



Current Report

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Protein Content of Winter Wheat Varieties in Oklahoma—2016

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General Information

Protein is just one of many attributes that determines 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 and drought stress, for example, can sharply impact final protein grain content.

To reflect these environmental impacts on wheat grain protein content, data are reported by variety and location in Table 1. In Table 2, we reported the wheat grain protein content as a deviation from location mean for each variety, as this provides easier comparison of wheat grain protein among varieties across locations. Doublestop CL Plus, for example, is a variety which showed positive deviation from the location mean in 90% of the trials, indicating it has a tendency for above-average grain protein content. Iba, on the other hand, has negative deviations from location means, indicating a tendency for lower than average grain protein content. Adequate nitrogen fertility as recommended by a recent soil test or sensor-based nitrogen management program can help ensure that varieties such as Iba produce grain protein within the acceptable range for end-use customers. Iba is also a prime example of how protein data can sometimes be misused, as the functionality of the protein in Iba is above average, which can offset lower absolute grain protein content.

Procedures

Approximately 600 g 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 2015-2016

Oklahoma Small Grains Variety Performance Tests on the web at www.wheat.okstate.edu. Samples were stored in plastic containers for approximately one month following harvest. Samples were nondestructively analyzed for protein content on a 12% moisture basis using a Diode Array Near Infrared instrument (NIR) (model DA 7200, Perten Instruments, Sweden).

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Marshall – Fuxa Farms
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Table 1. Wheat protein content (12% moisture basis) of varieties and experimental lines tested in the 2015-2016 Oklahoma Wheat Variety Performance Tests.

Source	Variety	Apache								Chickasha	Goodwell	
		Afton	Altus	Alva	Apache	Fungicide	Buffalo	Cherokee	Chickasha	IWM	Irrigated	
		----- %wheat protein -----										
KWA	1863	-	11.7	-	-	-	-	-	-	12.4	13.5	14.5
AGSECO	AG Robust	-	11.6	-	-	-	-	-	-	13.2	13.4	14.4
PlainsGold	Avery	-	12.7	10.3	-	-	10.1	10.3	11.9	12.0	13.2	13.2
OGI	Bentley	9.3	11.9	9.1	10.8	11.6	10.3	10.5	12.4	14.3	14.0	14.0
OGI	Billings	10.1	12.1	-	-	-	-	-	13.0	13.9	14.4	14.4
PlainsGold	Brawl CL Plus	-	11.4	11.1	-	-	12.0	11.0	12.6	13.6	14.5	14.5
PlainsGold	Byrd	-	11.3	10.3	-	-	10.6	9.7	12.5	12.4	13.4	13.4
OGI	Doublestop CL Plus	10.1	11.7	11.5	11.5	12.1	12.1	11.5	12.8	13.9	14.3	14.3
OGI	Duster	8.9	11.2	9.3	12.4	12.9	11.3	10.6	12.3	13.4	13.4	13.4
OSU	Endurance	9.7	11.6	10.7	11.9	12.3	10.5	10.6	11.6	12.7	12.6	12.6
KWA	Everest	10.6	11.4	-	-	-	-	-	13.2	13.3	13.3	13.3
OGI	Gallagher	8.5	12.5	11.0	11.5	11.9	11.8	11.8	12.3	13.2	14.1	14.1
OGI	Iba	9.0	11.7	10.5	10.7	11.2	10.8	10.4	11.9	12.4	13.2	13.2
KWA	Joe	-	11.7	-	-	-	-	-	12.7	13.7	13.5	13.5
KWA	KanMark	-	11.5	9.4	11.3	11.6	11.2	10.2	11.7	13.1	13.3	13.3
KWA	Larry	-	11.0	-	-	-	-	-	12.0	13.0	14.1	14.1
LCS	LCS Chrome	-	11.1	-	-	-	-	-	13.5	14.0	14.6	14.6
LCS	LCS Mint	-	11.2	8.9	-	-	10.3	10.6	11.9	13.3	13.4	13.4
LCS	LCS Pistol	9.5	11.9	9.9	11.8	12.5	12.1	10.8	12.0	14.1	13.7	13.7
LCS	LCS Wizard	10.1	12.1	9.0	11.8	12.4	12.1	11.7	11.8	13.2	14.0	14.0
Dyna-Gro	Long Branch	-	10.8	-	-	-	-	-	13.2	13.9	13.7	13.7
OGI	NF 101	-	12.8	-	-	-	-	-	12.5	13.4	13.6	13.6
KWA	Oakley CL	-	11.2	-	-	-	-	-	12.9	14.0	13.9	13.9
OGI	OK Rising	-	11.4	-	-	-	-	-	12.5	14.0	14.8	14.8
OGI	Ruby Lee	10.1	12.0	11.6	12.1	12.4	11.7	11.4	13.4	13.8	13.7	13.7
OGI	Stardust	-	-	-	-	-	-	-	-	-	-	-
Syngenta	SY Drifter	10.3	12.1	-	11.6	12.0	-	-	12.3	13.3	13.9	13.9
Syngenta	SY Flint	9.8	12.0	10.2	11.3	11.8	11.6	10.6	12.2	12.8	13.9	13.9
Syngenta	SY Grit	-	12.2	-	-	-	-	-	12.0	13.5	13.7	13.7
Syngenta	SY Llano	10.5	11.8	-	12.2	12.3	-	-	12.3	13.0	13.2	13.2
Syngenta	SY Monument	-	11.8	11.6	-	-	11.2	10.8	12.7	13.1	13.5	13.5
Syngenta	SY Razor	-	11.1	-	-	-	-	-	14.4	14.6	15.2	15.2
Syngenta	SY Wolf	-	-	-	-	-	-	-	-	-	14.0	14.0
LCS	T158	-	13.1	-	11.2	12.0	-	-	12.1	12.7	13.5	13.5
Watley	TAM 112	-	11.4	9.7	-	-	11.1	10.9	12.2	13.7	14.2	14.2
AGSECO	TAM 114	-	11.3	12.3	-	-	11.3	11.5	12.3	12.9	13.9	13.9
Watley	TAM 204	10.3	11.2	10.1	11.9	12.3	12.3	10.9	12.7	13.3	14.9	14.9
KWA	Tatanka	-	11.9	-	-	-	-	-	11.5	12.5	13.0	13.0
WestBred	WB4303	-	12.1	-	-	-	-	-	12.6	13.9	13.5	13.5
WestBred	WB4458	11.3	12.6	-	11.9	12.6	-	-	12.7	14.0	14.7	14.7
WestBred	WB4515	-	11.9	-	-	-	-	-	13.0	13.9	14.0	14.0
WestBred	WB4721	-	12.2	-	-	-	-	-	12.4	14.3	14.0	14.0
WestBred	WB-Cedar	10.2	11.7	11.7	-	-	11.8	12.9	13.4	13.5	14.2	14.2
WestBred	WB-Grainfield	9.0	11.5	10.4	10.3	11.0	11.0	10.1	12.8	13.6	13.6	13.6
WestBred	Winterhawk	-	11.7	10.0	10.7	11.0	11.2	10.6	11.5	12.5	13.3	13.3
KWA	Zenda	-	11.4	-	-	-	-	-	12.1	12.9	13.3	13.3
OSU Experimentals												
	OK09915C-1	10.9	11.8	11.9	12.1	12.8	12.5	12.3	13.0	14.3	15.0	15.0
	OK10126	-	-	-	-	-	-	-	-	-	-	14.5
	OK1059060-3	-	-	-	-	-	-	-	-	-	-	-
	OK11231	10.7	-	-	-	-	-	-	-	-	-	-
	OK118036R/W	-	-	-	-	-	-	-	-	-	-	-
	OK11D25056	-	11.6	11.3	-	-	-	-	12.6	13.3	13.8	13.8
	OK12621	-	-	11.1	-	-	-	-	-	-	-	13.9
	OK12716R/W	-	12.1	12.5	11.1	11.6	-	10.3	-	-	-	13.7
	OK12912C	-	-	12.5	-	-	12.6	11.8	13.9	13.8	14.6	14.6
	OK12DP22002-042	-	-	-	-	-	-	-	-	-	-	12.7
Mean		9.9	11.7	10.7	11.5	12.0	11.4	11.0	12.5	13.4	13.9	13.9
LSD (0.05)		1.0	NS	NS	0.7	0.7	1.1	0.7	0.5	0.6	0.7	0.7

Notes: Shaded values are not statistically different from the highest value within a column (i.e., location). NS = not significant.

Table 1. Wheat protein content (12% moisture basis) of varieties and experimental lines tested in the 2015-2016 Oklahoma Wheat Variety Performance Tests. (cont'd).

Source	Variety	%wheat protein										
		Homestead	Hooker	Kildare	Lahoma	Lahoma Fungicide	Lamont	Marshall Dual-Purpose	Marshall Grain-only	Thomas	Union City	Walters
KWA	1863	-	-	-	10.0	10.8	-	-	-	-	-	-
AGSECO	AG Robust	-	-	-	10.9	11.2	-	-	-	-	-	-
PlainsGold	Avery	-	13.3	-	10.7	10.5	-	-	-	-	-	-
OGI	Bentley	10.8	13.0	10.9	10.6	11.3	11.4	10.1	10.3	11.5	8.7	9.1
OGI	Billings	12.2	-	11.2	11.7	11.8	12.7	10.6	11.7	13.0	8.8	-
PlainsGold	Brawl CL Plus	-	13.2	-	12.0	12.5	-	-	-	-	-	-
PlainsGold	Byrd	-	12.7	-	10.8	10.9	-	-	-	-	-	-
OGI	Doublestop CL Plus	11.8	13.5	11.9	11.6	12.5	12.2	11.6	11.7	13.0	9.4	10.0
OGI	Duster	11.7	13.2	11.1	11.2	11.3	11.7	10.5	11.1	11.6	8.5	9.3
OSU	Endurance	11.1	12.4	11.2	11.1	10.9	12.1	10.4	10.5	11.8	8.7	10.0
KWA	Everest	12.0	-	11.6	10.4	11.1	12.2	11.3	11.6	-	-	-
OGI	Gallagher	11.3	13.1	11.0	10.5	10.8	12.0	11.3	10.6	11.6	8.0	9.0
OGI	Iba	10.3	12.9	10.1	10.7	10.9	11.1	10.4	10.6	11.1	8.8	9.8
KWA	Joe	-	-	-	10.5	10.7	-	-	-	-	-	-
KWA	KanMark	10.6	13.1	10.5	10.4	10.8	11.5	11.3	10.5	10.8	8.3	10.7
KWA	Larry	-	-	-	10.3	11.0	-	-	-	-	-	-
LCS	LCS Chrome	-	-	-	12.1	12.3	-	-	-	-	-	-
LCS	LCS Mint	10.6	12.6	11.0	10.3	11.0	11.5	11.4	10.4	11.4	8.1	-
LCS	LCS Pistol	11.4	13.3	11.4	11.1	11.1	12.3	11.9	11.6	11.9	8.5	10.0
LCS	LCS Wizard	11.1	13.3	11.2	10.9	11.4	11.6	11.9	11.4	13.0	8.6	10.1
Dyna-Gro	Long Branch	-	-	-	11.9	12.2	-	-	-	-	-	-
OGI	NF 101	-	-	-	10.8	11.5	-	-	-	-	-	-
KWA	Oakley CL	-	-	-	11.4	11.8	-	-	-	-	-	-
OGI	OK Rising	-	-	-	11.5	12.1	-	-	-	-	-	-
OGI	Ruby Lee	12.3	13.8	11.0	10.8	11.9	12.8	11.9	12.2	13.5	8.8	10.0
OGI	Stardust	-	-	-	11.2	11.5	12.1	-	-	-	-	-
Syngenta	SY Drifter	-	-	-	11.2	11.7	-	-	-	12.7	9.0	11.0
Syngenta	SY Flint	10.6	13.8	11.4	10.4	11.2	12.6	10.9	11.0	12.4	8.5	9.5
Syngenta	SY Grit	-	-	-	10.2	11.2	-	-	-	-	-	-
Syngenta	SY Llano	11.7	-	11.4	10.7	10.6	12.3	11.9	11.1	14.2	9.2	10.6
Syngenta	SY Monument	11.9	13.1	11.6	11.0	11.2	11.7	10.5	11.1	-	-	-
Syngenta	SY Razor	-	-	-	11.6	12.3	-	-	-	-	-	-
Syngenta	SY Wolf	-	13.7	-	-	-	-	-	-	-	-	-
LCS	T158	-	-	-	10.1	10.6	-	-	-	-	-	9.2
Watley	TAM 112	-	13.4	-	10.9	11.0	-	-	-	-	-	-
AGSECO	TAM 114	-	13.3	-	11.1	11.5	-	-	-	-	-	-
Watley	TAM 204	11.2	12.7	11.9	11.4	11.5	12.8	12.3	11.6	12.5	8.8	9.8
KWA	Tatanka	-	-	-	9.9	10.3	-	-	-	-	-	-
WestBred	WB4303	-	-	-	10.6	10.9	-	-	-	-	-	-
WestBred	WB4458	12.4	-	11.7	11.1	11.9	12.3	11.8	11.5	13.7	9.2	10.7
WestBred	WB4515	-	-	-	11.4	12.3	-	-	-	-	-	-
WestBred	WB4721	-	-	-	11.8	12.1	-	-	-	-	-	-
WestBred	WB-Cedar	12.3	14.0	11.9	11.3	11.4	12.5	12.1	12.3	14.7	9.6	-
WestBred	WB-Grainfield	10.8	12.9	11.3	10.9	11.2	11.4	10.7	10.9	12.0	8.2	9.7
WestBred	Winterhawk	-	12.8	-	10.3	10.9	-	-	-	-	-	9.8
KWA	Zenda	-	-	-	10.5	11.0	-	-	-	-	-	-
OSU Experimentals												
	OK09915C-1	12.4	14.2	12.1	12.2	13.0	13.5	12.3	12.2	13.4	9.5	10.2
	OK10126	-	-	11.2	-	-	11.8	-	-	-	-	-
	OK1059060-3	-	-	11.7	-	-	12.6	-	-	-	-	-
	OK11231	-	-	-	11.0	11.7	-	11.9	11.3	-	-	-
	OK118036R/W	-	13.6	-	-	-	-	-	-	-	-	-
	OK11D25056	-	-	-	11.1	11.2	-	-	-	11.6	8.5	-
	OK12621	-	-	-	-	-	-	11.5	11.4	-	8.6	-
	OK12716R/W	11.2	-	11.7	10.4	10.7	12.2	10.8	10.8	-	8.1	-
	OK12912C	11.5	-	12.6	12.4	12.7	12.8	12.2	12.6	-	9.5	-
	OK12DP22002-042	-	12.8	-	-	-	-	-	-	-	-	-
	Mean	11.5	13.2	11.4	11.0	11.4	12.1	11.4	11.3	12.4	8.7	9.9
	LSD (0.05)	1.1	NS	0.5	0.4	0.4	1.0	1.3	0.5	1.0	0.5	0.6

Notes: Shaded values are not statistically different from the highest value within a column (i.e., location). NS = not significant.

Table 2. Wheat protein content relative to the location mean (expressed as a deviation) for varieties and experimental lines in the 2015-2016 Oklahoma Wheat Variety Performance Tests.

Source	Variety	% wheat protein relative to location mean									
		Afton	Altus	Alva	Apache	Apache Fungicide	Buffalo	Cherokee	Chickasha	Chickasha IWM	Goodwell Irrigated
KWA	1863	-	-0.1	-	-	-	-	-	-0.1	0.1	0.6
AGSECO	AG Robust	-	-0.2	-	-	-	-	-	0.7	0.0	0.5
PlainsGold	Avery	-	0.9	-0.3	-	-	-1.3	-0.7	-0.6	-1.4	-0.7
OGI	Bentley	-0.7	0.2	-1.5	-0.7	-0.4	-1.1	-0.4	-0.1	0.9	0.1
OGI	Billings	0.2	0.3	-	-	-	-	-	0.5	0.5	0.5
PlainsGold	Brawl CL Plus	-	-0.4	0.5	-	-	0.6	0.1	0.1	0.2	0.6
PlainsGold	Byrd	-	-0.5	-0.3	-	-	-0.8	-1.3	0.0	-1.0	-0.5
OGI	Doublestop CL Plus	0.2	-0.1	0.8	0.0	0.1	0.7	0.5	0.2	0.5	0.4
OGI	Duster	-1.0	-0.5	-1.4	0.9	0.9	-0.1	-0.3	-0.3	0.0	-0.5
OSU	Endurance	-0.2	-0.1	0.1	0.4	0.3	-0.9	-0.3	-1.0	-0.7	-1.3
KWA	Everest	0.7	-0.3	-	-	-	-	-	0.6	-0.1	-0.6
OGI	Gallagher	-1.4	0.8	0.3	0.0	-0.1	0.4	0.8	-0.2	-0.2	0.3
OGI	Iba	-1.0	-0.1	-0.1	-0.8	-0.8	-0.6	-0.6	-0.7	-1.0	-0.7
KWA	Joe	-	-0.1	-	-	-	-	-	0.2	0.3	-0.4
KWA	KanMark	-	-0.3	-1.2	-0.2	-0.4	-0.2	-0.8	-0.8	-0.4	-0.5
KWA	Larry	-	-0.8	-	-	-	-	-	-0.5	-0.4	0.2
LCS	LCS Chrome	-	-0.6	-	-	-	-	-	1.0	0.6	0.7
LCS	LCS Mint	-	-0.5	-1.8	-	-	-1.1	-0.3	-0.7	-0.1	-0.4
LCS	LCS Pistol	-0.5	0.2	-0.8	0.3	0.5	0.7	-0.1	-0.5	0.7	-0.2
LCS	LCS Wizard	0.2	0.3	-1.7	0.3	0.4	0.7	0.7	-0.7	-0.2	0.2
Dyna-Gro	Long Branch	-	-1.0	-	-	-	-	-	0.7	0.5	-0.2
OGI	NF 101	-	1.1	-	-	-	-	-	-0.1	0.0	-0.3
KWA	Oakley CL	-	-0.5	-	-	-	-	-	0.4	0.5	0.1
OGI	OK Rising	-	-0.3	-	-	-	-	-	0.0	0.5	0.9
OGI	Ruby Lee	0.2	0.3	1.0	0.6	0.4	0.3	0.4	0.9	0.4	-0.2
OGI	Stardust	-	-	-	-	-	-	-	-	-	-
Syngenta	SY Drifter	0.4	0.4	-	0.1	0.0	-	-	-0.3	-0.1	0.0
Syngenta	SY Flint	-0.1	0.3	-0.5	-0.2	-0.2	0.2	-0.4	-0.3	-0.6	0.0
Syngenta	SY Grit	-	0.5	-	-	-	-	-	-0.5	0.0	-0.2
Syngenta	SY Llano	0.5	0.1	-	0.7	0.3	-	-	-0.2	-0.4	-0.7
Syngenta	SY Monument	-	0.0	0.9	-	-	-0.2	-0.1	0.2	-0.3	-0.3
Syngenta	SY Razor	-	-0.7	-	-	-	-	-	1.9	1.1	1.3
Syngenta	SY Wolf	-	-	-	-	-	-	-	-	-	0.1
LCS	T158	-	1.3	-	-0.3	0.0	-	-	-0.4	-0.7	-0.4
Watley	TAM 112	-	-0.3	-1.0	-	-	-0.3	-0.1	-0.3	0.2	0.4
AGSECO	TAM 114	-	-0.5	1.7	-	-	-0.1	0.6	-0.3	-0.5	0.0
Watley	TAM 204	0.4	-0.5	-0.6	0.3	0.2	0.9	-0.1	0.2	-0.1	1.0
KWA	Tatanka	-	0.2	-	-	-	-	-	-1.1	-1.0	-0.8
WestBred	WB4303	-	0.4	-	-	-	-	-	0.1	0.4	-0.4
WestBred	WB4458	1.3	0.9	-	0.4	0.6	-	-	0.1	0.5	0.8
WestBred	WB4515	-	0.2	-	-	-	-	-	0.5	0.5	0.1
WestBred	WB4721	-	0.5	-	-	-	-	-	-0.2	0.9	0.1
WestBred	WB-Cedar	0.2	-0.1	1.0	-	-	0.4	1.9	0.9	0.0	0.3
WestBred	WB-Grainfield	-0.9	-0.2	-0.3	-1.2	-1.0	-0.4	-0.8	0.3	0.1	-0.3
WestBred	Winterhawk	-	0.0	-0.7	-0.8	-1.0	-0.2	-0.3	-1.0	-0.9	-0.6
KWA	Zenda	-	-0.3	-	-	-	-	-	-0.4	-0.6	-0.5
OSU Experimentals											
	OK09915C-1	1.0	0.1	1.2	0.5	0.8	1.1	1.3	0.5	0.8	1.2
	OK10126	-	-	-	-	-	-	-	-	-	0.6
	OK1059060-3	-	-	-	-	-	-	-	-	-	-
	OK11231	0.7	-	-	-	-	-	-	-	-	-
	OK118036R/W	-	-	-	-	-	-	-	-	-	-
	OK11D25056	-	-0.1	0.6	-	-	-	-	0.1	-0.1	-0.1
	OK12621	-	-	0.4	-	-	-	-	-	-	0.0
	OK12716R/W	-	0.4	1.8	-0.4	-0.4	-	-0.7	-	-	-0.1
	OK12912C	-	-	1.9	-	-	1.2	0.8	1.3	0.4	0.8
	OK12DP22002-042	-	-	-	-	-	-	-	-	-	-1.2
	Mean	9.9	11.7	10.7	11.5	12.0	11.4	11.0	12.5	13.4	13.9
	LSD (0.05)	1.0	NS	NS	0.7	0.7	1.1	0.7	0.5	0.6	0.7

Table 2. Wheat protein content relative to the location mean (expressed as a deviation) for varieties and experimental lines in the 2015-2016 Oklahoma Wheat Variety Performance Tests. (cont'd).

Source	Variety	% wheat protein relative to location mean										
		Homestead	Hooker	Kildare	Lahoma	Lahoma Fungicide	Lamont	Marshall Dual-Purpose	Marshall Grain-only	Union Thomas	Union City	Walters
KWA	1863	-	-	-	-1.0	-0.6	-	-	-	-	-	-
AGSECO	AG Robust	-	-	-	-0.1	-0.2	-	-	-	-	-	-
PlainsGold	Avery	-	0.0	-	-0.3	-0.9	-	-	-	-	-	-
OGI	Bentley	-0.7	-0.2	-0.5	-0.4	-0.1	-0.7	-1.3	-1.0	-0.9	0.0	-0.8
OGI	Billings	0.7	-	-0.2	0.7	0.4	0.6	-0.7	0.4	0.6	0.1	-
PlainsGold	Brawl CL Plus	-	0.0	-	1.0	1.1	-	-	-	-	-	-
PlainsGold	Byrd	-	-0.6	-	-0.2	-0.5	-	-	-	-	-	-
OGI	Doublestop CL Plus	0.4	0.3	0.5	0.6	1.1	0.1	0.3	0.4	0.5	0.6	0.1
OGI	Duster	0.2	0.0	-0.3	0.3	-0.1	-0.4	-0.8	-0.2	-0.8	-0.3	-0.6
OSU	Endurance	-0.4	-0.8	-0.2	0.1	-0.5	-0.1	-0.9	-0.8	-0.7	0.0	0.1
KWA	Everest	0.5	-	0.2	-0.6	-0.3	0.1	-0.1	0.3	-	-	-
OGI	Gallagher	-0.1	-0.1	-0.4	-0.5	-0.6	-0.1	0.0	-0.6	-0.8	-0.7	-1.0
OGI	Iba	-1.1	-0.4	-1.2	-0.2	-0.5	-1.1	-1.0	-0.7	-1.4	0.1	-0.1
KWA	Joe	-	-	-	-0.5	-0.7	-	-	-	-	-	-
KWA	KanMark	-0.9	-0.1	-0.9	-0.6	-0.6	-0.7	0.0	-0.8	-1.7	-0.4	0.8
KWA	Larry	-	-	-	-0.7	-0.4	-	-	-	-	-	-
LCS	LCS Chrome	-	-	-	1.2	0.9	-	-	-	-	-	-
LCS	LCS Mint	-0.8	-0.6	-0.4	-0.7	-0.4	-0.6	0.0	-0.9	-1.0	-0.7	-
LCS	LCS Pistol	-0.1	0.1	0.0	0.1	-0.3	0.2	0.6	0.3	-0.5	-0.3	0.1
LCS	LCS Wizard	-0.3	0.1	-0.1	-0.1	0.0	-0.5	0.5	0.1	0.5	-0.1	0.2
Dyna-Gro	Long Branch	-	-	-	0.9	0.8	-	-	-	-	-	-
OGI	NF 101	-	-	-	-0.2	0.1	-	-	-	-	-	-
KWA	Oakley CL	-	-	-	0.5	0.4	-	-	-	-	-	-
OGI	OK Rising	-	-	-	0.5	0.7	-	-	-	-	-	-
OGI	Ruby Lee	0.9	0.6	-0.4	-0.2	0.5	0.7	0.6	0.9	1.0	0.0	0.1
OGI	Stardust	-	-	-	0.2	0.1	-0.1	-	-	-	-	-
Syngenta	SY Drifter	-	-	-	0.2	0.3	-	-	-	0.3	0.3	1.1
Syngenta	SY Flint	-0.8	0.6	0.0	-0.6	-0.2	0.5	-0.4	-0.2	-0.1	-0.2	-0.4
Syngenta	SY Grit	-	-	-	-0.8	-0.2	-	-	-	-	-	-
Syngenta	SY Llano	0.3	-	0.0	-0.3	-0.8	0.2	0.5	-0.2	1.7	0.5	0.7
Syngenta	SY Monument	0.4	-0.1	0.3	0.0	-0.2	-0.4	-0.8	-0.2	-	-	-
Syngenta	SY Razor	-	-	-	0.6	0.9	-	-	-	-	-	-
Syngenta	SY Wolf	-	0.5	-	-	-	-	-	-	-	-	-
LCS	T158	-	-	-	-0.9	-0.8	-	-	-	-	-	-0.8
Watley	TAM 112	-	0.2	-	-0.1	-0.4	-	-	-	-	-	-
AGSECO	TAM 114	-	0.1	-	0.1	0.1	-	-	-	-	-	-
Watley	TAM 204	-0.2	-0.5	0.5	0.4	0.1	0.7	1.0	0.3	0.1	0.0	-0.1
KWA	Tatanka	-	-	-	-1.1	-1.1	-	-	-	-	-	-
WestBred	WB4303	-	-	-	-0.4	-0.5	-	-	-	-	-	-
WestBred	WB4458	1.0	-	0.4	0.1	0.5	0.1	0.5	0.2	1.2	0.4	0.8
WestBred	WB4515	-	-	-	0.4	0.9	-	-	-	-	-	-
WestBred	WB4721	-	-	-	0.8	0.8	-	-	-	-	-	-
WestBred	WB-Cedar	0.9	0.7	0.5	0.3	0.0	0.3	0.7	1.0	2.2	0.8	-
WestBred	WB-Grainfield	-0.6	-0.3	-0.1	-0.1	-0.2	-0.8	-0.6	-0.4	-0.5	-0.6	-0.2
WestBred	Winterhawk	-	-0.4	-	-0.6	-0.5	-	-	-	-	-	-0.1
KWA	Zenda	-	-	-	-0.5	-0.4	-	-	-	-	-	-
OSU Experimentals		-	-	-	-	-	-	-	-	-	-	-
	OK09915C-1	1.0	1.0	0.7	1.2	1.6	1.3	1.0	0.9	0.9	0.8	0.3
	OK10126	-	-	-0.2	-	-	-0.3	-	-	-	-	-
	OK1059060-3	-	-	0.3	-	-	0.4	-	-	-	-	-
	OK11231	-	-	-	0.1	0.4	-	0.5	0.0	-	-	-
	OK118036R/W	-	0.4	-	-	-	-	-	-	-	-	-
	OK11D25056	-	-	-	0.1	-0.2	-	-	-	-0.9	-0.3	-
	OK12621	-	-	-	-	-	-	0.2	0.1	-	-0.1	-
	OK12716R/W	-0.2	-	0.3	-0.6	-0.7	0.0	-0.5	-0.5	-	-0.6	-
	OK12912C	0.0	-	1.2	1.4	1.3	0.7	0.9	1.3	-	0.8	-
	OK12DP22002-042	-	-0.4	-	-	-	-	-	-	-	-	-
Mean		11.5	13.2	11.4	11.0	11.4	12.1	11.4	11.3	12.4	8.7	9.9
LSD (0.05)		1.1	NS	0.5	0.4	0.4	1.0	1.3	0.5	1.0	0.5	0.6

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