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University of California
Agriculture and Natural Resources
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Kern County Field Crops

November 2013

2013 Kern County Wheat Variety Performance Trial

The 2013 California wheat crop was 690,300 acres including 71,300 acres of Durum wheat. Non-durum acreage increased by 19,000 acres, a modest 3% increase from 2012. Durum wheat acreage decreased almost 50%. The multi-year Durum acreage average is 110,000 acres with the low and high at 65,000 acres and 176,000 acres in 2006 and 2009, respectively. Over half of the common wheat acreage was planted to Joaquin (85,000 acres), PR 1404 (80,000 acres), Patron (64,000 acres), Cal Rojo (55,000 acres), and Summit (48,000 acres). This represents a slight change in variety preference. There were increased plantings of Patron and Summit. Blanca Grande 515 (37,500 acres) led the hard white wheat acreage in the state and the San Joaquin Valley. Orita (33,000) was the leading durum variety. Volante, Platinum and Westmore were the most widely planted Durum wheat varieties in the San Joaquin Valley representing 80% of the acreage.

Cereal grain variety evaluations were conducted at multiple locations throughout California. The Kern County results are shown in Tables 1 and 2. The tests included advanced breeding lines but only the top yielding experimental variety is included in these tables. Multi-site/year averages and additional information are included in an Agronomy Progress report published annually. Copies are available at the local county extension office or on the web at

http://agric.ucdavis.edu/crops/cereals/cereal.htm.

Varietal differences in Stripe Rust resistance, based on observations from the 2013 University of California statewide variety tests, are as follows:

Common Wheat

Highly Susceptible:	Anza, Joaquin, Mika, Triple IV, FV 2808
Susceptible:	Express, Redwing, PR 1404, Ultra
Resistant:	Blanca Royale, Blanca Grande 515, Cal Rojo, Lassik, New Dirkwin, Patwin, Patwin 515, WB-Patron, WB-Joaquin Oro, WB-Perla

Table 1. 2013 Kern County Durum Wheat Variety Trial Results.

Cultivar	Yield	Test Weight	Plant Height	†BYDV	Black Point	Protein	Lodging Harvest
	-- lbs/acre --	-- lbs/bu --	-inches -			-- % --	
Topper	9000	63.9	43	1.3	1.5	9.65	3.3
Desert King	8850	62.9	39	1.5	2.5	11.39	2.0
Saragoll	8670	63.6	38	1.3	1.5	9.72	4.3
Maestrale	8500	63.0	42	1.3	1.5	10.73	5.3
Q-Max	8190	61.1	44	1.0	1.0	10.71	1.3
Platinum	7970	62.3	36	1.5	2.0	11.44	1.5
Volante	7910	62.3	36	1.8	2.0	10.43	1.0
Westmore	7850	61.3	38	1.3	1.0	11.52	6.5
††UC 1690	8660	63.3	41	1.3	1.5	11.16	5.8
Mean	7940	61.6	39	1.5	1.8	10.66	3.9
CV %	7.5	1.5	3.4	39.3	32.0		30.1
$LSD_{0.05}$	840	1.9	2	0.8	1.1		1.7

†Ratings scale for diseases (area of flag leaf affected): 1 = 0-3%, 2 = 4-14%, 3 = 15-29%, 4 = 30-49%, 5 = 50-69%, 6 = 70-84%, 7 = 85-95%, 8 = 96-100%.
BYDV, lodging, and black point ratings (see scale above) were based on percentage of plants (or seeds) showing symptoms.
††Top yielding experimental variety included for comparison.

Planted:	December 2012
Prior Crop:	cotton
Fertilizer:	about 375# N total
Seeding Rate:	1,200,000 seeds/acre
Water Applied	about 2.5 acre feet
Harvested:	July 2013

Table 2. 2010 Kern County Common Wheat and Triticale Variety Trial Results.

Variety	Yield	Test Weight	Plant Height	†BYDV	Protein	Lodging Harvest
	-- lbs/acre --	-- lbs/bu --	-inches -	5/17	%	
Wheat						
Joaquin	8800	64.0	41	2.3	11.36	2.3
WB-Joaquin Oro	8450	64.0	43	3.0	12.17	1.0
Blaca Fuerte	8330	65.4	37	1.5	10.15	1.0
Redwing	8310	61.8	36	2.0	10.34	1.0
Summit 515	8210	63.	38	1.0	10.48	1.0
Blanca Royale	7930	62.6	38	1.0	10.89	2.0
Lariat	7930	63.0	38	2.0	10.30	1.3
Cal Rojo	7880	61.8	37	1.3	11.07	1.0
Patwin 515	7870	62.3	36	1.8	10.80	1.0
WB-Perla	7660	63.6	40	2.0	11.94	1.5
Blanca Grande 515	7870	62.3	36	1.8	10.80	1.0
Lassik	7620	62.7	39	1.5	10.60	2.8
Ultra	7570	63.4	37	1.5	11.05	1.8
SY 314	7540	60.1	38	1.5	11.09	1.0
Patwin	7530	61.3	39	2.0	11.64	2.3
Atomo††	8590	63.6	38	1.5	10.82	1.3
Triticale						
Trical 118	8380	58.2	44	1.0		1.0
SY 115T	8170	57.7	40	1.0		1.8
Trical 105	8060	58.7	45	1.8		2.8
Camelot	7820	55.1	45	1.3		1.5
SY 158T	7460	55.3	33	1.3		1.0
Mean	7510	61.6	40	1.2	11.22	2.6
CV %	5.3	0.3	3.3	26.5		46.6
$LSD_{0.05}$	620	1.2	2	0.43		1.7

†Ratings scale for diseases (area of flag leaf affected) and lodging: 1 = 0-3%, 2 = 4-14%, 3 = 15-29%, 4 = 30-49%, 5 = 50-69%, 6 = 70-84%, 7 = 85-95%, 8 = 96-100%.
BYDV and lodging (see scale above) were based on percentage of plants (or seeds) showing symptoms.
††Top yielding experimental variety included for comparison.

Nitrogen Fertilizer Recommendation Based on Early-Spring Chlorophyll Meter Readings

Nitrogen fertilizer is the most used and often the most mismanaged nutrient input. Nitrogen management has tremendous implications on crop productivity, quality and environmental stewardship. Sufficient nitrogen is needed to optimum yield and quality. Soil and in-season plant tissue testing for nitrogen status are a time consuming and expensive process. Real time sensing of plant nitrogen status can be a useful tool in managing nitrogen inputs. The following is the result of two year's data of a multi-location project to assess the usefulness of using chlorophyll meters for making nitrogen fertilizer recommendations in wheat.

Plots at multiple locations in the southern San Joaquin Valley had nitrogen applications of 0, 100, 200, and 300 lbs. nitrogen per acre applied at planting. At growth stage Feekes 5, nitrogen was applied so that each plot had received a total of 300 lbs N/acre. Plant nitrogen status was tested at Feekes 3, 5 and 8 and 10 (tillering through flag leaf extension). Plant nitrogen measurements were made by reflectance, transmittance/absorbance, and wet chemistry.

Good correlations (R^2>0.52) were observed between meter readings and V5 nitrogen concentration (Figure 1). There were some differences between varieties at the different locations. The difference between the meter reading of the well fertilized treatment and the other treatments was calculated. Very good correlation was observed (R^2=0.69) for the SPAD meter readings (Figure 2).

Grain yields were equivalent for all locations where total nitrogen applied was the same. The total nitrogen applied was greater than the typical amount (50 to 100 lbs N/A depending on yield potential). There was not a decline in yield for over fertilization that can occasionally occur. Once the crop was sufficiently fertilized meter readings became inconclusive and were of no benefit for determining nitrogen status, silage yield and protein and grain yield and protein.

Early season nitrogen fertilizer recommendation is as follows:

Apply the expected full nitrogen fertilizer rate on a reference area at least three weeks prior to sampling where plants are actively growing. The reference area should be representative of the field and can be several small areas throughout the field or a strip through the field. SPAD meter measurements should be made mid leaf on the upper most fully exposed leaf for greatest consistency and accuracy. Plants and leaves that are not representative of the field, under stress or insect damaged should not be sampled. At Feekes 5 to 6, compare the readings from the reference areas to readings from the remainder of the field. Because individual plants vary, at least 30 readings should be made throughout the field and reference area. The difference between the averages of the readings will give an indication of the need for additional nitrogen fertilizer.

The nitrogen rate calculation is: $N = 45 + 14D$

where

N = Recommended Nitrogen Rate in lbs N/A
D = Difference in SPAD meter reading between measured crop and reference area

As an example, if the average meter reading between the fertilizer reference sites and the field was 10, then the recommendation nitrogen fertilizer rate would be 45 + (14 * 10) for a total of 185 lbs N/A.

Figure 1. V5 Tissue Nitrogen Concentration versus SPAD Reading.

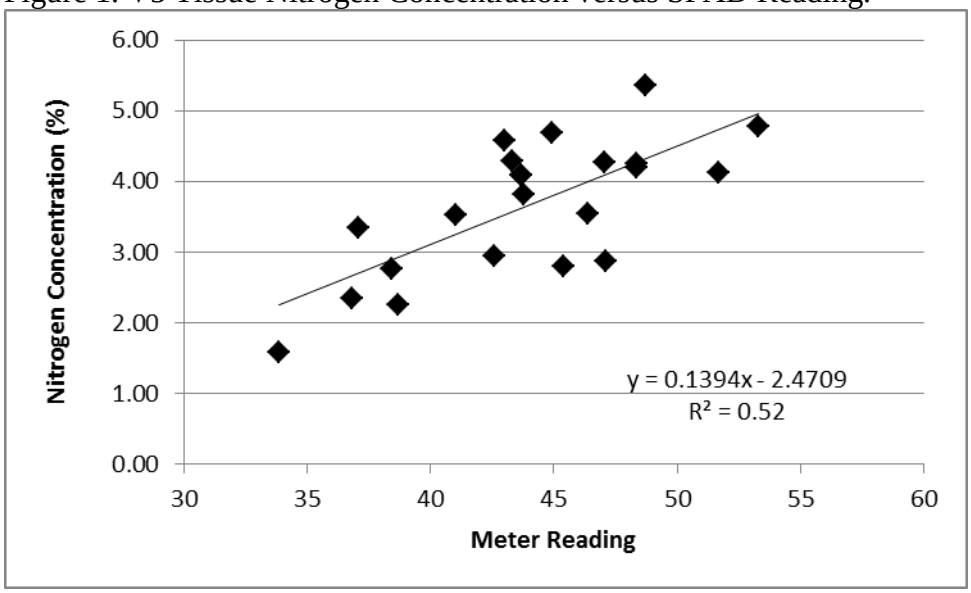
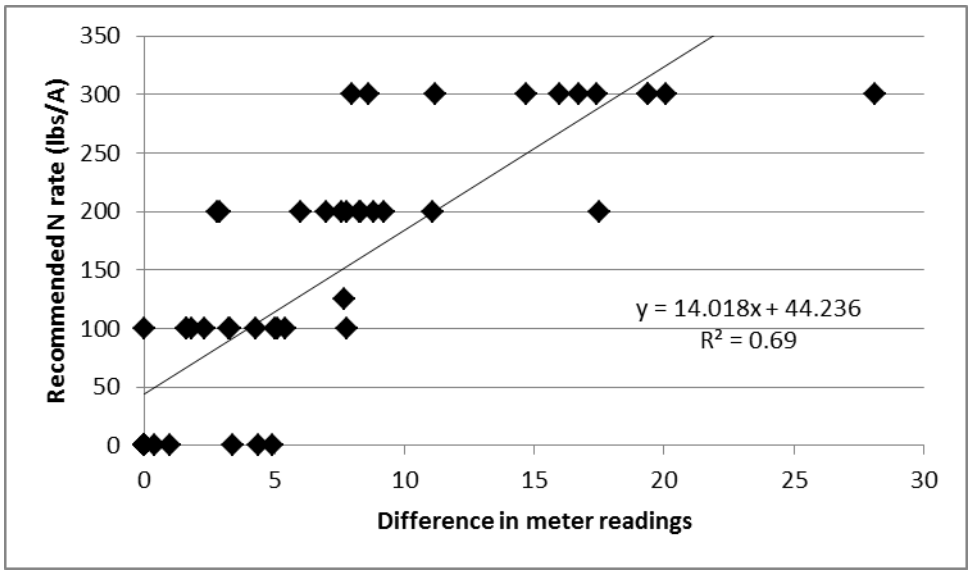


Figure 2. Recommended Nitrogen Rate versus SPAD Differential.



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