Field Crop & Nutrient Notes
Vol. 1, Issue 1, March 2016
University of California
Agriculture and Natural Resources
Kings, Tulare & Fresno Counties
PRACTICAL • CONNECTED • TRUSTED

Welcoming New Farm Advisor

Steve Wright

I'm happy to announce that Nicholas Clark recently took the position as the new Agronomy and Nutrient Management Farm Advisor for Kings, Tulare, and Fresno Counties. His assignment is to cover alfalfa, corn, dry beans, oilseed and biofuel crops. Nick's disciplinary focus in these crops will be in agronomic practices from planting to harvest. Additionally, he is assigned to focus his efforts in nutrient management, including as it pertains to dairy manure systems.

Nick grew up with his family in Fresno and welcomes the opportunity to live near his hometown raising his young family. He received his Master's degree in Plant Science in 2014 from Fresno State. Prior to his current position, Nick worked alongside Extension Agronomy Specialist Bob Hutmacher and me for approximately two years. His work was primarily on the cotton fusarium race 4 program with studies conducted in Fresno, Tulare, and Kern counties. In addition, he assisted with small grain variety and nitrogen trials conducted in Tulare, Kings and Fresno counties.

Introduction

Nicholas Clark

I am very pleased to be here. I look forward to collaborating and participating with growers, PCA's, consultants, seed and chemical agencies, along with other allied industry in the most productive region of the world. My office is in Hanford in the Kings County Government Center Agriculture Building. You can stop in to see me at 680 N. Campus Drive, Suite A, in Hanford, CA 93230. You also can always reach me or leave a message on my direct office line at (559) 852-2788.

2016 Golden State Dairy Management Conference

March 8 – March 10, 2016,
Seaside, CA

This is the first annual Golden State Dairy Management Conference and will be hosted by University of California Agriculture and Natural Resources. Join me in meeting and learning from dairy producers, nutritionists, veterinarians, and other allied industry professionals in this inaugural event featuring presentations on California dairying from UC Farm Advisors, Specialists and UC Davis Faculty.

View the agenda here:
http://ucanr.edu/sites/CAdairyconference/Agenda/
Register here:
https://ucanr.edu/survey/survey.cfm?surveynumber=16669

UCCE •4437B S. Laspina St. Tulare, CA 93274 • Phone (559) 684-3300 • Fax (559) 685-3319 • Website: cetulare.ucanr.edu

Milk Your Water for All the Corn It's Worth

An Excerpt from the Golden State Dairy Management Conference Proceedings
Nicholas Clark and Steven D. Wright

Since 2013, there have been up to about 600,000 acres of corn planted throughout California, of which approximately 70% are for silage. The rest are for grain and some scattered plantings of sweet corn, ornamental corn, and popcorn. The greatest concentration of silage corn is planted near dairies in the San Joaquin Valley (SJV). Ongoing drought conditions in California since 2012 have resurged interest in best irrigation strategies for corn production. Corn, a high energy value feed crop in dairy silage rations, uses approximately three acre feet of water per crop, and irrigation strategy is a major key in achieving appropriate tonnage and quality of yield.

Season-long farm management decisions will affect water use efficiency (WUE) of corn. Beginning at preplant, several decisions such as varietal maturity, planting date, weed control, and soil fertility management need to be made in the context of understanding certain on farm limitations such as irrigation water quality, irrigation system capacity, and seasonal availability of water for other crops. In-crop decisions such as irrigation timing and nitrogen fertilizer management can be made to minimize plant stress which would lead to yield loss. Finally, several plant-based and environmental indicators can be used to determine an irrigation cutoff date in preparation for an ideal harvest.

Preplant decisions

Know the quality of your irrigation source(s). The last several years have seen increases in new irrigation wells and depth to groundwater which has brought higher salinity in irrigation water for some farms. Corn is moderately sensitive to soil salinity (Table 1). When fresh water is available and a loss of nitrate-nitrogen (NO_3–N) risk is minimal, leaching salts from the soil profile can reduce the accumulation of damaging salts. Managing salt stress is important not only to minimize yield loss, but also because salt-stressed plants exhibit lower WUE.

Table 1. Yield Limits on Corn by Soil Salinity		
Saturated Paste EC (dS/m)	< 1.7	5.9
Yield Potential (%)	100	50

Also consider the availability of water for other crops on the farm. Sorghum has been shown to yield high biomass with less annual water use than corn, but the nutritional value of corn is better known and is a preferred crop by SJV dairies. Alfalfa forage is highly valuable as a protein source and is a formidable competitor for irrigation water. Since the highest quality dairy cuts may be made in the first half of the year and alfalfa is resilient to summertime deficit irrigation, water may be diverted from alfalfa to corn during the summer to ensure adequate supply for corn. **The opposite is not true since corn is relatively sensitive to drought stress**. If water availability is expected to be unavoidably short and corn is the choice crop, consider an early maturing variety which will use less annual water and still achieve a high quality yield.

Table 2. Available Nitrogen Estimator

Soil	
Calculate residual soil NO_3–N fertilizer value per foot depth tested	*test ppm NO_3–N * 4 = lbs NO_3–N in one acre foot*
Irrigation Water	
Calculate irrigation water NO_3–N fertilizer value	*test ppm NO_3–N * 0.23 * inches water applied = lbs NO_3–N applied*
Manure	
Mineralized N in lagoon water	*40-50% the first year; 15% the second year*
Mineralized N in lagoon sludge/slurry; corral manure	*20-30% the first year; 15% the second year*
Mechanical screened solids	*10-20% the first year; 5% the second year*

Preplant analyses of soil and well-water NO_3–N should be made in order to properly plan early and season-long N fertilization. Silage producers should work with their PCAs and CCAs to properly credit soil NO_3–N, previous crops' residue, and applied manure solids and test lagoon water NO_3–N when it's used as a pre-irrigation before recommending the application of additional preplant N fertilizer (Table 2). If the entire season's N is not applied preplant, a banded side-dress application of urea ammonium nitrate (UAN), water-run ammonia, or lagoon water are advised in order to make NO_3–N available to the crop when it is needed (CDFA-FREP).

A vigorous, competitive crop produced through proper seedbed preparation, variety selection, seeding rates, fertilization, irrigation, cultivation, pest control, and crop rotation is the best defense against problems. A well-managed corn crop is extremely competitive with most weeds. Good cultural practices combined with timely cultivations often control weeds sufficiently to maximize yields and profit without the use of an herbicide. Use caution in Roundup Ready crop systems to not apply more than the recommended seasonal amount of Roundup and to use a variety of weed control methods such as that mentioned above as well as rotating herbicides with different modes of action to reduce the risk of developing Roundup resistant weed populations.

Keep in Mind for Later

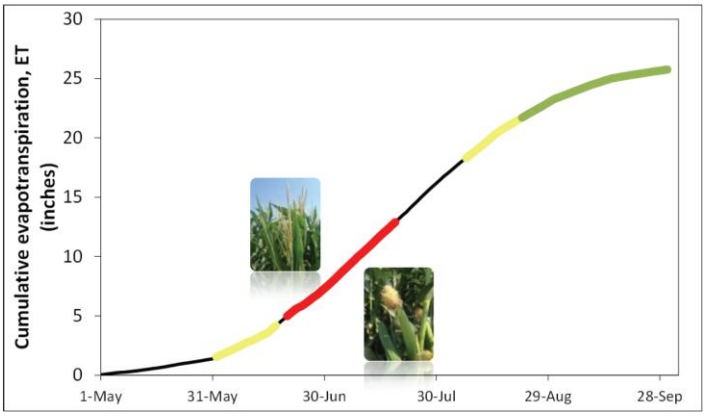

Figure 1. The most critical time to avoid water stress in corn (red line) is late vegetative to early reproductive stages.

Irrigation timing is key to avoid drought stress at critical stages which would result in the highest yield loss. 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 straw and diminish the plants' ability to draw from deeper soil profile reserves of water since roots will be less developed.

References

California Department of Food and Agriculture, (2016). *California Fertilization Guidelines*. Available: https://apps1.cdfa.ca.gov/FertilizerResearch/docs/Corn.html.

Hanson, B., Grattan, S. R., and Fulton, A., (2006). *Agricultural Salinity and Drainage*. University of California, Davis, Division of Agriculture and Natural Resources, Publication 3375.

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

2015 Annual Western Alfalfa & Forage Symposium – Reno, NV

Three take-home messages for those who couldn't attend

Nicholas Clark

It's all about ET (evapo-transpiration, not the Steven Spielberg alien).

This year at the symposium, the entire first day was dedicated to everything "irrigation." It's no surprise that attendees, especially those of us from California, would be thirsty for this session as we were nearing the end of a fourth year in a row with abysmal rainfall and equally troubling surface water allocations (if there was any). *Evapo-transpiration* – the process by which plants pass soil water from uptake in their roots to evaporation through their leaves into the atmosphere – was the word of the day. This was simply because ET was the common thread that was able to pull together the wide variety of topics ranging from basic irrigation management principles, to understanding crop demand and soil characteristics when scheduling irrigation, to the development of tools (such as quick test strips, and remote sensors) and models (based on ET or soil moisture) that aid in improving irrigation efficiency, to an update in practical examples from researchers and industry professionals that promise to or have already improved irrigation efficiency for forage growers. A compelling comment which highlighted the difficult decisions growers make with regard to on farm water diversions in times of shortage came from Dan Putnam, UC Extension Specialist of Alfalfa, who I'll paraphrase as stating "in a situation of growing alfalfa in a drought, we should consider the relatively high water use efficiency of alfalfa, a plant that yields a lot of 'crop per drop' of water applied."

Access the whole suite of video recorded and slideshow presentations here:

http://alfalfa.ucdavis.edu/+symposium/2015/workshop.aspx.

2016 high quality hay market outlook is a mixed bag.

Seth Hoyt, of *The Hoyt Report, Inc.: Hay Market Analysis and Insights*, reported that the many confounding factors which made the 2015 alfalfa hay year difficult – drought, low milk prices, high production and storage of mid-grade hay for dairies, diminished Japanese and Korean import markets, a West Coast port labor dispute, and a continuance of China's policy to exclude GMO (RoundUp Ready) alfalfa – make the 2016 outlook especially difficult to predict. The conclusion was that as barn stocks are used up, the dairy demand for higher quality hay should begin to rise, especially depending on milk prices, however planted acreage is expected to decrease.

Read the proceedings report here:

http://alfalfa.ucdavis.edu/+symposium/2015/PDFfiles/Hoyt%20Seth.pdf

Give due credit to residual soil nitrogen.

Eric Lin's paper and presentation, also presented two and a half months earlier at the 2015 Kearney Alfalfa and Forage Field Day, presented much needed data from California on the contributions of irrigated alfalfa to plant available nitrogen for a following crop of irrigated wheat for silage. Lin found that wheat grown to the soft dough stage after sudangrass required substantial addition of nitrogen fertilizer to achieve the same yield level as wheat grown after 2+ years of alfalfa with some variation between sites. What does it mean? Since all farmers in California are now in the same boat with regard to reporting nitrogen application and take-off rates, attention to detail in properly crediting the previous season's contributions to soil nitrogen (not just from legume N_2 fixation, but also from crop residue and organic amendments such as manure) has become more important than ever. Working with and trusting your PCAs and CCAs to analyze preplant soil tests to plan your fertilizer and/or manure applications with you is the best way to stay in sync with your crop's early nitrogen demand and predict when and how much your next application should be. One thing not discussed in Lin's paper regarding wheat was the importance of later applications of nitrogen to achieve desirable grain protein yields of at least 13% to avoid discounts at the grain elevator. So, while it's undeniably important to consider what the previous activities in your cropping pattern can do to satisfy your current crop's nitrogen demand, it's even more important to follow-up with tissue samples in season (mid-late vegetative stage for wheat) to determine the nitrogen needs for finishing off the season right – good, high quality yields with a manageable amount of nitrogen left over for the next crop.

Read Eric Lin's paper here:

http://alfalfa.ucdavis.edu/+symposium/2015/PDFfiles/Lin%20Eric.pdf\

Find all of the video recorded and slideshow presentations of the symposium here:

http://alfalfa.ucdavis.edu/+symposium/2015/index.aspx

University of California
Cooperative Extension
Tulare County
4437B S Laspina St
Tulare CA 93274-9537

Nonprofit Org
US Postage Paid
Visalia CA 93277
Permit No. 240

Field Crop & Nutrient Notes

March 2016

Nicholas Clark
Area Farm Advisor - Kings, Tulare & Fresno Counties
Field Crops & Nutrient Management
neclark@ucdavis.edu
559-852-2788