Winter Wheat Variety Performance Trial at Hayden, Colorado 2011

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Summary

A winter wheat variety performance test was conducted at Hayden, Colorado in 2011 to identify varieties that are adapted for commercial production in northwest Colorado. Thirty varieties were evaluated in the 2011 trial. Growing conditions during the 2011 cropping season in Hayden were quite favorable for winter wheat production compared to other years. Grain yield in the winter wheat variety performance trial averaged 3037 lbs/acre (50.6 bu/acre). The highest yielding variety was UI LHS at 3972 lbs/acre (66.2 bu/acre). Several winter wheat varieties were higher yielding than other varieties, with eleven varieties in the top statistical (LSD) yield group. Protein concentration in 2011 averaged 11.5%. Protein concentration ranged from a high of 13.6% for Brawl CL Plus to a low of 9.9% for CO050337-2.

Introduction

Winter wheat variety performance testing has been conducted in northwest Colorado for many years (Pearson and Haley, 2010; Pearson et al., 2009; 2008; 2007; 2005; 2004; 2003; Golus et al., 1997). Winter wheat variety performance tests are conducted each year in northwest Colorado to identify varieties that are adapted for commercial production in the region. The 2011 winter wheat variety performance test was conducted at Hayden, Colorado.

Materials and Methods

Thirty winter wheat varieties and breeding lines were evaluated during the 2011 growing season at the Mike Williams Farm near Hayden at the intersection of Highway 40 and 20-mile Road. The experiment design was a randomized complete block with four replications. Plot size was 4-ft. wide by 40-ft. long with six seed rows per plot. The seeding rate was 680,000 seeds/acre and planting occurred on 27 Sept. 2010. An application of Ally at 1/10 oz/acre plus 4 oz/acre 2,4-D was applied in 8 gal. water per acre during June 2011. No fertilizer was applied. Plant height and lodging were evaluated just prior to harvest. Harvest occurred on 2 Sept. 2011 using a Hege small plot combine. Grain samples were cleaned in the laboratory using a small Clipper cleaner to remove plant tissue that remained in the grain sample following threshing. Grain moistures and test weights were determined using a DICKEY-john GAC2100b™ Grain Analysis Computer[3]. Grain yields were calculated at 12% moisture content. Grain protein concentration was determined by whole grain near infrared reflectance spectroscopy with a Foss NIRSystems 6500 (reported on a 12% moisture basis).

Winter wheat plots at Hayden, Colorado at the Mike Williams Farm on June 30, 2011. Photo by Calvin Pearson.

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[3]Mention of a trade name or proprietary product does not imply endorsement by the authors, the Agricultural Experiment Station, or Colorado State University.

Wheat stands were thin in sporadic areas of the plot area and weeds, mainly prostrate knotweed, were a problem in various spots of the plot area. Because of weed problems and a poor stand in Rep 4 only Replications 1-3 were included in the statistical analysis of the data.

Results and Discussion

A field tour was held on July 28, 2011 for producers, industry representatives, and others to see the plots first hand. This gives attendees the opportunity to compare wheat varieties while growing in the field.

Field tour at the winter wheat plots at Hayden, Colorado on July 28, 2011 at the Mike Williams Farm. Photo by Calvin Pearson.

The results of the soil test analysis for the 2011 plot area at Hayden were: a sandy clay loam soil With a pH 5.3, 0.4 mmhos/cm, 3.0 % organic matter, 11.7 ppm NO_3-N, 4.9 ppm P, 167 ppm K, 2.2 ppm Zn, 66.2 ppm Fe, 13.6 ppm Mn, and 2.3 ppm Cu.

Growing conditions during the 2011 cropping season in Hayden were favorable for winter wheat production. The average maximum temperature for July 2011 at Hayden, Colorado was 83.4°F (Fig. 1). Precipitation at Hayden during the 2010-11 winter/spring growing season (September 2010 through August 2011, 12-month period) totaled 22.7 inches (data for March 2011 is missing). Winter moisture in the Hayden area was high (Fig. 2). During September 2010 through February 2011, a total of 11.3 inches of precipitation was received, and from April through Aug 2011 most of the growing season precipitation was received at Hayden at a total of 11.4 inches of precipitation, although most of that moisture came early in the spring with a much lower amount occurring during grain fill (Fig. 2).

Precipitation in the Craig/Hayden area is often the major limiting factor for crop production. Precipitation varies considerably from month to month and year to year. If timely precipitation occurs, grain yields of winter wheat will be good. If precipitation does not occur in a timely fashion, wheat yields will be low. Because the amount of precipitation is so variable and spotty during the growing season in the Craig/Hayden area, wheat yields often vary considerably from year to year.

Grain moisture in the winter wheat variety performance test at Hayden averaged 10.6% (Table 1). Grain moisture content ranged from a high of 11.5% for Snowmass to a low of 9.8 % for JC109.

Grain yield for the winter wheat varieties averaged 3037 lbs/acre (62.7 bu/acre) (Table 1). Grain yield ranged from a high of 3972 lbs/acre (66.2 bu/acre) for UI LHS to a low of 1867 lbs/acre (31.1 bu/acre) for IDO821. Many winter wheat varieties were higher yielding than others, with eleven varieties having grain yields in the top group according to LSD (0.05) mean separation. According to the Colorado Agricultural Statistics

Calvin Pearson determining grain moisture and test weight on the Hayden wheat samples at the WCRC at Fruita. Photo by Fred Judson.

Service, the average wheat yield in northwest Colorado in 2010 was 27.8 bu/acre (Colorado Department of Agriculture, 2011).

Test weights averaged 62.7 lbs/bu (Table 1). Test weights ranged from a high of 64.3 lbs/bu for Hayden to a low of 59.5 lbs/bu for JC109.

There was no lodging in the winter wheat variety performance test in 2011.

Plant height averaged 25.4 inches (Table 1). Plant height ranged from a high of 31.7 inches for UICF Grace to a low of 20.3 inches for Hatcher.

Protein concentration averaged 11.5% (Table 1). Protein concentration ranged from a high of 13.6% for Brawl CL Plus to a low of 9.9% for IDO050337-2.

Acknowledgments

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Table 1. Winter wheat variety performance test at Hayden, Colorado 2011. Farmer-Cooperator: Mike Williams.

Variety	Market class[1]	Grain moisture	Grain yield		Test weight	Plant height	Protein
		(%)	bu/acre	lbs/acre	lbs/bu	in.	(%)
UI LHS	HWW	10.2	66.2	3972	62.9	24.4	11.0
Gary	HWW	10.5	62.3	3735	63.0	26.7	11.7
Curlew	HRW	9.9	59.0	3541	63.2	25.9	12.9
UI Silver	HWW	10.5	58.1	3488	64.0	25.3	11.1
Deloris	HRW	10.8	58.0	3479	63.4	27.9	11.8
Golden Spike	HWW	10.3	56.4	3383	62.1	26.5	10.3
UI SRG	HRW	10.3	56.4	3382	62.9	28.4	11.3
Lucin CL	HRW CL	10.4	55.3	3316	62.9	30.4	12.8
Hatcher	HRW	10.6	53.9	3236	61.7	20.3	10.8
Byrd	HRW	11.0	52.9	3173	61.4	22.7	12.0
Winterhawk	HRW	10.9	52.8	3167	63.1	25.2	10.7
Fairview	HRW	10.1	51.9	3112	62.4	27.3	11.1
CO050337-2	HRW	11.4	51.8	3107	63.0	22.9	9.9
UI Darwin	HWW	10.7	51.2	3072	63.4	26.9	12.4
Snowmass	HWW	11.5	50.4	3022	61.7	24.8	10.7
IDO816	HRW	10.1	49.8	2987	63.3	27.5	11.7
Hayden	HRW	10.8	49.6	2976	64.3	29.3	11.8
CO050173	HRW	10.8	49.4	2965	62.2	23.3	11.3
CO050303-2	HRW	11.2	49.2	2950	63.6	23.7	12.4
Bond CL	HRW CL	10.6	48.1	2888	61.8	24.0	11.4
IDO660	HWW	10.7	48.0	2877	62.2	21.7	12.6
UICF Grace	HWW CL	10.2	48.0	2882	62.3	31.7	10.8
Weston	HRW	10.6	47.5	2849	64.1	31.5	12.3
CO05W111	HWW	10.9	45.3	2716	63.3	24.7	10.6
CO050233-2	HRW CL	10.2	45.0	2698	62.7	24.1	12.4
CO050322	HRW	10.4	43.9	2637	62.5	22.0	10.7
JC109	HRW	9.8	43.2	2593	59.5	21.3	10.9
Brawl CL Plus	HRW CL2	10.9	42.4	2544	62.6	23.7	13.6
JC108	HWW	10.8	41.5	2489	62.0	23.6	11.9
IDO821	HRW	11.4	31.1	1867	63.3	24.3	12.0
Ave.		10.6	50.6	3037	62.7	25.4	11.5
LSD (0.05)		0.9	13.6	817	0.6	2.3	
CV (%)		5.5	16.5	16.5	0.6	5.6	

[1] HRW = hard red winter wheat; HWW = hard white winter wheat; CL = Clearfield* wheat; CL2 = two-gene Clearfield* wheat.

Planted – September 27, 2010. Harvested – September 2, 2011.

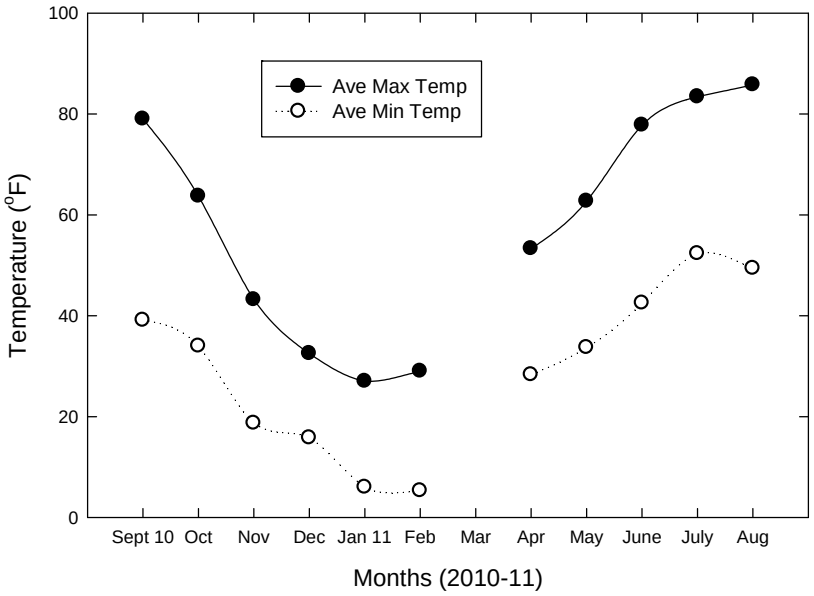

Fig. 1. Average maximum monthly and average minimum monthly temperatures for Sept 2010 through Aug 2011 at Hayden, Colorado. Data were missing for March 2011.

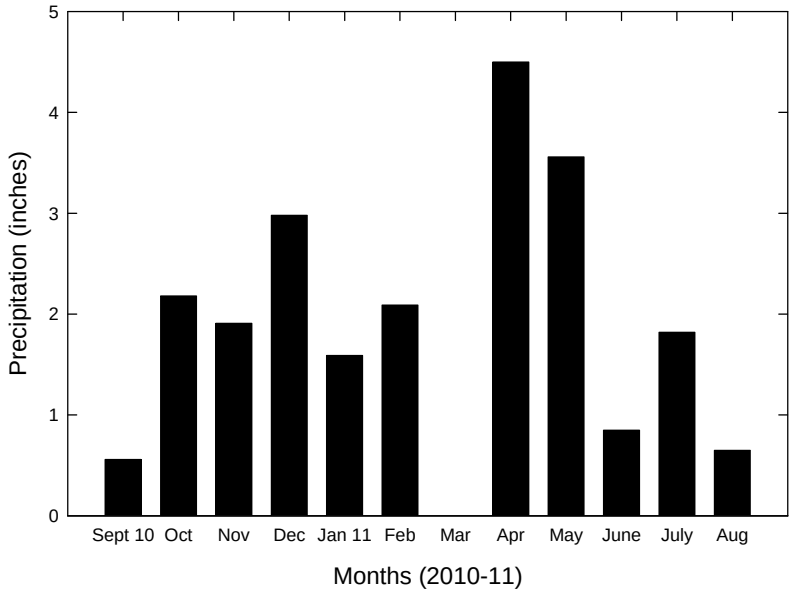

Fig. 2. Monthly precipitation for Sept. 2010 through Aug 2011 at Hayden, Colorado. Data were missing for March 2011.