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Southern San Joaquin Valley Small Grain Variety Performance Trials

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Small grain variety tests were conducted at multiple locations throughout California. The results are shown on the following pages. An Agronomy Progress Report containing more detailed results from all trials which is available on the web at <http://agric.ucdavis.edu/crops/cereals/cereal.htm> or at the Extension Office. The 2003 California wheat crop was 560,600 acres including 90,100 acres of Durum wheat. Yecora Rojo (128,500 acres), Bonus (77,500 acres) and Express (73,800 acres) were the leading non-durum wheat cultivars by acreage. Kronos was the leading durum variety with 61,000 acres. The tests included advanced breeding lines but only the top commercial varieties are included in **Tables 1-7** (on Pages 2, 3 4 & 5).

Stripe Rust

Stripe rust had a significant impact on grain yield in 2003. Reported yield losses from different locations and varieties ranged from 5% to 75%. As a result, 18 counties have filed for Federal Disaster assistance. Wheat varieties have different levels of genetic resistance to Stripe Rust and as new races of rust develop, the resistance breaks down. Environmental conditions during most of the growing season favored Stripe Rust development. Rust development stops when temperatures exceed 80°F. With the exception of two 3-day periods in late March and early April, day-time high temperatures were not above 80°F until mid-May, more than two weeks later than the long-term normal.

Multiple factors contributed to the severe yield loss to the California central valley wheat crop from Stripe Rust. The most often cited factor is the increasing acreage of early-planted susceptible wheat varieties grown for silage. This early-planted acreage served as a source of inoculum for spreading the disease. Next was the near perfect weather conditions during the 2002-03 growing season that was ideal for the development and spread of the disease. And finally, the genetic adaptability of the Strip Rust organism to develop new races capable of infecting a wide range of host plants.

The combination of these factors resulted in the significant yield losses experienced in susceptible wheat varieties planted for the 2003 harvest. While there are no guarantees the central valley will experience similar conditions during the 2003-04 growing season there are proven steps growers can take to prevent the reoccurrence of the disastrous results of 2003.

- First and foremost, select and plant moderately resistant or resistant varieties.
- Secondly, a well-timed fungicide application has been shown to reduce the yield loss in moderately susceptible to susceptible varieties (see fungicide results).

Figure 1 (on Page 2) shows the linear relationship of grain yield to the incidence of Stripe Rust recorded on the May 9th rating at the Kings County sites. The regression equation estimates that for every unit increase in Stripe Rust there is a 794 lbs grain yield loss. A similar analysis of data from seven central valley Regional Variety trials, all experiencing Stripe Rust damage, produced an average yield loss of 757 lbs per unit increase of Stripe Rust ratings.

Growers are encouraged to use this information to avoid a repeat of the disastrous losses experienced last year. No one can guarantee we will not experience another season like last year so it would be wise to hedge your risks by selecting resistance varieties to plant for 2004.

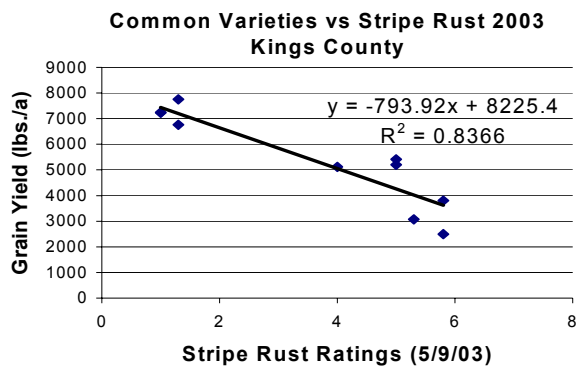


Figure 1. Stripe Rust affects to common wheat grain yields

Stripe Rust resistance based on observations from the University of California statewide variety tests:

- Highly Susceptible:** Dirkwin, Bonus, Brooks, Cavalier
- Susceptible:** Yecora Rojo, Anza, Klasic, Eldon, Yolo, Kern, Serra
- Moderately Susceptible:** Express
- Moderately Resistant:** Stander
- Resistant:** Summit, Blanca Grande, Plata

Fungicide Trials

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This year, more fungicide applications were made to wheat than ever before. Field experiments evaluating fungicides were conducted in Glenn, Butte, Colusa and San Joaquin (Delta) counties. Even though Quadris fungicide was applied after disease was well established, treated Express plots averaged about 1,000 lb/acre more than untreated plots. In one experiment in Glenn County with the highly susceptible variety Bonus, plots treated with Quadris yielded about 2,000 lb/acre more than untreated plots.

Table 8 (on Page 4) shows the results of the trial conducted on Victoria Island in the Delta region. This is thought to be the optimum trimming. A late treatment was applied after heading when rust has developed in the spiklets. Results of the early (pre-head) timing showed a yield increase with most fungicides and better grain quality. The late application was of little value for yield or quality

Table 1. Common Wheat Grain Yields - Southern San Joaquin Valley

	Kern	Kings	Madera	2003 (3 Loc)	2001-03 (9 Loc)	Tulare Rainfed 2002-03 (2 Loc)
Anza	4,040	5,280	5,800	4,370	5,320	1,600
Yecora Rojo	2,880	3,800	1,400	2,700	4,680	1,725
Yolo	4,010	5,000	2,610	3,870	5,560	1,395
Klasic	3,920	5,410	2,750	4,030	5,670	1,865
Serra	4,730	5,290	2,670	4,230	5,230	1,995
Express	5,590	5,120	4,600	5,110	5,430	1,650
Cavalier	2,400	3,640	580	2,210	4,820	1,745
Brooks	1,260	2,490	250	1,330	4,560	1,750
Bonus	1,760	3,070	1,630	2,150	5,040	2,010
Kern	4,840	5,200	2,990	4,350	5,630	1,750
Eldon	3,610	2,880	1,790	2,760	4,910	1,445
Stander	6,450	6,760	6,210	6,470	6,140	1,655
Summit	8,170	7,240	6,440	7,280	6,600	1,565
Blanca Grande	6,900	7,750	4,850	6,500	6,410	1,610
Plata	7,960	7,230	6,540	7,240	6,660	1,735
Beth Hashita	6,640	6,220	5,270	6,040	5,710	1,505
Dariel	3,690	3,720	1,830	3,080	4,970	1,540
Kama	3,670	4,530	2,420	3,540	5,060	1,530
Wincal 14	5,030	5,300	4,030	4,790	5,810	

Note: The Kings County trial was treated with Quadris

Table 2. 2003 Common Wheat Disease Summary

	Stripe Rust			Leaf Rust		
	Madera	Kings	Kern	Madera	Kings	Kern
Anza	4.0	3.5	4.8	1.0	1.0	1.0
Yecora Rojo	8.0	5.8	6.8	1.0	1.0	1.0
Yolo	8.0	5.8	6.0	1.0	1.0	1.0
Klasic	8.0	5.0	7.3	1.0	1.0	1.0
Serra	4.8	3.8	4.0	1.0	1.0	1.8
Express	4.5	4.0	4.0	1.0	1.0	1.3
Cavalier	8.0	6.0	7.3	1.0	1.0	1.0
Brooks	8.0	5.8	8.0	1.0	1.0	1.0
Bonus	8.0	5.3	7.5	1.0	1.0	1.0
Kern	8.0	5.0	5.5	1.0	1.0	1.0
Eldon	8.0	6.6	6.8	1.0	1.0	1.0
Stander	3.0	1.3	1.5	2.3	2.3	4.0
Summit	1.0	1.0	1.3	1.8	1.0	1.0
Blanca Grande	1.0	1.3	1.0	2.8	1.8	4.3
Plata	1.0	1.0	1.0	4.8	2.8	1.8
Beth Hashita	1.0	1.0	1.0	2.3	1.5	1.8
Dariel	7.8	4.8	6.5	1.0	1.0	1.0
Kama	4.0	4.0	4.3	1.0	1.0	1.0
Wincal 14	1.5	2.0	2.8	1.0	1.0	1.0

Rating scale for diseases (area of flag-1 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%

**Table 3. 2003 Common Wheat Grain Protein, Plant Height and Test Weight Summary
Southern San Joaquin Valley**

Cultivars				Plant Ht (in)		Test Wt			
	Madera	Kings	Kern	Mean (3 Loc)	Mean (3 loc)	Madera	Kings	Kern	Mean (3 Loc)
Anza	11.3	12.1	12.5	11.9	39	55.2	62.5	60.8	59.5
Yecora Rojo	13.4	13.0	13.4	13.2	36	46.8	60.0	56.4	54.4
Yolo	10.9	11.2	11.8	11.3	37	50.4	61.0	54.8	55.4
Klasic	12.1	12.6	12.3	12.3	34	56.0	62.4	59.0	59.1
Serra	11.4	13.0	13.8	12.7	39	52.0	62.5	60.4	58.3
Express	12.6	13.3	14.5	13.5	41	58.6	63.0	59.6	60.4
Cavalier	13.9	12.3	12.4	12.9	34	38.4	56.6	54.6	49.9
Brooks	-	12.9	13.8	-	35	-	57.5	47.6	-
Bonus	13.0	12.6	13.2	12.9	33	47.1	57.0	49.8	51.3
Kern	12.0	11.8	11.9	11.9	33	56.9	63.4	61.4	60.6
Eldon	13.5	13.9	13.5	13.6	40	46.6	56.2	55.6	52.8
Stander	11.3	13.4	13.2	12.6	34	63.3	62.7	61.5	62.5
Summit	12.2	13.4	13.6	13.0	38	63.7	63.1	63.4	63.4
Blanca Grande	11.4	14.1	14.6	13.4	39	64.8	64.8	64.8	64.8
Plata	11.0	13.0	12.8	12.3	38	62.5	64.5	64.9	64.0
Beth Hashita	11.2	12.7	12.7	12.2	35	62.8	62.5	62.2	62.5
Dariel	11.7	12.0	11.8	11.8	39	46.8	59.8	58.1	54.9
Kama	11.6	12.1	11.9	11.9	38	47.7	60.6	54.4	54.2
Wincal 14	12.5	13.0	13.4	12.9	39	58.9	63.1	62.3	61.4

Table 4. 2003 & 2001-2003 Durum Wheat Yield & Protein Summary (lbs/acre)

	San Joaquin Valley (Madera, Kings & Kern)			Central Valley		
	2003 (3 loc)	2002-03 (6 loc)	2001-03 (9 loc)	% Protein		
				Madera	Kings	Kern
Cultivars						
Yecora Rojo (hrs)	2960	4610	4890	-	-	-
Bravadur	5660	-	-	13.3	14.3	14.6
Duraking	5810	6400	6720	13.6	12.8	13.1
Kofa	5000	5720	5520	12.3	13.5	13.7
Kronos	5450	5680	5580	13.2	14.0	14.3
Ria	5220	5600	5400	12.8	14.6	13.9
Mohawk	5680	6300	6060	12.5	12.9	13.7
Deluxe	5710	6120	5900	12.9	13.7	14.5
Crown	6770	6690	6260	12.3	14.7	15.0
Matt	5450	5700	5470	13.0	14.2	14.5
Platinum	7060	7040	6520	11.2	13.1	13.6
Topper	5640	6110	5850	12.2	12.9	13.2
Orita	5110	5920	5610	13.8	14.9	15.4
Candura	5230	5530	5330	12.8	14.9	14.5

Table 5. 2003 Durum Wheat Disease and Lodging Summary

	Stripe Rust			Black Point			Lodging (Harvest)	
	Kings	Madera	Kern	Kings	Madera	Kern	Kings	Kern
Cultivars								
Yecora Rojo (hrs)	5.8	8.0	8.0	1.5	1.5	1.0	1.0	6.5
Bravadur	1.0	1.5	1.5	1.0	1.0	2.0	1.8	7.8
Duraking	1.3	2.8	3.3	1.0	1.0	1.0	1.0	3.3
Kofa	4.0	8.0	6.5	1.0	1.5	2.0	3.8	6.5
Kronos	1.5	3.5	3.5	2.0	1.0	1.0	4.5	8.0
Ria	3.0	4.0	4.3	2.0	1.0	2.0	1.0	5.0
Mohawk	2.3	4.3	3.3	1.0	1.0	1.0	6.3	7.8
Deluxe	2.0	4.5	4.5	2.0	1.0	2.0	1.0	3.8
Crown	1.0	2.0	1.5	2.0	1.0	2.0	1.0	4.0
Matt	1.8	2.5	2.8	2.5	1.0	2.0	3.8	7.8
Platinum	1.0	2.5	2.0	1.0	1.0	1.0	1.0	4.0
Topper	1.0	3.0	2.8	2.0	1.5	1.5	1.0	5.5
Orita	1.0	3.5	4.0	2.5	1.0	3.5	1.0	5.0
Candura	2.5	4.0	4.3	2.0	2.5	2.0	1.0	3.5

Table 6. Kings County Triticale Test

	Yield (lbs/acre)	Test Wt (lbs/acre)	1000 Kernel Wt (g)	Plant Ht (in)	Stripe Rust
					5/8
Cultivars					
Juan	6730.0	55.5	54.9	57	3.5
Trical 105	8230.0	59.9	51.8	50	1.0
Trical 96	7280.0	60.8	43.8	41	3.8
Trical 111	7290.0	55.9	49.7	47	1.0
Yolo (hrs wheat)	5100.0	60.7	29.2	40	5.5
Mean	6930.0	58.6	45.9	47	3.0
CV	4.0	0.9	4.0	2.1	14.5
LSD (.05)	420	1.5	5.1	3	0.7

Rating scale for diseases (area of flag-1 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%

Table 7. 2003 & 2001-03 Barley Yield Summary (lbs/acre)

Cultivars	King, Madera			Rainfed Tulare		
	2003 (2 loc)	2002-03 (4 loc)	2001-03 (6 loc)	2002-03	Test Wt	Plant Ht
	UC 603	5640	5290	5100	2065	47.5
Max	5430	5740	5090	1370	50.6	16
Patti	7060	6460	6410	2005	47.6	19
UC 933	6260	5940	6120	2190	45.6	22
UC 937	6040	5990	5990	2475	46.8	23
Meltan	4090	3620	3970	2370	54.9	20
UC 696	5080	5080	5220	2195	47.7	22

Table 8. Fungicide affect on grain yield and rust incidence – San Joaquin Co.

Treatment	Rate lbs/a	Timing	Flag Leaf	Yield lbs/a	Bushel Wt. lbs/bu	Rust Infected
			Rust Control %			Kernels %
Untreated			0	2941	53	56
Tilt	0.28	Pre-heading	92.4	3816	58	35
Folicur	0.28	Pre-heading	81.5	3584	57	35
A13705	0.33	Pre-heading	98.6	4274	59	30
A13705	0.44	Pre-heading	98.2	3872	58	33
A13705	0.44	Pre-heading	92.3	3912	58	32
Stratego	0.40	Pre-heading	89.0	3912	58	35
Quadris	0.25	Pre-heading	99.6	4109	58	27
Headline	0.25	Pre-heading	91.2	3940	58	36
Quadris	0.25	Pre-heading	N/A	3119	54	N/A
LSD 0.05				421	1.76	

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Small Grain News

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Steve Wright
Farm Advisor

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