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Fall Forage Production and First Hollow Stem Date for Wheat Varieties During the 2020-2021 Crop Year

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Introduction

Fall forage production potential is one of the major considerations when 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.

Fall forage production potential is determined by genetics, management and environmental factors. The purpose of this current report 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 characteristics 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. For more information on variety characteristics, please refer to OSU Fact Sheet PSS-2142 *Wheat Variety Comparison Chart.*

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 2020-2021 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 gallons per acre of 10-34-0 was applied in seed furrow at Stillwater and Chickasha. The seeding rate at both locations was 120 pounds per acre. Forage was measured by hand clipping two, 1-meter 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 early February at the Stillwater and Chickasha locations. It continued every three to four days on a by-variety basis until 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 10 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 2020-2021 fall forage production season experienced moderate temperatures and low rainfall which were conducive to moderate fall forage pro-

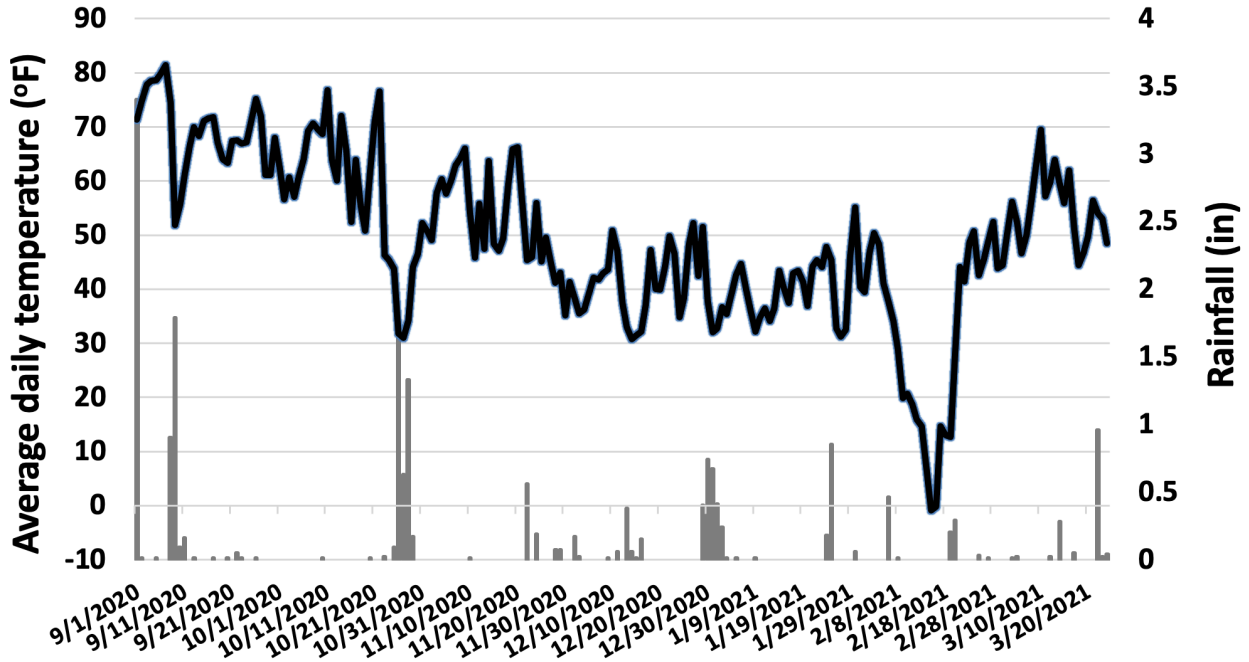

Figure 1. Average daily temperature (line graph) and rainfall (bar chart) from Sept. 1, 2020 to March 24, 2021, at Stillwater, OK. Weather data courtesy Oklahoma Mesonet.

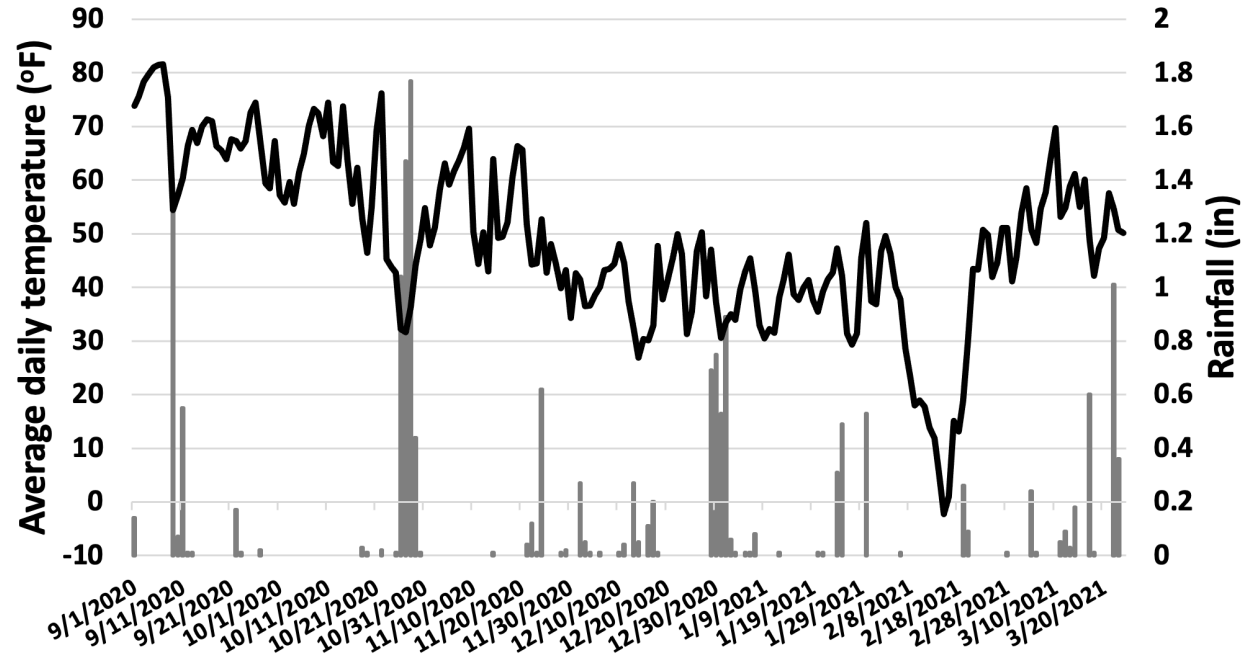

Figure 2. Average daily temperature (line graph) and rainfall (bar chart) from Sept. 1, 2020 to March 24, 2021, at Chickasha, OK. Weather data courtesy Oklahoma Mesonet.

duction in our fields. The results reflect these conditions at the sites evaluated. The average fall forage production at Stillwater was 2,850 pounds per acre, and values ranged from 2040 to 4043 pounds per acre (Table 2). Average forage production at Chickasha was 2,726 pounds per acre, and values ranged from 2,172 to 3,288 pounds per 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 March 1 is day 60. The winter was reasonably warm, February had two weeks of freezing temperatures and March 2021 was characterized by slightly warmer-than-average temperatures and good soil moisture. These conditions likely resulted in a reasonable 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 64 (March 4). This was 15 days later than 2020 (February 19), 10 days earlier than 2019 (March 15), and two days earlier than the 20-year average (March 6). There was a 48-day difference between the earliest and latest varieties at Stillwater compared to a 23-day difference in 2020 and 28-day difference in 2019. The average winter wheat first hollow stem date for the Chickasha location was 72 (March 13). This was 24 days later than 2020 (Feb. 18), 11 days later than in 2019 (March 2), and seven days later than the 20-year average (March 6). At this location, there was a 45-day difference between the earliest and latest varieties, compared to a 28-day difference in 2020 and 27-day difference in 2019.

Acknowledgments

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Seed Sources and Abbreviations

AgriMAXX = AgriMAXX Wheat
AgriPro = AgriPro|Syngenta Seeds
AGSECO = AGSECO Inc.
CHS= CHS Inc.
CROPLAN = CROPLAN by WinField United
Dyna-Gro = Dyna-Gro seed
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	9/29/20	12/21/20	7.3	151	43	271
Stillwater	9/21/20	12/9/20	5.9	112	35	306

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 2020-2021 production year.

Licensee	*Variety*	*2020-2021*	*2-Year*	*3-Year*
		----------lbs dry forage/acre----------		
OGI	Bentley	4,043	3,590	3,180
OGI	Lonerider	3,450	3,692	3,298
LCS	LCS Atomic AX	3,376	-	-
KWA	KS Hatchett	3,371	-	-
AGSECO	AG Radical	3,338	-	-
WestBred	WB4401	3,332	-	-
LCS	LCS Photon AX	3,263	3,208	-
OGI	Smith's Gold	3,256	3,159	2,813
AgriPro	AP Bigfoot	3,181	-	-
KWA	KS Dallas	3,130	3,042	-
LCS	LCS Revere	3,123	-	-
OGI	Doublestop CL+	3,120	2,594	2,585
AgriPro	SY Achieve CL2	3,099	2,802	2,725
Dyna-Gro	Buckhorn AX	3,091	-	-
OGI	Skydance	3,067	2,778	-
PlainsGold	Crescent AX	3,040	2,731	2,607
OGI	Strad CL+	3,037	3,661	-
AgriPro	SY Rugged	3,029	2,420	2,424
CROPLAN	CP7017AX	3,019	-	-
OGI	Iba	3,007	2,639	2,605
KWA	KS Hamilton	3,002	-	-
KWA	KS Ahearn	2,984	-	
AgriPro	AP18 AX	2,973	-	-
OGI	Showdown	2,939	2,684	2,408
LCS	LCS Fusion AX	2,902	-	-
LCS	LCS Chrome	2,880	3,216	2,872
AgriPro	AP EverRock	2,834	2,785	-
PlainsGold	Guardian	2,832	2,638	-
KWA	Zenda	2,801	3,221	2,936
AgriMAXX	AM Cartwright	2,780	2,743	2,583
WestBred	WB4792	2,774	2,732	2,561
OGI	Uncharted	2,765	2,947	2,559
OGI	Gallagher	2,755	2,862	2,812
WestBred	WB4699	2,741	2,117	2,162
OGI	Big Country	2,720	2,746	2,552
CHS	Allegiant 3063	2,694	-	-
WestBred	WB4269	2,682	3,462	3,081
OGI	Green Hammer	2,668	2,459	2,332
CROPLAN	CP7909	2,645	3,138	2,840
OGI	Baker's Ann	2,623	2,798	2,456
KWA	KS Silverado	2,612	2,950	-
AgriPro	Bob Dole	2,553	2,919	2,784
AgriPro	AP Roadrunner	2,545	-	-
LCS	LCS Valiant	2,470	-	-
AGSECO	AG Icon	2,427	2,566	2,475
OGI	OK Corral	2,414	2,925	-
OGI	Duster	2,414	2,640	2,777
PlainsGold	Canvas	2,371	2,420	2,342
CROPLAN	CP7050AX	2,360	-	-
OGI	Breakthrough	2,356	-	-
LCS	LCS Helix AX	2,349	-	-
KWA	KS Western Star	2,270	2,628	-
LCS	LCS Julep	2,040	-	-
OSU Experimentals				
	OCW03S580S-8WF	3,070	-	-
	OK15DMASBx7 ARS 6-8	2,905	-	-
	OK12716W	2,472	-	-
	OK15MASBx7 ARS 8-29	2,438	-	-
	Average	**2,850**	**2,880**	**2,671**
	LSD (0.05)	**174**	**585**	**443**

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 2020-2021 production year.

Licensee	*Variety*	*2020-2021*	*2-Year*	*3-Year*
		----------lbs dry forage/acre----------		
OGI	Green Hammer	3,097	3,381	3,373
KWA	KS Western Star	3,093	---	---
KWA	KS Dallas	3,038	---	---
OGI	Doublestop CL+	3,030	3,016	3,185
OGI	Smith's Gold	2,949	3,105	3,211
KWA	KS Silverado	2,913	---	---
AGSECO	AG Icon	2,910	2,951	3,047
OGI	Gallagher	2,885	2,959	3,357
OGI	Baker's Ann	2,837	2,687	---
OGI	OK Corral	2,753	2,997	---
OGI	Showdown	2,748	3,021	3,203
LCS	LCS Photon AX	2,695	---	---
OGI	Strad CL+	2,674	2,865	---
OGI	Skydance	2,616	2,857	---
WestBred	WB4269	2,611	2,636	2,904
AgriPro	Bob Dole	2,538	2,628	---
AgriPro	SY Rugged	2,527	2,504	2,706
WestBred	WB4401	2,500	---	---
OGI	Uncharted	2,479	2,480	2,606
LCS	LCS Chrome	2,363	3,091	3,180
WestBred	WB4792	2,298	2,502	---
OGI	Big Country	2,172	2,516	2,745
OSU Experimentals				
	OK15DMASBx7 ARS 6-8	3,288	---	---
	OK12716W	2,715	---	---
	OCW03S580S-8WF	2,657	---	---
	OK15MASBx7 ARS 8-29	2,501	---	---
	Average	**2,726**	**2,835**	**3,047**
	LSD (0.05)	**234**	**306**	**272**

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

Table 4. Occurrence of first hollow stem (day of year) for the winter wheat varieties sown in 2020 and measured in 2021 at Stillwater and Chickasha, OK.

Licensee	*Variety*	*Stillwater*	*Chickasha*
		-------day of year-------	
Westbred	WB4269	37	63
AgriPro	SY Achieve CL2	37	75
KWA	Zenda	37	70
OGI	Gallagher	56	61
OGI	Skydance	56	75
AgriPro	Bob Dole	56	-
AgriPro	AP Roadrunner	56	-
Dyna-Gro	Buckhorn AX	57	-
OGI	Green Hammer	60	67
OGI	Iba	63	67
OGI	Strad CL+	63	75
OGI	Smith's Gold	63	75
OGI	Uncharted	63	70
Westbred	WB4401	63	67
Westbred	WB4699	63	70
AgriPro	AP18 AX	63	-
KWA	KS Western Star	63	67
LCS	LCS Chrome	63	67
LCS	LCS Atomic AX	63	67
LCS	LCS Valiant	63	67
AGSECO	AG Radical	63	-
PlainsGold	Crescent AX	63	-
AgriMaXX	AM Cartwright	63	-
OGI	Butler's Gold	63	-
OGI	Bentley	68	-
OGI	Duster	68	-
OGI	Showdown	68	75
OGI	Baker's Ann	68	-
OGI	Big Country	68	-
Westbred	WB4792	68	70
AgriPro	SY Rugged	68	75
AgriPro	AP EverRock	68	-
AgriPro	AP BigFoot	68	-
KWA	KS Hatchett	68	67
KWA	KS Ahearn	68	67
LCS	LCS Fusion AX	68	67
LCS	LCS Julep	68	67
LCS	LCS Revere	68	67
PlainsGold	Canvas	68	-
CROPLAN	CP7909	68	-
CROPLAN	CP7017AX	68	-
CHS	Allegiant 3063	68	-
OGI	Lonerider	70	67
OGI	OK Corral	70	70
OGI	Breakthrough	70	-
KWA	KS Dallas	70	67
KWA	KS Silverado	70	67
LCS	LCS Photon AX	70	67
LCS	LCS Helix AX	70	67
AGSECO	AG Icon	70	-
PlainsGold	Guardian	70	67
CROPLAN	CP7050AX	70	-
OGI	Doublestop CL+	75	-
KWA	KS Hamilton	75	67
OSU Experimentals			
	OK12716W	75	75
	OCW03S580S-8WF	54	67
	OK15MASBx7 ARS 8-29	68	75
	OK15DMASBx7 ARS 6-8	68	75
	Average	**64**	**72**

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