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Fall Forage Production and First Hollow Stem Date for Wheat Varieties During the 2023-2024 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 Oklahoma. The forage trials were conducted under Oklahoma State University's Small Grains Variety Performance Tests. During the 2023-2024 growing season, forage trials were conducted at the Chickasha

and Stillwater test sites. Additionally, first hollow stem measurements were collected at both sites in 2024. 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. There was only one forage sampling date at each location (Table 1). Forage was collected from the entire plot with a forage harvesting machine and fresh weight was collected. A subsample of each plot was placed in a forced-air dryer after collection for approximately seven days and used to estimate the dry weight of the entire sampling area. Fertility, planting date and forage sampling date information is provided in Table 1.

First hollow stem sampling began at the end of January at the Stillwater and Chickasha locations. It continued every three to four days on a by-variety basis until all varieties reached first hollow stem. Plant samples were collected for each variety by digging an approximately 8-inch section of row and selecting 10 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 2023-2024 fall forage production season included moderate temperatures and adequate rainfall which was responsible for the moderate to high

fall forage production in our fields. The average fall forage production at Stillwater was 2915 lbs/acre and values ranged from 1452 to 4433 lbs/acre (Table 2). Average forage production at Chickasha was 676 lbs/acre and values ranged from 377 to 1220 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 fall and winter months were characterized by moist conditions in Stillwater with temperatures somewhat normal. Adequate moisture resulted in timely wheat emergence, good plant development and slightly accelerated the onset of first hollow stem for our region when considering the long-term average. The average winter wheat first hollow stem date at Stillwater was day 48 (February 17). This was 21 days earlier than 2023 (March 10), similar to 2022 (February 18) and 17 days earlier than the 20-year average (March 6). There was a 21-day difference between the earliest and latest varieties at Stillwater compared to a 14-day difference in 2023 and 32-day difference in 2022. The average winter wheat first hollow stem date for the Chickasha location was 58 (February 27). This was 13 days earlier than 2023 (March 12), 8 days earlier than 2022, and 7 days earlier than the 20-year average (March 6). There was a 13-day difference between the earliest and latest varieties at this location, compared to a 11-day difference in 2023 and 36-day difference in 2022.

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Seed Sources and Abbreviations

AgriPro = AgriPro|Syngenta Seeds
 AGSECO = AGSECO Inc.
 KWA = Kansas Wheat Alliance
 LCS = Limagrain Cereal Seeds
 OGI = Oklahoma Genetics Inc.
 OSU = Oklahoma State University
 PlainsGold = PlainsGold Seeds
 WestBred = WestBred Wheat

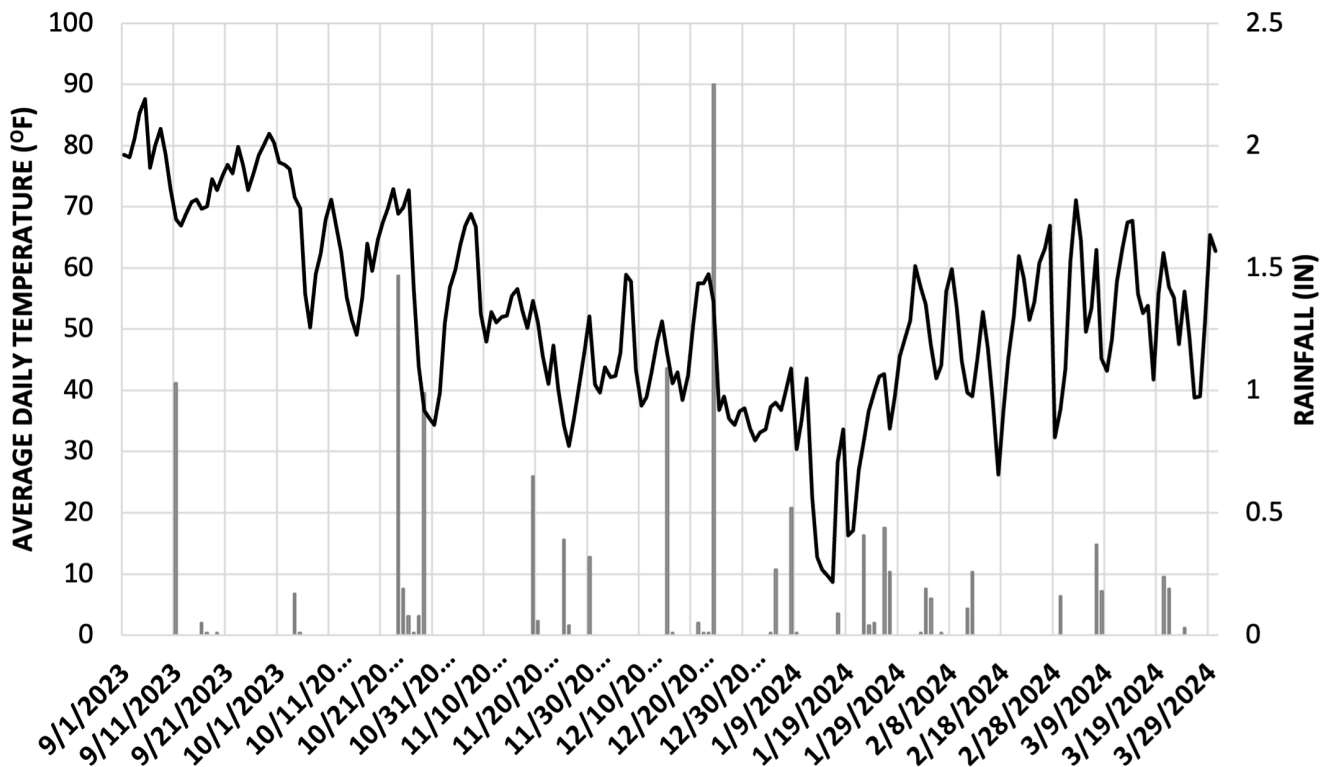


Figure 1. Average daily temperature (line graph) and rainfall (bar chart) from September 1, 2023 to April 1, 2024, at Stillwater, Oklahoma. Weather data courtesy Oklahoma Mesonet.

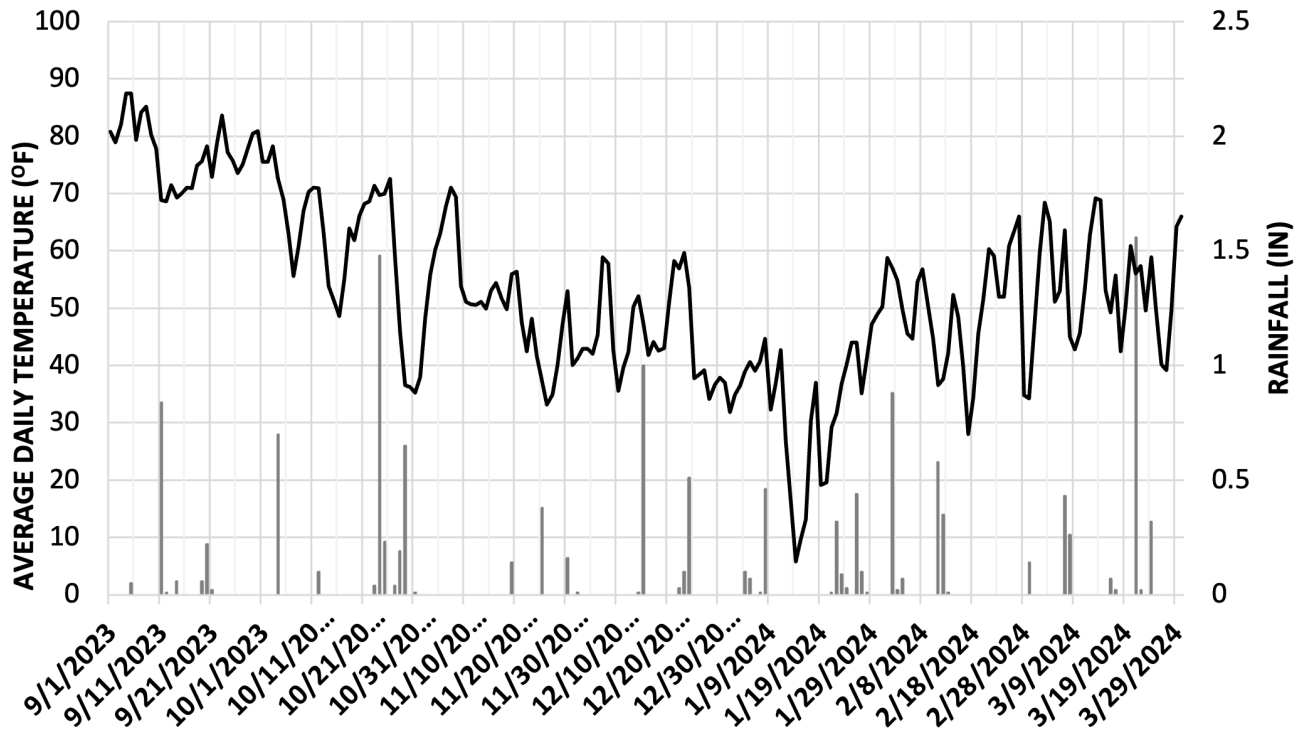


Figure 2. Average daily temperature (line graph) and rainfall (bar chart) from September 1, 2023 to April 1, 2024, at Chickasha, OK. Weather data courtesy Oklahoma Mesonet.

Table 1. The locations, planting and forage sampling dates, and pre-plant soil test information of the trials.

	Planting Date	Sampling Date	pH	nitrate-N (lbs/ac)	STP	STK
Chickasha	9/21/23	12/11/23	8.0	109	45	284
Stillwater	9/18/23	12/6/23	6.4	20	66	208

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 2023-2024 production year and 2-, 3- and 4-year averages

Licensee	Variety	2023-2024	2-Year	3-Year	4-Year
-----lbs dry forage/acre-----					
OGI	Firebox	4433	—	—	—
PlainsGold	Kivari AX	4322	—	—	—
OGI	Breadbox	4246	—	—	—
OGI	Iba	4153	2243	2494	2641
AGSECO	AG Golden	3788	—	—	—
OGI	OK Corral	3780	2046	2457	2445
OGI	Gallagher	3778	2162	2442	2532
OGI	Paradox	3766	—	—	—
Westbred	WB4632	3758	—	—	—
OGI	Green Hammer	3626	1984	2377	2460
LCS	LCS Photon AX	3573	2004	2330	2597
LCS	LCS Atomic AX	3404	1914	2155	2504
AgriPro	AP Sunbird	3399	—	—	—
LCS	LCS Helix AX	3263	1789	2051	2136
KWA	KS Providence	3262	—	—	—
OGI	High Cotton	3248	—	—	—
LCS	LCS Warbird AX	3240	—	—	—
OGI	Showdown	3148	1771	2129	2360
Westbred	WB4792	3117	1754	2275	2417
AgriPro	AP Roadrunner	3043	—	—	—
LCS	LCS Runner	2930	—	—	—
KWA	KS Mako	2916	—	—	—
OGI	Strad CL+	2909	1559	2102	2369
OGI	Big Country	2883	1666	2195	2345
LCS	LCS Julep	2882	1588	1946	1973
AgriPro	Bob Dole	2738	—	—	—
PlainsGold	Canvas	2620	1456	2078	2162
Westbred	WB4422	2478	—	—	—
LCS	LCS Radar	2457	—	—	—
OGI	Doublestop CL+	2438	1382	1933	2272
OGI	Smith's Gold	2369	1353	2032	2382
AgriPro	AP Prolific	2257	—	—	—
OGI	Bentley	2215	1209	1898	2511
LCS	LCS Steel AX	2152	—	—	—
PlainsGold	Whistler	2081	—	—	—
AGSECO	AG Radical	2076	1291	1854	2278
LCS	LCS Galloway AX	2032	—	—	—
OGI	Uncharted	2018	1270	1838	2103
PlainsGold	Crescent AX	2007	1190	1738	2110
Westbred	WB4401	1811	1088	1926	2328
AgriPro	AP24AX	1703	—	—	—
Experimentals					
OSU	OK16103083	3181	—	—	—
OSU	OK16107133-19-3	2588	—	—	—

OSU	OK16107133-19-4	2541	—	—	—
OSU	OK198417C	2006	—	—	—
OSU	OK20708	1452	—	—	—
Mean LSD (0.05)		2915	1636	2113	2346
		1094	668	461	380

Notes: Shaded values are not statistically different from the highest-yielding variety within a column. Em-dashes "—" = data not available.

Table 3. Fall forage production for the winter wheat varieties at Chickasha, OK during the 2023-2024 production year and 2-, 3- and 4-year averages.

Licensee	Variety	2023-2024	2-Year	3-Year	4-Year
-----lbs dry forage/acre-----					
Westbred	WB4632	1220	—	—	—
OGI	OK Corral	1167	819	1236	1670
OGI	Gallagher	900	694	1197	1679
PlainsGold	Kivari AX	888	—	—	—
LCS	LCS Galloway AX	882	—	—	—
AGSECO	AG Radical	761	—	—	—
OGI	Green Hammer	754	571	1145	1702
LCS	LCS Photon AX	679	515	975	1467
OGI	Showdown	670	552	1093	1566
OGI	High Cotton	659	—	—	—
OGI	Doublestop CL+	657	460	876	1491
KWA	KS Providence	636	—	—	—
OGI	Strad CL+	580	418	805	1339
PlainsGold	Crescent AX	514	—	—	—
LCS	LCS Atomic AX	489	—	—	—
Westbred	WB4401	462	402	978	1412
LCS	LCS Steel AX	436	—	—	—
AgriPro	AP Roadrunner	424	—	—	—
OGI	Uncharted	421	484	865	1326
OGI	Smith's Gold	377	374	950	1521
Experimentals					
OSU	OK16107133-19-3	621	—	—	—
Mean LSD (0.05)		676	529	1012	1517
		522	298	NS	296

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. Em-dashes "—" = data not available.

Table 4. Occurrence of first hollow stem (day of year) for the winter wheat varieties sown in 2023 and measured in 2024 at Stillwater and Chickasha, OK.

Licensee	Variety	Stillwater	Chickasha
-----day of year-----			
OGI	High Cotton	39	53
OGI	Gallagher	44	50
OGI	OK Corral	44	57
OGI	Green Hammer	44	50
OGI	Uncharted	44	53
OGI	Paradox	44	—
Westbred	WB4401	44	53
AgriPro	Bob Dole	44	—
AgriPro	AP Roadrunner	44	53
KWA	KS Providence	44	60
LCS	LCS Galloway AX	44	57
AGSECO	AG Radical	44	60
PlainsGold	Kivari AX	44	57
OGI	Smith's Gold	46	53
OGI	Iba	46	—
OGI	Big Country	46	—
OGI	Showdown	46	60
OGI	Bentley	46	—
OGI	Breadbox	46	—
Westbred	WB4422	46	—
Westbred	WB4792	46	—
AgriPro	AP24 AX	46	—
LCS	LCS Atomic AX	46	64
AGSECO	AG Golden	46	—
PlainsGold	Crescent AX	46	60
PlainsGold	Canvas	46	—
OGI	Firebox	50	—
AgriPro	AP Prolific	50	—
AgriPro	AP Sunbird	50	—
LCS	LCS Helix AX	50	—
LCS	LCS Steel AX	50	64
LCS	LCS Radar	50	—
LCS	LCS Runner	50	—
LCS	LCS Photon AX	50	60
PlainsGold	Whistler	50	—
OGI	Strad CL+	53	60
Westbred	WB4632	53	64
KWA	KS Mako	57	—
LCS	LCS Warbird AX	57	—
LCS	LCS Julep	57	—
OGI	Doublestop CL+	60	64
Experimentals			
OSU	OK16103083	44	—
OSU	OK198417C	50	—

OSU	OK20708	50	—
OSU	OK16107133-19-4	60	—
OSU	OK16107133-19-3	60	64
Average		48	58

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