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Fall Forage Production and First Hollow Stem Date for Wheat Varieties During the 2022-2023 Crop Year

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Introduction

Fall forage production potential is one of the major considerations in deciding which wheat variety to plant. For example, dual-purpose wheat producers 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, fall forage production is a selection criterion that should be considered. For more information on variety characteristics, 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 big role in dictating how much fall forage is produced. All 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 2022-2023 growing season, 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 is 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 are 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 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 lengthwise 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 2022-2023 fall forage production season included moderate temperatures and low rainfall, which was responsible for low fall forage production in our fields. The average fall forage production at Stillwater was 366 lbs/acre, and values ranged from 204 to 546 lbs/acre (Table 2). Average forage production at Chickasha was 379 lbs/acre, and values ranged from 230 to 546 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 extreme drought with temperatures above normal. Many wheat fields did not receive significant rain until the end of March 2023. Lack of moisture likely resulted in late wheat emergence, slow plant development and delayed onset of first hollow stem for the north central region. It also may have comprised differences among varieties on the onset of first hollow stem. The average winter wheat first hollow stem date at Stillwater was day 69 (March 10). This was 20 days later than 2022 (Feb. 18), six days later than 2021 (March 4), and 4 days later than the 20-year average (March 6). There was a 14-day difference between the earliest and latest varieties at Stillwater compared to a 32-day difference in 2022 and 48-day difference in 2021. The average winter wheat first hollow stem date for the Chickasha location was day 71 (March 12). This was five days later than 2022 (March 7), similar to 2021 (March 13), and six days later than the 20-year average (March 6). There was an 11-day difference between the earliest and latest varieties at this location compared to a 36-day difference in 2022 and 45-day difference in 2021.

Acknowledgments

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Seed Sources and Abbreviations

AgriMAXX = AgriMAXX Wheat
AgriPro = AgriPro/Syngenta 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	nitrate-N (lbs/ac)	STP	STK
Chickasha	10/7/22	12/19/22	7.9	105	39	278
Stillwater	10/6/22	12/19/22	6.1	18	38	327

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

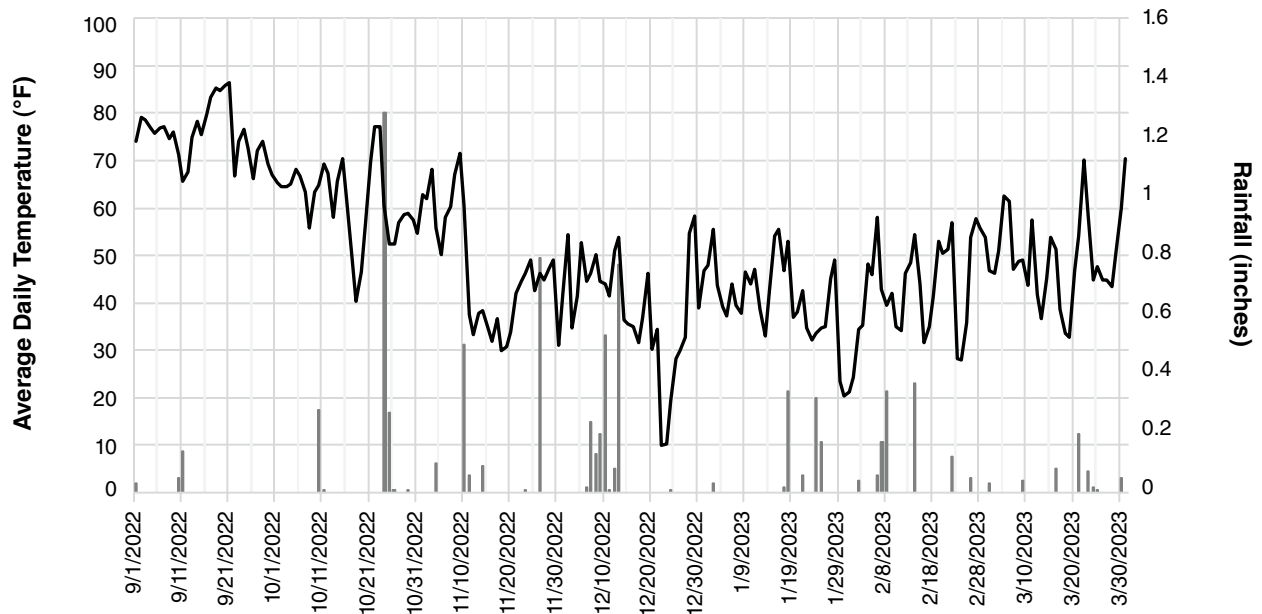


Figure 1. Average daily temperature (line graph) and rainfall (bar chart) from Sept. 1, 2022 to March 31, 2023, at Stillwater. Weather data courtesy Oklahoma Mesonet.

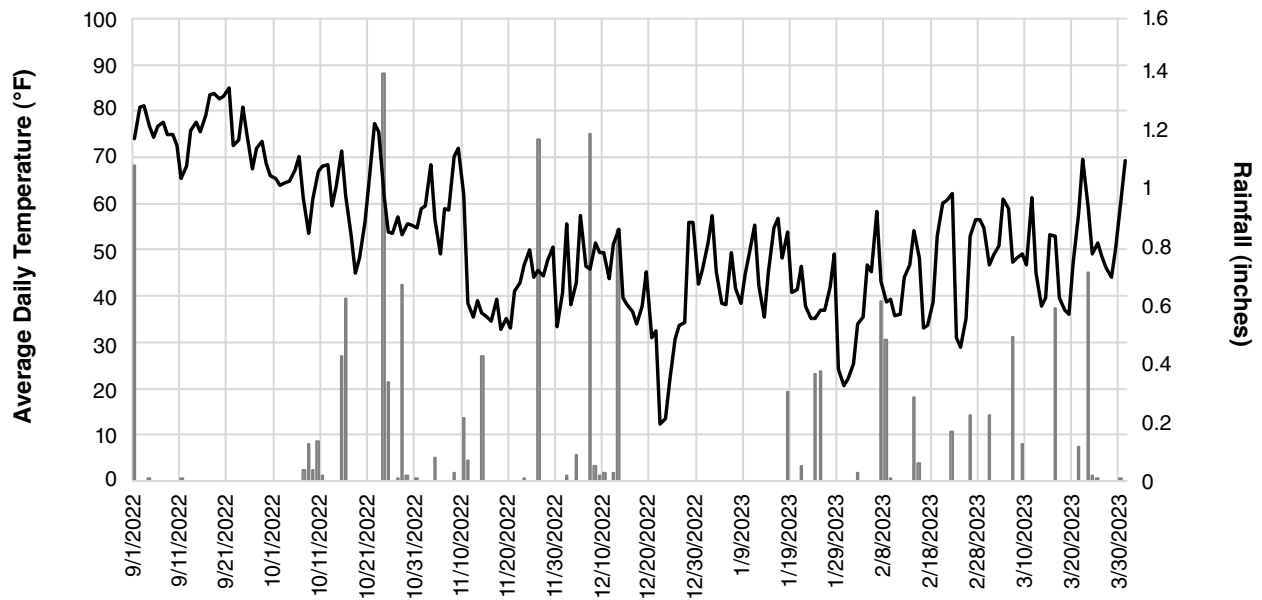


Figure 2. Average daily temperature (line graph) and rainfall (bar chart) from Sept. 1, 2022 to March 31, 2023, at Chickasha. Weather data courtesy Oklahoma Mesonet.

Table 2. Fall forage production for the winter wheat varieties at Stillwater during the 2022-2023 production year.

Licensee	Variety	2022-2023	2-Year	3-Year
			lbs dry forage/acre	
OGI	Gallagher	546	1870	2192
OGI	Uncharted	521	1761	2126
Westbred	WB4632	509	--	--
AGSECO	AG Radical	506	1759	2333
PlainsGold	Kivari AX	463	--	--
OGI	Big Country	449	1900	2198
AgriPro	Bob Dole	438	--	--
LCS	LCS Photon AX	434	1797	2330
LCS	LCS Atomic AX	425	1620	2258
LCS	LCS Steel AX	395	1558	--
OGI	Showdown	393	1692	2145
Westbred	WB4792	391	1914	2227
AgriPro	SY Wolverine	390	--	--
Westbred	WB4422	390	1865	--
KWA	KS Ahearn	387	1828	2248
Croplan	CP7266AX	382	1607	--
PlainsGold	Crescent AX	373	1623	2138
KWA	KS Providence	373	1814	--
Westbred	WB4523	366	1723	--
Westbred	WB4401	364	1976	2469
AgriPro	AP Bigfoot	363	--	--
LCS	LCS Galloway AX	359	--	--
AgriPro	AP Prolific	357	1784	--
PlainsGold	Breck	345	1592	--
OGI	Green Hammer	343	1842	2143
OGI	Smith's Gold	336	1887	2385
OGI	Iba	333	1783	2228
Croplan	CP7017AX	329	1643	2143
OGI	Doublestop CL+	326	1717	2227
AgriPro	AP Longjack	322	--	--
AGSECO	AG Golden	318	1323	--
OGI	Breakthrough	316	1771	1984
LCS	LCS Helix AX	315	1532	1829
OGI	OK Corral	313	1890	2081
LCS	LCS Chrome	296	1558	2039
PlainsGold	Canvas	293	1846	2037
LCS	LCS Julep	293	1545	1725
OGI	High Cotton	255	--	--
AgriPro	AP EverRock	248	1703	2114
AgriMAXX	AM Cartwright	240	1681	2081
OGI	Strad CL+	209	1756	2222
OGI	Bentley	204	1762	2592

Table 2. Fall forage production for the winter wheat varieties at Stillwater during the 2022-2023 production year. (cont'd)

Licensee	Variety	2022-2023	2-Year	3-Year
Experimentals Lines				
OSU	OK18205	528	--	--
OSU	OK15MASBx7 ARS 8-29	498	1898	2094
OSU	OK19225	467	--	--
OSU	OK16107133-19-3	348	--	--
OSU	OK15DMASBx7 ARS 6-8	330	1857	2238
OSU	OK16103083	205	--	--
	Mean	366	1741	2172
	LSD_(0.05)	196	296	542

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

Table 3. Fall forage production for the winter wheat varieties at Chickasha during the 2022-2023 production year.

Licensee	Variety	2022-2023	2-Year	3-Year
lbs dry forage/acre				
OGI	Uncharted	546	1056	1573
OGI	Gallagher	488	1324	1892
OGI	High Cotton	480	--	--
OGI	OK Corral	471	1266	1807
AgriMAXX	AM Cartwright	436	1119	--
LCS	LCS Chrome	436	1308	1691
OGI	Showdown	435	1274	1810
PlainsGold	Crescent AX	433	1266	--
PlainsGold	Canvas	426	1202	--
Croplan	CP7017AX	411	1148	--
OGI	Green Hammer	387	1312	1961
OGI	Smith's Gold	371	1196	1833
AgriPro	AP EverRock	353	--	--
LCS	LCS Photon AX	352	1102	1681
Westbred	WB4401	341	1198	1672
Westbred	WB4632	320	--	--
KWA	KS Ahearn	309	1470	00
OGI	Big Country	298	1126	1506
AGSECO	AG Radical	298	1016	--
Westbred	WB4422	269	--	--
OGI	Doublestop CL+	263	969	1719
OGI	Strad CL+	256	901	1546
LCS	LCS Atomic AX	230	1022	--
Experimentals Lines				
OSU	OK16107133-19-3	490	--	--
	Mean	379	1172	1724
	LSD_(0.05)	186	NS	NS

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. Double-dashes "--" indicates data not available.

Table 4. Occurrence of first hollow stem (day of year) for the winter wheat varieties sown in 2022 and measured in 2023 at Stillwater and Chickasha.

Licensee	Variety	Stillwater	Chickasha
			day of year
OGI	Gallagher	65	68
OGI	Smith's Gold	65	68
OGI	Uncharted	65	68
OGI	Breakthrough	65	--
Westbred	WB4401	65	68
AgriPro	AP EverRock	65	72
PlainsGold	Crescent AX	65	72
OGI	Iba	68	--
OGI	Strad CL+	68	74
OGI	OK Corral	68	72
OGI	Big Country	68	72
OGI	Green Hammer	68	72
OGI	High Cotton	68	68
Westbred	WB4422	68	72
Westbred	WB4523	68	--
Westbred	WB4632	68	68
Westbred	WB4792	68	--
AgriPro	AP Prolific	68	--
AgriPro	AP Bigfoot	68	--
AgriPro	SY Wolverine	68	--
AgriPro	AP Longjack	68	--
AgriPro	Bob Dole	68	--
KWA	KS Providence	68	--
LCS	LCS Atomic AX	68	68
LCS	LCS Helix AX	68	--
LCS	LCS Steel AX	68	--
LCS	LCS Galloway AX	68	--
LCS	LCS Photon AX	68	68
AGSECO	AG Radical	68	68
AgriMAXX	AM Cartwright	68	72
PlainsGold	Kivari AX	68	--
Croplan	CP7017AX	68	68
OGI	Showdown	72	72
OGI	Bentley	72	--
LCS	LCS Chrome	72	72
AGSECO	AG Golden	72	--
PlainsGold	Canvas	72	72
PlainsGold	Breck	72	--
Croplan	CP7266AX	72	--
OGI	Doublestop CL+	75	74
KWA	KS Ahearn	75	79
LCS	LCS Julep	79	--

Table 4. Occurrence of first hollow stem (day of year) for the winter wheat varieties sown in 2022 and measured in 2023 at Stillwater and Chickasha. (cont'd)

Licensee	Variety	Stillwater	Chickasha
Experimentals Lines			
OSU	OK15MASBx7 ARS 8-29	65	--
OSU	OK15DMASBx7 ARS 6-8	68	--
OSU	OK16103083	68	--
OSU	OK18205	68	--
OSU	OK16107133-19-3	72	74
OSU	OK19225	72	--
Average		69	71

Notes: Double-dashes "--" indicates data not available.

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