



# Current Report

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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-

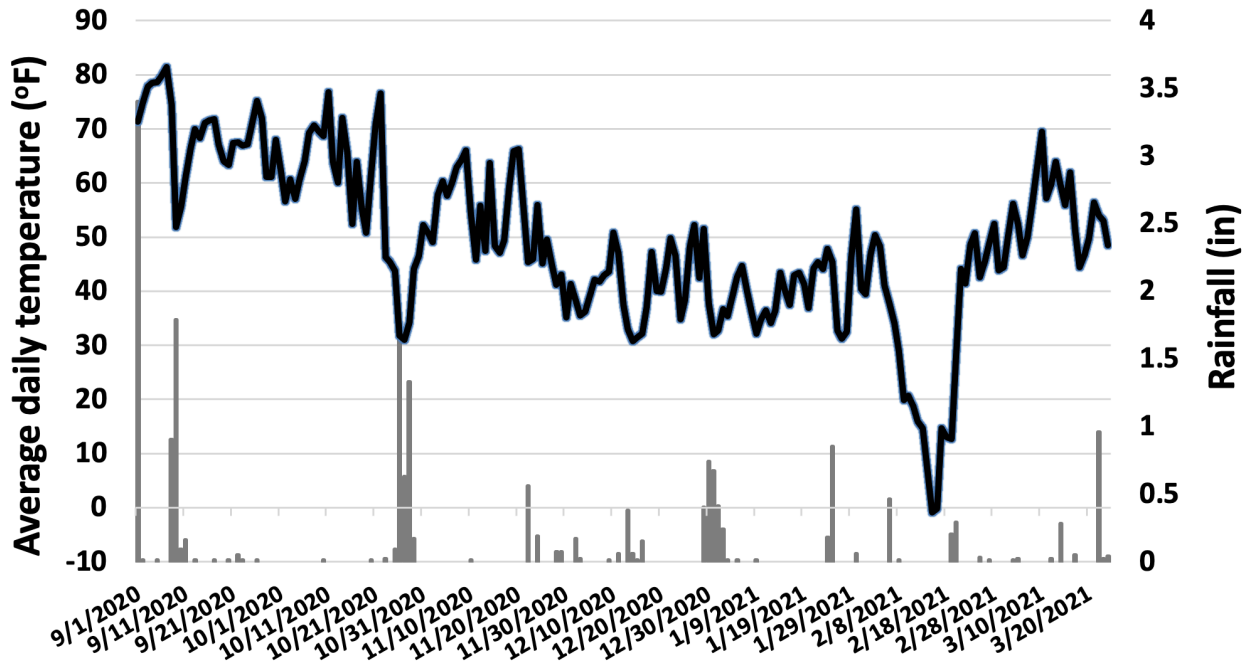


Figure 1. Average daily temperature (line graph) and rainfall (bar chart) from Sept. 1, 2020 to March 24, 2021, at Stillwater, OK. Weather data courtesy Oklahoma Mesonet.

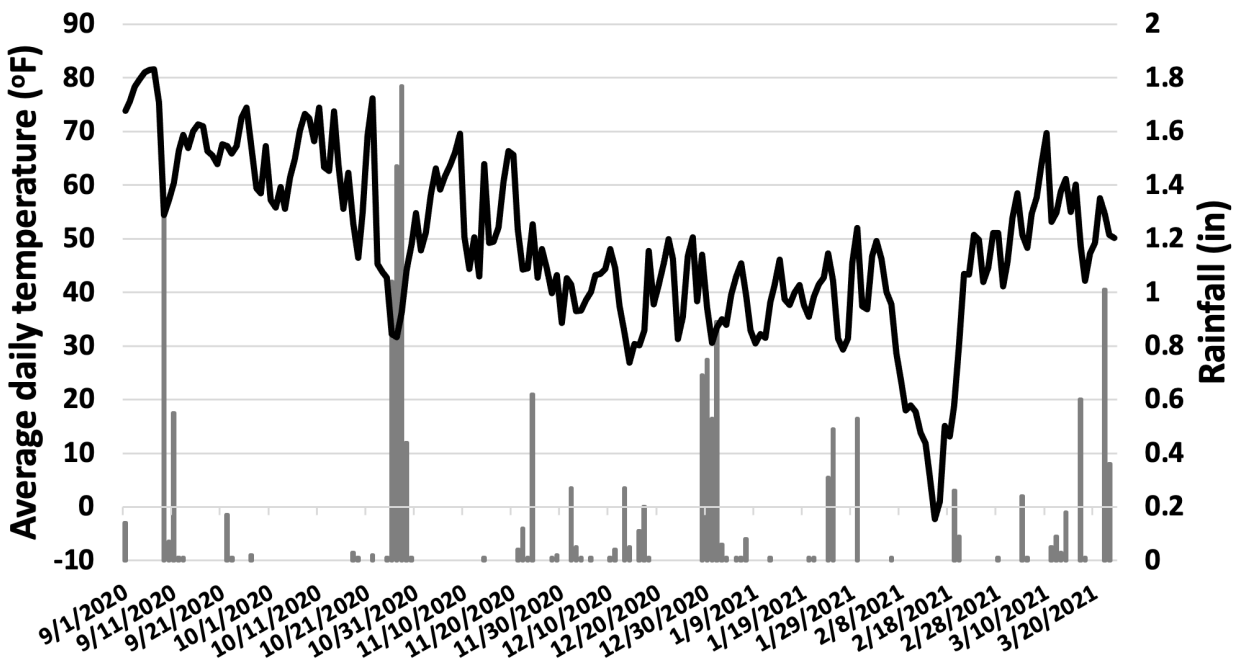


Figure 2. Average daily temperature (line graph) and rainfall (bar chart) from Sept. 1, 2020 to March 24, 2021, at Chickasha, OK. Weather data courtesy Oklahoma Mesonet.

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

The authors want to thank the Oklahoma Wheat Commission and the Oklahoma Wheat Research Foundation for providing partial funding for this research.

### 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.**

|            | <i>Planting date</i> | <i>Sampling date</i> | <i>pH</i> | <i>N</i> | <i>STP</i> | <i>STK</i> |
|------------|----------------------|----------------------|-----------|----------|------------|------------|
| 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                         | -            | -            |
| <b>OSU Experimentals</b> |                     |                               |              |              |
|                          | OCW03S580S-8WF      | 3,070                         | -            | -            |
|                          | OK15DMASBx7 ARS 6-8 | 2,905                         | -            | -            |
|                          | OK12716W            | 2,472                         | -            | -            |
|                          | OK15MASBx7 ARS 8-29 | 2,438                         | -            | -            |
| <b>Average</b>           |                     | <b>2,850</b>                  | <b>2,880</b> | <b>2,671</b> |
| <b>LSD (0.05)</b>        |                     | <b>174</b>                    | <b>585</b>   | <b>443</b>   |

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.**

| <i>Licensee</i>               | <i>Variety</i>      | <i>2020-2021</i> | <i>2-Year</i> | <i>3-Year</i> |
|-------------------------------|---------------------|------------------|---------------|---------------|
| -----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         |
| <b>OSU Experimentals</b>      |                     |                  |               |               |
|                               | OK15DMASBx7 ARS 6-8 | 3,288            | ---           | ---           |
|                               | OK12716W            | 2,715            | ---           | ---           |
|                               | OCW03S580S-8WF      | 2,657            | ---           | ---           |
|                               | OK15MASBx7 ARS 8-29 | 2,501            | ---           | ---           |
| <b>Average</b>                |                     | <b>2,726</b>     | <b>2,835</b>  | <b>3,047</b>  |
| <b>LSD (0.05)</b>             |                     | <b>234</b>       | <b>306</b>    | <b>272</b>    |

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.**

| <i>Licensee</i>          | <i>Variety</i>      | <i>Stillwater</i>     | <i>Chickasha</i> |
|--------------------------|---------------------|-----------------------|------------------|
|                          |                     | -----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               |
| <b>OSU Experimentals</b> |                     |                       |                  |
|                          | OK12716W            | 75                    | 75               |
|                          | OCW03S580S-8WF      | 54                    | 67               |
|                          | OK15MASBx7 ARS 8-29 | 68                    | 75               |
|                          | OK15DMASBx7 ARS 6-8 | 68                    | 75               |
| <b>Average</b>           |                     | <b>64</b>             | <b>72</b>        |



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