Field Crop & Nutrient Notes

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Kings, Tulare & Fresno Counties

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Introduction

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This exceptionally warm Spring has been favorable to hay drying conditions, crop growth, and seed germination of beans, corn, and sorghum wherever moisture was not an issue. Early announcements of increased water allocations apparently prompted growers to plant more corn than last year. Early planters of corn are in the reproductive stages in crop development while some corn is only emerging now. I have seen some interesting issues out in the fields, but generally good, rapid growth and relatively low insect pressure.

Don’t Overplant Sorghum and Fertilize Correctly for the Sorghum You Are Planting

Jeff Dahlberg Director, UCANR-KARE

One of the common mistakes made by farmers in growing sorghum is that they plant using the strategy of “pounds per acre” and not “plants per acre.” A pound of sorghum seed can vary a great deal in the number of seeds per pound. There may be as little as 12,000 seed per pound all the way up to 18-19,000 seed per pound, all of which will directly impact your final seed count. For example, if you’re targeting 70,000 plants per acre for your final stand count for a high yielding grain sorghum, you might only use 4.1 pounds of seed per acre if the number of seed per pound were roughly 17,000, while you’d need 5.8 pounds if there were 12,000 seed per pound. This is the case with your forage sorghums as well. The only sorghum that you can get away using pounds per acre is Sudangrass-type sorghums. These are typically small seeded and pounds per acre are typically recommended for them. Talk to your seed dealers, get on-line, or look at the grain sorghum production books available at the Sorghum Checkoff webpage http://www.sorghumcheckoff.com/assets/media/productionguides/2011HighPlainsProductionHandbookFINAL.pdf) for estimates of your plant population for various irrigation and non-irrigation planting strategies. For forage help, go to: http://www.sorghumcheckoff.com/assets/media/productionguides/westforageguideforweb092611.pdf.

The other common mistake made by folks planting sorghum is that they don’t fertilize the crop correctly. Grain sorghum will utilize as much nitrogen as you can put on. In fact, grain sorghum nitrogen requirements are very similar to corn. Folks tend to under-fertilize with N, so again use one of the production guides to ensure proper nutrition. A rule of thumb N level is presented in Table 1. On forages, producers tend to over-fertilize, which can bring about lodging issues, especially with photoperiod forage sorghums. Bottom line is that with a few management strategies on planting populations and fertility, one can grow high yielding, high quality sorghum!

Table 1: Nitrogen levels should be based on Yield Goals for grain sorghum.

Yield Goals (bushel per acre)	Nitrogen (lbs/acre)
40	45
80	90
120	135
160	180
200	223

Growing and Harvesting Corn in Water Limiting and Nitrogen Monitoring Times

Nicholas Clark – Agronomy and Nutrient Management Farm Advisor, Kings, Tulare, and Fresno

Pre-plant decisions

Please see the first issue of *Field Crop and Nutrient Notes* (http://cekings.ucanr.edu/newsletters/Field_Crops_-_Nutrient_Notes/?newsitem=62277) for consideration of pre-plant decisions in corn.

In-crop decisions

On-farm water allocation decisions, nitrogen program, and weed control were mentioned in the first issue so will not be discussed here, but it should be noted that these are also things to be considered throughout the season. One thing that has recently come to my attention; however, is that for those of you getting around to planting or currently nursing some young plants, irrigation with lagoon water should be done with caution during this heatwave. High concentrations of ammonium in well drained soils will volatilize quickly and may burn young corn. Similarly, seedling corn is especially intolerant of salt stress. If your first irrigation this season is with lagoon water, consider blending with a fresh water source to help prevent this issue.

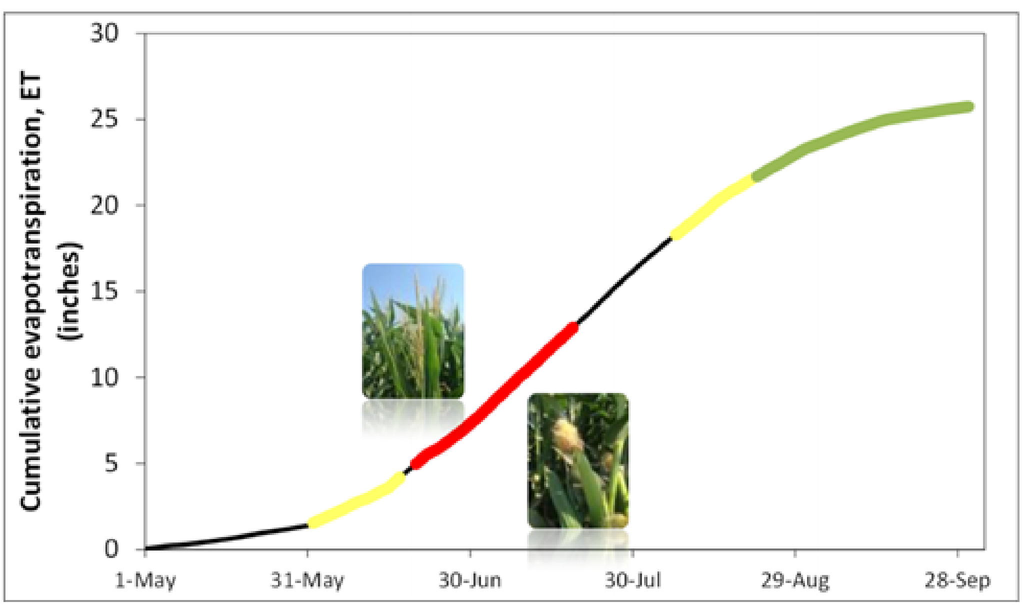

Figure 1. The most critical time to avoid water stress in corn (red line) is late vegetative to early reproductive stages.

Especially important to irrigation management for high yields in corn is irrigation timing. It is known that certain stages of corn's plant growth cycle are more sensitive to drought stress with respect to the potential to depress yield. Generally, these drought sensitive stages are in the late vegetative to early reproductive phases. Two weeks prior to tasseling and two weeks after silking are the most sensitive stages to drought stress as this period is highly determinant of grain yield (Lundy) (Figure 1). Earlier drought stress will reduce the biomass of stalks and leaves and diminish the plants' ability to draw from deeper soil profile reserves of water since roots will be less developed. It is also recommended to avoid drought stress during grain fill, however deficit irrigation during this phase should be managed in silage corn as physiological maturity is not desired and the crop is harvested relatively early at around the 50% milkline stage (Figure 3).

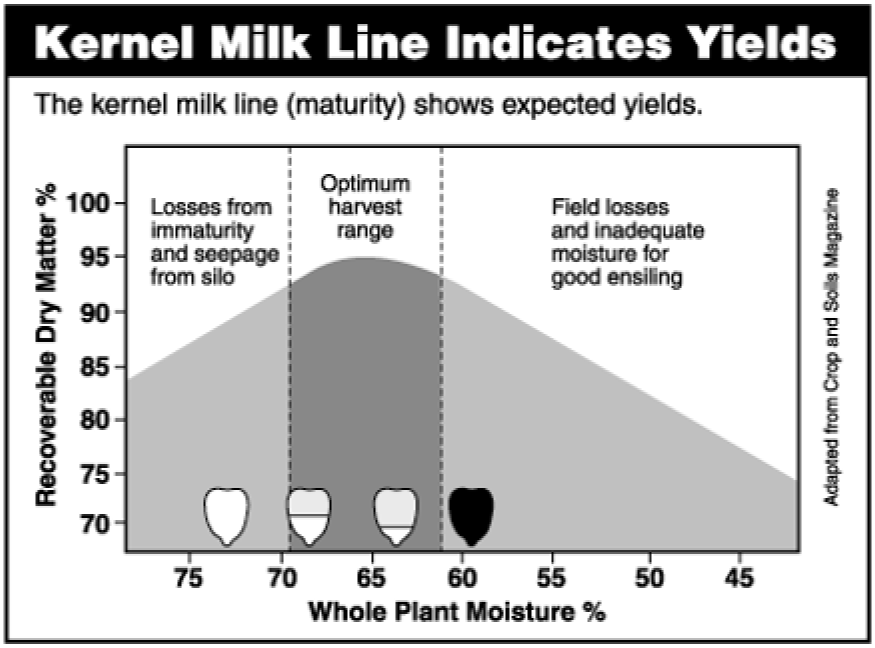

Figure 3. Relationship between milkine and silage moisture and its implication for harvest timing and silage quality.

On the other side of the coin, over-irrigation of corn can be detrimental to N management, as NO_3–N will follow with water that moves below the plant root zone. Additionally, soils restrictive to water infiltration such as those that are sodic or in need of gypsum, are finely textured, or have restrictive plowpan layers can exhibit ponding if over-irrigated. This ponding can reduce soil oxygen levels resulting in denitrification. If conditions last longer than 48 hours there can be stunting and even plant mortality. This is especially true in manured soils since waterlogged soils will promote the use of biologically available nitrogen by anaerobic bacteria, reducing root growth and halting processes such as nitrogen uptake. Thus, drainage is as important to manage as irrigation scheduling to avoid water related plant stress.

Harvest strategy

The best indicator of crop readiness for harvest is the milkline. The milkline, or division between solid and liquid endosperm in the kernel, also indicates whole plant moisture. Ideal harvest of silage corn is just below 70% plant moisture, indicated by a 50% milkline, to promote conditions favorable to fermentation while ensiled with a minimum loss of nutrients through seepage from the pile due to excess plant moisture (Figure 2).

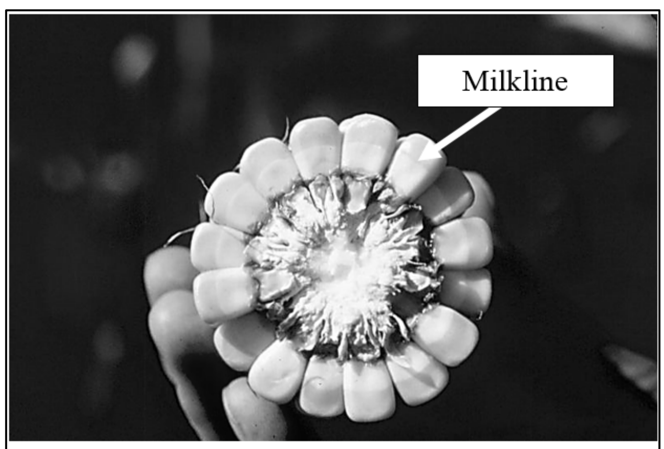

Figure 2. Milkline at approximately 50%

Factors which must be weighed in addition to plant indicators are the environment and time. The available water holding capacity of soils along with the forecasted evaporative demand must be considered in planning a cutoff date. For example, a coarser soil with low organic matter facing a week of hot, low humidity, windy conditions will be dry and ready for equipment to enter the field earlier than a fine soil with low temperatures and calm wind conditions, so the coarser soil could stand a later irrigation which would benefit grain-fill.

References

Lundy, M.E. (2015). Drought tip: Managing irrigated corn during drought. ANR Publication 8551, September, 2015. Available: http://anrcatalog.ucanr.edu/pdf/8551.pdf.

Managing Junglerice in Corn

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Carol Frate – Agronomy Farm Advisor Emeritus, Tulare County

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 in minimum till fields, as well as in other crops. Glyphosate products do not easily kill this weed unless the grass is quite small. Junglerice seed continues to germinate throughout the summer so even if 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

Junglerice, *Echinochloa colona*.
Photo by Jack Kelly Clark.

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 shown to be effective on control of young junglerice.

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.

Decision Support Tools for Alfalfa IPM

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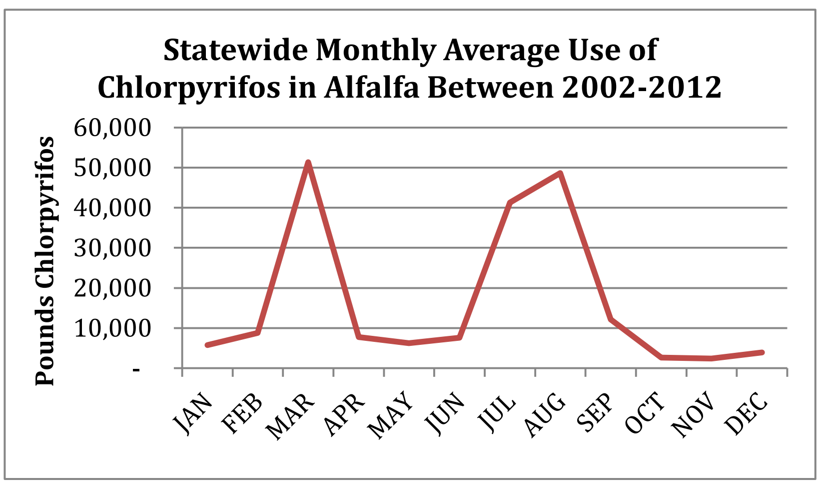
The issues surrounding the future use of the active organophosphate ingredient, Chlorpyrifos, are many. From environmental concerns of protecting surface water to chronic and acute human health risks, this active ingredient, better known as Lorsban and other product names, is under review.

In 2014, a facilitated process was conducted involving key alfalfa industry stakeholders to identify the role of Chlorpyrifos in alfalfa IPM. Eleven key pests were identified along a “*criticality spectrum*” ranging from occasional pests with alternatives to key pests with alternatives and finally, key pests with no few or no alternatives. To view the full report, click here or go to: http://ipm.ucanr.edu/IPMPROJECT/CDPR_Chlorpyrifos_critical_use_report.pdf



A key finding from this process was that Chlorpyrifos plays an important role in alfalfa IPM for the management of winter/summer aphids, weevils and summer worms, reflected in the monthly use pattern. When this project was gathering information, there were few or no alternatives to Chlorpyrifos for the most critical use pests; Blue Alfalfa Aphid, Cowpea Aphid and Alfalfa Weevil. Unlike other crops, alfalfa has not had the same number of insecticide registrations, including many of the more selective active ingredients useful against aphids. Several new active ingredients have been registered which can provide valuable alternatives to Chlorpyrifos. In addition, cultural and biological control practices are also available.

To Keep Chlorpyrifos in our IPM Toolbox....

We need to consider all options and employ alternate management and control practices whenever practicable. Chlorpyrifos is an important tool in alfalfa IPM and its use needs to be reserved for those situations where there are no alternatives.

During the past year, UC Statewide Integrated Pest Management Program (UC IPM) conducted five workshops statewide on alfalfa IPM with a focus on understanding and deploying alternative management approaches for insect pests against which Chlorpyrifos is used. One of the key elements of these workshops was the introduction of the Decision Support Tool.

The Decision Support Tool provides an easy way to navigate the content rich UC IPM Pest Management Guidelines for Alfalfa. By choosing your insect pests, quick links are provided which guide you directly to additional monitoring and population assessment information. The tool provides a complete list of best management practices including cultural (early cutting, resistant varieties, strip cutting), biological controls (conservation of critical natural enemies, evaluation of natural presence) and chemical control (selectivity, impact on environment, impact on beneficial insects, role in an IPM program).

Finally, the Decision Support Tool creates a PDF summary of information of all options with links for quick reference and can be stored on a mobile smart device. To access the Decision Support tool, click here or go to http://www2.ipm.ucanr.edu/decisionsupport/.

Decision Support Tool output for three alfalfa insect pests

Management options for alfalfa (in season):

Select if you are considering (👍) or not considering (👎) the management options below.

👍	👎	Management Options	Alfalfa Weevil (P1) (Pre-Season/In Season Options)	Blue Alfalfa Aphid (P2) (Pre-Season/In Season Options)	Western Yellowstriped Armyworm (P3) (Pre-Season/In Season Options)
○	○	Conservation of natural enemies	✗ / ⓘ	✗ / ⓘ	✗ / ⓘ
○	○	Early harvest	✗ / ⓘ	✗ / ✗	✗ / ⓘ
✗	✗	Grazing (sheep)	✓ / ✗	✗ / ✗	✗ / ✗
✗	✗	Light harrowing during winter	✓ / ✗	✗ / ✗	✗ / ✗
✗	✗	Burning	✓ / ✗	✗ / ✗	✗ / ✗
✗	✗	Resistant varieties	✗ / ✗	✓ / ✗	✗ / ✗
○	○	Border cutting	✗ / ✗	✗ / ⓘ	✗ / ⓘ
○	◉	Chemical control	✗ / 💧	✗ / 💧	✗ / 💧

Next ➔

Your selected chemical control options for alfalfa (in season):

Common Name (example trade name)	P1	P2	P3	MoA[1]	Selectivity[2]	Predatory mites[3]	General predators[4]	Parasites[4]	Honey bees[5]	Duration of impact to natural enemies[6]
Bacillus thuringiensis ssp. *kurstaki* (Xentari, Dipel ES)	✖	✖	✔	11A	narrow	L	L	L	IV	short
beta-cyfluthrin (Baythroid, Baythroid, Baythroid XL)	✔	✖	✖	3A	broad	H	H	H	I	moderate
chlorantraniliprole (Coragen, Altacor)	✖	✖	✔	28	narrow	L	L	L/M	IV	short
chlorpyrifos (Lorsban, Lorsban Advanced, Lorsban 15G, PT DuraGuard ME)	✔	✔	✖	1B	broad	M	H	H	I	moderate
flonicamid (Carbine, Beleaf)	✖	✔	✖	9C	narrow	L	L	L	IV	short
flubendiamide (Belt)	✖	✖	✔	28	—	L	L	L/M	I	short
flupyradifurone (Sivanto 200SL)	✖	✔	✖	4D	narrow	—	—	—	—	—
indoxacarb (Steward)	✔	✖	✔	22A	narrow	—	L	L	I	moderate
lambda-cyhalothrin (Warrior, Scimitar)	✔	✔	✖	3A	broad	H	H	H	I	moderate
methoxyfenozide (Intrepid, Intrepid 2F)	✖	✖	✔	18	narrow	L	L	L	IV	short
spinosad (Success, Entrust, GF-120, Entrust SC)	✔	✖	✖	5	narrow	L/H	M	L/M	III	short to moderate
zeta-cypermethrin (Mustang)	✖	✔	✖	3	broad	H	M	M	I	moderate

Surface Irrigation Workshop Highlights

Daniel Munk – Irrigation and Soils Farm Advisor, Fresno County

A surface irrigation workshop was held on June 3rd at the University's Kearney Research and Extension Center in Parlier focused on the evaluation and improvement of surface irrigation practices in the San Joaquin Valley. Approximately 50 growers, irrigator and industry supporters turned out to listen to speakers and participate in discussions related to efficient surface irrigation management.

Some of the key points made at the workshop included:

1. The rate of water movement down the field (advance rate) should be balanced with the water recession rate to achieve high field uniformity. Many surface irrigated fields have a disproportionate amount of time in which water is standing on the head end of the field resulting in much higher amounts of water being applied at the top of the field.

2. This advance rate can be controlled by varying the irrigation check on-flow rate or check width, while the recession rate is largely a function of the soils infiltration rate. In fields that have much higher application at the head end of the field, increasing the flow rate or decreasing check width or length can help reduce over application at the head end of the field and improve distribution uniformity (DU).

3. Modification of surface soil conditions can either increase or decrease the rate of water movement down the field and help manage DU. The workshop discussed methods to increase

surface roughness thereby reducing advance rate or by using amendments to modify soil or water quality characteristics.

4. New modeling efforts by USDA ARS allow growers to input basic water application characteristics to estimate current DU and application efficiency (AE) while estimating impacts when changing field application variables such as on-flow rate, run length, area irrigated, and field slope.

Toward the end of the program, discussion opened up to address some useful surface irrigation principles that would improve application efficiency and conversation highlighted the basic measurements needed to evaluate systems on a field by field basis. One grower said he was not aware of the computer modeling program and plans to look into this further so he can get good estimates of distribution uniformity in his field which can directly result in water savings by spacing his irrigation events further apart during the growing season.

Materials from the workshop can be found online at http://ucanr.edu/sites/irrigation_and_soils_/.

Announcements

California Alfalfa and Forage Symposium
When: November 29 through December 1, 2016
Where: Peppermill Reno in Reno, NV
Who should attend: Farmers, PCAs and CCAs, industry members, agency representatives, and anybody interested in issues related to alfalfa, grains, and forage.

For registration, hotel and travel info, and a schedule of events, see http://calhay.org/symposium/
For archives of last year's presentations, visit http://alfalfa.ucdavis.edu/+symposium/2015/index.aspx

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