

Winter Wheat Variety Performance Trial at Hayden, Colorado 2013

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Summary

A winter wheat variety performance test was conducted at Hayden, Colorado in 2013 to identify varieties that are adapted for commercial production in northwest Colorado. Twenty varieties and breeding lines were evaluated in the 2013 trial. Growing conditions during the 2013 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 2233 lbs/acre (37.2 bu/acre). The highest yielding variety was Byrd at 2522 lbs/acre (42.0 bu/acre). Several winter wheat varieties were higher yielding than other varieties, with nine varieties in the top statistical (LSD) yield group. Protein concentration in 2013 averaged 9.6%. Protein concentration ranged from a high of 10.3% for the wheat variety Hayden to a low of 9.0% for Cowboy and CO05W111.

Introduction

Winter wheat variety performance testing has been conducted in northwest Colorado for many years (Pearson and Haley, 2010, 2011, 2012; 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 2013 winter wheat variety performance test was conducted at Hayden, Colorado.

Materials and Methods

Twenty winter wheat varieties and breeding lines were evaluated during the 2013 growing season at the Mike Williams Farm near Hayden located approximately a mile south of the intersection of Highway 40 and 20-mile Road. The experimental design was a randomized



Winter wheat plots were planted on September 26, 2012 at Hayden, Colorado on the Mike Williams Farm. Photo by Calvin Pearson.

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 26 Sept. 2012. An aerial application of Sword at 8 oz/acre plus 1/10 oz/acre Ally was applied on May 25, 2013 in 1 gallon water per acre with 1 qt of Liberate per 100 gallons. No fertilizer was applied. Plant height and lodging were evaluated just prior to harvest. Harvest occurred on 15 Aug. 2013 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 Computer³. Grain yields were calculated at 12% moisture content.

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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.

Grain protein concentration was determined by whole grain near infrared reflectance spectroscopy with a Foss NIRSystems 6500 (reported on a 12% moisture basis).

Results and Discussion

The results of the soil test analysis for the 2013 plot area at Hayden were: pH 6.2, 0.3 mmhos/cm, 1.3 % organic matter, 5.4 ppm NO₃-N, 13.0 ppm P, and 260 ppm K.

Growing conditions during the 2013 cropping season in Hayden were challenging for winter wheat production. The average maximum temperature for June 2013 at Hayden, Colorado was 83.0°F (Fig. 1). Precipitation at Hayden during the 2012-13 winter/spring growing season (September 2012 through August 2013, 12-month period) totaled 15.09 inches (data for March 2013 are missing). This precipitation amount was less than in some years. Winter moisture in the Hayden area was marginal (Fig. 2). During September 2012 through February 2013, a total of 7.84 inches of precipitation was received, and from April through Aug 2013 (data were missing for March 2013) a total of 7.25 inches of precipitation was received. Precipitation during the 2013 summer growing season was marginal at Hayden and likely had a negative impact on wheat production in the test plots.

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 and varies considerably by location, even within short distances. If timely precipitation occurs, grain

yields of winter wheat can 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 11.3% (Table 1). Grain moisture content ranged from a high of 12.3% for Snowmass to a low of 10.6 % for UI Silver.

Grain yield for the winter wheat varieties averaged 2233 lbs/acre (37.2 bu/acre) (Table 1). Grain yield ranged from a high of 2522 lbs/acre (42.0 bu/acre) for Byrd to a low of 1786 lbs/acre (29.8 bu/acre) for Gary. Several winter wheat varieties were higher yielding than others, with nine 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 Colorado in 2012 was 34.3 bu/acre (Colorado Department of Agriculture, 2013).

Test weights averaged 60.8 lbs/bu (Table 1). Test weights ranged from a high of 63.5 lbs/bu for Weston to a low of 58.8 lbs/bu for Deloris.

There was no lodging in the winter wheat variety performance test in 2013.

Plant height averaged 23.1 inches (Table 1). Plant height ranged from a high of 26.8 inches for Lucin CL to a low of 19.1 inches for Hatcher.

Protein concentration averaged 9.6% (Table 1). Protein concentration ranged from a high of 10.3% for the wheat variety Hayden to a low of 9.0% for Cowboy and CO05W111.

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References

Colorado Department of Agriculture. 2013. Colorado Agricultural Statistics: 2013. National Agric. Stat. Service and Colo. Dept. of Agric. Lakewood, CO. Available online at

- http://www.nass.usda.gov/Statistics_by_State/Colorado/Publications/Annual_Statistical_Bulletin/bulletin2012.pdf (verified 3 Dec. 2013).
- Golus, H.M., C.H. Pearson, R.W. Hammon, J.S. Quick, and J.F. Shanahan. 1997. Wheat and barley variety performance tests, 1987-96, in northwest Colorado. Colorado State University, Agricultural Experiment Station and Dept. of Soil and Crop Sciences. Technical Report TR97-10. Fort Collins, Colorado.
- Pearson, C.H. and S. Haley. 2012. Winter wheat variety performance trial at Hayden, Colorado 2012. p. 30-35. *In*: Western Colorado Research Center 2013 Research Report. Colorado State University, Agricultural Experiment Station and Extension, Technical Report TR13-05. Fort Collins, Colorado.
- Pearson, C.H. and S. Haley. 2011. Winter wheat variety performance trial at Hayden, Colorado 2011. Available at www.colostate.edu/programs/wcrc/ (verified 4 Mar. 2011). Agricultural Experiment Station. Fort Collins, CO.
- Pearson, C.H. and S. Haley. 2010. Winter wheat variety performance trial at Hayden, Colorado 2010. Available at www.colostate.edu/programs/wcrc/ (verified 4 Mar. 2011). Agricultural Experiment Station. Fort Collins, CO.
- Pearson, C.H., S. Haley, J.J. Johnson, and C. Johnson. 2009. Winter wheat variety performance trial at Hayden, Colorado 2009. Available at www.colostate.edu/programs/wcrc/ (verified 4 Mar. 2011). Agricultural Experiment Station. Fort Collins, CO.
- Pearson, C.H., S. Haley, and J.J. Johnson. 2008. Small Grain Performance Tests at Hayden, Colorado 2007. p. 31-33. *In*: Western Colorado Research Center 2007 Research Report. Colorado State University, Agricultural Experiment Station and Extension, Technical Report TR08-10. Fort Collins, Colorado.
- Pearson, C.H., S. Haley, J.J. Johnson, and C. Johnson. 2007. Small Grain Performance Tests at Hayden, Colorado 2006. p. 14-17. *In*: Western Colorado Research Center 2006 Research Report. Colorado State University, Agricultural Experiment Station and Extension, Technical Report TR07-08. Fort Collins, Colorado.
- Pearson, C.H., S. Haley, J.J. Johnson, and C. Johnson. 2004. Small grain variety performance tests at Hayden, Colorado 2004. Available at www.colostate.edu/programs/wcrc/ (verified 4 Mar. 2011). Agricultural Experiment Station. Fort Collins, CO.
- Pearson, C.H., S. Haley, J.J. Johnson, and C.L. Johnson. 2004. Small grain variety performance tests at Hayden, Colorado 2004. p. 23-28. *In* H.J. Larsen (ed.) Western Colorado Research Center 2003 research report. Technical Report TR04-05. Agricultural Exp. Stn. and Cooperative Ext., Colorado State Univ. Fort Collins, CO.
- Pearson, Calvin H., Scott Haley, Jerry J. Johnson, and Cynthia Johnson. 2003. Small Grain Variety Performance Tests at Hayden, Colorado 2002. p. 51-55. *In*: Western Colorado Research Center 2002 Research Report. Colorado State University, Agricultural Experiment Station and Cooperative Extension, Technical Report TR03-7. Fort Collins, Colorado.

Table 1. Winter wheat variety performance test at Hayden, Colorado 2013. Farmer-Cooperator: Mike Williams.

Variety	Market class ¹	Grain moisture	Grain yield		Test weight	Plant height	Protein
		(%)	lbs/acre	bu/acre	lbs/bu	in.	(%)
Byrd	HRW	11.9	2522	42.0	59.8	19.6	9.1
Hatcher	HRW	11.7	2451	40.8	61.4	19.1	9.4
Cowboy	HRW	11.2	2418	40.3	59.8	21.4	9.0
Brawl CL Plus	HRW CL2	11.2	2380	39.6	61.7	21.8	9.8
CO05W111	HWW	11.6	2372	39.5	61.3	22.1	9.0
Snowmass	HWW	12.3	2368	39.4	59.8	21.6	9.7
UI SRG	HRW	11.2	2358	39.3	60.7	27.2	9.9
Antero	HWW	11.8	2334	38.9	61.5	19.5	9.1
Weston	HRW	11.4	2306	38.4	63.5	26.3	10.2
Lucin CL	HRW CL	11.0	2241	37.4	62.4	26.8	9.9
Hayden	HRW	11.0	2239	37.3	63.3	26.6	10.3
Fairview	HRW	11.0	2224	37.0	60.9	23.8	9.5
UI Darwin	HWW	11.4	2203	36.7	62.2	24.6	9.7
UI Silver	HWW	10.6	2167	36.1	61.6	23.2	9.2
UI LHS	HWW	11.2	2145	35.8	59.3	22.0	9.3
Golden Spike	HWW	11.4	2131	35.5	59.6	21.8	9.5
IDO1103	HRW	11.4	2094	34.9	60.3	21.5	9.3
Deloris	HRW	11.3	2021	33.7	58.8	25.8	10.0
Curlew	HRW	10.9	1906	31.8	59.9	25.0	10.0
Gary	HWW	11.2	1786	29.8	59.2	21.9	9.4
AVE.		11.3	2233	37.2	60.8	23.1	9.6
LSD (0.05)		NS	278	4.6	2.1	1.3	
CV (%)		6.2	8.8	8.8	2.5	4.1	

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

Planted – September 26, 2012. Harvested – August 15, 2013.

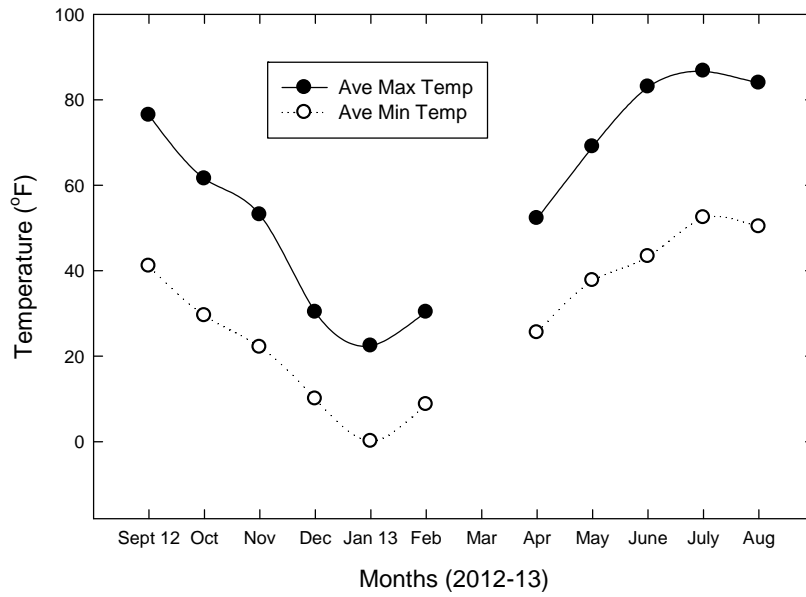


Fig. 1. Average maximum monthly and average minimum monthly temperatures for Sept 2012 through Aug 2013 at Hayden, Colorado. Data were missing for March 2013.

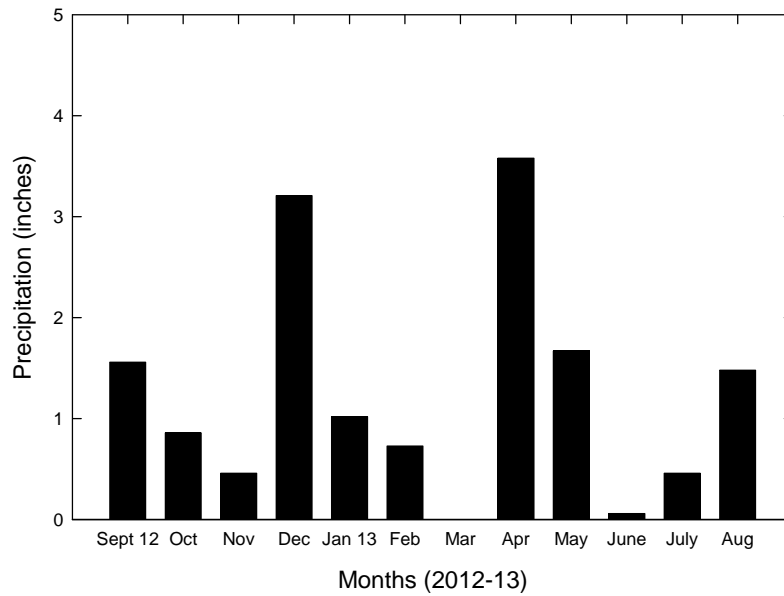


Fig. 2. Monthly precipitation for Sept. 2012 through Aug 2013 at Hayden, Colorado. Data were missing for March 2013.