for if you are going for top field performance. This looks complicated, but in reality most of these are fixed at the time you plant the orchard. Once you determine your soil water holding capacity and irrigation system design application rate, these will be fairly constant.
Then the only in-season things that may vary and should be monitored are salinity in the rootzone and irrigation water (How good or bad is it?), soil/rootzone water content (How much is available, how fast are the plants using it?), irrigation frequency (How often?) and system uniformity (How even are my pressures, how often to flush hoses?).

The salinity/quality factors are usually tested/treated once a year, unless you're injecting gypsum and/or acid. So once you've processed this data and planned the likely field logistics (i.e. vary irrigation hours to match daily/weekly need or vary onset of irrigation to match a set application say over 24 hours) it's just a matter of matching the volume water balance pieces together so you can …

Program

These data can be put into a table such as shown in Table 1 (below) or even one line of an Excel spreadsheet.
You wouldn't think of buying a booster motor for your pump that didn't have the boiler plate specs on the casing. (Very similar to the 'boiler plate' of this Field 12-2.). But after 23 years of tromping the fields of Kern County I am still surprised by the number of growers and fields that don't have this simple yet critical information ready and easily accessible. Using this information along with expected "normal year" ET, it's relatively straightforward to construct a simple water balance checkbook like the one below.

Table 1. Soil and irrigation system charactersitics necessary for scheduling irrigations in mature almonds with 2, A-40 Fanjets per tree.

FIELD:	**12-2**		
SOIL TYPE:	Milham/Panoche sandy clay loam		
FIELD CAPACITY (in/ft):	2.4		
REFILL POINT (in/ft):	0.9	**Total Avail @ 100% (in):**	**9**
ROOTING DEPTH (ft):	6	**AREA/TREE (sq ft):**	504
ROW SPACING:	21' x 24'	**DESIGN FLOW (gph/tree):**	21.6
IRRIGATION SYSTEM:	2, 10.7 gph Fanjets		
NORMAL RUN TIME (hrs):	24	**WET AREA APPLIC (in):**	3.30
WETTED VOLUME (%):	50%	**NUMBER of SETS:**	3
		TOTAL AREA APPLIC (in):	1.65

SOIL TYPE:	FIELD CAPACITY (in/ft):	REFILL POINT (in/ft):	ROOTING DEPTH (ft):	ROW SPACING:	IRRIG. SYSTEM:	NORMAL RUN TIME (hrs):	WETTED VOLUME (%):	Total Avail @ 100% (in):	AREA/ TREE (sq ft):	DESIGN FLOW (gph/tree):	WET AREA APPLIC (in):	NUMBER of SETS:	TOTAL AREA APPLIC (in):
Milham/ Panoche sandy clay loam	**2.6**	**0.9**	**6**	**21' x 24'**	**2, 10.7 gph Fanjets**	**24**	**50%**	**10.2**	**504**	**21.4**	**3.27**	**3**	**1.63**
Week Ending:	**6/15**	**6/22**	**6/29**	**7/6**	**7/13**	**7/20**	**7/27**	**8/3**	**8/10**	**8/17**	**8/24**	**8/31**	**9/7**
"Avg" Almond ET:	1.99	2.09	2.11	2.14	2.14	2.06	2.05	1.97	1.95	1.87	1.79	1.71	1.60
Run Time to Refill for Week (hrs):	29.2	30.6	31.0	31.4	31.4	30.2	30.1	28.9	28.6	27.5	26.3	25.1	23.5
Actual Run Time (hrs):	24	24	24	48	24	36	**Harvest**		48	48	**Harvest**	24	24
Cumulative Surplus or Deficit (hrs):	-5.2	-11.8	-18.8	-2.2	-9.5	-3.7	-33.8	-62.7	-43.3	-22.8	-49.1	-50.2	-49.7
Estimated Soil Moisture Depletion (inches):	0.71	1.61	2.56	0.30	1.30	0.51	4.60	8.55	5.90	3.11	6.69	6.84	6.77
Estimated Soil Moisture (% available):	**93%**	**84%**	**75%**	**97%**	**87%**	**95%**	**55%**	**16%**	**42%**	**70%**	**34%**	**33%**	**34%**

(Now available at http://cekern.ucdavis.edu/Irrigation%5FManagement/, click IRRIGATION CHECKBOOK SCHEDULER in the list of files on the left hand side. The file has separate worksheets for mature almonds, citrus, late season table grapes and pistachios.)

There are plenty of irrigation scheduling aids/programs on-line. A Google search of "free irigation scheduling programs" returns more than 80,000 hits. The list will make your head hurt – even before you start to use them. Links to a few of these sites that I have looked at and can recommend as completely free and sponsored by worthy organizations are below:

http://www.cimis.water.ca.gov/cimis/infoIrrSoftware.jsp Concise list of free and pay-for scheduling software. Some tutorials on basic scheduling. State of CA, Sacramento.

http://www.wateright.org/ Checkbook type schedule, all on-line, mostly crop water demand based on CIMIS weather and standard crop coefficients. Cal State Fresno, CATI,

http://biomet.ucdavis.edu/irrigation_scheduling/bis/BIS.htm Multi-worksheet Excel file, completely downloadable, soil moisture estimation but no feedback adjustment. Most comprehensive list of crop coefficients. Calculator for estimating daily crop coefficients. Rick Snyder, UC Davis

http://cesanjoaquin.ucdavis.edu/files/14724.xls Simple one-page worksheet checkbook for winegrape irrigation scheduling.

http://oiso.bioe.orst.edu/RealtimeIrrigationSchedule/index.aspx Most complex of the extension type web-based scheduling programs. Has the capacity to create integrated whole ranch schedules. Difficult to use, but with some of the best "feedback" calculations.

Blake Sanden

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Alfalfa Cultivar Choice

(Adapted from the 2009 Kearney Field Day Handout, September 2, 2009, by Shannon Mueller, Dan Putnam and Craig Giannini)

When planting a new field, you are at a crossroads; you will need to live with your decision for many years. Why not take a few minutes to consider which variety makes the most sense?

UC Variety Testing Program

The University of California testing program is the most comprehensive in the western US, and provides unbiased information that can be used to judge performance of alfalfa varieties. We have plots ranging from Tulelake and Scott Valley (Intermountain), to Davis and Kearney (Central Valley), El Centro (Imperial Valley) and starting this year in Lancaster (High Desert).

Factors for Choosing Alfalfa Varieties:

1. Choose group of high yielding certified varieties from relevant trials. Look at multi-year trial results (please, see table on next page – data from Kearney Ag Station would be the most suitable for the High Desert at this time);
2. Determine Fall Dormancy requirements and preference;
3. Determine Pest Resistance requirements for your area (emphasize those you expect); see Table 2;
4. Consider Biotech Traits (e.g. Roundup Ready);
5. Look for evidence of better Persistence;
6. Consider Forage Quality;
7. Consider Price/Availability, and of course, free hats.

Cost and Price: is it Important? You bet!

However, look at the value of production FIRST, and other benefits like pest resistance, persistence and quality, and THEN look at the price of the seed.

There is the potential for hundreds of dollars difference between varieties in gross return considering only variety choice and the effect on production. Compare that with only about $40/acre difference in seed costs ($2.00/lb difference).
The chart below is at only $100/ton prices – even larger differences would be expected with higher prices!

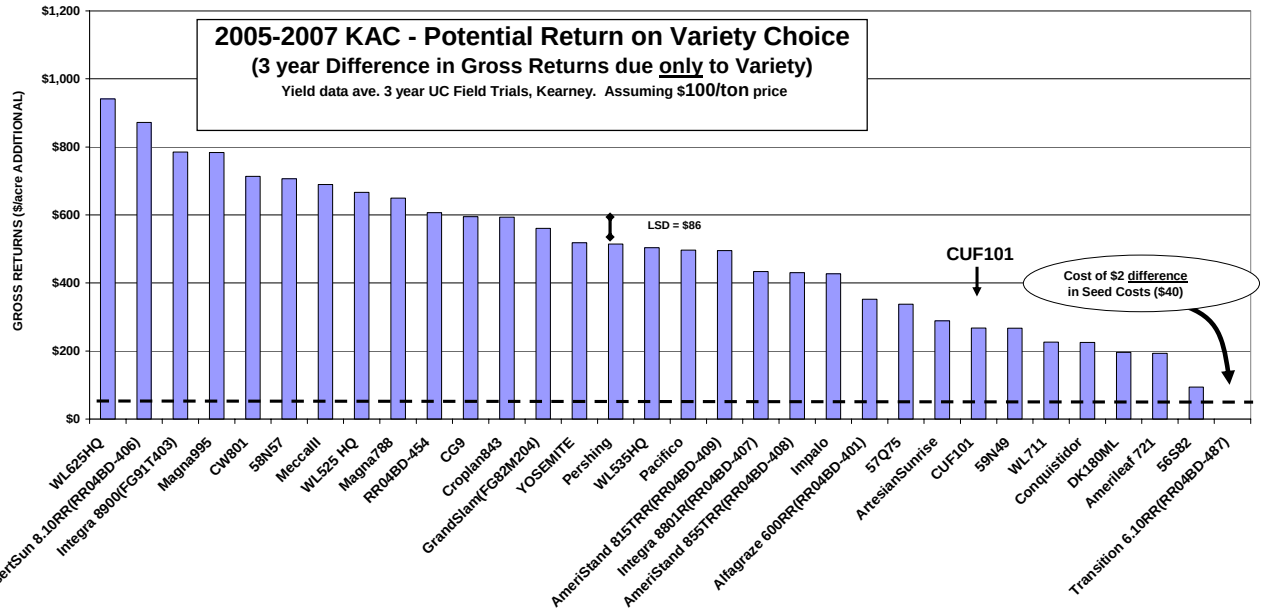

Table 1. 2005-2007 YIELDS, UC KEARNY ALFALFA CULTIVAR TRIAL. TRIAL PLANTED 3/15/05

		2005 Yield	2006 Yield	2007 Yield	Average	% of CUF101
	FD	Dry t/a				%
Released Varieties						
WL625HQ	9.2	11.3 (1)	15.0 (5)	14.4 (1)	13.6 (1) A	121.3
DesertSun 8.10RR	8.4	10.9 (2)	15.1 (3)	14.0 (2)	13.4 (2) AB	119.2
Magna995	9	9.9 (29)	15.5 (1)	13.7 (6)	13.1 (4) ABCD	116.7
Integra 8900	9	10.7 (6)	14.9 (7)	13.6 (7)	13.1 (5) ABCD	116.6
WL525 HQ	8	10.5 (10)	14.2 (19)	13.8 (5)	12.8 (6) ABCDE	114.5
CW801	8	10.3 (13)	15.1 (4)	13.0 (14)	12.8 (7) ABCDE	114.3
58N57	9	10.7 (4)	14.1 (21)	13.4 (8)	12.7 (8) ABCDEF	113.8
MeccaII	9	10.1 (19)	14.7 (10)	13.2 (10)	12.7 (9) BCDEFG	113.1
Croplan843	8	9.9 (32)	14.2 (20)	13.8 (4)	12.6 (11) BCDEFG	112.6
Magna788	7	9.8 (34)	14.9 (8)	12.7 (19)	12.5 (16) CDEFGH	111.4
CG9	9	10.2 (16)	14.1 (23)	13.0 (12)	12.4 (19) CDEFGHI	111.0
Saltana(SW9332)	9	10.0 (25)	14.0 (26)	13.2 (9)	12.4 (20) CDEFGHI	110.9
WL535HQ	8.2	9.9 (31)	14.0 (28)	13.1 (11)	12.3 (24) DEFGHI	110.0
Pacifico	8	9.7 (39)	14.0 (27)	12.8 (16)	12.2 (28) EFGHIJK	108.7
GrandSlam	8	10.0 (28)	14.1 (25)	12.5 (30)	12.2 (29) EFGHIJK	108.6
YOSEMITE	8	9.8 (33)	14.1 (22)	12.4 (31)	12.1 (30) EFGHIJK	108.3
Pershing	8	10.0 (24)	13.9 (31)	12.4 (32)	12.1 (31) EFGHIJK	108.1
Integra 8801R	7.8	9.7 (40)	13.9 (30)	12.7 (17)	12.1 (32) EFGHIJK	108.0
AmeriStand 855TRR	8.5	10.0 (27)	13.5 (35)	12.1 (36)	11.9 (36) FGHIJKLM	106.2
AmeriStand 815TRR	7.4	10.1 (20)	13.5 (37)	12.1 (39)	11.9 (37) GHIJKLM	106.1
Alfagraze 600RR	6.4	10.1 (21)	13.2 (41)	12.4 (33)	11.9 (38) GHIJKLM	106.0
57Q75	7	9.8 (36)	13.0 (44)	12.1 (38)	11.6 (41) HIJKLMN	103.8
Impalo	9	9.6 (41)	13.8 (33)	11.3 (46)	11.6 (42) IJKLMNO	103.3
ArtesianSunrise	7	9.4 (45)	13.3 (39)	11.5 (44)	11.4 (43) JKLMNO	101.9
Conquistidor	8	9.2 (50)	13.0 (45)	11.8 (42)	11.3 (44) KLMNO	101.3
WL711	10	9.4 (46)	12.9 (47)	11.7 (43)	11.3 (45) KLMNO	101.2
CUF101	9	9.6 (44)	12.8 (50)	11.2 (47)	11.2 (47) LMNOP	100.0
59N49	9	9.6 (43)	12.8 (51)	11.2 (48)	11.2 (48) LMNOP	100.0
DK180ML	8	9.2 (51)	12.9 (46)	11.1 (50)	11.1 (50) MNOP	99.1
Amerileaf 721	7	9.3 (49)	12.8 (49)	11.2 (49)	11.1 (51) MNOP	99.0
56S82	6	9.0 (53)	12.2 (53)	11.1 (52)	10.8 (53) OP	96.1
Transition 6.10RR	6.1	9.4 (47)	11.5 (54)	10.5 (54)	10.4 (54) P	93.3

Trial seeded at 25 lb/acre viable seed on Hanford fine sandy loam soil at the Univ. of Calif. Kearney Agricultural Center, Parlier, CA.
Entries followed by the same letter are not significantly different at the 10% probability level according to Fisher's (protected) LSD.
FD = Fall Dormancy reported by seed companies.

Look at Pest Resistance Ratings!

Look for the best package for your region, and remember:
1. Resistance is not absolute (it is only a % of the plants); **2.** Even highly resistant varieties can be overwhelmed by a severe pest infestation; **3.** Pest resistance is often the only economic measure against some pest problems; **4.** Think of Pest Resistance as you do auto insurance – not important every year, but can be very important when those problems arise.

Table 2. Suggested minimum alfalfa cultivar pest resistance and fall dormancy ratings for alfalfa pests found in six California climate zones.

Zone	Fall Dormancy	Spotted Alfalfa Aphid	Pea Aphid	Blue Alfalfa Aphid	Phytophthora Root Rot	Bacterial Wilt	Fusarium Wilt	Anthracnose	Stem Nematode	Root Knot Nematode	Verticilium Wilt
Inermountain	2--4	S[1]	R	MR	R	R	HR	R	R	R	R
Sacramento Valley	4--8	MR	HR	HR	HR	MR	HR	R	R	R	R
San Joaquin Valley	6--9	R	HR	HR	HR	MR	HR	R	HR	HR	R
Coastal	5--7	MR	HR	HR	HR	MR	HR	R	HR	HR	R
High Desert	4--7	R	R	R	R	MR	HR	MR	HR	HR	R
Low Desert	8--9	HR	HR	HR	HR	S	HR	HR	R	HR	S

Resistance Abbreviations		Percent resistance[1]
HR	Highly Resistant	>51%
R	Resistant	31-50%
MR	Moderate Resistant	15-30%
LR	Low Resistant	6-14%
S	Susceptible	<5%
T	Tolerance	--

[1] Percent of plants in a population resistant to a given pest

Precision Ag Workshop – UC Davis

Growers from many parts of the US and the world are benefiting from precision agriculture practices; however this technology has not yet taken off to the same degree in the West. UC is offering a one day workshop on Wednesday July 14th at UC Davis, Davis, CA to discuss the potential uses and techniques for site-specific management for California's agriculture.

The workshop was created to address the specific conditions of California's agriculture and will cover topics like orchard fertility and yield variability, practical uses of remote sensing, electrical conductivity and yield monitors, and site-specific weed control. In addition to applied research findings and examples illustrating the practical benefits of this technology, the workshop will have an overview of concepts and techniques used to identify and manage within-field variability.

A select group of researchers, a grower and a crop consultant will share their expertise at this workshop: Rob Mikkelsen, Director, Western North America IPNI; Richard E. Plant, Patrick Brown and Tom Lanini, Department of Plant Sciences, UC Davis; Cannon Michael, Vice President Bowles Farming Company; Jason Ellsworth, Regional Technology Specialist, Wilbur-Ellis Company; and Jose P. Molin, Biosystems Engineering, University of Sao Paulo.

Registration cost is $65 and $15 for students with valid ID. For more details and to register, see http://ucanr.org/sites/paica/ or call/e-mail (661) 974-8825/ asbiscaro@ucdavis.edu

Antelope Valley Beekeepers Meetings

Beekeepers of the Antelope Valley have started to promote regular meetings in order to discuss common issues and to formally create a Beekeepers Association. The last meeting was on June 29th at Palmdale Hometown Buffet. Please contact Greg Price (661-942-2822) for next meeting's arrangements and for more details.