



FIELD NOTES

A QUARTERLY PUBLICATION OF COOPERATIVE EXTENSION

2101 E. Earhart Ave., Suite 200, Stockton, CA 95206-3924 Telephone: (209) 953-6100 Fax: (209) 953-6128 Web: <http://cesanjoaquin.ucdavis.edu>

Fertilizer Sticker Shock? Consider Cover Crops

Text and reference books usually define cover crops as “non-economic” grasses, legumes, or mixtures grown in orchard middles and – on rare occasions - in tree rows. Cover crops have been used in permanent crops for centuries to add organic matter to the soil, improve soil structure and water penetration, reduce erosion, and to provide other benefits. Cover crops that include legumes such as peas, beans, and clovers can fix significant amounts of atmospheric nitrogen. Properly managed, this nitrogen can be converted efficiently to soil nitrogen for use by trees. With the recent dramatic rise in nitrogen fertilizer costs (Fig. 1), the ability of cover crops to harvest atmospheric nitrogen for orchard use may prompt a reconsideration of legume cover crops as “non-economic” crops in orchards.

Depending on the nitrogen demand of a particular crop and orchard, some or all of the need may be met with a properly managed cover crop. From a short-term cost perspective, the economics of substituting cover crop nitrogen for fertilizer nitrogen depend, of course, on the relative costs of fertilizer, seed, planting, and cover crop care. But other demonstrated benefits of cover crops to soil condition and fertility need also to be factored into a comparison of the two alternatives.

The amount of nitrogen fixed and subsequently made available from a cover crop depends primarily on the following factors:

Portion of the orchard floor planted. Though theoretically the entire orchard floor can be planted to cover crops to maximize potential nitrogen capture, practical realities of orchard floor management dictate that cover crops be planted in orchard middles with tree rows kept clear of vegetation. Typical coverage is 60-75% of the orchard floor.

Cover crop composition. Only legumes fix atmospheric nitrogen; grasses do not. The greater the percentage of legumes in the cover crop stand, the greater the potential for nitrogen fixation. Grasses will absorb available nitrogen in the soil (residual nitrogen from fertilization and organic matter decomposition), preserving the nitrogen from leaching and denitrification losses. Grasses typically contain 1.5% nitrogen on a dry weight basis while legumes are near 2.5 - 3.0%.

Growth of the cover crop. Nitrogen fixed by the *Rhizobium* bacteria associated with the root nodules of legumes is converted to organic forms of nitrogen, then moved and stored mostly in above-ground portions of the cover crop. Maximizing cover crop growth and biomass therefore maximizes captured nitrogen. Early fall planting

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Fig. 1 Average US farm prices of selected fertilizers

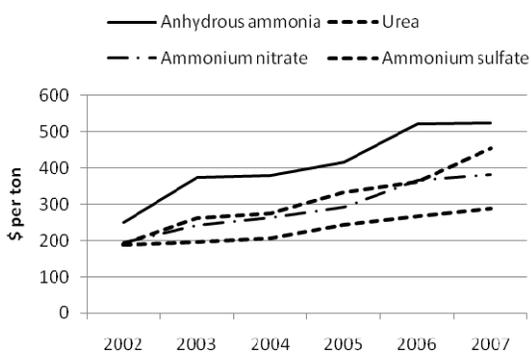


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along with adequate moisture (from rain or irrigation if necessary to promote good germination and growth in fall) takes advantage of warmer temperatures to ensure a good stand, competition with weeds, and greater eventual biomass. Some species grow well under cool fall and early spring conditions. Others – vetch, for example – tend to grow better under warmer conditions. Cover crop biomass production and nitrogen capture can be maximized by allowing the cover to remain growing in the orchard later into spring. Orchard floor vegetation increases the risk of spring frost damage, so the decision to remove a cover crop must balance multiple considerations.

Available soil nitrogen. If pre-existing levels of soil nitrogen are high, legumes fix less nitrogen. As described above, however, cover crop grasses can absorb and temporarily store residual soil nitrogen until they are removed by disking or mowing.

Management of the cover crop residue. There are many cover crop “systems”, depending on the composition of the cover (legumes, broadleaf non-legumes, or grasses), growing season (winter or summer), length of time the cover is in the orchard (one year or multiple years), and how the cover is managed (mowed or disked). The simplest and most common system is to plant winter-growing legumes or legume-grass mixes in fall and mow or disk the residue in spring. Nitrogen capture and re-release to the orchard is maximized when the cover crop is incorporated into the soil, as opposed to mowing and leaving the residue to decompose on the soil surface.

The many variables that affect nitrogen capture and availability from cover crops make it difficult to know exactly how much nitrogen can be expected in each particular orchard situation. Published estimates from various species and mixes are available, but the most accurate way to determine the nitrogen contribution from a cover crop is to have a sample analyzed by a commercial laboratory. Guidelines for collecting such samples, estimating the nitrogen recovery from the cover crop based on the way it is managed, and reducing nitrogen fertilizer rates accordingly, are available in the UC publication, *Guide to Efficient Nitrogen Fertilizer Use in Walnut Orchards* (UCANR Publication #21623), available from our office.

Two additional UC publications with extensive and detailed information on cover crops adaptable to all orchard situations are: *Cover Cropping in Vineyards* (UCANR Publication # 3338) and *Cover Crops for Walnut Orchards* (UCANR Publication # 21627). Most local seed suppliers are also excellent sources of information on cover crops selection and management.

Joe Grant, Farm Advisor
Terry Prichard, Soil & Water Specialist

Calendar of Events

- ◆ **CPRS District 5 Fall Parks Forum**
September 17, 2008
7:15 am - 1:00 pm
Robert J. Cabral Agricultural Center
2101 E. Earhart Avenue (Arch-Airport Rd. at B St.)
Stockton, CA 95206
Info: Ed Lovell (209) 831-6200
Registration deadline is September 10th
Continuing Education Credits Applied for DPR;
CCA and ISA CEU hours pending.
- ◆ **San Joaquin County Agritourism Conference**
November 12, 2008
8:30 am to 4:00 pm
Robert J. Cabral Agricultural Center
2101 E. Earhart Avenue (Arch-Airport Rd. at B St.),
Stockton, CA 95206
Info: Michelle @ 209-337-2726
See page 4 for more information

Viruses and Powdery Mildew in Tomatoes

You may have read in agricultural newspapers, or even in the general media, about a “mysterious new tomato virus.” And indeed, we do seem to have a virus in tomatoes on the west side of the county this year which we haven’t seen before. That’s the bad news. The good news is that the infected plants that I’ve been watching seem to be holding up well, most fruit have no symptoms, and yield does not appear to be impacted under this year’s growing conditions. This virus is believed to be related to tobacco streak virus which we do occasionally see in tomatoes in our area. It is likely vectored by thrips, which seem to have been abundant this season.

Unlike this new virus, incidence of tomato spotted wilt virus has been severe in fields in some parts of the county, although generally only in portions of the field adjacent to orchards or wheat. Some fields have had a recurring problem year after year, while others have not. We think that the virus is overwintering in weeds in the adjacent plantings, though we don’t yet know which weeds are the culprits, as this virus has a very wide host range. This year we looked at the effect of row covers placed over the plants. The row covers did an excellent job of reducing thrips but unfortunately covered plants

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also had a dramatic reduction in fruit set. Insecticide treatments had a small impact on the thrips but not enough to impact virus spread.

It seems the “new”, more abundantly sporulating powdery mildew is here to stay. While this is the same species of mildew that we have had in the Central Valley since it was first introduced in 1979, it appears that it now produces more spores and has been more difficult to control. We first saw abundantly sporulating mildew in the fall of 2006. It reappeared in 2007 and again this year, and was widespread in the Central Valley, though very severe problems were sporadic.

The weather has been very conducive for powdery mildew development both last year and this year. Model forecasts of favorable weather began around June 24th (based on data from the Winters weather station) to June 29th (Tracy area weather station) and continued through July 6th, after which we had a heat wave predicted to stop disease increase. If indeed the initial infections occurred in late June, this was before many growers had begun their fungicide or sulfur dusting programs. Note that there is a latent period of about 10 to 14 days during which the pathogen is already inside the leaf but symptoms are not yet seen. The earliest reports of mildew came in early July; by the 3rd week in July the disease was developing rapidly in the Tracy area. The model identified a second period of favorable weather from around July 23rd through mid-August.

While we have had UC trials evaluating powdery mildew fungicides in the past, the results of these trials may no longer apply if mildew populations have changed, particularly if fungicide tolerance or resistance is a part of that change. Before concluding that a particular fungicide no longer works, remember that 1) fungicides may not perform as well if the pathogen is now more aggressive and abundantly sporulating and 2) these fungicides work best when applied preventatively and at shorter intervals. Note that mildew coming into a field within 2-3 weeks of harvest is of little consequence and need not be controlled. For those with late-season fresh market tomatoes, I expect that there will be plenty of disease pressure from air-borne spores and fall weather that is typically conducive to disease development.

Symptoms of powdery mildew include bright yellow spots (left), which may have a powdery white sporulation on the underside. Sometimes only the powdery white sporulation is present on the top or underside of the leaf (right).



Brenna Aegerter
Farm Advisor

Country of Origin Labeling (COOL)

Country of Origin Labeling (COOL) will become effective on September 30th. Are you prepared? Do you need to keep different records, or maybe start keeping records? Is anyone exempt? The following provides you a quick summary of what is currently in place, and what you may have to start doing.

Who does COOL apply to?

It is important to remember that COOL applies to cuts of meat (beef, lamb, pork, goat, etc.) as well as other perishable foods, not live animals. Therefore, retailers and packers who sell meat to consumers are directly affected by COOL. Ranchers are not directly affected.

Who does COOL NOT apply to?

Anything packaged before September 30th is exempt as well as small retailers (less than \$230,000 in perishable agriculture commodities in a calendar year). Food service is also exempt (restaurants, hotels, caterers, hospitals, etc.), as are salad bars and delis located within retail establishments that provide ready-to-eat foods (Safeway or Raley's delis are exempt; the meat sold in the meat case is not).

To further confuse the issue, if the meat is processed in some way (pre-cooked, cured, smoked, extruded, breaded, marinated, etc), it is also exempt. So a marinated tri-tip that you may purchase at Costco is now exempt, but the trimmed tri-tip in the next case must be labeled.

Labeling Categories for Muscle Cuts.

U.S. Origin: The meat must be derived exclusively from animals (1) born, raised, and slaughtered in the United States; or (2) present in the United States on or before July 15, 2008 and remain present in the United States from that date.

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Multiple Countries of Origin that include the United States: For example, steers that were brought into the U.S. to be finished before slaughter either on grass, the feedlot, or both, then slaughtered in the U.S. An example label might read "Product of the United States and Mexico."



Imported Direct for Slaughter: If the animal spent less than two weeks in the U.S. before slaughter, the label then would read "Product of Canada and the United States."

Imported Meat: Meat (not a live animal) that arrives in the U.S. from another country, for example, "Product of Australia."

Recordkeeping.

Packers are the responsible party for initiating a country of origin declaration. They must have legal access to records necessary to substantiate a claim on origin. This is where the requirement will make its way back down the chain to individual ranchers. Currently an affidavit from the producer is considered acceptable, however, USDA will not provide a standardized affidavit for producers to use. If there is an audit, normal business records can be used to verify the affidavit. For example, your brand inspection papers can help prove that the calves you sold were all originated in the U.S. or that maybe you bought Mexican steers to feed out that would fall under the second label. If you are participating in a National Animal Identification System, all the necessary information is already maintained. In any event, maintaining a good record system can help you with an audit of COOL as well as many daily management decisions.

If you have any other questions about COOL, NAIS, or record keeping in general, please give me a call in the Modesto office – 209-525-6800. This winter keep your eye out for workshops on Ranch Planning that I will be offering in several different locations.

Theresa Becchetti
Livestock Advisor

San Joaquin County Agritourism Conference

San Joaquin County Agritourism Conference

Wednesday, November 12, 2008
8:30 am to 4:00 pm
Robert J. Cabral Agriculture Center
2101 E. Earhart Avenue (Off Arch-Airport Rd.)
Stockton, CA 95206

Tourism is the largest industry in the world. Agritourism and nature tourism are steadily growing forms of tourism due to an increasingly urbanized population desiring a rural experience and a connection to where food is produced. For many farmers and ranchers, agritourism offers an additional and welcome form of income. In California, agritourism and nature tourism opportunities for farmers and ranchers abound. Farm tours, U-pick operations, school tours, on-farm classes, and special events are just a handful of the many forms of agritourism farmers are choosing to participate in. However, developing a tourism enterprise is not simple. Hosting visitors on the farm or ranch brings with it issues of liability, public safety, marketing and governmental regulations.

Join us for this very informative conference and discover if agritourism is right for you. Attendees will receive a copy of the UCCE Agritourism manual, "Agritourism and Nature Tourism in California."

Registration is \$40 per person and includes lunch and the manual. For more info or to attend, please call Michelle at 209-337-2726.

Produced in partnership with the San Joaquin Farm Bureau, San Joaquin County UC Cooperative Extension, San Joaquin County Visitors Bureau & Chamber of Commerce and the San Joaquin Partnership.

Jennifer Heguy
Dairy Farm Advisor
jmheguy@ucdavis.edu
(209) 525-6800



Crop Digest

Grapes and Almonds

August-September 2008

Grapes

A second dry year started the season off with low soil moisture after below average rainfall. In addition to dry conditions, the first widespread spring frost in 36 years, moderate temperatures, and lots of windy days resulted in less shoot growth, fewer and smaller clusters, poor berry development (shot berry), and average to slightly small berry size. Fruit set and clusters seem especially variable this year, even more so than last year. Zinfandel appears most affected.

Demand is very good and prices seem to have improved for many varieties such as Pinot Grigio (Gris), Petite Sirah, Zinfandel, Colombard, Riesling, Sauvignon Blanc, and the relative newcomer Pinot Noir. The demand for Cabernet Sauvignon is still improved and is good for many other varieties such as Chardonnay, Pinot Gris, Pinot Noir, and Sauvignon Blanc. Even Merlot after a fair amount of removals and grafting is better situated in the overall market.

After the dry and mild spring, summer temperatures brought on symptoms of vine stress such as yellowing basal leaves and some berry shrivel, even with "good" irrigation sets. With no deep soil moisture and dry windy conditions, it was difficult to supply water fast enough to portions of the root zones of vines under deficit irrigation or on shallow soils, especially with Syrah and Zinfandel destined for red wine. It was curious to see new shoot tip growth in many cases at the same time! The same type of symptoms occurred in 2003 and 2004, when rainfall was somewhat below normal.

Summer bunch rot should be minimal as long as current conditions continue. Managing irrigation for quality and reasonable yield is a fine line between providing enough water to keep the vines from being excessively stressed and too much water that can cause tight clusters, large berries and thin berry skins. The bottom line is to moderate vine stress and water inputs as vines and growers experience "hang time."

Veraison began with color and berry softening around Independence Day, which is fairly typical. Harvest did start slightly ahead of the long-term average date of August 12. Yields look to be slightly below average, in most sites and varieties. Harvest appears on a relatively average pace and schedule but may speed up with a smaller crop. Powdery mildew pressure has been light and only

a few problems seem to be of limited concern. Insect pests and spider mite pressure appears to be average or light but there have been a few problems from mites and leafhoppers, especially variegated leafhoppers.

Vine mealybug is still spreading through the county, so be aware of any new infestations, often indicated by sooty (black) mold or excessive honeydew in clusters, spurs, or cordons. A high degree of ant activity in and around vines can also indicate problem spots. Good places to focus on a first look are where birds tend to perch or roost. The glassy-winged sharpshooter and another invasive species, the light brown apple moth (LBAM) are not in the County, and the Ag Commissioner staff is working hard to monitor both of these threats. Learn more about LBAM at <http://www.ipm.ucdavis.edu/EXOTIC>.



The dry and cold winter did seem to provide one benefit, another year of below average weed problems but there is still concern about herbicide resistant horseweed (or mare's tail) and flaxleaf fleabane. Puncture vine is another weed seen more around the County. It has a good natural control in two species of puncture vine

weevil (*Microlarinus* spp.), one that attacks the seed and one the weed's stem. But population levels have plummeted over the past few years because of successful eradication of puncture vines and possibly from some recent road materials having been infested with puncture vine seed. Many more roadsides, untended areas and headlands now host solid stands of this weed. There are some sellers of the puncture vine weevils, but if you are interested in buying a batch of weevils for augmentation you may have to surf the web. The weevils are present in many areas in low numbers. If there is a patch of puncture vine that doesn't get traveled through, letting bio-control work may help. But if there is any possible traffic through an infested area, herbicide is needed to prevent further spread. It is more important than ever to monitor and to control some of the more noxious and troublesome weeds before they seed. Star thistle is also a growing problem along roadsides and requires attention or it will dominate mowed areas, row middles and habitats.

This year a smaller grape crop may be difficult for individual growers as costs and regulations continue to increase, but it may set the stage for better prices and good quality. The grape cost study has just been updated and is available at our county web site or at www.coststudies.ucdavis.edu.

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Almonds

Hull split was only slightly delayed compared to recent years and the Nonpareil harvest has started in earnest as of August 21. Prices are expected to be fair to good; demand seems to be staying ahead of supply to help strengthen the market. The estimated 1.5 billion pound crop should have little trouble finding buyers.

Bloom started in mid February and early varieties did get rained on even as the winter ended dry. Bees were in somewhat limited supply, but the rain was brief enough and the rest of bloom weather turned good. In spite of a less than perfect start, the Nonpareil crop looks pretty good, as the bees took advantage of breaks in the last winter rains. Later blooming Mission types had very good weather and the crop looks very good. With decent weather and increased acreage state-wide, growers will provide another harvest of one billion pounds - the third in four years.



In spite of dry soil conditions, mite problems have been moderate locally, but severe in the Southern San Joaquin. Fortunately there are several miticides now available that provide a choice in various modes of action; a long awaited situation to help manage resistance and at the same time reduce overall chemical use. Water demand by trees was not a problem, until mid summer, and then there were several calls about "adequately" watered trees that seemed to be stressed. As in 2003 and 2004, late season water demand by trees exceeded water uptake. Fortunately we had no long heat spells and most growers stabilized tree water balances as hull split approached. The deep soil moisture is minimal, so caution is required as harvest progresses.

Increased prices for pollination bees and higher pumping costs have made inputs to the 2007 harvest even more expensive. Remember that if you are using wells as an irrigation source, it may help to run a well water analysis for nitrate nitrogen to see if you can cut back on nitrogen fertilizer. That may help increase nitrogen efficiency, reduce environmental impacts, and provide a few dollars for other cost increases.

In general, crop maturity seems to be catching up with long term averages. So it appears harvest may be about "on time" and a little ahead of last year. The Nonpareil at the San Joaquin Delta College Regional Variety trial was at 1% hull split as of July 11 (the same as 2007, 12 days earlier than 2006 and 2 days ahead of 2005). Whether normal or slightly delayed, it is important to monitor for ant problems and pick up quickly after harvest. The last few years have

seen increasing ant problems, but some alternative bait materials are available that can help in choosing a good course of action. Be aware of what ant species is present, as bee hives have been arriving from many different areas, and could have introduced red imported fire ants. For information check out: <http://www.ipm.ucdavis.edu/EXOTIC/>

Good luck with harvest.

Paul Verdegaaal
Farm Advisor

Extending the Life of Ornamental Trees

Summer is almost over and many of our trees in the valley are starting to look ragged with dried up leaves and perhaps loss of entire branches. Symptoms of this nature are usually associated with water stress when the root system cannot take up enough water to keep up with transpiration from the canopy during the hot dry summer in the valley. The following tree maintenance methods, when implemented, can increase your tree's survival in a drought, help protect your landscape tree from disease and insects, and extend the overall life of your tree.

FIRST - Get rid of the competition.

Turfgrass or any other vegetation can compete with your tree if it is underneath its canopy. These plants are competing with the tree not only for water, but for nutrients as well. Trees have "feeder" roots that are usually within the top three feet of soil and are the primary roots for nutrient uptake. Any plants growing underneath the canopy should be considered for removal. If you have a tree canopy width of 20 ft then the topsoil around the tree should be clear of plants the full 20 ft underneath that canopy (See Figure 1). This area can be mulched to prevent future weeds, but keep the mulch away from the base of the tree. Mulch against the tree can retain moisture around the trunk and cause rotting at the crown of the tree or encourage entry of boring insects.

SECOND - Water separately. Most irrigation systems for your front and back yard are on only a couple of valves. A valve allows you to control amounts of water for a section of your irrigation. With only a few valves, often turfgrass is watered at the same frequency as

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trees and for the same duration. Frequent, shallow watering of trees is not adequate; they need deep watering. Trees can be watered manually by applying a slow drip from a water hose once a month from around June to September. This is feasible for a homeowner who has one or two trees, but for the houses with a forest in their yard, an irrigation modification may be necessary. This irrigation modification would be to install a separate valve on the portion of the system going to your trees (and a separate valve for shrubs as well) to allow less frequent, longer duration watering of your trees. Consider replacing the sprinkler head system around the tree with slower watering emitters, such as drip emitters, tree bubblers or microsprinklers. If you plan to change the irrigation yourself, consult with an irrigation specialist and see irrigation references for more information on the different types of watering emitters. Each irrigation emitter will have different patterns of wetting the soil, and you may need to increase/decrease the number of emitters around the tree. A combination of a separate valve for the trees in your landscape, slower watering emitters, and correct timing on the irrigation controller will accomplish deep watering of a tree's root system.

THIRD - Choose a tree species that is adapted to the California valley.

Making wise choices in species selection can solve many of your tree problems. UC researchers continue to test new species of California natives and non-natives in different regions to see which survive well and have the most ornamental value for a home landscape. More information on species selection is provided below in the resource section. Before selecting a species, know what criteria you are looking for in a tree (Good fall color, drought tolerant, No messy fruit, etc.) and check multiple sites to get the best compilation of information. I am currently working on a tree list for San Joaquin County, which will be updated with new species that have been tested and proved to survive the California valley. Our new San Joaquin County Agricultural Center demonstration garden contains three UC Arboretum All-Star trees, Western Redbud (*Cercis occidentalis*), Washington Hawthorn, (*Crataegus phaenopyrum*), and Chinese fringe (*Chionathus retusus*). These All-Star trees will be evaluated at the garden for drought tolerance, maintenance needs, pest problem potential, and overall ornamental value.

Other Tree Resources:

Note: Some UC ANR publications may be free at <http://anrcatalog.ucdavis.edu>; other UC ANR publications may be ordered online or purchased from a UCCE county office.

Arboretum All-Stars database:

<http://arboretum.ucdavis.edu/searchSimple.aspx>

California Native Plant Link Exchange:

<http://www.cnplx.info>

(On this site you can select for Tree and Your County to obtain a list of trees adapted to your area.)

Drip Irrigation in the Home Landscape, UCANR 21579

Fertilizing Landscape Trees, UCANR 8945

Pest of Landscape Trees and Shrubs, UCANR 3359

Trees for Energy Savings, UCANR 21485

Ashley Basigner

Environmental Horticulture Advisor

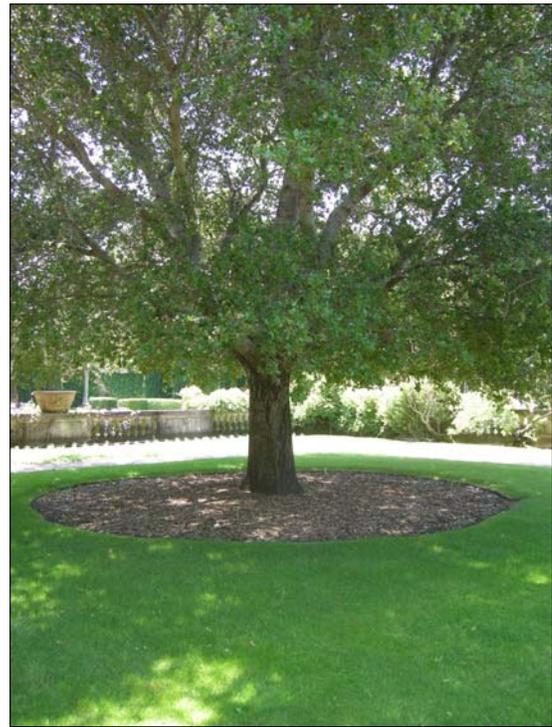


Figure 1. Example of keeping turfgrass out of the tree canopy rootzone.

The Stories We Tell Ourselves

Our emotions regularly get in the way of effective negotiations at the farm and at home. Nothing kills creativity quicker than anger, pride, embarrassment, envy, greed, jealousy or other strong negative emotions. Anger is often an expression of fear, or lack of confidence in our ability to get what we think we want. Emotional outbursts tend to escalate rather than solve a conflict. If we can improve our ability to manage our emotions and respond without getting defensive, we have gone a long way toward improved negotiation skills. A friend wisely said, "When we permit negative emotions, such as anger, to take control of us, this is a sure sign we are about to step into a trap". (1)

It is extremely difficult to hide our emotions, especially when we feel there is much hanging in the balance. Our body language, particularly our facial gestures and voice tonal qualities, often give us away. We are not emotionless robots. However, it is better to describe negative emotions (e.g., a feeling of disappointment) rather than showing them. I recently attended a fantastic seminar on *Crucial Conversations* put on by Linda Manton and Darlene Liesch of the University of California. I got so much out of it. There is a great book by the same name, by Patterson et al. (2)

The authors of *Crucial Conversations* contend that negative emotion is always preceded by telling ourselves a story. This may happen in milliseconds. The more critical the situation, or the more important the relationship we have with an individual, the more likely that we are vulnerable to such storytelling. We may presume to understand another's feelings or intentions, or we may come up with the worst possible scenario in terms of future consequences.

Some years ago I was asked to talk to a group of young adults. I noticed that as I spoke a young man would lean toward the young lady beside him and whisper in her ear. I found this to be very distracting and annoying. I feel very strongly that only one person should speak at a time, and so it was that every time he began to talk, I stopped. When I stopped, he stopped, and so it went. I later found out he was interpreting for a foreign visitor from Japan! The story I had constructed, however, was that this individual was flirting with the young lady, and was being rude to me.

Have you ever gone into a difficult situation with intentions of putting forth your best behavior, only to fail part-way through the experience? After attending this *Crucial Conversations* seminar and reading the book, I have

come to understand that this happens to us because we permitted the negative story to prevail. In other words, it will be hard to control our negative emotions as long as we give preeminence to our unconstructive stories. As we give people the benefit of the doubt, and build alternative narratives that avoid the presumption of evil, and allow for honorable or noble motives, we will succeed in managing our emotions.



1. Alavi, K. Personal communication..

2. Patterson, K.; Greeny, J.; McMillan, R. & Switzler, A. (2002). *Crucial Conversations: Tools for Talking when Stakes are High*. McGraw Hill.

Gregorio Billikopf
Labor Management Farm Advisor

2007/08 San Joaquin Delta Wheat Variety Trial

High wheat prices are making wheat planting a higher priority. In past years the biggest decision was how few acres to plant. Today, variety selection is more complex as stripe rust disease, location, and water availability have a greater influence on yield. The major varieties grown four years ago are no longer viable choices. Replacement varieties with improved disease resistance are needed every three to four years given the continuous stripe rust pressure. The value of regional variety testing is more important than ever before as variety performance is constantly changing. This year we expanded the variety types to include hard reds, whites, durum, and triticale varieties.

The variety trial was located on Victoria Island, an excellent trial site that provided good information. It was planted December 3, 2007 and harvested June 27, 2008. The field was drilled seeded at 150 lbs/acre; 100 lbs of 10-54-0 were applied at planting, followed by a mid-season top dress of Urea, one fungicide application, and three total irrigations.

Stripe rust was detected on March 31st (late joint to boot stage). Stripe rust became severe by April 30 in susceptible varieties (flowering to soft dough stage depending on variety). Low levels of powdery mildew were detected on lower leaves of some entries by April 30. By May 15 stripe rust was very severe on Anza, Yecora Rojo, Express, Summit, Blanca Grande, Clear White, Solano, and APB W02AZ-365; and moderately severe on Dash 12, Joaquin, Sagitarrio, and APB W05AZ-149. Extremely windy weather in June resulted in moderately severe to severe shatter for several entries (Mika, Dash 12, WWW CNBR9330, APB W05AZ-137, APB W05AZ-149, and APB W05AZ-176). Yields ranged from 2810 to 9280 lb/acre. The highest yielding entry was WB ACS 55304 triticale; highest yielding wheat was Blanca Fuerte.

Mick Canevari
Farm Advisor and County Director

Durum Wheat Observation Trial 2008 San Joaquin Delta Victoria Island Farms

Entry	Rep 1		Rep 2		Mean Yield (lb/acre)
	Plant Ht (in)	Yield (lb/acre)	Plant Ht (in)	Yield (lb/acre)	
Duraking	39	5638	39	8030	6834
Crown	37	5436	38	8064	6750
Platinum	34	6696	35	7815	7255
Desert King	38	8127	39	7618	7872
Fortissimo	36	7798	37	8116	7957
Cal Rojo	34	7372	31	7477	7424

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2008 SACRAMENTO/SAN JOAQUIN DELTA COMMON WHEAT AND TRITICALE TEST

Name	Yield (rank) (lbs/acre)		Shatter ¹	Plant Ht (inches)	Lodging ¹		BYD	Stripe Rust ¹	
					soft dough	harvest		4/30	5/15
ANZA	6240	(30)	1.3	36	1.0	1.0	1.0	4.3	4.8
YECORA ROJO	2810	(45)	1.0	33	1.0	1.0	1.0	8.0	8.0
EXPRESS	4820	(38)	1.8	42	1.0	1.0	1.0	6.5	6.8
SUMMIT	3140	(44)	1.0	35	1.0	1.0	1.0	8.0	8.0
BLANCA GRANDE	5470	(34)	2.3	40	1.0	1.0	1.0	6.8	7.8
MIKA	5300	(35)	2.5	45	1.0	1.0	1.3	1.0	1.0
DASH 12	5040	(37)	3.3	44	1.0	1.0	1.0	3.0	4.0
CLEAR WHITE	6290	(29)	1.8	38	1.0	1.0	1.0	4.3	5.0
SOLANO	4610	(39)	1.0	39	1.0	1.0	1.0	6.5	7.3
PATWIN	6840	(22)	1.0	37	1.0	1.0	1.3	1.0	1.0
JOAQUIN	7210	(14)	1.8	38	1.0	1.0	1.0	1.5	3.3
CAL ROJO	7470	(9)	1.3	33	1.0	1.0	1.0	1.0	1.3
OTIS	5280	(36)	1.3	51	1.0	1.0	1.0	1.0	1.3
LASSIK	7090	(18)	1.8	37	1.0	1.0	1.0	1.0	1.0
WWW BR5874E	7110	(17)	1.3	42	1.0	1.0	1.0	1.0	1.8
EXPRESSO	6640	(24)	1.8	42	1.0	1.0	1.0	1.0	1.0
REDWING	6950	(20)	1.0	35	1.0	1.0	1.0	1.0	1.0
BLANCA ROYALE	7380	(10)	1.3	35	1.0	1.0	1.0	1.0	1.0
BLANCA FUERTE	8110	(5)	1.0	32	1.0	1.0	1.0	1.0	1.0
WB DA 904-32W	7220	(13)	1.3	39	1.0	1.0	1.0	1.0	1.0
LARIAT	6290	(28)	1.5	36	1.0	1.0	1.0	1.0	1.0
APB W02AZ-365	6570	(25)	2.3	39	1.0	1.0	1.0	1.0	3.3
SAGITTARIO	5930	(31)	1.0	34	1.0	1.0	1.0	1.8	2.8
VAIOLET	5790	(32)	1.0	29	1.0	1.0	1.0	1.3	1.8
ULTRA	7500	(8)	1.0	33	1.0	1.0	1.0	1.0	1.0
TRICAL BRAND 105	8250	(4)	1.0	46	1.0	1.0	1.0	1.0	1.0
TRICAL BRAND 118	8690	(3)	1.0	43	1.0	1.0	1.0	1.3	1.3
TRICAL BRAND 98	7280	(12)	1.0	41	1.0	1.0	1.0	2.8	3.3
RSI 01T40207	9160	(2)	1.0	40	1.0	1.0	1.0	1.5	1.8
WB ACS 55304	9280	(1)	1.0	45	1.0	1.0	1.0	1.0	1.0
MEAN	6390		1.6	39	1.0	1.0	1.0	2.0	2.4
CV	7.7		34.4	4.3	19.3	7.4	14.6	17.6	27.2
LSD (.05)	690		0.8	2	0.3	ns	ns	0.5	0.9

¹ Rating scale for diseases (area of flag-1 leaf affected), lodging and shatter: 1 = 0-3%, 2 = 4-14%, 3 = 15-29%, 4 = 30-49%,

5 = 50-69%, 6 = 70-84%, 7 = 85-95%, 8 = 96-100%.

BYD ratings (see scale above) were based on percentage of plants showing foliar symptoms.

Numbers in parentheses indicate relative rank in column.

Evaluation of Insect Repellents and Barriers as Methods to Control Cucumber Mosaic Virus of Bell Peppers

Bell peppers and chili peppers in Kern County have been afflicted by cucumber mosaic virus (CMV) for the past several years. Some fields have had over 50% yield reduction due to CMV. There is no pattern as to when it appears or how severe the infection will be. However, the earlier in the season that CMV appears, the more severe the yield loss will be.

CMV is a cucumovirus that is vectored by several different species of aphids, but most efficiently by *Aphis gossypii* and *Myzus persicae*, the cotton aphid and the green peach aphid respectively. It is transmitted in a non-persistent manner, meaning the aphid vector acquires the virus after only a few minutes of feeding on an infected plant and that it can transmit the virus for a few hours afterward.

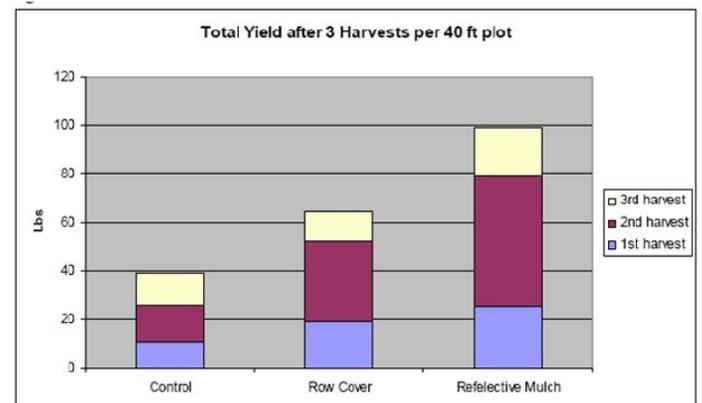
Even though the plants are being treated with a systemic insecticide from the time they are young seedlings, fields are still being infected with CMV. The reason for this is most likely because once an aphid lands on a plant surface it immediately begins to probe the plant to see if it is a suitable host plant. Once this probing begins the virus is transmitted to the plant. Even if the aphid is killed by the insecticide, it is not killed quickly enough to prevent the vectoring of the virus. Although treating pepper fields with imidacloprid does reduce the buildup of aphids in field, it does not prevent viruses from being introduced to a field.

A trial was conducted in spring of 2008 with bell peppers to determine if CMV can be controlled by insect repellents, reflective mulch, and insect barriers. The insect repellents are composed of botanical oils that are commercially available. The botanical oils tested were: A) 40% citronella oil; B) 25% citronella oil, 25% clove oil, and 5% of geranium oil; C) 20% clove oil and 10% rosemary oil; D) 5% garlic oil; and E) 3% citronella oil and 0.5% garlic oil. Other treatments included a floating row cover and silver reflective mulch. The floating cover was the lightest weight available but the weave was tight enough to prevent aphids from passing through. Reflective mulches have been shown by others to repel aphids, thus reducing plant virus infections. A second trial was conducted without the botanical oils, instead looking at only the floating row cover

and reflective mulch.

The trial was evaluated for aphid counts on a weekly basis by placing yellow sticky cards just above the plant canopy. The impact of CMV was determined by harvesting the bell peppers over the course of several weeks. Aphid counts were significantly reduced by the floating row cover and silver reflective mulch as compared to the control. The aphid counts were not different for any of the botanical oils compared to the control. At harvest, the floating row cover and silver reflective mulch had significant yield increase over the control plots. The botanical oils plots yielded the same as the control plots. The use of silver reflective mulch and floating row covers can reduce the incidence of CMV in peppers.

From this first year experiment it appears that keeping aphids from landing onto the pepper plants at all is the key to reducing the incidence of CMV. Although the botanical oils didn't achieve this goal, the use of reflective mulch and the floating row cover did an excellent job of this. The floating row cover did have reduced yields in one plot compared to the control and less than the reflective in the other. It may be that the floating row cover shaded the plants too much and preventing the plants from reaching



their potential.





UNIVERSITY of CALIFORNIA
Agriculture & Natural Resources
 Cooperative Extension- San Joaquin County
 2101 E. Earhart Ave., Suite 200
 Stockton, CA 95206-3924

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