Winter Wheat Variety Performance Trial at Hayden, Colorado 2012

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Summary

A winter wheat variety performance test was conducted at Hayden, Colorado in 2012 to identify varieties that are adapted for commercial production in northwest Colorado. Twenty-four varieties and breeding lines were evaluated in the 2012 trial. Growing conditions during the 2012 cropping season in Hayden were challenging for winter wheat production compared to many other years. Grain yield in the winter wheat variety performance trial averaged 2101 lbs/acre (35.0 bu/acre). The highest yielding variety was CO050322 at 2465 lbs/acre (41.1 bu/acre). Several winter wheat varieties were higher yielding than other varieties, with seven varieties in the top statistical (LSD) yield group. Protein concentration in 2012 averaged 10.5%. Protein concentration ranged from a high of 11.2% for UI SRG to a low of 9.8% for Hatcher and Golden Spike.

Introduction

Winter wheat variety performance testing has been conducted in northwest Colorado for many years (Pearson and Haley, 2010; Pearson et al., 2003; 2004; 2005; 2007; 2008; 2009; 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 2012 winter wheat variety performance test was conducted at Hayden, Colorado.

Materials and Methods

Twenty-four winter wheat varieties and breeding lines were evaluated during the 2012 growing season at the Mike Williams Farm near Hayden just a short distance south of 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.

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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.

Planting winter wheat plots at the Mike Williams Farm at Hayden, Colorado, September 29, 2011. Photo by Calvin H. Pearson.

The seeding rate was 680,000 seeds/acre and planting occurred on 29 Sept. 2011. 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 end of May 2012. No fertilizer was applied. Plant height and lodging were evaluated just prior to harvest. Harvest occurred on 14 Aug. 2012 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

Winter wheat plots at the Mike Williams Farm at Hayden, Colorado on January 9, 2012. Photo by Calvin H. Pearson.

6500 (reported on a 12% moisture basis).

Results and Discussion

The results of the soil test analysis for the 2012 plot area at Hayden were: a sandy clay loam soil with a pH 7.7, 0.5 mmhos/cm, 1.3 % organic matter, 22 ppm NO_3-N, 29.7 ppm P, 60 ppm K, 2.3 ppm Zn, 81.7 ppm Fe, 3.2 ppm Mn, and 1.6 ppm Cu.

Growing conditions during the 2012 cropping season in Hayden were challenging for winter wheat production. The average maximum temperature for June 2012 at Hayden, Colorado was 86.3°F (Fig. 1). Precipitation at Hayden during the 2011-12 winter/spring growing season (September 2011 through August 2012, 12-month period) totaled 6.20 inches (data for Sept 2011, Apr 2012, and July 2012 are missing). This is a very low amount of precipitation in spite of the missing data. Winter moisture in the Hayden area was low (Fig. 2). During September 2011 through February 2012, a total of 6.2 inches of precipitation was received (data were missing for Sept 2011), and from April through Aug 2012 (data were missing for Apr 2012 and July 2012) most of the growing season precipitation was received at Hayden at a total of 2.45 inches of precipitation. This is a very low amount of precipitation, keeping in mind the missing data for two months during this period. Precipitation during the 2012 summer growing season was low at Hayden and had a major impact on crop production in the area. (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 10.3% (Table 1). Grain moisture content ranged from a high of 11.1% for Bryd to a low of 8.9 % for Fairview.

Grain yield for the winter wheat varieties averaged 2101 lbs/acre (35.0 bu/acre) (Table 1). Grain yield ranged from a high of 2465 lbs/acre (41.1 bu/acre) for CO050322 to a low of 1620 lbs/acre (27.0 bu/acre) for Hayden. Several winter wheat varieties were higher yielding than others, with seven varieties having grain yields in the top group according to LSD (0.05) mean separation. According to the Colorado Agricultural Statistics Service, the average wheat yield in northwest Colorado in 2011 was 25.7 bu/acre (Colorado Department of Agriculture, 2012).

Test weights averaged 60.1 lbs/bu (Table 1).

Winter wheat plots at maturity at the Mike Williams Farm at Hayden, Colorado, August 6, 2012. Photo by Calvin H. Pearson.

Test weights ranged from a high of 61.9 lbs/bu for Weston to a low of 57.9 lbs/bu for Golden Spike.

There was no lodging in the winter wheat variety performance test in 2012.

Plant height averaged 23.3 inches (Table 1). Plant height ranged from a high of 28.0 inches for Lucin CL to a low of 20.3 inches for CO07W245.

Protein concentration averaged 10.5% (Table 1). Protein concentration ranged from a high of 11.2% for UI SRG to a low of 9.8% for Hatcher and Golden Spike.

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Table 1. Winter wheat variety performance test at Hayden, Colorado 2012. Farmer-Cooperator: Mike Williams.

Variety	Market class[1]	Grain moisture	Grain yield		Test weight	Plant height	Protein
		(%)	bu/acre	lbs/acre	lbs/bu	in.	(%)
CO050322	HRW	10.6	41.1	2465	59.8	22.0	9.9
Hatcher	HRW	10.7	41.0	2455	59.8	20.8	9.8
Deloris	HRW	10.2	40.1	2406	60.6	26.8	11.0
CO050337-2	HRW	10.7	38.5	2310	60.2	23.1	10.1
Golden Spike	HWW	10.0	38.0	2283	57.9	23.2	9.8
CO07W245	HWW-NEW	10.2	37.0	2216	60.0	20.3	10.1
Brawl CL Plus	HRW CL2	10.8	36.6	2193	61.2	22.4	10.9
CO05W111	HWW	10.8	35.9	2153	60.5	23.2	10.3
Byrd	HRW	11.1	35.4	2124	59.2	22.4	10.3
Snowmass	HWW	11.0	35.3	2119	58.2	23.3	10.2
UI LHS	HWW	10.0	35.0	2104	58.4	22.0	11.0
Lucin CL	HRW CL	9.8	34.7	2084	60.6	28.0	10.4
CO050233-2	HRW CL	10.4	34.6	2078	60.9	22.2	9.9
Curlew	HRW	9.9	34.6	2076	60.2	23.4	11.1
Gary	HWW	10.4	34.4	2063	59.5	23.4	10.4
Weston	HRW	10.5	33.6	2016	61.9	26.7	11.1
CO050303-2	HRW	10.0	33.4	2004	61.1	20.9	9.9
UI Darwin	HWW	10.8	33.1	1986	60.7	25.7	10.7
CO050173	HRW	10.7	32.8	1964	60.8	22.2	10.3
UI Silver	HWW	10.4	32.6	1957	60.8	22.1	10.6
Fairview	HRW	8.9	32.1	1926	59.5	24.5	10.5
UI SRG	HRW	10.0	31.9	1911	59.1	25.2	11.2
IDO816	HRW	9.4	31.9	1915	58.9	22.0	10.8
Hayden	HRW	9.8	27.0	1620	61.4	23.5	11.1
AVE.		10.3	35.0	2101	60.1	23.3	10.5
LSD (0.05)		0.8	5.0	302	0.6	2.2	
CV (%)		5.4	10.2	10.2	0.7	6.8	

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

Planted – September 29, 2011. Harvested – August 14, 2012.

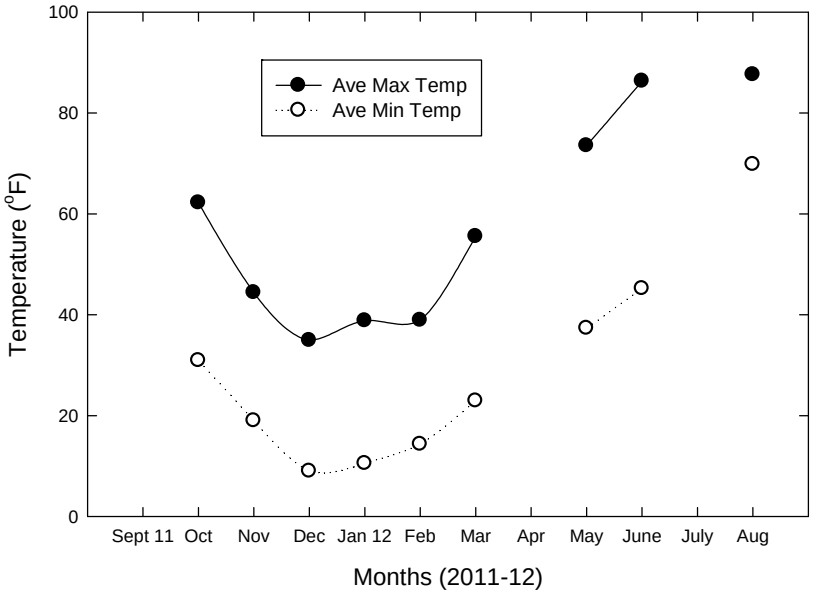

Fig. 1. Average maximum monthly and average minimum monthly temperatures for Sept 2011 through Aug 2012 at Hayden, Colorado. Data were missing for Sept 2011, Apr 2012, and July 2012.

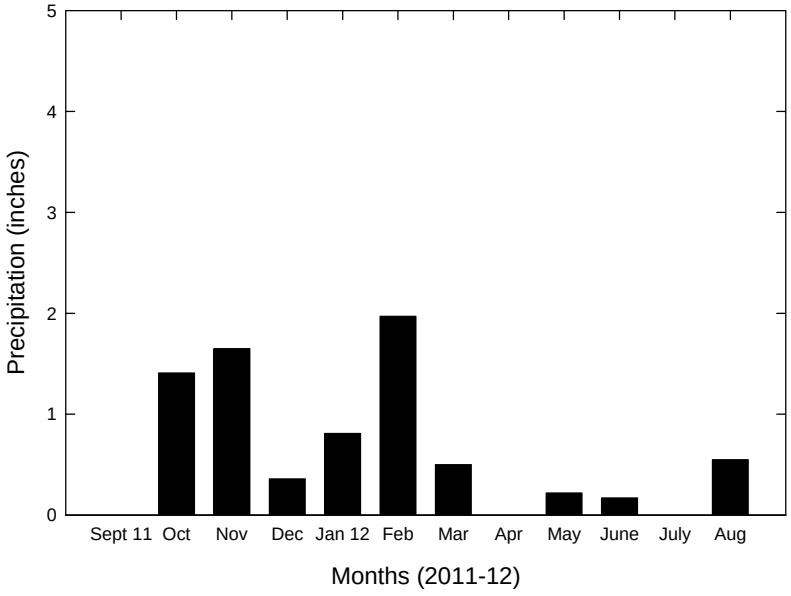

Fig. 2. Monthly precipitation for Sept. 2011 through Aug 2012 at Hayden, Colorado. Data were missing for Sept 2011, Apr 2012, and July 2012.