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UCCE

Field Crop Notes
Tulare County

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Retirement – C. Frate

I will be retiring this summer. It has been my privilege to work with the growers, pest control advisors, and industry personnel of Tulare County for the past 34 years. When I started, I had no intention of working at this job for 3 decades but I have thoroughly enjoyed it and the time went by all too fast.

The one constant in those years has been change. This is true for the weather, for farming practices, for technology and for the University of California Cooperative Extension. When I started in 1980 there were about twice as many advisors in the state as there are today. The good news is that UCCE is committed to, and has already started, hiring new advisors – not quite keeping up with retirements yet but aiming to do so. There will probably never be as many farm advisors as when I started so the new hires will be responsible for multiple counties and multiple commodities/ disciplines. When I started, county offices and the specialists on campuses had resources that could help with county trials. Research plots were often conducted without the need for outside funding. That situation changed during my career and it is even truer now. Commodities without organized grower groups and/or no mechanism for funding research may find that little or no research is conducted on those crops. Seed and agrochemical companies have funded much of my research in the past few years in corn and alfalfa.

The way information is delivered to growers, PCA's and the ag industry has also changed. One of the first changes in my career was the development and licensing of pest control advisors. At first some advisors thought of them as competitors but they became allies in extending information to growers and finding trial locations. Mailed newsletters are giving way to e-mails informing people where they can find the newest issue on the internet. While person-to-person interaction at meetings is still valued, many growers prefer to find the information at their convenience on the internet through posted PowerPoint's and handouts (for that reason the presentations, handouts and other references for the March meeting on irrigating field crops in a short water year can be found at: http://cetulare.ucanr.edu/Agriculture782/). Nothing will replace the value of face-to-face meeting to help trouble shoot problems in a field but with fewer advisors having a larger area to cover and more crops, it may not be possible to answer every call with a farm visit.

Given UC budget issues and high priorities throughout the state for new Cooperative Extension advisors, it may take a year or more to get a new agronomist in the Tulare/Kings area. In mid-May, the proposed new advisor and specialist positions for Cooperative Extension were submitted to UC administrators and are now posted online at http://ucanr.edu/sites/anrstaff/Divisionwide_Planning/2014_Call_for_Positions/. Scroll down the page to see the listing of more than 120 positions submitted including 4-H,

Family and Consumer Science, and Crop or Livestock advisor positions. Only a small fraction of these will be funded. The website mentioned above is open for comments from individuals, commodity groups, and professional groups. Within 2 days of posting, one of the positions had 14 comments stating how important it was. While the decision of which positions to fill will not be based solely on the number of supportive online comments, I think one can assume that positions with no supporting comments will most likely not be filled. Individuals, companies, grower associations, and anyone who wants to comment on the value of a position should do so. It is important to let UCCE administrators know what positions are important to you. Your comments may be very short but be aware that they will be accessible for others to read. The deadline for comments is July 21, 2014 but don't put it off or, if you are like me, it may not get done.

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In the meantime, if you have questions on corn, contact Steve Wright. I am organizing and planting the annual silage corn variety trial. Steve Wright will take care of harvest and summarize the results. For questions on alfalfa and beans, call our office and your question will be referred to the most appropriate person. When a new advisor is hired, please take the time to meet him or her, invite him/her to the field and let them know what production issues are most important to you.

I give a very sincere thank you to all the growers, PCA's, ag chemical, seed and industry reps, custom spray applicators, harvesters and truckers who were involved in field trials I conducted over the years. Your patience and cooperation were essential to those trials and therefore to providing local, research-based information to growers. Thank you for the opportunity to be a part of this great industry

Managing Junglerice in Corn

S. Wright & C. Frate

Introduction. The summer annual grass weed junglerice (*Echinocloa colona*) has become a difficult problem to control in corn fields in the southern San Joaquin Valley, especially minimum till fields, as well in other crops. Glyphosate products do not easily kill this weed unless the grass is quite small. Seed continues to germinate throughout the summer so even if junglerice seedlings are killed by a post-emergent herbicide, new seedlings can emerge the next day or next irrigation.

Junglerice identification. Seedling leaves are grayish or dull green in color. Often leaves are banded with purplish-red stripes across the blade but this feature can be absent. Mature plants are prostrate or erect and 2-3 ft tall. Leaves are rolled in the stem before emerging. Leaf blades are flat and usually the upper surface is hairless. Stems are hairless except at the nodes. There are no ligules or auricles. Purple banding on the leaves is the easy way to distinguish junglerice from barnyardgrass. There are more photographs and details on identification at the UC IPM website: http://www.ipm.ucanr.edu/PMG/WEEDS/junglerice.html.

A major concern is the development of glyphosate (Roundup) resistance in junglerice in California. Rotating glyphosate-resistant corn with other glyphosate-resistant crops such as cotton or alfalfa will only increase this problem. To help prevent the development of herbicide-resistant weeds and prevent weed shifts from occurring, it is important to incorporate tillage into

your weed management practices, as well as alternating or tank-mixing herbicides that have different chemical modes of action.

Research Results. Research conducted in the SJV in 2011- 2013 by S. Wright and C. Frate with Matrix (rimsulfuron) and Laudis (tembotrione) demonstrated excellent junglerice control could be achieved when these materials are applied according to the labels. Both herbicides will enhance control of broadleaves, grasses, and glyphosate-resistant weeds, while also reducing glyphosate induced weed shifts. Matrix can be applied either preemergent to the corn and junglerice or postemergent to the corn. In the first case, corn is planted dry, the herbicide is applied and then followed by an irrigation to germinate the corn and activate the herbicide. The other approach is to preirrigate, plant or strip till and then plant. After weeds emerge treat postemergent to corn and junglerice. The most consistent results have been observed with a tank mix of glyphosate and Matrix. Matrix can be applied postemergent up to 12 inch corn but weeds must be small. "Steadfast", a combination of Accent plus Matrix, applied postemergent has also demonstrated effective on control of young junglerice.

Stripes across the leaf blades commonly found on junglerice can be seen in this UC IPM photo.

Laudis (tembotrione) also adds to the options available for corn growers to control junglerice. Laudis is for postemergence use. Best results are obtained when it is applied to young actively growing weeds. According to the label, Laudis can affect weeds that are larger than the recommended height; however applications of Laudis when weeds are taller than 4 to 5 inches in height may result in incomplete weed control activity. Broadcast applications of Laudis may be made to corn from emergence up to the V8 stage of growth. A second post-emergence application is allowable on corn but it must be a minimum of 14 days from the first application. According to the label, cultivation can help remove suppressed weeds or multiple flushing weeds. However, don't cultivate within 7 days of an application of Laudis as this could decrease the effectiveness of weed control due to disruption of herbicide translocation in the plant.

Lygus Bug Management in Blackeye Beans

Year in and year out, lygus bugs are the most damaging insect pest to blackeye beans in CA. Although these insects are worse in some years compared to others, growers expect to spray for them at least once every year and commonly have to make an additional application – or even two.

Why are lygus bugs such a problem in blackeyes?

First, they reduce yield and seed quality. When they feed on flower buds and flowers, no pods form and yields are reduced. When they feed on developing pods, young seeds are killed (reducing yield) and older seeds are damaged (reducing the quality of the seed lot).

Secondly, they can do damage over an extended period of time as plants go from flower bud through most of pod fill. If the field is managed for a second flush of beans, then that second round of blooms and pods are also at risk.

Lygus bug adult (UC IPM).

Thirdly, it is difficult to determine the lygus bug population in a field. The standard sampling method is to use a sweep net but it is not a very accurate tool. Lygus adults are winged and move around while nymphs are often down in the canopy and missed by the sweep net. Later in the season, it is difficult to walk through large blackeye plants that have intertwined not to mention trying to sweep them! In short, the sweep net is not the most accurate way to find and count Lygus bugs – but other ways, such as using a D-Vac, are cumbersome and not practical.

Blackeyes and dry beans in general have not been on the forefront of being included on labels for new insecticides. Dimethoate, Orthene and Lannate are still being applied to blackeyes after 30 years or more on the market. When did you last hear of these materials applied to cotton? Recently, blackeyes have been added to the labels of several pyrethroids and neonicotinoids. However, these materials had been used so extensively in other crops prior to getting them labeled for dry beans, that they are often less effective in controlling lygus bugs now than when they first hit the market.

Lastly, most insecticide applications for lygus bugs in blackeyes are by air making coverage within the canopy problematic.

Recent Studies

The Blackeye Council of the California Dry Bean Advisory Board and ag chemical companies have supported trials, conducted at the Kearney Agricultural Research and Extension Center, that evaluated potential new insecticides for lygus bugs. Detailed descriptions of these trials can be found at the UC website for dry beans (http://beans.ucanr.org/ then click on "Searchable database of the Work group proceedings." Search for reports using key words such as "lygus bugs").

Damage to blackeye seed caused by feeding of lygus bugs (photo from UC IPM)

In both 2012 and 2013, individual plots were 16 rows wide and 50 ft in length with 5 replications of each treatment (one treatment in 2013 was replicated only 4 times). CB 46 was seeded at 35 lbs/acre. Applications were made with a ground rig at a water volume of 50 gpa which is more than anyone would use commercially but if an insecticide worked in these trials, then it is worth looking at it under commercial practices. Lygus populations were estimated by taking 10 sweeps per plot and counting adults and nymphs. Table 1 lists the dates for planting, treatment applications, and harvest for each year.

Table 1. Planting, treatment, cutting and threshing dates for two years of lygus bug management trials in blackeye cowpeas, UC Kearney Agricultural Research and Extension Center, Parlier, CA.

	2012	**2013**
Planting date	June 8	June 11
Treatment dates	July 24 and August 13	August 13, August 29
Cutting date	September 6	September 18
Threshing date	September 28	October 24

Some of the treatments were repeated in both years, some treatments were applied at different rates or formulations, and some treatments were tested in only one of the two years. For

example, in 2012, Closer was evaluated but by 2013 the formulation and trade name the company decided to use for field crops was Transform. The treatment details for each year are found below in Table 2.

Table 2. Insecticide treatments for two years of lygus bug management trials in blackeye cowpeas, UC Kearney Agricultural Research and Extension Center, Parlier, CA

Insecticide	Active ingredient	Rate lb ai/Acre		Rate Product/Acre	
		2012	2013	2012	2013
Untreated		--	--	--	--
Hero EW	zeta-cypermethrin with bifenthrin	0.10		11.2 fl oz	
*****Closer	sulfoxaflor	0.05		3 fl oz	
*****Transform WG	sulfoxaflor		0.05		1.5 oz
*****Transform WG	sulfoxaflor		0.07		2.25 oz
*****Belay	clothianidin	0.07		4.5 fl oz	
*****Belay 50WDG	clothianidin		0.19		6 oz
*****Beleaf	flonicamid	0.09		2,8 fl oz	
*****Steward	indoxacarb	0.11		11.3 fl oz	11.3 fl oz
Warrior II + Rimon 0.83EC	lambda-cyhalothrin + novaluron	0.03+ 0.08	0.03+ 0.08	1.92 fl oz + 12 fl oz	1.92 fl oz + 12 fl oz
*****Sivanto	flupyradifurone	0.18	0.18	14 fl oz	14 fl oz
Leverage	imidacloprid		0.07		2.8 fl oz
Grandevo	Chromobacterium subtsugae strain PRAA4-1		0.90		3 lb

*****Not registered for use on blackeye cowpeas in CA as of May 1, 2014.

In 2012, the first treatment application (July 24) was timed to control aphids more than lygus bugs because cowpea aphids had developed a large population that was causing damage. Lygus bug counts were below the bloom threshold level of 5 lygus/10 sweeps. All treatments except for Steward controlled the aphids. Aphid populations continued to develop in the untreated check and Steward plots. Following the first spray, lygus counts were higher in the untreated check than in the sprayed plots but, within 2 weeks, counts were approaching the treatment threshold at pod fill (10 lygus/10 sweeps) and a second application was applied. In 2013, lygus counts exceeded the treatment threshold prior to the first treatment. A second application occurred 16 days later even though Lygus counts were below the threshold in all treatments.

As mentioned at the beginning of this article, estimating lygus bug populations using sweep nets is not very accurate. (Counts are available in the detailed report on the web). The real proof of benefit from a treatment is a yield response with improved seed quality. Table 3 shows the percent of beans with no damage due to lygus bugs, the percent of bean seeds with 2 or more lygus “stings,” and yield data.

Table 3. Seed quality and yield results from 2012 and 2013 lygus bug management trials, U.C. Kearney Agricultural Research and Extension Center, Parlier, CA.

		2012			2013		
Insecticide	**Rate Product/ Acre**	**Percent beans with no damage**	**Percent beans with 2 or more lygus "stings"**	**Yield Lbs beans/ Acre[1]**	**Percent beans with no damage**	**Percent beans with 2 or more lygus "stings"**	**Yield Lbs beans/ Acre**
Untreated	--	60.7 c	23.4 b	2,267 bc	86.6 c	6.7 c	1,951 e
Hero EW	11.2 fl oz	80.8 a	9.7 a	3,024 a			
*****Closer	3 fl oz	74.5 ab	12.6 a	2,835 ab			
*****Transform WG	1.5 oz				93.4 ab	1.8 ab	2,900 ab
*****Transform WG	2.25 oz				94.7 a	1.5 a	2,923 a
*****Belay	4.5 fl oz	79.0 ab	10.6 a	2,835 ab			
*****Belay 50WDG	6 oz				92.4 ab	2.6 ab	2,560 bc
*****Beleaf	2,8 fl oz	74.9 ab	14.9 a	2,690 ab			
*****Steward[1]	11.3 fl oz	70.7 b	15.1 a	1,693 c	94.4 a	2.1 ab	2,700 abc
Warrior II + Rimon 0.83EC	1.92 fl oz + 12 fl oz	78.1 ab	10.4 a	2,861 ab	94.4 a	1.9 ab	2,602 abc
*****Sivanto	14 fl oz	71.2 b	15.5 a	2,572 ab	83.3 d	6.8 c	2,106 de
Leverage	2.8 fl oz				91.4 b	3.4 b	2,429 cd
Grandevo	3 lb				86.5 c	6.1 c	1,973 e
	Probability	0.001	0.007	0.02	0.000	0.000	0.000
	LSD (0.05)	8.47	6.82	699	2.55	1.58	348
	CV %	8.9	37.5	20.97	2.2	33.6	11.0

***** Not registered for use on blackeye cowpeas in CA as of May 1, 2014.

[1]The Steward treatment performed poorly compared to other treatments in 2012 not because it failed to reduce lygus bug counts but because Steward has no activity on aphids and cowpea aphid populations in 2012 were very high in every Steward plot, even higher than in the untreated check plots. In 2013, there were no problems with cowpea aphids.

Results and Discussion

In 2012, all the insecticide treatments had a higher percentage of undamaged seed and fewer seeds with 2 or more lygus "stings" compared to the untreated check. There was a high level of variability in the trial (co-efficient of variability for yield was almost 21%). The only treatment to yield significantly higher than the untreated check was Hero, a pyrethroid. However, Hero did not yield statistically more than the other insecticide treatments with the exception of Steward. It is important to understand that the low yield of the Steward treatment was due to severe cowpea aphid populations and not due to lygus bugs.

In 2013, all the treatments except Grandevo had a higher percentage of seed without lygus damage than the untreated check. Grandevo and Sivanto had the same percent of seeds with 2 or more Lygus "stings" as the untreated check. For yield, the level of variability was almost half that of the 2012 trial (coefficient of variability was 11%). The low and high rates of Transform produced the most beans, significantly more than Grandevo, Sivanto, and the untreated control

treatments. Grandevo is a bio pesticide that is registered in CA but did not perform well in this trial. Sivanto is a very new pesticide that is not registered yet on any crop. It is effective on some sucking-type insects but did not look particularly effective in these trials on lygus bugs. (It did kill the cowpea aphids in 2012).

Leverage, which is a combination of a pyrethroid and a neonicotiniod, was not quite as good as the combination of Warrior II plus Rimon (a pyrethroid plus a growth regulator). The unregistered insecticides Steward (in 2013 when there were no aphids), Belay, Beleaf, and Transform (Closer in 2012) produced yields and bean quality comparable to or better than registered materials.

Transform has been submitted for registration to the California Department of Pesticide Regulation and may be available for use this summer. So far, it is not registered on any crop in CA. If approved, bean growers will be able to use it starting at the same time as cotton growers rather than having to wait several years for dry beans to be added to the label.

SORGHUM - DROUGHT YEAR FORAGE OF CHOICE?

UCCE field trials evaluate yield, agronomic traits, water use and nutritional quality

Carol Collar, UCCE Kings County and Peter Robinson, Ph.D. Dairy Nutrition Specialist

California forage growers and dairy producers are facing tough choices this season regarding forage production. With little to no surface water, and uncertain water supply from existing wells, planting corn for silage may not be an option. Among summer annual forages, corn is valued for superior yields of high energy silage for dairy cows. But corn also requires much higher water and nutrient inputs.

So, what about sorghum? Sorghum for silage production falls into three main categories: grain sorghum (milo), forage sorghum, and sorghum-sudangrass hybrids. Of the three types, forage sorghums are most commonly used for silage. There are many different varieties of forage sorghum, each with specific attributes, including conventional, Brown Mid-Rib (BMR), photoperiod sensitive and brachytic dwarf with or without the BMR trait. The water savings potential and nutritional attributes of forage sorghums have been studied extensively in the Texas panhandle. That research has shown forage sorghums can produce silage yields similar to corn, with adequate nutritional quality, while using 30% less water. This suggests sorghum is a crop with promise in the parched San Joaquin Valley. To help growers and dairy producers assess the potential value of sorghum, UC advisors and specialists have conducted field trials in recent years.

What are the differences between sorghum types, and how do they compare to corn silage? Selecting grain type sorghum, which has a much bigger and heavier grain head compared to a forage type, could potentially boost the energy value of the resulting silage without sacrificing yield/acre. We investigated this possibility in a field trial on a commercial dairy with the objective of comparing yield and nutritive value of a grain type and a forage type sorghum. Following is a brief summary of the results. A more detailed report can be found at: http://sorghum.ucanr.edu/

Yield - At harvest, the forage sorghum was taller, and produced 25% higher yields than the grain sorghum (Table 1). Both the grain and forage sorghum had lower yields relative to average values for corn silages grown in the area.

Table 1. Relative Yields of Forage and Grain Type Sorghums and Irrigation Events compared to Corn Silage

Type	Brand	Plant Height (ft)	% DM at harvest	Tons/Acre at 30% DM	No. of Irrigations (planting to harvest)
Grain	HyTest 850	5.3	28.9	22.8	3
Forage	SorgoMax FS 403	8.6	26.2	28.4	3
Corn silage	Average values	12.5	32.0	30.0	8

Nutrient profile - The grain type sorghum had a lower level of structural fiber and a sharply higher level of starch, compared to the forage type, as would be expected due to its larger seed head (Table 2). The grain type nutrient profile was similar to corn silages grown in the San Joaquin Valley.

Table 2. Chemical Composition of Sorghums and Corn Silage on 100% Dry Matter Basis

Type	Brand	ADF	NDF	Lignin	CP	Starch
Grain	HyTest 850	29.1	45.7	7.6	9.1	23.1
Forage	SorgoMax FS 403	32.3	49.1	8.0	8.6	16.8
Corn silage	Average values	30.8	48.0	2.9	7.9	25.0

Notes: ADF and NDF are measures of the amount of structural fiber in plants. Lignin is an indigestible part of structural fiber which is in both ADF and NDF. Structural fiber is only partly digested by cattle, and only in the rumen. CP is a measure of protein level of the plant material whereas starch is essentially fully digested by the cattle in either the rumen or small intestines.

Digestibility -While the *in vitro* estimate of fiber digestion ($dNDF_{30}$) did not differ between sorghum types (Table 3), the values were sharply lower than for corn silages and this is reflected in the much lower estimates of net energy (NEl) of both sorghums *versus* corn silage. This difference, especially for the grain sorghum which had a similar gross nutrient profile as corn silage, is partly due to the lower digestion of fiber, but likely also reflects the small sorghum seeds, many of which will escape crushing during harvest, as well as not be fully digested by cattle. Thus more sorghum starch will appear in feces than from corn silage with its larger kernel size.

Table 3. *In vitro* Digestibility and Fermentation, as well as Calculated Energy Values of Sorghums and Corn Silage

Type	Brand	$dNDF_{30}$ (% of NDF)	Gas-4h (ml/g DM)	Gas-24h (ml/g DM)	NEl based on 24 h gas (Mcal/lb DM)	NEl based on $dNDF_{30}$ (Mcal/lb DM)	TDN (% of DM)
Grain	HyTest 850	30.1	5	256	0.59	0.56	63
Forage	SorgoMax FS 403	31.8	11	256	0.56	0.54	61
Corn silage	Average values	48.0	61	229	0.67	0.65	69

Notes: $dNDF_{30}$ is a bench top estimate of the digestibility of NDF in the rumen of high producing dairy cows. Gas produced at 4 h using a bench top technique reflects the digestion of the most rapidly digested fractions of the plant whereas that at 24 h is a reflection of the digestibility of DM in the rumen of high producing dairy cows. NE can be calculated from both dNDF30 as well as 24 h gas, and both are shown here. The TDN (total digestible nutrients) values allow a quick comparison to the values of alfalfa hays.

What sorghum type is best to replace corn silage for lactating dairy cows - grain or forage? The energy value of the forage variety was lower than for the grain variety, but the difference was very small and is unlikely to be of sufficient magnitude to overcome the sharply higher yield of the forage variety. High yield will be particularly important in the current drought conditions when all feeds will be at a premium. However this forage sorghum had a much poorer nutrient profile than did corn silage, and feeders can expect lower intakes of TMR and lower animal performance when it is substituted for corn silage unless compensatory changes are made in the ration formulation. We evaluated only one conventional variety of forage sorghum in this trial. Among the many commercially available forage sorghums, there is enormous diversity. To see how other sorghums performed in UC field trials, visit the UC ANR sorghum website: http://sorghum.ucanr.edu/. There you will find forage data and production manuals for both grain and forage sorghum.

Consider drought tolerance – From planting (July 3) to harvest (Oct 18), only three irrigations were applied to the sorghum in this field trial. Corn in the surrounding areas would require about 8 irrigations. Where water is limited, or if there is a desire to conserve or reallocate available water, forage sorghum may be a viable alternative to corn silage.

Irrigating Field Crops in a Water-Short Year

Copies of the PowerPoint presentations plus additional information from the meeting held on March 21, 2014, "Irrigating Field Crops in a Water-Short Year" are available on the UC Tulare County Cooperative Extension website (http://cetulare.ucanr.edu/).

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