WHEAT RESEARCH FINAL REPORT

Title of Research Project: Evaluating Spring Wheat Variety Performance in Organic Environments

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Abstract/Summary of Results and Conclusions:

The objective of this project was to help organic producers to identify superior varieties for their production system by surveying growers about their variety choices and by conducting replicated variety trials. A North Coast Grain Variety Survey has been conducted to determine varieties and harvested yield of small grains grown in the coastal counties of Marin, Sonoma, Mendocino, Lake, and Humboldt. Organic wheat variety trials took place on two certified organic farms: one in Humboldt county and one in Sonoma county. Each trial was conducted as a randomized complete block design (RCBD) with four replications of eight varieties. Data was collected for lodging, rust, plant height, yield, moisture, and protein.

Growers participating in the survey indicated that they cultivated 48 varieties of wheat, 11 varieties of barley, three varieties of rye, and four varieties of oats. The most frequently grown wheat varieties were Sonora, Foisy, and Red Fife with six, four, and four farmers growing them, respectively. It is important to note that these three varieties were likely more readily available for growers to initiate wheat production than the other varieties grown by fewer farmers but on greater acreage.

Field trial results indicate that Lassik and Yecora Rojo were the highest yielding varieties. However, Yecora Rojo suffered from high susceptibility to stripe rust at College of the Redwoods, where conditions were favorable. Both Lassik and Yecora are also short stature, with Yecora Rojo the shortest of the trial, averaging 19 inches. Yecora Rojo's protein levels were also the lowest of the hard red wheat varieties in the trials. Canus, an awned hard red spring wheat developed in Alberta in the 1930s, ranked third in yield and in protein content, and is tall statured (average of 32" in these trials). It was moderately susceptible, and could be considered for areas with higher weed competition and low to moderate rust pressure. In the soft white wheat category, Alturas and Diva performed very similarly, with values that were equal within the margin of error for yield, rust susceptibility, and protein content. Diva was slightly taller (2 inches on average) while Alturas was slightly earlier maturing. Although significantly lower yielding than the other soft white wheat varieties, Foisy was much taller than the other soft white wheat varieties and had higher protein values.

Introduction and Objectives:

Organic wheat is a rapidly expanding specialty crop in California. According to the most recent organic survey from the USDA Economic Research Service, between 1997 and 2008 organic wheat acreage has increased 50-fold in California, from 727 acres in 1997 to 36,115 acres in 2008. While this story statewide, on the North Coast a few grain growers began to produce wheat and other grains around 2009. Since then, the expansion of organic wheat production on the North Coast has coincided with increased interest in local grain, including local and regional sourcing of wheat by many independent bakeries and supermarkets.

One of the key pieces in successfully increasing the production and profitability of organic wheat on the North Coast is identifying appropriate varieties. In many ways the needs of organic producers are similar to those of conventional producer: both need reliably high yields of high quality wheat. However, organic production practices do differ from typical conventional practices and those differences will influence variety selection. For example, many organic wheat producers rely on slow-releasing forms of nitrogen such

as cover crops, manure and previous legume crops. Also organic farmers rely on mechanical cultivation and crop competiveness for weed control. These differences in production practices can lead to differences in relative variety performance between conventional and organic systems. In a 2007 paper in *Field Crops Research*, Murphy et al. found that the highest yielding soft white wheat varieties on organic farms were different than the highest yielding varieties on conventional farms.

This project helps organic producers identify superior varieties for their production system by (1) surveying growers about their variety choices and by (2) conducting replicated variety trials.

A North Coast Grain Variety Survey has been conducted to determine the varieties and harvested yield of small grains grown in the coastal counties of Marin, Sonoma, Mendocino, Lake, and Humboldt.

Organic wheat variety trials took place on two certified organic farms: one in Humboldt County and one in Sonoma County. The trial at each location was conducted as a randomized complete block design (RCBD) with four replications of eight varieties. Data was collected for lodging, rust, plant height, yield, moisture, and protein. Variety means were compared using Analysis of Variance and Tukey's Honestly Significant Difference test.

Materials and Methods:

(1) Conduct the North Coast Grain Variety Survey for 2012 / 2013

The North Coast Grain Variety Survey has been conducted in the past to determine the varieties and harvested yield of small grains grown in the coastal counties of Marin, Sonoma, Mendocino, Lake, and Humboldt. The survey has been repeated by using the existing networks of the coastal grain growers associations, the Community Alliance with Family Farmers (CAFF), UC Cooperative Extension, and Organic Seed Alliance to reach as many producers as possible. The survey has been implemented online, with individual follow up calls to ensure high response rates. The survey data was analyzed to determine which varieties are performing well for coastal grain growers and why.

(2) Conduct variety trials to identify superior wheat varieties for organic farms along the North Coast

Trial design and location

The first trial site was the College of the Redwoods Farm (CR) in Shively, Humboldt County. The soil at the CR site is a Shively flat silt loam, with a previous crop of four years of alfalfa. No fertilizer or supplemental irrigation was applied at this site. The planting rate was approximately 100 pounds / acre. The trial was planted on March 27th, 2013 and harvested on September 7th, 2013.

The second site was Front Porch Farm (FPF) in Healdsburg, Sonoma County. The soil at the FPF site is Yolo sandy loam, with a previous crop of oat and bell bean cover crop. The trial was amended with about 10 tons / acre farm-made compost and overhead irrigated with 2 inches of water. The planting rate was approximately 100 pounds / acre. The trial was planted on March 14th, 2013 (See Figure 1 below) and harvested on August 24th, 2013.

A third site in Marin County was discarded because of unacceptably low plant populations due to poor emergence in a dry and inadequately prepared seedbed.

The trial at each location was conducted as a randomized complete block design (RCBD) with four replications of eight varieties. Each plot contained one variety and was 8 feet wide by 100 feet long (see Figure 2).

Materials

The eight varieties included in the trials are listed in Table 1.

Varieties were selected for inclusion in the trial based on: yield potential under organic coastal management, rust resistance, protein, lodging resistance, weed competiveness, quality.

They were selected based on recommendations by:

- Kent Brittan and Lee Jackson, University of California Cooperative Extension;
- Michael Flowers, Oregon State University;
- Kevin Murphy and Steven Jones, Washington State University;
- and area farmers

Evaluation

Initial Stand Density – At approximately two weeks after planting, we recorded the average number of plants per row foot based on a five foot sample.

Stripe Rust Incidence – At approximately the time of heading, we recorded stripe rust incidence as a percentage of leaf area affected. No significant incidence of stripe rust was found at Front Porch Farm; therefore this trait was not measured at that site.

Relative Maturity – We measured relative maturity approximately two weeks after the first varieties begin to yellow from maturity. Maturity was based on the progress of senescence on a 1-9 scale relative to the varieties in the trial at that site, with 1 representing the earliest maturing plot and 9 representing the latest maturing plot.

Lodging – We measured lodging at harvest as a visual rating on a 1 to 9 scale, with 1 being the entire plot on the ground, and 9 being no lodging.

Plant Height – We measured plant height in inches at harvest based on a visual average of the plot average height from soil surface to the maximum height of the plants, and noted degree of variation.

Yield – We measure yield in pounds for each plot. Plots were harvested at both sites with a Hege plot combine.

Moisture, Test Weight, and Protein - These traits were based on analysis of 2 pound subsamples sent to the California Wheat Commission Laboratory.

Data Analysis

For each of the traits measured, data from each location was analyzed separately using a mixed model analysis where varieties and sites are considered fixed effects and replicates considered random effects. Analysis of variance (ANOVA) was used to test if there are significant differences between varieties. For traits with significant variety by location interactions, Spearman rank correlations were calculated to determine if the interaction was due to a change in rank. If no rank-change interactions were present, trait means across sites were calculated. If significant differences (at $p<0.05$) were found, the Tukey's honestly significant difference (HSD) procedure was used to separate varieties.

Budget: The budget, with proposed and actual line-item expenses, is shown in Table 2.

Results:

Objective 1: North Coast Grain Variety Survey

A total of 26 growers were surveyed in 2010-2011 and again in 2012-2013. These surveys were conducted to compile the experiences of North Coast growers and to initiate sharing of lessons learned. Specifically the surveys asked grower to list the varieties of grains they were cultivating, share where they sourced their seed, and relate their experiences, including problems and benefits of each variety.

In the first year, the survey was mailed to growers and follow-up phone calls were made to encourage participation. In the second year, the survey was administered online and emailed to growers with follow-

up phone calls to encourage participation. In addition, project team members participated in a growers meeting on May 18th, 2013, sharing the survey and how to participate. Despite these efforts, the level of response, both in the number of participants and completeness of the response was disappointing. A total of 12 growers responded in 2010-2011 and five growers in 2012-2013.

Participating growers indicated that they cultivated 48 varieties of wheat, 11 varieties of Barley, three varieties of Rye, and four varieties of Oats (Table 3). This list includes small 2' X 2' trials to larger multiple acreage farm production. The most popular wheat varieties to grow were Sonora, Foisy, and Red Fife with six, four, and four farmers growing them, respectively. Growers made multiple comments that Sonora displayed lodging, Foisy appeared to be well adapted and a good producer for the North Coast, and Red Fife produced a reasonable yield. It is important to point out that in many cases these three varieties were grown by these farmers as an introduction to wheat production and while grown by the majority of farmers other varieties were grown on greater acreages. The remaining varieties were grown by three farmers or less.

Problems encountered by growers, as indicated by their comments, offer insight into the problem solving that is needed for them to be successful in producing wheat organically. This includes careful screening, selection, and preparation of fields to avoid impacts from low pH and low fertility soils. Field preparation to avoid weed competition coupled with identification of taller stature wheat varieties that grow above weeds. Lastly, increasing the understanding of the susceptibility of specific varieties to stripe rust and the advantages and drawbacks to winter versus spring planting in reducing the risk.

Growers are sourcing grain seed from a variety of seed suppliers, grain grower associations, and from each other. Identified sources for seed include: Adams Seed, Grants Pass Grange Co-op, Homestead Organics, Johnny's, Lockwood Seed, Montana Four and Grain Company, Peaceful Valley Farm Supply, Rubin Seeds, Timeless Seeds, Ukiah Natural Food Store, USDA, Vermont Seed Company, Washington State Crop Improvement Association, Welter Seed Company, and the Whole Grain Connection.

Objective 2: Wheat Variety Trials

Analysis of Variance (Table 4)

Significant differences between locations were seen for stand count, plant height, lodging, yield, percent moisture, and test weight. Significant differences between varieties were seen at both locations for relative maturity, plant height, lodging, yield, percent moisture, and percent protein. Significant differences for stripe rust incidence were seen at the CR site (measurements were not taken for stripe rust at the FPF site because no significant infections were seen). Location by variety interactions were seen for plant height, lodging, percent moisture, test weight, and percent protein. Although location by variety interactions existed for plant height and protein, the ranks of varieties across locations were still significantly correlated.

Means (Table 5)

Turkey Red failed to fully vernalize in these trials; therefore no data were collected on this variety. Stand density did not vary significantly between varieties; therefore means are not reported. At CR, Lassik, Alturas and Diva had the lowest incidence of stripe rust, while Yecora Rojo and Red Fife had the highest. Yecora Rojo was the earliest maturing, while Foisy was the latest to mature. Foisy was the tallest variety, averaging 40.3 inches across both sites, while Yecora Rojo was the shortest, averaging 19.0 inches across both sites. The results for susceptibility to lodging varied by location. At FPF, Canus was the most prone to lodging, while Alturas was the least susceptible. At CR, Canus and Alturas were the most susceptible to lodging, while Foisy and Yecora Rojo were the least susceptible. While significant, the differences between varieties for lodging at CR may in fact have partially been the results of animal trampling. While yields at FPF were much lower than at CR, the relative performance of the varieties was similar across sites. Yield (adjusted to 13% moisture) was highest for Lassik, at 2701 pounds per acre, and Yecora Rojo, at 2587 pounds per acre. Yield

was lowest for Foisy, at 1165 pounds per acre. The results for grain moisture varied by location. At Front Porch, Canus has the lowest moisture at harvest, at 10.8%, while Yecora Rojo had the highest, at 11.7%. At CR, Lassik had the lowest moisture at harvest, at 12.5%, while Foisy had the highest, at 14.7%. The results for test weight varied by location. At FPF, Diva had the highest test weight, at 60.2 pounds per bushel, while Foisy had the lowest, at 57.8 pounds per bushel. At CR, Lassik had the highest test weight, at 63.9 pounds per bushel, while Yecora Rojo had the lowest, at 60.2 pounds per bushel. Protein content was highest for Foisy, at 16.2%, and was lowest for Alturas (11.3%), Yecora Rojo (11.4%), and Diva (11.5%).

Discussion, Conclusions and Recommendations:

The primary objective of the variety trials was to identify superior varieties for organic farms on the North Coast. Based on yield alone, the best hard red wheat varieties were Lassik and Yecora Rojo. However, Yecora Rojo suffered from high susceptibility to stripe rust at CR, where conditions were favorable. Both Lassik and Yecora are also short stature, with Yecora Rojo the shortest of the trial, averaging 19 inches. Yecora Rojo's protein levels were also the lowest of the hard red wheat varieties. Based on these results, Lassik would be tentatively recommended for locations with stripe rust, but where weed competition is less of a concern. Canus, an awned hard red spring wheat developed in Alberta in the 1930s, ranked third in yield and in protein content, and is tall statured (average of 32" in these trials). It was moderately susceptible to rust, and could be considered for areas with higher weed competition and low to moderate rust pressure. In the soft white wheat category, Alturas and Diva performed very similarly, with values that were equal within the margin of error for yield, rust susceptibility, and protein content. Diva was slightly taller (2 inches on average) while Alturas was slightly earlier maturing. Although significantly lower yielding than the other soft white wheat varieties, Foisy was much taller than the other soft white wheat varieties and had higher protein.

A number of cultural and environmental factors may have influenced the performance of the varieties of these trials, and are important to keep in mind when interpreting the results. The first factor was the variability in the seeding rate. Due to the equipment available, a single setting was used on the grain drill to plant all the varieties. Because the varieties varied in seed size, some plots could have been planted at a heavier rate. Stand counts were taken to account for that. The analysis showed no significant difference in stand counts between varieties; however, it is possible that the sample sizes used to establish stand counts were insufficient to be accurate. Also, Foisy had the smallest seeds, while Lassik had the largest. Even if more of the small-seeded Foisy had been planted in each plot, it did not correspond to higher yields.

The second factor was the dry conditions at Front Porch Farm. While there was sufficient soil moisture at planting to germinate and establish the plots, the sandy loam soils rapidly dried. One two-inch set of water was applied one month after planting. At the time of harvest, symptoms of drought stress were evident, including poorly developed roots with a possible fungal disease, incompletely filled heads, and low yields.

This project was only able to evaluate a subset of potential varieties, and was only able to evaluate them under the climate stresses of one year and at two locations. Future trials would allow additional varieties to be evaluated, and would allow a better understanding of how well these varieties perform under a wider range of climatic conditions.

Figure 1: Photo of trial at Front Porch Farm, taken at planting (3/14/13)

Figure 2: Trial layout for 2013 organic wheat trial at Front Porch Farm in Healdsburg, CA.

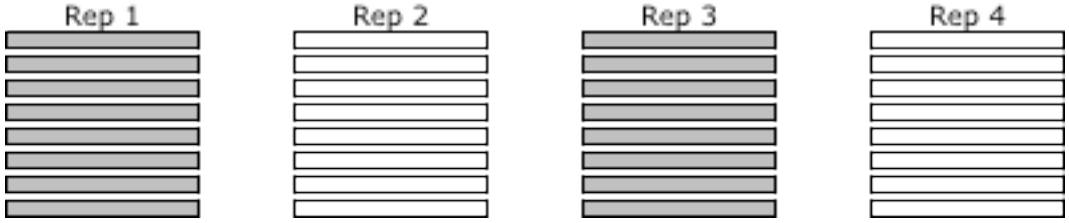

Table 1: Selected wheat varieties for 2013 organic wheat trials

1	Turkey Red	Hard Red Winter
2	Yecora Rojo	Hard Red Spring
3	Canus	Hard Red Spring
4	Lassik	Hard Red Spring
5	Red Fife	Hard Red Spring
6	Alturas	Soft White Spring
7	Diva	Soft White Spring
8	Foisy	Soft White Spring

Table 2: Line-item budget for 2013 organic wheat trials

Item	Proposed	Actual
Labor:		
John LaBoyteaux, Camp Grant Ranch	$3,000.00	$1,500.00
Jared Zystro, Organic Seed Alliance	$1,500.00	$4,650.00
Juliet Braslow, UCCE	$1,900.00	$1,900.00
Fuel	$300.00	$0.00
Seed	$1,000.00	$750.00
Custom harvest contractor	$200.00	$800.00
Travel	$1,100.00	$400.00
Grain analysis	$1,000.00	$0.00
TOTAL	$10,000.00	$10,000.00

Table 3: Grain grower survey

Grain	Variety	Grower Comments
Wheat	Akmolinka	Rust occurred
	Anza	
	Barrt	
	Blue Beard	Poor performance - Produced ok
	Bolero	
	Buckwheat Mancan	Hardy and yield well
	Canoco	Promising
	Chiddham Blac De Maus	Medium producer
	Chul	
	Currawa	
	Desert King Durham	
	Duram	Poor to average yield
	Durum Iraq	Produced well
	Eaton	
	Emmer	
	Ethiopian Blue Tinge	Weed competition impacted results
	Expresso	Spring planting had good yield – short stature to about 18”
	Foisy	Low yield from acid soils – Tall strong plants with good yield otherwise – best producer – Seems well adapted to North Coast and makes nice flour
	Galgalos	
	Goldcoin	
	Hard Federation	
	Hard White Winter	Poorly when planted in spring
	Hollis	
	India Jammu	Produced well
	Kelse	Crop failure from acid soils – “Best” yielder

Grain	Variety	Grower Comments
	Ladoga	
	Lynn	
	Marpacha	Light rust – no problems
	Marquis	Seems to produce similarly to Red Fife
	Odessa	
	Pennawawa	
	Red fife	Crop failure from acid soils - slight rust and reasonable yield – would plant again
	Redwing	
	Soft Winter	
	Senatore	Tall stature overtopped weeds
	Sol	
	Sonora	Reasonable harvest – spring planting usually results in good yield – tendency to lodge – Over winter production increases risk of rust and crop failure – better the soil the better it produced – problem with lodging – lodging problem
	Talimka	
	Thatcher	
	Triple IV	
	Turkey	
	Tuscan	
	White Federation	
	Wit Wolkoring	No rust and a good harvest – poor producer, susceptible to rust and lodging experienced if over wintered
	Yamhill	
	WS-44 (Soft Red)	
	W.B. Cristallo	Flavor is a customer favorite
	W1377	Great yield even with weed pressure
Barley		
	“McGuire” Canadian Hulless	Smut

Grain	Variety	Grower Comments
	Arabian Blue Hulless	Early yield, great flavor
	Black	Produced poorly
	Bronze	Produced and threshed well
	Conlon Malting	Produced and threshed well – Weed pressure impacted production
	Ethiopian Hulless	No smut, reasonable yield -good flavor, light braned – hardy with heavy yield
	Kye	
	Pinnacle	Good yield
	Purple	Medium producer, hard to thresh
	Robust	Smut and low yield
	UC937	
Rye		
	AGS104	
	MTDA Organic HL 237-10	
	Unknown “Cereal Rye”	Good harvest
Oats		
	California Red Oats	
	Cyuse hulled	
	Kanota	Good yield
	Rodeo hulless	Good yield

Table 4: Analysis of Variance (ANOVA) and Spearman correlations across College of the Redwoods and Front Porch Farm trial locations for traits evaluated

	Stand count	Stripe rust incidence	Relative maturity	Plant height	Lodging	Yield	Percent moisture	Test weight	Percent protein
Overall:									
Location	**	N/A		**	**	**	**	**	
Variety		N/A	**	**	*	**	**	**	**
Location x Variety		N/A		**	**		**	**	**
Spearman rank correlation		N/A		**					*
Shively:									
Variety		**	**	**	*	**	**	**	**
Healdsburg:									
Variety		N/A	**	**	**	**	**	*	**

*,** Significant at the 0.05 and 0.01 probability levels, respectively

Table 5: Means of traits evaluated

		Stand count			Stripe rust incidence	Relative maturity		
Variety	Type	CR	FPF	ALL	CR	CR	FPF	ALL
		---- plants / ft^2 ----			- % -	---- 1 to 9 scale ----		
Turkey Red	HRW	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Yecora Rojo	HRS	N/A	N/A	N/A	76.7a (7)	3.0e (1)	2.8e (1)	2.9e (1)
Canus	HRS	N/A	N/A	N/A	43.3b (4)	5.0d (3)	5.0d (2)	5.0d (2)
Lassik	HRS	N/A	N/A	N/A	0c (1)	4.8d (2)	5.3d (4)	5.0d (2)
Red Fife	HRS	N/A	N/A	N/A	63.3a (6)	7.3b (6)	7.0b (6)	7.1b (6)
Alturas	SWS	N/A	N/A	N/A	3.3c (2)	5.0d (3)	5.0d (2)	5.0d (2)
Diva	SWS	N/A	N/A	N/A	10.0c (3)	6.0c (5)	6.0c (5)	6.0c (5)
Foisy	SWS	N/A	N/A	N/A	46.7b (5)	9.0a (7)	9.0a (7)	9.0a (7)
Average					34.8	5.7	5.7	5.7
CV					0.25	0.05	0.05	0.05
LSD					12.7	0.4	0.4	0.3

CR = College of the Redwoods Farm
FPF = Front Porch Farm
ALL = Combined results from CR and FPF
Numbers in parenthesis indicate rank (1 is best)
Letters after trait value indicate groups of varieties whose means are not significantly different for that trait.
NS = Variety effects were not significant

Table 5 (cont.)

Variety	Plant height			Lodging			Yield @ 13% moisture		
	CR	FPF	ALL	CR	FPF	ALL	CR	FPF	ALL
	--------- in ---------			---- 1 to 9 scale ----			----- lbs / acre -----		
Turkey Red	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Yecora Rojo	18.0f (7)	20.0f (7)	19.0e (7)	8.25bc (3)	6.5abc (4)	N/A	3265ab (2)	1908a (1)	2587a (2)
Canus	34.0c (3)	30.0bc (3)	32.0b (3)	7.0c (6)	3d (7)	N/A	2609bc (3)	1392b (3)	2000b (3)
Lassik	25.3d (5)	24.0e (6)	24.7d (5)	8.8ab (2)	8ab (2)	N/A	3585a (1)	1816a (2)	2701a (1)
Red Fife	36.7b (2)	30.5b (2)	33.6b (2)	8.0bc (4)	6.3bc (5)	N/A	1901de (6)	616d (7)	1258de (6)
Alturas	22.7e (6)	26.3de (5)	24.5d (6)	7.0c (6)	8.5a (1)	N/A	2197cde (5)	949c (4)	1573cd (5)
Diva	25.7d (4)	27.5cd (4)	26.6c (4)	7.3c (5)	5.75c (6)	N/A	2465cd (4)	896cd (5)	1680c (4)
Foisy	45.3a (1)	35.3a (1)	40.3a (1)	9a (1)	7.5abc (3)	N/A	1692e (7)	638cd (6)	1165e (7)
Average	29.7	27.6	28.7	2.1	6.5		2531	1173	1852
CV	0.06	0.07	0.06	0.45	0.22		0.23	0.18	0.23
LSD	2.5	3.0	1.9	1.4	2.1		791	314	411

CR = College of the Redwoods Farm
FPF = Front Porch Farm
ALL = Combined results from CR and FPF
Numbers in parenthesis indicate rank (1 is best)
Letters after trait value indicate groups of varieties whose means are not significantly different for that trait.
NS = Variety effects were not significant

Table 5 (cont.)

	Moisture			Test weight			Protein		
Variety	CR	FPF	ALL	CR	FPF	ALL	CR	FPF	ALL
		-------- % -------			------ lbs / bu ------			----- % -----	
Turkey Red	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Yecora Rojo	13.1cd (2)	11.7a (7)	N/A	60.2c (7)	59.6ab (5)	N/A	12.6c (5)	10.2e (7)	11.4d (6)
Canus	13.1cd (3)	10.8e (1)	N/A	62.1b (4)	59.9a (4)	N/A	13.3b (2)	13.5bc (3)	13.4bc (3)
Lassik	12.5d (1)	10.9de (2)	N/A	63.9a (1)	60.0a (2)	N/A	12.7bc (4)	12.6cd (4)	12.7c (4)
Red Fife	14.0ab (6)	11.1cd (3)	N/A	62b (5)	59.9a (3)	N/A	13.2b (3)	14.2b (2)	13.7b (2)
Alturas	13.8bc (4)	11.3bc (5)	N/A	62.8b (2)	58.1bc (6)	N/A	11.1d (7)	11.5de (6)	11.3d (7)
Diva	13.9bc (5)	11.2c (4)	N/A	62.2b (3)	60.2a (1)	N/A	11.5d (6)	11.5d (5)	11.5d (5)
Foisy	14.7a (7)	11.5ab (6)	N/A	60.77 (6)	57.8c (7)	N/A	15.2a (1)	17.1a (1)	16.2a (1)
Average	13.6	11.2		62.0	59.4		12.8	12.9	12.9
CV	0.03	0.02		0.01	0.02		0.03	0.07	0.05
LSD	0.76	0.3		0.7	1.7		0.5	1.3	0.7

Numbers in parenthesis indicate rank (1 is best)
Letters after trait value indicate groups of varieties whose means
are not significantly different for that trait.
NS = Variety effects were not significant