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Fall Forage Production and First Hollow Stem Date for Wheat Varieties During the 2019-2020 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 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 2019-2020 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, 50 pounds per acre of 18-46-0 was applied in seed furrow in Stillwater and 5 gallons per acre of 10-34-0 was applied in seed furrow in 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 and 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 approximate 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 5/8 inch (1.5 cm) 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 2019-2020 fall forage production season included moderate temperatures and good

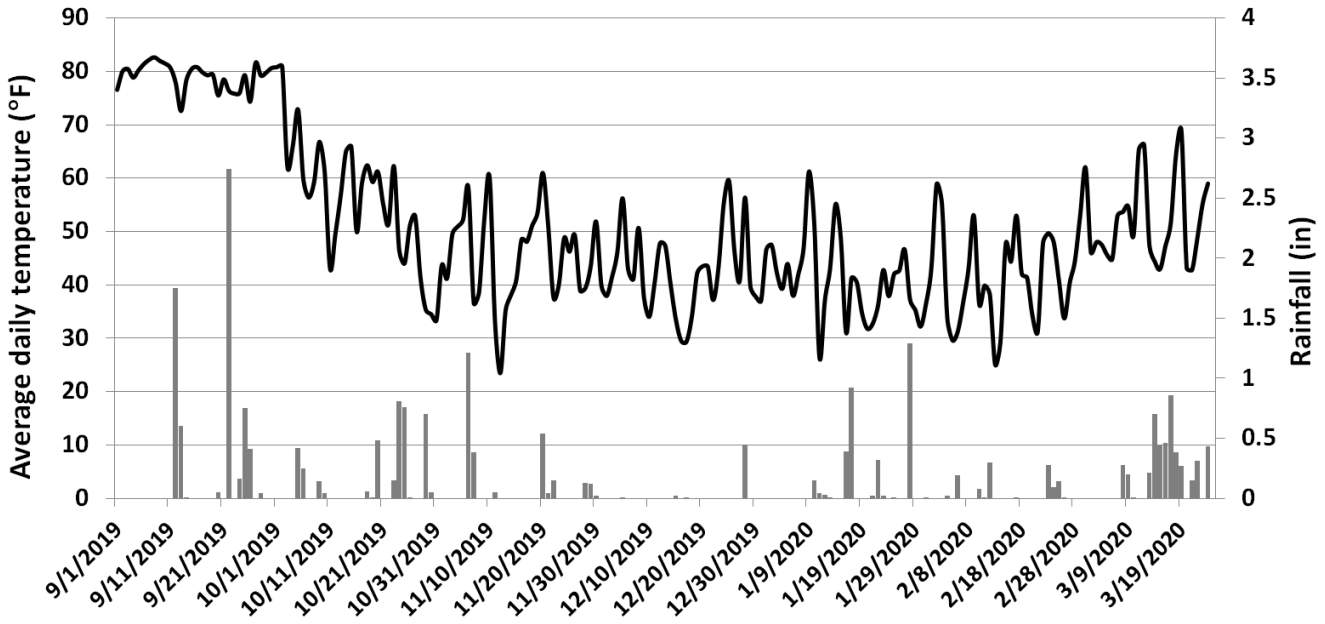

Figure 1. Average daily temperature (line graph) and rainfall (bar chart) from September 1, 2019 to March 25, 2019 at Stillwater, OK. Weather data courtesy Oklahoma Mesonet.

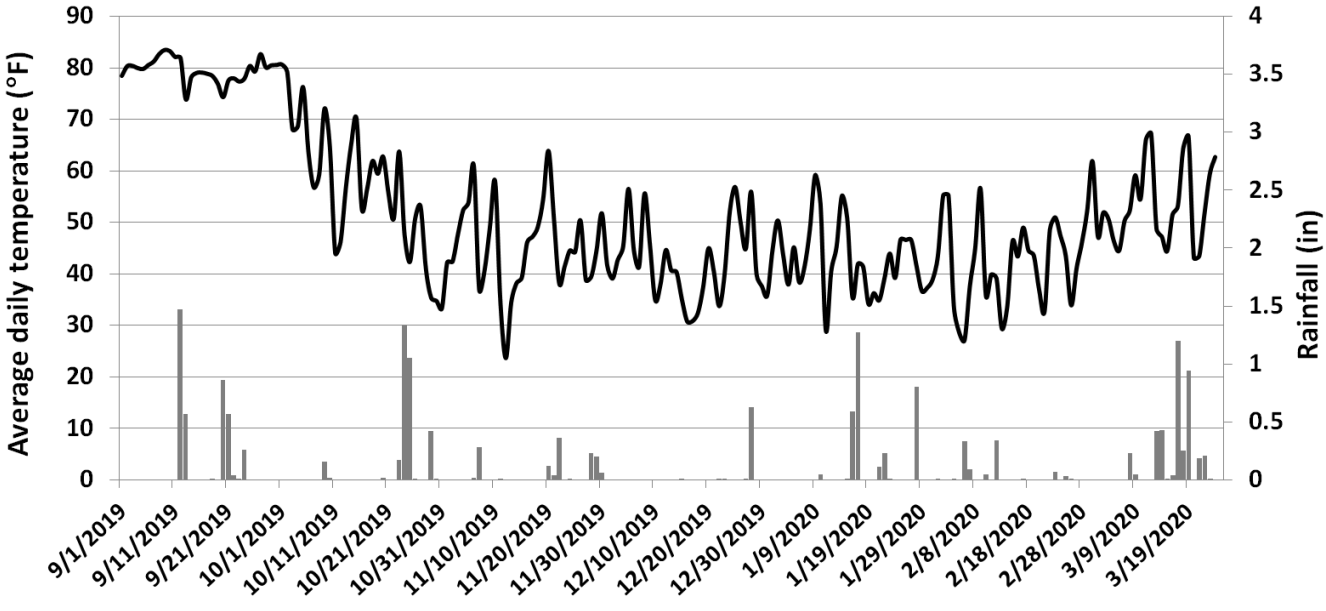

Figure 2. Average daily temperature (line graph) and rainfall (bar chart) from September 1, 2019 to March 25, 2019 at Chickasha, OK. Weather data courtesy Oklahoma Mesonet.

rainfall that were conducive to fall forage production in the field, and the results reflect these favorable conditions in the sites evaluated. Average fall forage production at Stillwater was 2,880 pounds per acre and values ranged from 1,493 to 4285 pounds per acre (Table 2). Average forage production at Chickasha was 2,943 pounds per acre and values ranged from 2,099 to 3,819 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 reference, keep in mind that March 1 is day 60. February and March 2020 were characterized by slightly warmer-than-normal temperatures and good moisture. These conditions likely resulted in plant development and onset of first hollow stem occurring earlier than normally expected for our region. The average winter wheat first hollow stem date at Stillwater was day 49 (February 19). This was almost one month earlier than 2019 (March 15), 25 days earlier than 2018 (March 11), and 16 days earlier than the 20-year average (March 6). At Stillwater, there was a 23-day difference between the earliest and latest varieties, compared to a 28-day difference in 2019 and 20-day difference in 2018. The average winter wheat first hollow stem date for the Chickasha location was 48 (February 18), which was 13 days earlier than in 2019, 17 days earlier than in 2018 and 24 days earlier than the 20-year average (March 6). At this location, there was a 28-day difference between the earliest and latest varieties, compared to a 27-day difference in 2019 and a 25-day difference in 2018.

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*	*N*	*STP*	*STK*
Chickasha	9/19/19	12/19/19	6.3	65	57	32
Stillwater	9/18/19	12/13/19	6.3	154	76	407

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 2019-2020 production year.

Licensee	*Variety*	*2019-2020*	*2-Year*	*3-Year*
		----------lbs dry forage/acre----------		
WestBred	WB4269	4,242	3,281	2,640
OGI	Lonerider	3,933	3,223	2,642
KWA	Zenda	3,642	3,004	2,617
CROPLAN	CP7909	3,631	2,937	-
LCS	LCS Chrome	3,552	2,868	2,501
PlainsGold	Langin	3,544	2,946	2,437
OGI	OK Corral	3,437	-	-
KWA	KS Silverado	3,287	-	-
AgriPro	Bob Dole	3,284	2,900	2,546
LCS	LCS Photon AX	3,152	-	-
OGI	Bentley	3,138	2,749	2,285
AgriPro	SY Benefit	3,078	2,533	2,151
OGI	Smith's Gold	3,062	2,591	2,236
KWA	KS Western Star	2,987	-	-
CROPLAN	CP7010	2,981	-	-
OGI	Baker's Ann	2,972	2,373	2,223
OGI	Gallagher	2,968	2,841	2,264
KWA	KS Dallas	2,955	-	-
OGI	Duster	2,865	2,959	2,444
WestBred	WB4515	2,848	2,633	2,298
OGI	Ruby Lee	2,802	2,706	2,167
OGI	Spirit Rider	2,801	2,582	2,230
LCS	T173	2,794	-	-
AgriPro	AP EverRock	2,736	-	-
WestBred	WB4595	2,758	2,479	-
CROPLAN	CP7869	2,732	2,462	-
AgriMAXX	AM Cartwright	2,707	2,485	-
AGSECO	AG Icon	2,704	2,499	2,221
WestBred	WB4792	2,690	2,454	-
AgriMAXX	AM Eastwood	2,515	2,304	2,072
AgriPro	SY Achieve CL2	2,506	2,538	2,231
OGI	Skydance	2,489	-	-
AGSECO	TAM 114	2,482	2,487	2,082
PlainsGold	Canvas	2,468	2,328	-
PlainsGold	Guardian	2,445	-	-
OGI	Showdown	2,430	2,143	1,961
PlainsGold	Crescent AX	2,421	2,390	-
OGI	Iba	2,271	2,403	1,968
OGI	Green Hammer	2,249	2,164	2,024
OGI	Doublestop CL Plus	2,068	2,318	1,973
AgriPro	SY Rugged	1,812	2,122	1,932
WestBred	WB4699	1,493	1,873	-
OSU Experimentals				
	OK12912C-138407-2	4,285	-	-
	OK16D101089	3,129	2,457	-
	OCW04S717T-6W	2,772	2,468	2,135
	OK15MASBx7 ARS 8-1	2,662	-	-
	OK16729W	2,578	2,259	-
	Average	**2,880**	**2,565**	**2,251**
	LSD (0.05)	**901**	**560**	**432**

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 2019-2020 production year.

Licensee	*Variety*	*2019-2020*	*2-Year*	*3-Year*
		----------lbs dry forage/acre----------		
LCS	LCS Chrome	3,819	3,588	2,963
OGI	Green Hammer	3,665	3,511	---
OGI	Bentley	3,315	3,576	3,080
OGI	Showdown	3,293	3,430	2,881
OGI	Smith's Gold	3,262	3,342	2,872
OGI	OK Corral	3,240	---	---
OGI	Ruby Lee	3,240	3,611	3,121
WestBred	WB4699	3,116	---	---
OGI	Skydance	3,097	---	---
WestBred	WB4595	3,088	---	---
OGI	Gallagher	3,032	3,593	3,099
OGI	Doublestop CL Plus	3,002	3,263	2,672
AGSECO	AG Icon	2,991	3,115	---
KWA	Zenda	2,753	---	---
AgriPro	Bob Dole	2,719	---	---
WestBred	WB4792	2,706	---	---
WestBred	WB4269	2,660	3,051	2,812
OGI	Baker's Ann	2,537	---	---
AgriPro	SY Rugged	2,482	2,796	2,434
LCS	T173	2,319	---	---
OGI	Duster	2,099	2,964	2,651
OSU Experimentals				
	OK12912C-138407-2	3,056	---	---
	OK16729W	3,007	---	---
	OCW04S717T-6W	2,859	3,032	---
	OK188608	2,827	---	---
	OK15MASBx7 ARS 8-1	2,804	---	---
	OK16D101089	2,482	2,669	---
Average		**2,943**	**3,253**	**2,859**
LSD (0.05)		**448**	**407**	**365**

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 2019 and measured in 2020 at Stillwater and Chickasha, OK.

Licensee	*Variety*	*Stillwater*	*Chickasha*
		-------day of year-------	
KWA	Zenda	34	33
AgriPro	SY Benefit	34	---
OGI	Smith's Gold	34	47
OGI	Skydance	34	33
AgriPro	Bob Dole	44	43
OGI	Baker's Ann	44	47
OGI	Gallagher	44	43
AgriPro	SY Achieve CL2	44	---
PlainsGold	Crescent AX	44	---
OGI	Iba	44	---
WestBred	WB4269	48	47
PlainsGold	Langin	48	---
Limagrain	LCS Photon AX	48	---
KWA	KS Dallas	48	---
OGI	Duster	48	54
OGI	Ruby Lee	48	47
AgriPro	AP EverRock	48	---
WestBred	WB4595	48	47
AgriMaxx	AM Cartwright	48	---
WestBred	WB4792	48	50
AgriMaxx	AM Eastwood	48	---
AGSECO	TAM 114	48	---
PlainsGold	Guardian	48	---
OGI	Showdown	48	47
OGI	Green Hammer	48	33
AgriPro	SY Rugged	48	54
WestBred	WB4699	48	50
OGI	OK Corral	51	50
KWA	KS Silverado	51	---
OGI	Bentley	51	50
KWA	KS Western Star	51	---
CROPLAN	CP7010	51	---
WestBred	WB4515	51	---
AGSECO	AG Icon	51	54
PlainsGold	Canvas	51	---
OGI	Lonerider	54	---
CROPLAN	CP7909	54	---
Limagrain	LCS Chrome	54	58
OGI	Spirit Rider	54	---
OGI	Doublestop CL Plus	54	61
Limagrain	T173	57	54
CROPLAN	CP7869	57	---
OSU Experimentals			
	OK12912C-138407-2	48	50
	OK15MASBx7 ARS 8-1	48	47
	OK16729W	48	50
	OCW04S717T-6W	48	47
	OK16D101089	48	43
Average		**49**	**48**

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