



Current Report

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Protein Content of Winter Wheat Varieties in Oklahoma 2012

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General Information

Protein is just one of many attributes which determine end-use quality and marketability of winter wheat. In fact, some millers and bakers would argue that functionality of wheat protein is more important than the quantity of protein. While varietal differences commonly exist, differences in varietal protein among environments are generally much larger than differences among varieties. Factors such as nitrogen fertility, for example, can sharply impact final protein content of the grain. The Hooker and Buffalo locations, for example, were fertilized to reach a 50 bu/ac yield goal and had the tiller and seed numbers to reach this goal. The onset of heat and drought during mid grainfill, however, prematurely terminated seed development and average test weight at Buffalo and Hooker was 48.7 and 51.3 lb/bu. This resulted in shriveled kernels with high concentrations of nitrogen and very high wheat grain protein in 2012. If these kernels had reached full size, it is likely that grain protein would have been closer to the 13.2% average at the Goodwell irrigated site.

Procedures

Approximately 600g subsamples of wheat grain were collected from the OSU wheat variety performance test plots at harvest. These plots were well-fertilized and managed according to OSU Cooperative Extension recommendations. Additional information on test locations and management practices is available in Current Report 2143 2012 Oklahoma Small Grains Variety Performance Tests on the web at www.wheat.okstate.edu. Samples were stored in plastic containers for approximately three months following harvest. Samples were analyzed for protein content using a Diode Array Near Infrared instrument (NIR) (model DA 7200, Perten Instruments, Sweden).

Acknowledgments

The authors wish to acknowledge the financial support of the Oklahoma Wheat Commission and Oklahoma Wheat Research Foundation.

Table 1. 2012 Oklahoma Wheat Variety Trial Grain Protein Summary.

Variety	Apache										Goodwell
	Alva	Apache	Fung.	Balko	Buffalo	Chattanooga	Cherokee	El Reno	Gage	Goodwell Irr	Non-Irr
2174	-	-	-	-	-	-	-	-	-	-	-
AP503CL2	10.3	-	-	-	18.5	-	-	-	15.6	-	-
Armour	11.5	14.4	14.5	13.8	16.1	14.9	12.4	10.8	14.1	13.4	16.4
Bill Brown	-	-	-	13.4	-	-	-	-	-	12.7	15.0
Billings	10.9	14.4	14.4	14.3	17.3	15.8	12.8	10.9	15.9	14.4	16.5
Centerfield	10.8	-	-	-	15.9	15.1	13.0	-	14.7	-	-
CJ	11.2	-	-	13.2	15.5	-	13.5	10.7	14.0	13.3	15.6
Deliver	-	14.3	13.7	-	-	-	11.9	10.5	-	-	-
Doans	12.1	15.8	15.6	13.4	16.5	16.8	13.7	11.6	14.6	14.0	15.5
Duster	10.5	14.8	14.7	14.0	16.5	15.4	11.5	11.0	14.3	13.1	16.0
Endurance	11.0	15.0	14.8	12.7	16.2	16.0	11.9	10.8	13.2	13.0	15.4
Everest	10.6	14.5	14.1	-	15.9	15.9	12.7	10.4	13.6	-	-
Fannin	-	17.4	16.9	-	-	16.4	-	11.7	-	-	-
Fuller	11.4	15.1	15.1	-	17.6	15.6	14.3	11.1	15.5	-	-
Gallagher	9.9	15.2	14.7	13.8	17.6	15.8	12.6	10.9	-	13.5	14.7
Garrison	11.8	15.8	-	14.4	17.3	16.2	12.7	10.9	13.9	13.0	16.3
Greer	11.1	16.4	15.7	14.4	18.9	16.6	12.8	11.0	15.9	13.6	16.3
Hatcher	-	-	15.9	13.7	-	-	-	-	-	12.6	15.3
Iba	9.7	15.2	15.0	12.7	16.2	16.0	11.6	10.5	-	12.5	16.5
Jackpot	11.4	15.5	15.4	13.9	18.6	15.6	13.0	10.9	14.7	13.0	17.1
Jagger	11.8	16.0	15.5	13.6	18.4	16.5	13.9	11.5	16.3	13.7	17.1
Mace	-	-	-	14.3	-	-	-	-	-	13.9	15.0
OK Bullet	11.1	16.3	15.6	-	18.8	17.3	12.8	11.9	15.3	-	-
Pete	-	13.1	13.3	-	-	14.9	12.7	9.8	-	-	-
Ruby Lee	11.1	15.0	15.2	14.0	16.6	15.0	13.0	10.7	13.9	13.3	15.8
Santa Fe	-	-	-	-	-	-	13.2	11.6	-	-	-
T153	-	-	-	13.2	-	-	-	-	-	12.9	16.0
T158	-	-	-	13.1	-	-	-	-	-	12.4	15.5
TAM 111	11.2	-	-	14.3	17.9	-	-	-	14.4	12.8	16.7
TAM 112	10.9	-	-	13.8	17.4	-	-	-	14.3	13.3	16.2
TAM 113	10.6	-	-	13.7	17.4	-	-	-	14.9	13.4	15.9
TAM 203	-	16.4	15.9	-	-	16.0	-	-	-	-	-
TAM 401	-	15.7	15.7	-	-	15.2	13.5	11.3	-	-	-
WB-Cedar	-	-	-	-	-	-	-	10.2	-	12.5	-
Winterhawk	10.4	-	-	13.2	16.6	-	11.5	-	13.5	12.8	15.6
Experimentals											
OCW00S063S-1B	-	-	-	-	-	-	-	-	-	-	15.4
OK05312	-	-	-	12.7	-	-	-	-	-	13.1	15.7
OK08229	-	-	-	14.1	-	-	-	-	15.5	13.8	15.9
OK08328	9.8	15.5	15.2	14.2	17.1	17.1	-	10.5	15.2	13.0	15.6
OK08413	-	-	-	-	-	-	-	-	-	-	-
OK08707W	-	-	-	13.7	-	-	-	-	-	13.7	16.4
OK09125	-	-	-	-	-	-	-	-	-	-	16.8
OK09634	10.1	14.9	14.2	-	-	-	-	11.0	-	-	-
OK0986146W	-	-	-	-	-	-	-	-	-	13.5	-
OK09915C	10.2	-	-	-	18.4	-	-	11.3	15.9	-	-
Mean	10.9	15.3	15.1	13.7	17.2	15.9	12.8	10.9	14.7	13.2	15.9
LSD (0.05)	1.2	1.1	0.9	1.1	0.8	1.5	1.3	0.6	0.8	0.5	1.5

Table 1. 2012 Oklahoma Wheat Variety Trial Grain Protein Summary (cont'd).

	Homestead	Hooker	Keyes	Kildare	Kingfisher	Lahoma	Lahoma Fung.	Marshall DP	Marshall GO	McLoud	Olustee	Thomas
Variety-----% wheat protein (12% moisture basis) -----												
2174	-	-	-	-	-	-	-	-	-	16.3	-	-
AP503CL2	-	-	-	-	-	-	-	-	-	-	-	-
Armour	14.0	17.8	14.3	12.8	11.1	13.5	12.4	13.9	15.7	15.6	14.2	15.4
Bill Brown	-	18.0	14.2	-	-	-	-	-	-	-	-	-
Billings	14.7	19.0	16.3	12.8	11.8	12.9	12.5	13.1	13.8	17.1	14.6	15.9
Centerfield	-	-	-	-	11.6	-	-	-	-	-	-	-
CJ	13.8	16.6	14.8	12.6	11.5	12.5	12.5	12.5	13.2	14.2	-	-
Deliver	13.5	-	-	12.4	11.7	11.9	12.3	12.6	13.2	-	14.3	14.7
Doans	14.3	17.2	15.0	13.2	12.5	13.3	13.5	13.5	14.5	15.5	14.0	15.8
Duster	13.8	17.5	15.2	12.1	11.8	12.5	12.3	12.9	13.8	15.1	14.1	14.3
Endurance	13.6	16.2	14.7	12.0	11.9	12.4	12.5	12.5	13.4	14.7	13.6	15.9
Everest	13.7	-	-	12.2	10.9	12.6	12.7	12.4	13.6	15.0	14.1	16.2
Fannin	-	-	-	-	-	-	-	-	-	-	14.6	16.4
Fuller	14.1	-	-	13.1	11.4	13.0	13.1	13.2	14.1	15.8	13.9	17.4
Gallagher	13.8	17.1	14.8	12.3	10.6	11.8	11.9	12.2	13.4	15.1	14.0	16.5
Garrison	14.0	17.4	15.2	12.5	11.7	12.5	12.9	12.7	14.6	15.6	15.2	17.4
Greer	13.9	18.9	15.7	12.6	11.7	12.3	12.5	13.1	13.9	14.7	15.0	13.0
Hatcher	-	16.7	15.1	-	-	-	-	-	-	-	-	-
Iba	12.7	17.0	14.3	11.4	11.0	11.2	11.7	11.4	12.8	15.1	13.8	13.5
Jackpot	13.6	16.9	14.8	12.3	11.3	12.7	12.5	12.6	13.7	16.3	13.7	15.8
Jagger	14.7	18.2	15.5	13.7	11.4	13.4	13.4	14.1	15.0	15.4	14.2	17.3
Mace	-	17.5	15.1	-	-	-	-	-	-	-	-	-
OK Bullet	14.0	17.0	14.4	13.2	12.0	13.1	13.6	13.2	14.5	16.2	14.9	17.3
Pete	12.2	-	-	11.7	10.1	11.1	12.0	11.5	13.4	-	13.4	15.9
Ruby Lee	14.0	18.0	15.6	12.2	11.2	12.7	12.8	12.5	13.7	16.1	13.8	15.7
Santa Fe	14.8	-	-	13.1	13.1	14.1	13.8	14.2	15.2	16.2	-	-
T153	-	16.8	14.9	-	-	-	-	-	-	-	-	-
T158	-	17.3	15.1	-	-	-	-	-	-	-	-	-
TAM 111	-	18.2	15.8	-	-	-	-	-	-	-	-	-
TAM 112	-	17.8	14.5	-	-	-	-	-	-	-	-	-
TAM 113	-	17.9	14.0	-	-	-	-	-	-	-	-	-
TAM 203	-	-	-	-	-	-	-	-	-	-	14.5	17.1
TAM 401	14.8	-	-	13.5	12.3	13.2	13.8	13.6	15.2	-	14.9	14.6
WB-Cedar	14.1	-	-	12.1	11.2	12.3	12.0	12.4	13.7	15.3	-	-
Winterhawk	-	16.6	14.8	-	-	-	-	-	-	-	13.8	14.9
Experimentals												
OCW00S063S-1B	-	-	14.7	-	-	-	-	-	-	-	-	-
OK05312	-	-	-	-	-	-	-	-	-	-	-	-
OK08229	-	18.9	14.8	-	-	-	-	-	-	-	-	-
OK08328	13.4	17.6	14.5	-	11.4	12.1	11.7	12.2	12.7	15.0	14.4	13.4
OK08413	-	-	-	12.7	-	-	-	-	-	16.7	-	-
OK08707W	-	-	-	-	-	-	-	-	-	-	-	-
OK09125	-	-	14.6	-	-	-	-	-	-	-	-	-
OK09634	-	-	-	-	10.8	12.6	13.0	-	-	-	-	-
OK0986146W	-	17.8	14.2	-	-	-	-	-	-	-	-	-
OK09915C	-	-	-	-	12.8	12.3	13.2	-	14.0	-	-	-
Mean	13.9	17.5	14.9	12.6	11.5	12.6	12.7	12.8	14.0	15.6	14.2	15.6
LSD (0.05)	0.4	1.2	1.8	0.6	0.9	0.8	1.0	0.9	0.7	1.0	0.7	2.7

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