2011 Southern Sacramento Valley Small Grains Research Program

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Cooperators: California Wheat Commission; Craig Gnos and Sam Beukelman, E & H Farms; Larry Hunn, Hunn, Merwin & Merwin; Jeannie McCormack and Al Medvitz, McCormack Sheep and Grain; Rick Rominger, Rominger Brothers; John Gilbert, Adams Grain Company; Mark Mezger, Farmers Grain Company; Oly Cantu, Syngenta Small Grains; Jorge Dubcovsky, Wheat Breeder, UC Davis; Oswaldo Chicaiza, Wheat Breeder, UC Davis; Mark Kochi, Field Technician Yolo County.

Summary of Results and Conclusions

This research project evaluated commercial attributes of 22 small grain cultivars at four environmentally distinct locations in the southern Sacramento Valley. There were 18 cultivars common to all four locations. This year's Southern Sacramento Valley Small Grain Trials show the effects of a complex weather season.

Average grain yield of the over-locations analysis for 18 cultivars was 5,647 lbs/acre. Triticale grain variety 05T14058, Syngenta, had the highest yield at 6978 lbs/acre and lowest protein at 9.2%. WestBred's two hard red wheat varieties, Expresso and Rockland, had the lowest yields but highest protein. For this area with cooler night time temperatures, good grain protein level is the challenge. Also this season, low Falling Numbers (FN) challenged the crop in this area. Blanca Grande 515 and Summit 515, returning with 2 new stripe rust genes Yr5 and Yr15, continue to show their weakness for low FN. In addition, Blanca Grande has a lodging problem at a joint about 3 inches up from the crown. Despite its higher quality attributes, I cannot recommend Blanca Grande for production in the southern Sacramento Valley because of these problems.

Plant disease pressures were moderate for this season in this area. Stripe rust (SR) showed up in Redwing and was treated in several locations commercially. Camelot and Trical Brand 118 triticale varieties are also showing higher levels of SR sporulation. Despite good late season resistance, several commercial fields were treated and harvest evaluations showed the economic advantage of fungicide treatment for Camelot.

These large research plots, placed in commercial fields where local growers can come periodically through the season, provided a reliable source of information for choosing small grain cultivars for the southern Sacramento Valley.

Research suggested by the study: Fertility rate to increase yield of high protein but low yielding varieties; fertility rate and timing to increase low protein in wheat grown in delta temperature influenced regions.

Recommended Small Grain Cultivars for Southern Sacramento Valley

Hard Red varieties

Cal Rojo, Syngenta – good yields and disease resistance, fair protein, good test weight, OK FN

Redwing, Syngenta – good yields, some stripe rust, fair protein, good test weight, marginal FN, lodging may be an issue

Rockland, WestBred – low yields, good disease resistance, very good test weight, highest protein, good FN

Hard White varieties – check with buyer before planting

WB-Cristallo, - OK-good yields, good disease resistance, fair protein, very good test weight, marginal FN this year

Blanca Fuerte, Syngenta – best white yield, good disease resistance and test weight, fair protein, marginal FN this year, not popular with the mills

Patwin, UC - good yields, good disease resistance, fair protein, good test weight, good FN

Triticale – check with buyer before planting

05T14058, Syngenta – very good yields and disease resistance, low protein, OK test weight – new name?

Camelot, Syngenta - very good yields, some stripe rust, fair protein, OK test weight

Trical Brand 118, Syngenta - very good yields, some stripe rust, fair protein, OK test weight

Durum – Do not plant without a contract

Fortissimo – good yields and disease resistance, fair protein, good test weight, fair quality

Introduction and Objectives

Southern Sacramento Valley has four distinct small grains growing regions: high quality well drained mineral soils with a cool night time delta influence, heavy clay medium quality soils with delta climate, low quality foothill soils dry land farmed with delta climate, and highly well drained mineral soils with warm night time temperatures. Southern Sacramento Valley Small Grains Research program evaluated new small grain cultivars in these unique regions and provided complementary data to the University of California Regional Grain Trials. This program is responsible for helping to describe new cultivar growth characteristics including plant population, maturity, lodging, shatter, disease resistance, grain quality, and yield. Trial data from this research program has helped to increase the number of commercially available small grain cultivars.

I conducted four cereal trials over the 1-year growing period within each of these four growing regions and different irrigation practices. This was an increase of one location made possible by this grant. I provided a grower field meeting at each of the four trial locations during the season to show the effects of the heavy late rainfall, and associated diseases and crop damage. I provided three newsletters describing current conditions and harvest results with planting recommendations. I also conducted one technical grower meeting showing the trial results and alternative uses of small grains, with research and industry updates.

Materials and Methods

I conducted four randomized block designed small grains trials each replicated at least three times. Plot widths and lengths varied per location depending on grain drill used. Widths were 9, 15, or 18 ft and lengths were 120 to 170 feet. Total acreage of the four locations was 12.7 acres.

Gnos Small Grain Trial – Located three-quarters mile north of Sievers Rd. on the east side of Curry Rd. about 1 mile north of Dixon, CA. Soil: Yolo silty clay loam. One irrigation. 22 varieties, 4 replications, 3 reps harvested, planted flat. Tomato-grains-seed crop rotation. Plot width 9 ft + 2 ft border, length 126 ft.

Hunn, Merwin & Merwin Small Grain Trial – Located north of grapes on Courtland Road, 0.86 miles west of Jefferson Blvd, 3 mi. southwest of Clarksburg, CA. Soil type: Sacramento silty clay loam. No irrigation, 17 varieties, 3 replications, planted flat. Safflower-grains-alfalfa rotation. Plot width 18 ft + 2 ft border, length 170 ft.

McCormack Small Grain Trial – Location on the north side of Montezuma Hills Road 0.78 miles east of Anderson Rd., west of Rio Vista, CA. Soil type: Clear Lake clay A and Diablo-Ayar on slopes. No irrigation, 20 varieties, 3 replications, planted flat. Sheep-fallow-grains rotation. Plot width 18 ft + 2 ft border, length 120 ft.

Rominger Small Grain Trial – Location Southwest corner of County Roads 29 and 89, north of Winters, CA. Soil type: Marvin silty clay loam & Tehama loam. No irrigation, 20 varieties, 3 replications. No irrigation. Tomato-wheat rotation. No-till planter on 60” beds. Plot width 12 ft + 2 ft border, length 150 ft.

Data collected at all sites: plant population, days to heading from planting, head height, lodging, frost, foliar disease ratings (stripe rust, leaf rust, barley yellow dwarf virus, Septoria), harvest grain moisture, test weight, protein, falling number, full grade, and yield. Data analyzed using UC MSTAT analysis of variance (ANOVA) and Duncan’s Means Separation at 5% tests. Least significant Difference (LSD) test and Coefficient of Variation (CV) provided where appropriate.

Results

For this research project, I looked at 22 varieties, at 4 locations. There were 17 varieties common to all four locations. I will first discuss the results of the over-locations analysis and highlight particular regional problems during the Regional Results section. The over-locations and regional analysis summary tables are included at end this report.

Over-location Results (Table 1)

Plant growth at all locations was very good until the March rains. When looking at the data averaged over all locations, I noted low plant stands for Expresso, Desert King HP, and Trical 118. Lodging was an issue for Blanca Grande, Blanca Royale, and Redwing. Disease symptoms of stripe rust, leaf rust, barley yellow dwarf virus, and septoria were low over the locations. Volante is showing the heavy leaf speckling which appears to affect production. Most of the varieties now have good stripe rust resistance, however Trical Brand 118 and Camelot have some leaf sporulation occurring. Falling Numbers (FN) were low for Blanca Grande 515 and Summit 515. Only Rockland was able have an average protein level of 12% or better. The triticale varieties all have the lowest average bushel weights in the trials, at about 60.3 lbs/bu. But, they are consistently the highest yielding grain in these trials.

Syngenta's 05T14058 triticale, at 6978 lbs/acre, was significantly higher yielding than all other varieties. Summit 515 was the best yielding hard red wheat variety and significantly the same as the best hard white wheat Blanca Fuerte. Fortissimo was the best yielding durum wheat variety at 6165 lbs/acre.

Regional Trial Discussions

Gnos Small Grain Trial (Table 2) – Located three-quarters mile north of Sievers Rd. on the east side of Curry Rd. about 1 mile north of Dixon, CA. Soil: Yolo silty clay loam. One irrigation. 22 varieties, 3 Replications.

I use this location as an indicator of what the maximum yield potential is for each of the varieties grown in the lower Sacramento Valley. This year was no exception with an average yield of 7031 lbs/acre. Protein and FN were unusually low for this location this season. Late season rain and one irrigation induced lodging and slowed maturity.

Three **Triticale** varieties topped out at 8971 lbs/acre with an average yield of 8856 lbs/acre. These varieties are bred for forage production but have turned out to be great feed grain producers. As of this writing, I have not heard what Syngenta's plans are for the 2 numbered varieties: 05T14058 and 05T14084. The 1458 significantly out yields 14084, but 14084 gets better protein. If you choose to grow triticale grain please check with your grain handler before you plant to see that they are willing to buy it. This season we saw some stripe rust on Camelot and Trical Brand 118, but not enough to spray for.

Syngenta's 05W90192 and Redwing were the highest yielding **Hard Red** varieties. Both varieties had OK test weights, low FN, and low protein. Redwing lodged and had to be sprayed for stripe rust at a commercial field in nearby Yolo, CA. Summit 515 and Cal Rojo yielded well but Summit has low FN and Cal Rojo has low protein. Rockland did well here at 6074 lbs/acre with the highest protein, 11.9%, good test weight, and high FN.

I looked at 8 **Hard White** selections, some with different stripe rust gene combinations to see the effects of those gene additions on performance. UC Patwin was evaluated in 3 different combinations: Patwin without additional stripe rust genes; Patwin 5 SR, Sr5 stripe rust gene and the Slow Rusting (SR) gene; and Patwin 515 SR, both the Sr5 and Sr15 stripe rust genes and the SR gene. There does not appear to be a significant difference between the three selections. Patwin's yield at 7264 lb/acre was one of the best. It had good test weight but low protein and FN at this location.

Patwin appears to have good milling quality. Blanca Fuerte and Blanca Royale are not as popular with the mills. Please check with your handler/buyer before planting.

Durum wheat really needs the heat of the Central Valley or Desert to get the high protein and quality. Fortissimo is the only durum I would grow in this area and it does not produce enough protein here. Do not plant durum without a contract.

Hunn, Merwin & Merwin Small Grain Trial (Table 3) – Located north of grapes on Courtland Road 0.86 miles west of Jefferson Blvd 3 mi. southwest of Clarksburg, CA. Soil type: Sacramento silty clay loam. No irrigation, 17 varieties, 3 replications. This location had standing water for 3.5 weeks following the March rains totaling 5.5". I observed severe crown rot, bacterial streak, and some heads with black chaff all caused by this flooding. In looking at the wheat yields at this location, I would estimate at least a 50% reduction from this event. Interestingly, 5% of Cal Rojo lodged but no other variety did. Septoria also was highest at this location, heaviest in Cal Rojo and Rockland. Low FN and low protein also plagued this location; this is the only site that Rockland had low FN.

Triticale varieties were on top but were about one ton below what I would expect. They appeared to be a bit more tolerant to the flooding with their larger root systems. Trical Brand 118 and 05T14058 were the top yielders at 6500 lbs/acre. There was only slight stripe rust in the trial at this location. However, I was at one location in Clarksburg, CA where it paid to apply fungicide to control the disease on Camelot. You definitely want to watch out for stripe rust if you plant this grain.

Summit 515 topped the **Hard Red** wheat at this site but its low FN would have reduced its value. Only Cal Rojo and Expresso had adequate FN levels for the hard reds at this location. Rockland had the best protein at 12.2%.

Patwin and Blanca Royal had the highest **Hard White** yields but both had low FN. Cristallo had the best protein and highest FN values. Blanca Fuerte had the highest bushel weight, 64.4 lbs/bu.

Fortissimo had the highest yield but moderate protein of the **Durum** class.

McCormack Small Grain Trial (Table 4) – Location on the north side of Montezuma Hills Road 0.78 miles east of Anderson Rd., west of Rio Vista, CA. Soil type: Clear Lake clay A and Diablo-Ayar on slopes. No irrigation, 20 varieties, 3 replications. Rolling hills topography, with very good rainfall for dry land conditions, wheat-fallow-sheep rotation. Heavy grass-weed competition despite two herbicide applications decreased plot uniformity.

Two **Triticale** varieties were on top followed by Blanca Fuerte, Summit 515 and Fortissimo. Trical Brand 118 did not do well at this location due to grass weed pressure and some late stripe rust. Cristallo and Blanca Grande were the only two varieties with low FN at this site. When this area gets enough rainfall grain quality is good, dockage is down and so, unfortunately, is the protein. If we knew when we were going to have good rainfall in the hills I would recommend nitrogen topdressing to increase the protein. This is a gamble that rarely pays in the low yielding dry land grain areas.

Summit 515 had the highest yield at 3863 lbs/acre for the **Hard Red** wheats. Rockland brought in the best protein at 11.3% with low yield, 2999 lbs/acre.

Blanca Fuerte had the best dry land **hard white** yield, 3899 lbs/acre, but its protein is low here at 9.6%.

Fortissimo had the best yield for the **Durum** varieties with 3774 lbs/acre and very low protein, 9.3%.

Rominger Small Grain Trial (Table 5) – Location Southwest corner of County Roads 29 and 89, north of Winters, CA. Soil type: Marvin silty clay loam & Tehama loam. No irrigation, 20 varieties, 3 replications. No irrigation. Tomato-wheat rotation. No-till planter on 60" beds. This site had the best grain quality of all the locations and very high plot uniformity.

Five varieties topped 4 tons per acre at this site, three were Triticale one was Blanca Fuerte and the other Fortissimo. We had 5 varieties with 12% or greater protein, Rockland was the best at 12.9%. This is the location that shows which varieties have a consistent problem with low FN: Expresso and Volante marginal, Summit 515 usually, and Blanca Grande 515 always. The Triticale and Cal Rojo were the only varieties with low test weights; every other variety did better than 61 lbs/bu. Blanca Grande 515 lodged at several locations, the worst here at 75% down. It lodges at a joint about 3'' above the soil surface after heading. With consistent low falling numbers, low yield, and lodging, I would not plant this variety in this area.

Discussion, Conclusions and Recommendations

Weather conditions this season affected the expected results at most of the locations. Higher than normal rains later in the season decreased yields significantly at the heavy soil locations like the Hunn trial. This highlighted some of the inherent problems with some of the varieties and made it difficult to get good falling number and protein levels at several locations. It improved the yields but lowered the protein in the dry land hill region.

Blanca Grande 515, returning with 2 new stripe rust genes (Yr5 & Yr15), tends to lodge four inches up from the ground. At the non-irrigated locations, it just bent at that point, but went down at Gnos where it was irrigated. This variety is liked by the mills, but for the Sacramento Valley growers, this variety (with its low falling numbers and lodging) is not recommended.

Montezuma Hills region is an area where Summit 515 might have a place. Given the late harvest times, this variety's FN might have time enough to reach the minimum threshold of 300 sec. on a consistent basis. It has a record of high adaptability and a favorite of mine in the upper Delta, but has low protein. Research on fertility application timing to increase protein levels in this region is needed.

High quality but relatively low yielding varieties like Expresso and Rockland need research to determine the economic threshold of increased nitrogen fertility to increase yield.

Recommended Small Grain Cultivars for Southern Sacramento Valley

Hard Red varieties

Cal Rojo, Syngenta – good yields and disease resistance, fair protein, good test weight, OK FN

Redwing, Syngenta – good yields, some stripe rust, fair protein, good test weight, marginal FN, lodging may be an issue

Rockland, WestBred – low yields, good disease resistance, very good test weight, highest protein, good FN

Hard White varieties – check with buyer before planting

WB-Cristallo, - OK-good yields, good disease resistance, fair protein, very good test weight, marginal FN this year

Blanca Fuerte, Syngenta – best white yield, good disease resistance and test weight, fair protein, marginal FN this year, not popular with the mills

Patwin, UC - good yields, good disease resistance, fair protein, good test weight, good FN

Triticale – check with buyer before planting

05T14058, Syngenta – very good yields and disease resistance, low protein, OK test weight

Camelot, Syngenta - very good yields, some stripe rust, fair protein, OK test weight

Trical Brand 118, Syngenta - very good yields, some stripe rust, fair protein, OK test weight

Durum – Do not plant without a contract

Fortissimo – good yields and disease resistance, fair protein, good test weight, fair quality

Table 1 - 2010-2011 SOUTHERN SACRAMENTO VALLEY SMALL GRAINS RESEARCH

Over Locations Summary by Variety Sorted By Yield

Variety		Stand (Plants/ft^2)	Days to Heading	Plant Height (in)	Lodging (harvest)	Frost (%)	Rating (1-8)[1] Stripe Rust	BYDV	Septoria	UC Harvest Moisture (%)	Adams Grading Results (NQI) Falling Number (sec)	Protein (%)	Test Weight (lbs/bu)	Yield (lbs/ac)	Duncan's Means@5% Separation
05T14058	TR	32	146	36	0	0	1	1	1	10.1		9.2	60.7	6978	A
Trical Brand 118	TR	29	142	38	0	1	2	1	1	9.9		10.0	60.3	6726	B
Camelot	TR	33	141	40	0	1	2	1	1	9.8		10.3	60.2	6597	B
05T14084	TR	33	145	37	0	0	1	1	1	9.8		10.2	60.1	6270	C
Fortissimo	DR	30	152	33	1	0	1	1	2	10.0	356	10.0	62.9	6165	C
Blanca Fuerte	HW	34	143	33	1	0	1	1	2	10.1	300	10.0	63.9	5925	D
Summit 515	HR	35	142	33	8	0	1	1	2	10.1	281	10.5	62.6	5852	D
Volante	DR	30	149	33	2	0	3	1	2	10.0	338	9.7	62.9	5500	E
Redwing	HR	35	143	32	16	0	1	1	2	9.6	304	10.5	61.4	5494	E
Blanca Royale	HW	34	142	33	17	0	1	1	2	10.2	345	10.8	61.7	5453	E
05W90192	HR	34	144	34	0	0	1	1	2	10.3	303	10.8	62.5	5436	E
Patwin	HW	31	148	35	2	0	1	1	2	9.9	327	10.5	62.1	5422	E
Cal Rojo	HR	33	140	32	2	3	1	1	3	10.2	339	10.7	61.1	5353	E
WB-Cristallo	HW	32	143	35	10	0	1	2	2	9.9	311	10.7	63.1	5337	E
Desert King HP	DR	29	156	35	2	0	1	1	2	9.9	419	10.8	61.7	4902	F
Blanca Grande 515	HW	35	137	34	60	0	1	1	4	10.3	240	11.0	63.1	4875	F
Rockland	HR	34	141	32	0	0	1	1	2	10.1	312	12.0	63.3	4707	FG
Expresso	HR	27	145	36	1	0	1	1	2	10.1	306	11.1	63.0	4656	G
Average		32	144	34	7	0	1	1	2	10.0	320	10.5	62.0	5647	
C.V.		5	1	4	na	na	29	na	29	0.9	11	3.8	0.9	4	
L.S.D @5%		1	1	1			0.3		0.5	0.4	28	0.3	0.5	196	
Sigificance by Rep							**								
Sigificance by Location		**	**	**			**		**	**	**	**	**	**	
Sigificance by Variety		**	**	**			**		**	**	**	**	**	**	
Sigificance by Interaction		**	**	**			**		**	**	**	**	**	**	

2 Factor Factorial Analysis - A = Location, B = Variety

** = significant 99% of the time * = significant 95% of the time

[1] Foliar Disease Rating (1-8): 1=0-3%, 2=4-14%, 3=15-29%, 4=30-49%, 5=50-69%, 6=70-84%, 7=85-95%, 8=96-100%

Grain color/type: **HR** = Hard Red Wheat **HW** = Hard White Wheat **DR** =Hard Durum **TR** = Triticalie

No significant Shatter, Leaf Rust, Loose Smut detected

NQI = National Quality Inspections, Inc.

Excellent Dk. Green
Very Good Lt. Green
Check Lt. Yellow
Caution Yellow
Problem Lt. Red
Not recommended Dk. Red

Table 2 - GNOS SMALL GRAIN TRIAL - HARVEST YEAR 2011

Funding: California Wheat Comission

Cooperators: Craig Gnos, and Sam Beukelman
Experimenters: Kent Brittan, Jorge Dubcovsky, Mark Kochi, Syngenta (Resource Seeds Int.), West Bread and World Wide Wheat LLC. and John Gilbert of Adams Grain
Soil Type: Yolo silty clay loam
Planting Method: Drilled with 10" single disk grain drill planted flat
Previous Crop: Processing tomatoes
Fertilizer: Pre-plant 500lbs/ac ammoniun sulfate, topdress 150lbs/ac urea. Total 174lbs N/ac applied
Herbicide: 4.75oz Osprey/ac plus 0.5pts MCPA/ac
Location: Three-quarters mile north of Sievers Rd.on Curry Rd.and just to the east of walnut trees along the roadside and north of Dixon, CA.

Planting Date, Rate: 11/19/2010 120lbs/ac
Harvest Date: 7/7/2011
Irrigation: 04/03/11
Length of Plots: 126 feet
Plot Width: 9 feet
No.of drill rows: 14 rows
Replications: 4
Field Variety: WB-Cristallo

2010 to 2011 Gnos Wheat Variety Trial Summary Sorted by Yield

Variety	Grain Type	Stand (Plants/ft^2)	Days to Heading	Plant Height (in)	Harvest Lodging (%)	Stripe Rust [1]	Leaf Rust [1]	BYDV [1]	Septoria Blotch [1]	Grain Moisture (%)	Test Weight (lbs/bu)	Adams Grain Grade Falling No. (300 sec)	Adams Grain Grade Protein (%)	**Yield** (lbs/ac)	Duncan's Means@5% Separation
05T14058	TR	36	148	39	0	1	1	1	1	9.5	60.10	na	8.1	8971	A
Trical Brand 118	TR	29	140	40	1	2	1	1	1	9.3	59.60	na	9.0	8926	A
Camelot	TR	35	141	44	0	3	1	1	1	9.3	59.47	na	9.5	8670	A
05T14084	TR	32	145	40	0	1	1	1	1	9.2	59.40	na	8.9	7950	B
Fortissimo	DR	30	153	37	4	1	1	1	2	9.6	62.37	369	8.7	7721	BC
05W90192	HR	34	144	36	0	1	1	1	2	9.9	61.33	292	10.0	7381	CD
Redwing	HR	37	142	34	51	1	1	1	2	9.2	60.30	244	9.5	7359	CD
Patwin 515 SR	HW	35	147	34	0	1	1	1	2	9.5	61.37	274	9.9	7264	DE
Patwin	HW	28	148	37	5	1	1	1	2	9.3	61.87	290	9.3	7220	DE
Blanca Fuerte	HW	34	142	35	2	1	1	1	2	9.6	61.80	244	9.1	7183	DE
Summit 515	HR	34	141	34	37	1	1	1	3	9.4	61.27	254	10.3	7109	DEF
Cal Rojo	HR	34	140	32	2	1	1	1	3	9.7	59.83	325	9.7	7078	DEF
Blanca Royale	HW	33	143	34	59	1	1	1	2	9.9	60.97	310	9.7	7051	DEF
Patwin 5 SR	HW	32	147	34	0	1	1	1	3	9.5	61.43	271	9.9	6836	EF
Volante	DR	27	148	36	7	4	1	1	2	9.5	61.53	351	8.5	6705	F
Kern 515 HP2NS	HR	34	140	32	6	1	1	1	6	9.8	60.53	233	11.0	6224	G
Clear White 515 HP2NS	HW	32	140	37	5	1	1	1	4	9.6	60.97	270	10.9	6173	G
WB-Cristallo	HW	30	144	38	36	1	1	1	2	9.4	61.83	285	9.7	6167	G
Rockland	HR	35	141	33	1	1	1	1	2	9.6	62.13	352	11.9	6074	G
Expresso	HR	24	147	39	4	1	1	1	1	9.6	62.17	259	10.4	5643	H
Desert King HP	DR	28	157	37	11	1	1	1	3	9.5	60.37	449	9.9	5601	H
Blanca Grande 515	HW	36	140	34	86	1	1	1	6	9.7	62.17	235	10.8	5367	H
Average:		32	145	36	14	1	1	1	2	9.5	61.04	295	9.8	7031	
C.V.%		5	1	3	NA	32	NA	NA	19	1.3	0.37	3	1.9	4	
L.S.D @5%		2	1	2		1			1	0.2	0.32	10	0.3	376	
Sigificance by Variety		**	**	**		**			**	**	**	**	**	**	
Sigificance by Rep		**	*							**					

** = significant 99% of the time * = significant 95% of the time

[1]Disease Rating (1-8): 1=0-3%, 2=4-14%, 3=15-29%, 4=30-49%, 5=50-69%, 6=70-84%, 7=85-95%, 8=96-100%

Grain color/type: **HR**= Hard Red **MR**= Medium hard Red **T**=Trical= triticale DR = Durim

NQI = National Quality Inspections, Inc.

No Frost, Loose Smut detected this season.

Table 3 - HUNN, MERWIN & MERWIN SMALL GRAIN TRIAL - HARVEST YEAR 2011

Funding: California Wheat Comission

Cooperators: Pete and Larry Hunn
Experimenters: Kent Brittan, Jorge Dubcovsky, Mark Kochi, Syngenta (Resource Seeds Int.), West Bread and World Wide Wheat LLC. and John Gilbert of Adams Grain
Soil Type: Sacramento silty clay loam
Planting Method: Drilled with 10² single disk grain drill planted flat
Planting Rate: 120 Lbs/Acre
Herbicide: 1pt/a MCPA + 3oz/a Clairty in 10gal/a water
Fertilizer: 125 units nitrogen preplant as Aqua
Location: Second field north of grapes on Courtland Road 0.86miles west of Jefferson Blvd south of Clarksburg, CA.

Planting Date: November 12, 2010
Harvest Date: June 23, 2011
Irrigation: None
Length of Plots: 120 feet
Plot Width: 18 feet
No.of drill rows: 28 rows
Replications: 3
Previous Crop: Safflower

2010 to 2011 Hunn, Merwin & Merwin Wheat Variety Trial Summary Sorted by Yield

Variety	Grain Type	Stand (Plants/ft²)	Days to Heading	Plant Height (in)	Harvest Frost (%)	Lodging (%)	Stripe Rust [1]Disease Rating (1-8)	Leaf Rust	BYDV	Septoria Blotch	Grain Moisture (%)	Test Weight (lbs/bu)	Adams Grain Grade Falling No. (300 sec)	Protein (%)	**Yield** (lbs/ac)	Duncan's Means@5% Separation
Trical Brand 118	TR	26	147	37	3	0	2	1	1	1	9.5	60.1	na	10.4	6588	A
05T14058	TR	27	150	34	0	0	1	1	1	2	9.8	60.7	na	8.8	6555	A
Camelot	TR	33	147	39	3	0	2	1	1	1	9.4	59.5	na	10.7	5669	B
05T14084	TR	33	150	35	1	0	1	1	1	2	9.5	59.7	na	10.8	5153	C
Fortissimo	DR	29	155	31	0	0	1	1	1	3	10.0	63.3	333	10.0	5095	C
Summit 515	HR	35	147	33	0	0	1	1	1	4	9.5	63.3	257	10.5	4739	D
Patwin	HW	30	153	33	0	0	1	1	1	3	9.5	62.3	290	10.2	4515	DE
Blanca Royale	HW	34	147	33	0	0	1	1	1	4	9.5	62.5	260	10.7	4507	DE
Volante	DR	32	154	29	0	0	5	1	1	4	9.7	63.2	357	9.7	4490	DE
Blanca Fuerte	HW	34	148	33	0	0	1	1	1	3	9.7	64.4	308	10.6	4450	DE
Desert King HP	DR	30	165	34	0	0	1	1	1	2	9.6	63.2	257	10.9	4361	EF
WB-Cristallo	HW	33	148	34	0	0	1	1	3	4	9.5	63.1	362	11.0	4354	EF
Redwing	HR	33	148	31	0	0	1	1	1	4	9.2	62.2	268	10.5	4333	EF
05W90192	HR	35	148	31	0	0	1	1	1	3	9.7	63.2	294	10.8	4082	FG
Cal Rojo	HR	30	144	30	10	5	1	1	1	5	10.4	62.1	316	10.9	3938	G
Rockland	HR	37	144	31	0	0	1	1	1	5	9.5	63.8	246	12.2	3799	G
Expresso	HR	30	150	36	0	0	1	1	1	3	9.5	62.8	321	11.6	3754	G
Average		32	150	33	1	0	1	1.0	1	3	9.6	62.3	298	10.6	4728	
C.V.%		4	1	4	NA	NA	32.7	NA	15	35	3.0	1.0	14	2.1	4	
L.S.D @5%		2	3	2			0.72		0.3	2	0.5	1.1	11	0.4	307	
Sigificance by Variety		**	**	**			**		**	Varies	*	**	NS	**	**	
Sigificance by Rep		*		**								*		**	**	

** = significant 99% of the time * = significant 95% of the time

[1]Disease Rating (1-8): 1=0-3%, 2=4-14%, 3=15-29%, 4=30-49%, 5=50-69%, 6=70-84%, 7=85-95%, 8=96-100% NQI = National Quality Inspections, Inc.

Grain color/type: **HR**= Hard Red **MR**= Medium hard Red **T**=Trical= triticale DR = Durim No Frost, Loose Smut detected this season.

Table 4 - McCORMACK SMALL GRAIN TRIAL - HARVEST YEAR 2011

Funding: California Wheat Comission

Cooperators: Jennie McCormack, Al Medvitz

Experimenters: Kent Brittan, Jorge Dubcovsky, Mark Kochi, Syngenta (Resource Seeds Int.), West Bread and World Wide Wheat LLC. and John Gilbert of Adams Grain

Soil Type: Clear Lake clay A and Diablo-Ayar on slopes

Planting Method: Drilled with 10" single disk grain drill planted flat

Planting Rate: 120 Lbs/Acre

Previous Crop: Fallow grazing for sheep

Fertilizer: 80 units NH3 preplant, 50lbs 11-52-0 at plant

Herbicide: 2pt/ac Glyphosphate at planting, 0.5pt/a MCPA + 4.5oz/a Oberion in 15gal/a water ground

Location: Located on the north side of Montezuma Hills Road 0.78 miles east of Anderson Rd., west of Rio Vista, CA.

Planting Date: 12/7/2010

Harvest Date: 8/3/2011

Irrigation: None

Length of Plots: 120 feet

Plot Width: 18 feet

No.of drill rows: 28 rows

Replications: 3

Field Variety: PR1404

2010 to 2011 McCormack Wheat Variety Trial Summary Sorted by Yield

Variety	Grain Type	Stand (Plants/ft^2)	Days to Heading	Plant Height (in)	Harvest Lodging (%)	Stripe Rust [1]Disease Rating (1-8)	Leaf Rust [1]Disease Rating (1-8)	BYDV [1]Disease Rating (1-8)	Septoria Blotch [1]Disease Rating (1-8)	Grain Moisture (%)	Test Weight (lbs/bu)	Adams Grain Grade Falling No. (300 sec)	Adams Grain Grade Protein (%)	**Yield** (lbs/ac)	Duncan's Means@5% Separation
05T14058	TR	30	136	32	0	1	1	1	1	10.9	59.9		9.0	4175	A
Camelot	TR	30	133	35	0	2	1	1	1	10.4	59.6		10.0	3945	AB
Blanca Fuerte	HW	34	135	29	0	1	1	1	1	10.9	63.2	333	9.6	3899	ABC
Summit 515	HR	35	135	30	0	1	1	1	1	10.8	61.4	325	9.9	3863	ABCD
Fortissimo	DR	26	141	31	0	1	1	1	1	10.5	62.4	324	9.5	3809	ABCDE
Volante	DR	26	135	33	0	1	1	1	1	10.8	62.8	351	9.3	3774	ABCDE
WB-Cristallo	HW	30	135	32	0	1	1	1	1	10.6	62.7	280	10.2	3748	ABCDEF
05T14084	TR	35	135	33	0	1	1	1	1	10.7	58.9		9.6	3703	ABCDEF
Desert King HP	DR	27	142	34	0	1	1	1	1	10.4	62.0	454	10.5	3643	BCDEFG
Patwin 5 SR	HW	34	137	31	0	1	1	1	1	10.6	60.8	330	10.1	3424	CDEFGH
Redwing	HR	36	136	30	0	2	1	1	1	10.2	61.1	319	9.9	3404	DEFGH
Patwin 515 SR	HW	33	136	30	0	1	1	1	1	10.7	61.3	340	10.2	3385	DEFGH
Cal Rojo	HR	33	135	30	0	1	1	1	2	11.0	60.7	350	10.0	3385	DEFGH
05W90192	HR	31	135	33	0	1	1	1	1	10.9	61.7	302	10.6	3354	EFGH
Trical Brand 118	TR	28	135	33	0	2	1	1	1	10.7	59.5		9.7	3287	FGHI
Blanca Royale	HW	31	134	30	0	1	1	1	1	10.8	59.8	386	10.8	3202	GHI
Blanca Grande 515	HW	31	131	32	0	1	1	1	2	11.1	62.3	230	10.1	3076	HI
Rockland	HR	31	136	31	0	1	1	1	1	10.8	62.6	307	11.3	2999	HI
Patwin	HW	30	136	32	0	1	1	1	1	10.6	61.0	365	10.1	2864	I
Expresso	HR	25	135	33	0	1	1	1	1	10.8	62.5	350	10.7	2854	I
Average		31	136	32	0	1	1	1	1	10.7	61.3	334	10.1	3490	
C.V.%		7	1	4	NA	11	NA	NA	16	1.2	1.2	12	4.1	7	
L.S.D @5%		4	2	2		0.2			0.3	0.2	1.2	66	0.7	414	
Sigificance by Variety		**	**	**		**			**	**	**	**	**	**	
Sigificance by Rep										**			**		

** = significant 99% of the time * = significant 95% of the time

[1]Disease Rating (1-8): 1=0-3%, 2=4-14%, 3=15-29%, 4=30-49%, 5=50-69%, 6=70-84%, 7=85-95%, 8=96-100%

NQI = National Quality Inspections, Ir

Grain color/type: **HR**= Hard Red **MR**= Medium hard Red **T**=Trical= triticale DR = Durim

No Frost, Loose Smut detected this sea

Table 5 - ROMINGER SMALL GRAIN TRIAL - HARVEST YEAR 2011

Funding: California Wheat Comission

Cooperators: Rick and Bruce Rominger and Nick Charles

Experimenters: Kent Brittan, Jorge Dubcovsky, Mark Kochi, Syngenta (Resource Seeds Int.), West Bread and World Wide Wheat LLC. and John Gilbert of Adams Grain

Soil Type: Marvin silty clay loam & Tehama loam

Planting Method: Drilled with 10² single disk grain drill planted flat

Planting Rate: 120 Lbs/Acre

Previous Crop: Processing tomatoes

Fertilizer: 75lbs11-52-0/ac preplant, 200lbs Urea/ac topdress. Total 100.25lbs N/ac applied

Herbicide: 1.5 pts MCPA/ac

Location: Southwest corner of County Roads 29 and 89, north of Winters, CA.

Planting Date: 11/16-17/2010

Harvest Date: June 25, 2011

Irrigation: None

Length of Plots: 150 feet

Plot Width: 13 feet

John Deer No-till drill No.of drill rows: 28 rows

Replications: 3

2009 to 2010 Rominger Brothers Wheat Variety Trial Summary Sorted by Yield

Variety	Grain Type	Stand (Plants/ft^2)	Days to Heading	Plant Height (in)	Harvest Lodging (%)	Stripe Rust [1]	Leaf Rust [1]	BYDV [1]	Septoria Blotch [1]	Grain Moisture (%)	Test Weight (lbs/bu)	Adams Grain Grade Falling No. (300 sec)	Adams Grain Grade Protein (%)	**Yield** (lbs/ac)	Duncan's Means@5% Separation
05T14084	TR	34	149	39	0	1	1	1	1	9.9	59.9	na	11.6	8275	A
05T14058	TR	35	151	37	0	1	1	1	1	10.2	60.1	na	10.9	8213	A
Blanca Fuerte	HW	34	147	36	0	1	1	1	2	10.3	64.6	314	10.7	8168	A
Trical Brand 118	TR	33	144	40	0	2	1	1	1	9.9	59.9	na	11.0	8104	A
Fortissimo	DR	36	160	35	0	1	1	1	2	10.0	62.3	398	11.6	8035	A
Summit 515	HR	38	145	36	0	1	1	1	2	10.5	63.6	286	11.5	7696	B
Patwin	HW	36	153	37	0	1	1	1	2	10.1	61.9	364	12.2	7088	C
WB-Cristallo	HW	36	145	36	0	1	1	2	3	10.2	63.6	315	11.8	7080	C
Blanca Royale	HW	37	144	35	0	1	1	1	2	10.6	61.8	424	11.9	7053	C
Volante	DR	35	159	33	0	1	1	1	2	10.1	62.6	291	11.3	7031	C
Cal Rojo	HR	35	142	34	0	1	1	1	3	9.9	60.0	364	12.1	7011	C
05W90192	HR	37	147	37	0	1	1	1	2	10.7	63.0	324	11.7	6926	C
Redwing	HR	35	146	35	0	1	1	1	3	9.9	60.7	385	12.0	6879	CD
Blanca Grande 515	HW	40	139	35	75	1	1	1	3	10.6	64.3	260	12.1	6629	DE
Expresso	HR	30	148	38	0	1	1	1	3	10.5	63.3	294	11.7	6376	E
Desert King HP	DR	32	161	34	0	1	1	1	2	10.1	60.9	517	11.7	6002	F
Rockland	HR	33	144	35	0	1	1	1	2	10.4	63.6	342	12.9	5956	F
Average		36	147	36	9	1	1	1	2	10.3	62.3	348	11.7	7244	
C.V.%		3	1	3	NA	13	NA	7	19	2.8	0.9	11	5.1	2	
L.S.D @5%		2	2	2		0.2		0.1	1	0.5	0.9	65	1.0	276	
Sigificance by Variety		**	**	**		*		**	**	**	**	**	*	**	
Sigificance by Rep									*						

** = significant 99% of the time * = significant 95% of the time

[1]Disease Rating (1-8): 1=0-3%, 2=4-14%, 3=15-29%, 4=30-49%, 5=50-69%, 6=70-84%, 7=85-95%, 8=96-100%

NQI = National Quality Inspections,

Grain color/type: **HR**= Hard Red **MR**= Medium hard Red **T**=Trical= triticale DR = Durim

No Loose Smut detected this season