

Small Grain Variety Performance Tests at Hayden, Colorado 2006

Calvin H. Pearson¹, Scott Haley, Jerry J. Johnson, Cynthia Johnson²

Summary

Each year small grain variety performance tests are conducted at Hayden, Colorado to identify varieties that are adapted for commercial production in northwest Colorado. Twenty-six varieties were evaluated in 2006 in winter wheat variety performance test conducted at Hayden, CO. Growing conditions during the 2006 cropping season in Hayden were favorable for winter wheat production. Grain yield in the winter wheat variety performance test averaged 4454 lbs/acre (74.2 bu/acre). The highest yielding entry was Golden Spike at 5357 lbs/acre (89.3 bu/acre). Many winter wheat varieties were high yielding with ten varieties having higher yields than the other sixteen. Protein concentration averaged 13.13% and ranged from a high of 14.91% for Postrock to a low of 12.11% for Golden Spike.

Introduction

Small grain variety performance testing has been ongoing in northwest Colorado for many years (Pearson, et al., 2005; Pearson et al., 2004; Pearson, et al., 2003; Golus et al., 1997). Small grain variety performance tests are conducted in northwest Colorado to identify varieties adapted for commercial production in the region. The 2006 winter wheat variety performance test was conducted at Hayden, CO.

Materials and Methods

Twenty-six winter wheat varieties and breeding lines were evaluated during the 2006 growing season at the Mike Williams Farm near Hayden, Colorado (Fig. 1). 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. 2005. No fertilizer, herbicides, or insecticides were applied to the plots. Harvest occurred on 10 Aug. 2006 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 combining. Grain moistures and test weights were determined using a DICKEY-john GAC2100b™ Grain Analysis Computer¹. Grain yields were calculated at 12% moisture content. Protein concentration was determined by whole grain near infrared reflectance spectroscopy with a Foss NIRSystems 6500 (reported on a 12% moisture basis).



¹Contact information: Colorado State University Agricultural Experiment Station, Western Colorado Research Center – Fruita, 1910 L Road, Fruita, CO 81521. Ph. 970-858-3629; Fax 970-858-0461; email: calvin.pearson@colostate.edu

²Respectively: Professor/Research Agronomist, Western Colorado Research Center at Fruita; Associate Professor/Wheat Breeder, Fort Collins; Research Scientist/Extension Crop Specialist, Fort Collins; Research Associate, Crops Testing Program, Fort Collins.

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

Fig.1. Fred Judson standing in the winter wheat variety performance test plots at Hayden, Colorado just prior to harvesting them on 10 Aug 2006. Photo by Calvin H. Pearson.

Results and Discussion

The 2005-2006 growing season in the Craig/Hayden area was favorable for winter wheat production. The average maximum temperature for July 2006 at Hayden, Colorado was 87.3°F (Fig. 2). Precipitation at Hayden during the 2005-06 winter/spring growing season (September 2005 through July 2006, 11-month period) totaled 17.81 inches. Winter moisture in the Hayden area was good. During September 2005 through February 2006 a total of 11.11 inches of precipitation was received and from March through July 2006 a total of 6.7 inches of precipitation was received at Hayden (Fig. 3).

Precipitation in the Craig/Hayden area varies considerably from month to month and year to year and is a critical factor affecting crop production. If timely precipitation occurs, grain yields of winter wheat can be increased significantly as occurred in 2006. If precipitation does not occur in a timely fashion, grain yields of wheat can be low. Because precipitation is so variable 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 9.3% (Table 1). Grain moisture content ranged from a high of 11.6% for NuGrain to a low of 8.7% for Juniper.

Grain yields of the winter wheat varieties averaged 4454 lbs/acre (74.2 bu/acre). Grain yields ranged from a high of 5357 lbs/acre (89.3 bu/acre) for Golden Spike to a low of 1770 lbs/acre (29.5 bu/acre) for NuGrain. NuGrain was low yielding mainly because the plant stand was poor. The low plant population was possibly caused by poor quality seed that was planted. Many winter wheat varieties were high yielding with ten varieties having higher yields than the other sixteen.

Test weights averaged 60.6 lbs/bu. Test weights ranged from a high of 63.0 lbs/bu for Hayden to a low of 57.8 lbs/bu for NuDakota.

There was no lodging in the winter wheat variety performance test in 2006 (Fig. 1).

Plant height averaged 29.4 inches. Plant height ranged from a high of 38.8 inches for Juniper to a low of 20.8 inches for NuGrain.

Protein concentration averaged 13.13% and ranged from a high of 14.91% for Postrock to a low of 12.11% for Golden Spike. Three varieties (Postrock, NuHills, and Hayden) had protein concentrations above 14%.

Acknowledgments

The farmer-cooperator for this trial was Mike Williams. We thank Mike for his willingness to participate with us year after year in conducting this research. We also thank C.J. Mucklow, CSU Cooperative Extension, for his support of our small grain research in northwest Colorado. Appreciation is also expressed to Fred Judson and Chip Brazelton (Western Colorado Research Center staff), and Daniel Dawson (part-time hourly employee) who assisted with this research. Appreciation is also extended to the Colorado Wheat Administrative Committee for funding this research.

References

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., S. Haley, J.J. Johnson, and C. Johnson. 2005. Small grain variety performance tests at Hayden, Colorado 2004. Available at www.colostate.edu/programs/wrc/infopages/haydensmallgrain2004.pdf (accessed 29 Jan. 2006). 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 2006. Farmer-Cooperator: Mike Williams.

Variety	Market class ¹	Grain moisture (%)	Grain yield		Test weight lbs/bu	Plant height in.	Protein (%)
			lbs/acre	bu/acre			
Golden Spike	HWW	9.0	5357	89.3	59.9	31.3	12.11
Deloris	HWW	9.3	5323	88.7	61.3	31.9	13.22
Gary	HWW	9.4	5024	83.7	61.0	30.5	12.36
Lakin	HWW	8.9	5003	83.4	58.8	27.0	12.54
Above	HRW (CL)	9.0	4925	82.1	60.3	28.6	12.61
NuDakota	HWW	9.0	4879	81.3	57.8	25.9	12.47
UT9508-88	HRW	9.5	4848	80.8	62.3	30.3	12.34
IDO616	HRW	9.6	4782	79.7	61.6	35.0	12.93
UT9508-157	HRW	9.4	4771	79.5	61.7	31.4	12.75
Fairview	HRW	9.1	4719	78.6	61.2	31.8	13.42
Danby	HWW	9.4	4665	77.7	62.9	28.0	13.43
Bond CL	HRW (CL)	9.0	4617	77.0	60.0	29.2	12.20
TAM 111	HRW	9.8	4568	76.1	61.2	27.3	13.08
UI Darwin	HWW	9.6	4463	74.4	61.8	30.7	13.52
Ankor	HRW	9.7	4460	74.3	59.8	28.2	12.87
Avalanche	HWW	9.1	4441	74.0	60.9	29.1	13.59
Jagalene	HRW	8.8	4434	73.9	60.3	29.0	13.48
IDO573	HWW	9.2	4414	73.6	61.6	33.3	13.99
Juniper	HRW	8.7	4366	72.8	61.3	38.8	13.99
NuFrontier	HWW	9.4	4345	72.4	59.8	28.6	12.42
Hatcher	HRW	9.2	4298	71.6	60.4	26.6	12.08
Hayden	HRW	9.6	4279	71.3	63.0	34.4	14.05
Postrock	HRW	9.0	3948	65.8	60.9	26.6	14.91
Ripper	HRW	9.4	3750	62.5	58.8	25.6	12.71

NuHills	HWW	9.0	3363	56.1	59.8	25.1	14.66
NuGrain	HWW	11.6	1770	29.5	58.4	20.8	13.60
Ave.		9.3	4454	74.2	60.6	29.4	13.13
LSD (0.05)		0.8	652	10.9	0.9	1.7	
CV (%)		6.20	10.4	10.4	1.0	4.2	

¹HRW = hard red winter wheat; HWW = hard white winter wheat; CL = Clearfield* wheat.

Hayden 2005-06

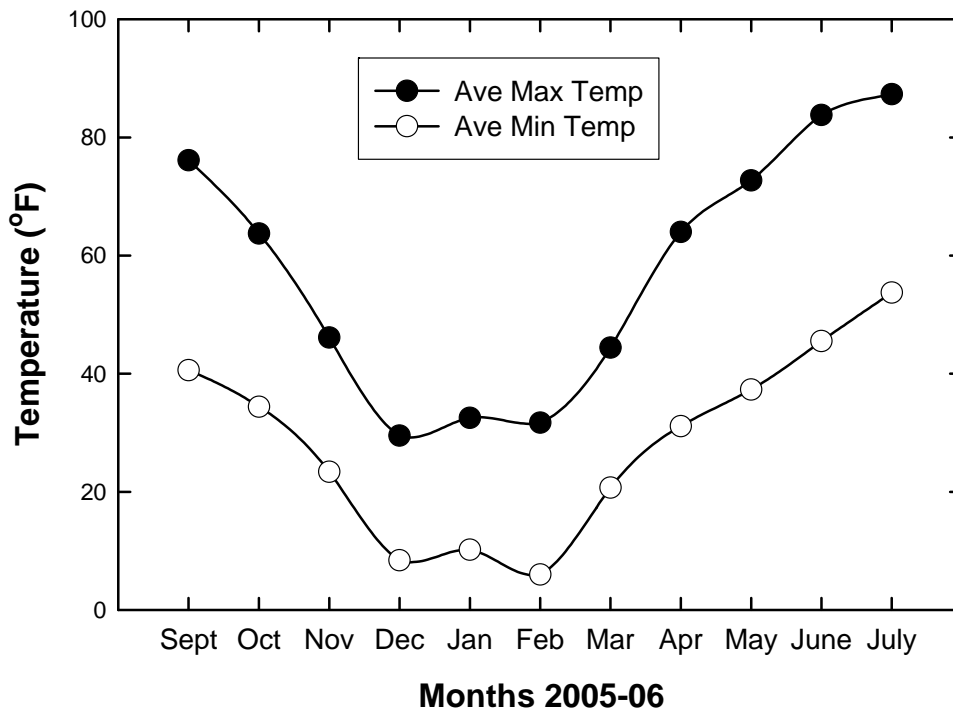


Fig. 2. Average maximum monthly and average minimum monthly temperatures for Sept 2005 through July 2006 at Hayden, Colorado.

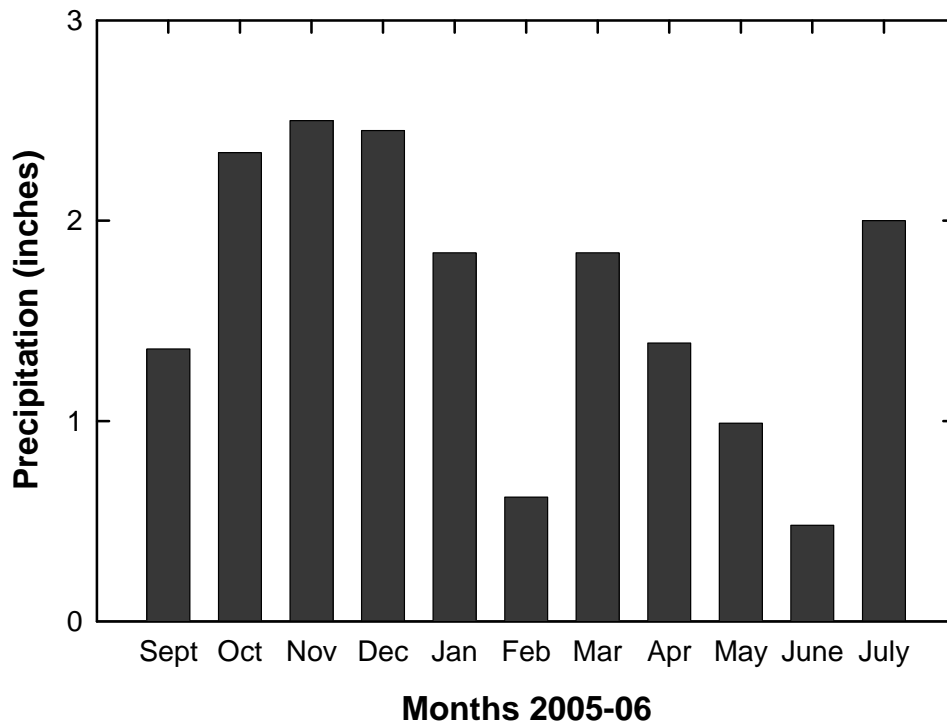


Fig. 4. Monthly precipitation for Sept. 2005 through July 2006 at Hayden, Colorado.