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Fall Forage Production and First Hollow Stem Date for Wheat Varieties During the 2021-2022 Crop Year

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Introduction

Fall forage production potential is one of the major considerations in deciding which variety to plant. Dual-purpose wheat producers, for example, may find varietal characteristics such as grain yield after grazing and disease resistance to be more important selection criteria than an advantage in early forage production potential. Forage-only producers might place more importance on planting an awnless wheat variety or one that germinates readily in hot soil conditions. Ultimately though, fall forage production is a selection criterion that should be considered. For more information on variety characteristics, please refer to OSU Fact Sheet PSS-2142 *Wheat Variety Comparison Chart.*

Fall forage production potential is determined by genetics, management and environmental factors. The purpose of this publication is to quantify some of the genetic differences in wheat forage production potential and grazing duration among the most popular varieties grown in Oklahoma. Management factors such as planting date, seeding rate and soil fertility are very influential and are sometimes more important than variety selection in determining forage production. Environmental factors such as rainfall amount and distribution and temperature also play a heavy role in dictating how much fall forage is produced. All of these factors along with yield potential after grazing and the individual producer's preferences will determine which variety is best suited for a particular field.

Site descriptions and methods

The objective of the fall forage variety trials is to give producers an indication of the fall forage production ability of wheat varieties commonly grown throughout the state of Oklahoma. The forage trials were conducted under the umbrella of the Oklahoma State University Small Grains Variety Performance Tests. During the 2021-2022 crop year, the forage trials were conducted at the Chickasha and Stillwater test sites. Additionally, first hollow stem measurements were collected at both sites. Weather data for each location are provided in Figures 1 and 2.

A randomized complete block design with four replications was used at each site. Plots at each location were established in a conventionally tilled seedbed. At planting, 5 gal/acre of 10-34-0 was applied in seed furrow at Stillwater and Chickasha. The seeding rate at both locations was 120 lbs/acre. Forage was measured by hand clipping two, 1-m by 1-row samples approximately ½ inch above the soil surface from the interior rows within each plot. There was only one forage sampling date at each location. All samples were placed in a forced-air dryer after collection for approximately seven days and weighed. Fertility, planting date and clipping date information is provided in Table 1.

First hollow stem sampling began in early February at the Stillwater and Chickasha locations. It continued every three to four days on a by-variety basis until all

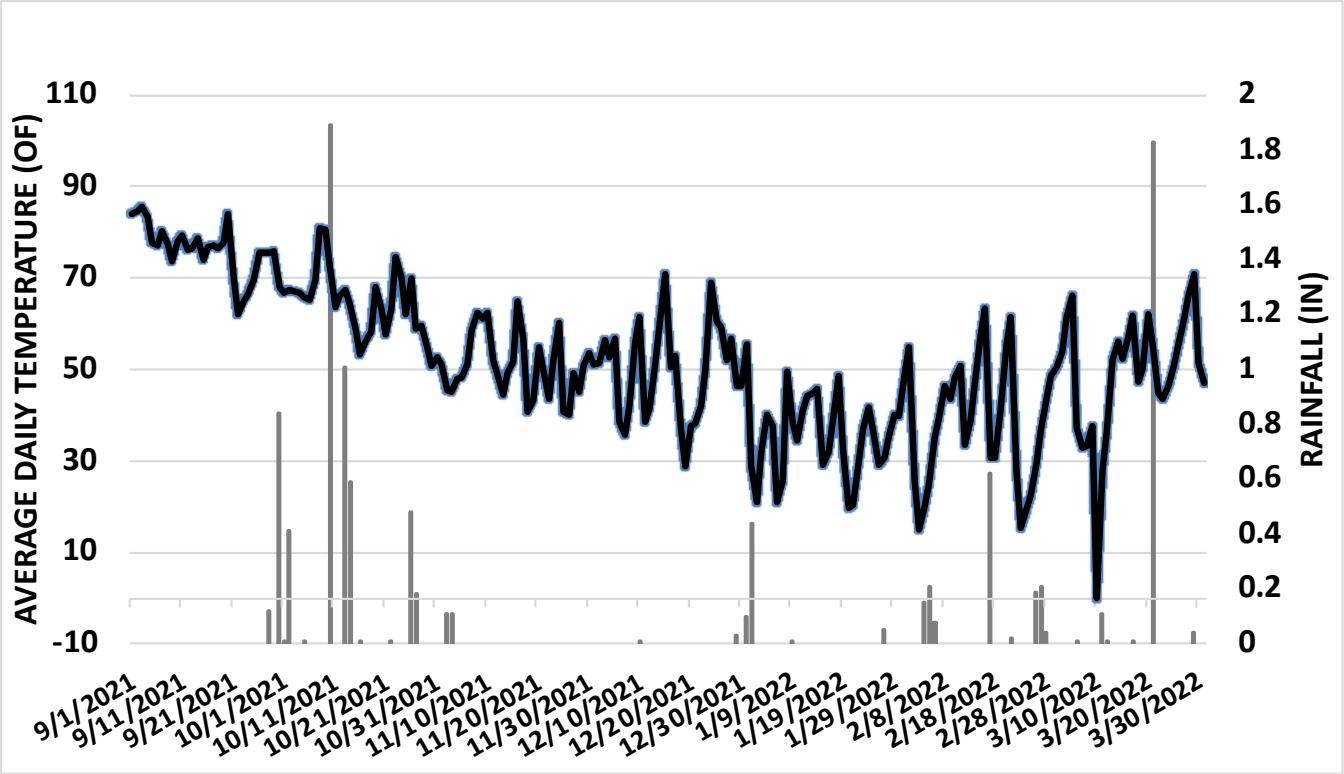

Figure 1. Average daily temperature (line graph) and rainfall (bar chart) from September 1, 2021 to March 30, 2022, at Stillwater, OK. Weather data courtesy Oklahoma Mesonet.

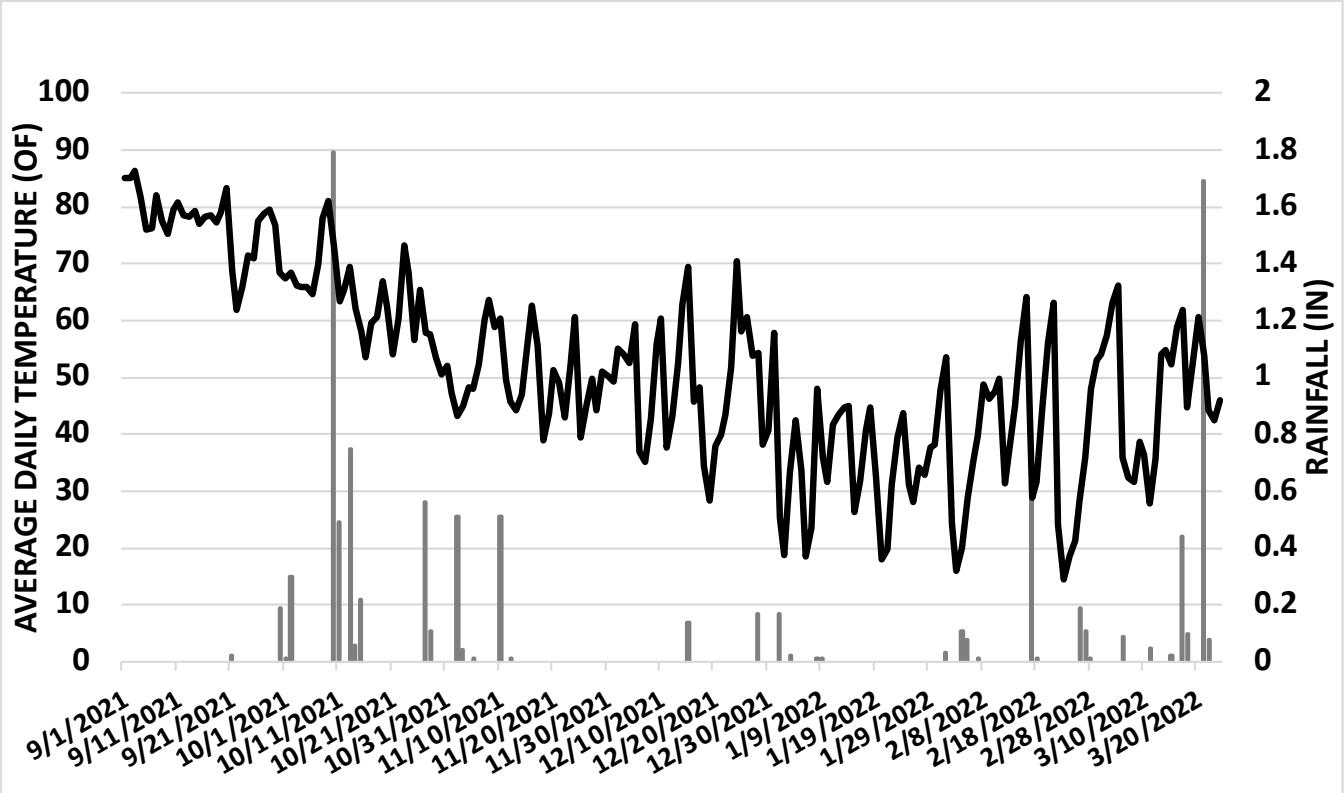

Figure 2. Average daily temperature (line graph) and rainfall (bar chart) from September 1, 2021 to March 30, 2022, at Chickasha, OK. Weather data courtesy Oklahoma Mesonet.

varieties reached first hollow stem. Plant samples were collected for each variety by digging an approximately eight-inch section of row and selecting ten plants randomly from this sample. The largest tiller on each plant was split longitudinally, and the hollow stem below the developing grain head was measured. Varieties were considered to be at first hollow stem when the average measurement of the ten plant samples was 1.5 cm (5/8 inch) or greater. For more information on first hollow stem, refer to OSU Fact Sheet PSS-2147 *First Hollow Stem: A Critical Wheat Growth Stage for Dual-Purpose Producers.*

Results

As indicated in Figures 1 and 2, the 2021-2022 fall forage production season included moderate temperatures and low rainfall that was conducive to moderate fall forage production in our fields. Our results reflect these conditions in the sites evaluated. The average fall forage production at Stillwater was 2,775 lbs/acre, and values ranged from 1,777 to 3,277 lbs/acre (Table 2). Average forage production at Chickasha was 1,762 lbs/acre and values ranged from 1,385 to 2,340 lbs/acre (Table 3).

First hollow stem data are reported in 'day of year' (day) format for the winter wheat varieties in Table 4. To provide a reference, keep in mind that March 1 is day 60. The winter was warmer than usual, and March of 2022 was characterized by warmer and drier than the average. These conditions likely resulted in plant development and the onset of first hollow stem as expected for our region. The average winter wheat first hollow stem date at Stillwater was day 48 (February 18). This was 13 days earlier than 2021 (March 4), similar to 2020 (February 19), and 2 days earlier than the 20-year average (March 6). There was a 32-day difference between the earliest and latest varieties at Stillwater compared to a 48-day difference in 2021 and 23-day difference in 2020. The average winter wheat first hollow stem date for the Chickasha location was 66 (March 7). This was 7 days earlier than 2021 (March 13), 17 days later than 2020 (February 18), and similar to the 20-year average (March 6). There was a 36-day difference between the earliest and latest varieties at this location, compared to a 45-day difference in 2021 and 28-day difference in 2020.

Acknowledgments

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Seed Sources and Abbreviations

AgriMAXX = AgriMAXX Wheat
AgriPro = AgriProlSyngenta Seeds
AGSECO = AGSECO Inc.
CROPLAN = CROPLAN by WinField United
KWA = Kansas Wheat Alliance
LCS = Limagrain Cereal Seeds
OGI = Oklahoma Genetics Inc.
OSU = Oklahoma State University
PlainsGold = PlainsGold Seeds
WestBred = WestBred Wheat

Table 1. Location, planting, clipping and soil information.

	Planting date	*Sampling date*	*pH*	*N*	*STP*	*STK*
Chickasha	9/28/21	12/1/21	6.8	69	42	309
Stillwater	9/27/21	11/29/21	5.6	45	77	258

Notes: STP: soil test P index; STK: soil test K index

Table 2. Fall forage production for the winter wheat varieties at Stillwater, OK during the 2021-2022 production year.

Licensee	*Variety*	*2021-2022*	*2-Year*	*3-Year*
		--------lbs dry forage/acre-------		
OGI	Duster	3277	2845	2852
Westbred	WB4401	3185	3258	-
OGI	Baker's Ann	3121	2872	2905
OGI	OK Corral	3073	2743	2975
Syngenta	SY Achieve CL2	3063	3081	2889
Westbred	WB4792	3056	2915	2840
OGI	Smith's Gold	3051	3153	3123
PlainsGold	Canvas	3011	2691	2617
OGI	Big Country	2988	2854	2827
PlainsGold	Sunshine	2978	-	-
PlainsGold	Guardian	2976	2904	2751
Westbred	WB4422	2971	-	-
OGI	Green Hammer	2967	2818	2628
OGI	Bentley	2931	3487	3371
OGI	Strad CL+	2916	2976	3413
KWA	KS Ahearn	2909	2946	-
KWA	KS Western Star	2896	2583	2718
Westbred	WB4699 2882	2811	2372	-
OGI	Iba	2871	2939	2716
OGI	Breakthrough	2863	2610	-
OGI	Gallagher	2862	2809	2862
Syngenta	AP18 AX	2861	2917	-
Syngenta	AP Prolific	2854	-	-
LCS	LCS Photon AX	2820	3041	3078
Syngenta	AP EverRock	2793	2814	2788
AgriMAXX	AM Cartwright	2762	2771	2750
OGI	Doublestop CL +	2761	-	-
Westbred	WB4523	2742	-	-
Syngenta	AP Roadrunner	2717	2631	-
AGSECO	AG Radical	2698	3018	-
OGI	Uncharted	2690	2728	2861
OGI	Showdown	2667	2803	2679
AGSECO	AG Icon	2643	2535	2591
Croplan	CP7017AX	2628	2824	-
PlainsGold	Crescent AX	2560	2800	2674
PlainsGold	Breck	2527	-	-
Croplan	CP72166AX	2526	-	-
LCS	LCS Atomic AX	2516	2946	-
LCS	LCS Chrome	2504	2692	2979
LCS	LCS Julep	2484	2262	-
KWA	KS Hamilton	2458	2730	-
LCS	LCS Helix AX	2445	2397	-
LCS	LCS Steel AX	2430	-	-
LCS	LCS Valiant	2339	2405	-
AGSECO	AG Golden	2077	-	-
LCS	LCS Runner	1777	-	-
Experimentals Lines				
	OK15DMASBx7 ARS 6-8	3002	2954	-
	OK15DMASBx7 ARS 8-29	2947	2953	-
	KS13DH0041-35	2896	-	-
	Mean	2775	2822	2836
	LSD (0.05)	525	327	409

Notes: Shaded values are not statistically different from the highest-yielding variety within a column.

Table 3. Fall forage production for the winter wheat varieties at Chickasha, OK during the 2021-2022 production year.

Licensee	*Variety*	*2021-2022*	*2-Year*	*3-Year*
		----------lbs dry forage/acre----------		
KWA	KS Ahearn	2340	-	-
OGI	Green Hammer	2006	2551	2923
LCS	LCS Chrome	1961	2162	2714
OGI	Gallagher	1951	2418	2623
OGI	Showdown	1903	2325	2648
PlainsGold	Crescent AX	1891	-	-
Syngenta	AP Roadrunner	1866	-	-
OGI	OK Corral	1862	2308	2618
Westbred	WB4401	1841	2170	-
OGI	Smith's Gold	1814	2381	2675
PlainsGold	Canvas	1785	-	-
Westbred	WB4699	1759	-	-
OGI	Big Country	1747	1959	2259
Croplan	CP7017AX	1701	-	-
LCS	LCS Photon AX	1665	2180	-
AGSECO	AG Icon	1664	2287	2522
Syngenta	AP18 AX	1637	-	-
AgriMAXX	AM Cartwright	1631	-	-
LCS	LCS Atomic AX	1615	-	-
AGSECO	AG Radical	1555	-	-
OGI	Doublestop CL+	1499	2265	2510
OGI	Uncharted	1438	1959	2133
OGI	Strad CL+	1385	2030	2372
	Mean	1762	2230	2545
	LSD (0.05)	NS	NS	372

Notes: Shaded values are not statistically different from the highest-yielding variety within a column.
NS; no statistical differences were detected among varieties within a column.

Table 4. Occurrence of first hollow stem (day of year) for the winter wheat varieties sown in 2021 and measured in 2022 at Stillwater and Chickasha, OK.

Licensee	*Variety*	*Stillwater*	*Chickasha*
		-------day of year-------	
OGI	Gallagher	39	69
OGI	Green Hammer	39	66
OGI	Big Country	39	73
Westbred	WB4401	39	46
Syngenta	SY Achieve CL2	39	-
Syngenta	AP Roadrunner	39	52
AGSECO	AG Radical	39	60
OGI	Iba	42	-
OGI	Baker's Ann	42	-
OGI	OK Corral	42	66
Westbred	WB4792	42	-
Westbred	WB4422	42	-
Westbred	WB4523	42	-
Syngenta	AP18 AX	42	66
LCS	LCS Steel AX	42	-
AGSECO	AG Icon	42	73
OGI	Butler's Gold	42	-
OGI	Duster	45	-
OGI	Smith's Gold	45	69
OGI	Strad CL +	45	69
OGI	Bentley	45	-
Syngenta	AP EverRock	45	-
LCS	LCS Atomic AX	45	66
PlainsGold	Crescent AX	45	52
OGI	Uncharted	49	69
OGI	Showdown	49	77
OGI	Breakthrough	49	-
Syngenta	AP Prolific	49	-
KWA	KS Western Star	49	-
KWA	KS Ahearn	49	66
LCS	LCS Chrome	49	69
AGSECO	AG Golden	49	-
AgriMAXX	AM Cartwright	49	60
PlainsGold	Canvas	49	60
PlainsGold	Guardian	49	-
Croplan	CP7017AX	49	62
LCS	LCS Photon AX	52	66
LCS	LCS Valiant	52	-
Croplan	CP72166AX	52	-
KWA	KS Hamilton	60	-
LCS	LCS Helix AX	60	-
LCS	LCS Julep	60	-
LCS	LCS Runner	60	-
PlainsGold	Breck	60	-
Westbred	WB4699	66	77
PlainsGold	Sunshine	66	-
OGI	Doublestop CL +	69	80
Experimentals Lines			
	KS13DH0041-35	45	-
	OK15DMASBx7 ARS 6-8	49	-
	OK15DMASBx7 ARS 8-29	49	-
	Average	48	66

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