# 2015 Kansas Spring Annual Forage Variety Trial

*J. Holman, A. Obour, T. Roberts, S. Maxwell, and J. Kimzey*

## Summary

A total of 3 spring annual forage varieties were tested for performance at the Southwest Research-Extension Center near Garden City, KS and the Western Kansas Agriculture Research Center near Hays, KS, in 2015. Spring crops evaluated included oat and triticale.

## Introduction

In 2014 there was a total of 34,455,000 acres of hay and haylage harvested in the U.S. for a total of 95,372,000 dry matter tons of production. Yields averaged 2.77 tons of dry matter per acre. Of this total about 13,580,000 acres was alfalfa, which averaged 3.76 dry matter tons per acre. All other crops averaged 2.13 dry matter tons per acre.

In Kansas, there were 2,420,000 acres of hay and haylage harvested with an average yield of 2.24 dry matter tons per acre in 2014. Of this total, 650,000 acres was alfalfa with an average yield of 3.72 dry matter tons per acre, and 1,770,000 acres were crops other than alfalfa with an average yield of 1.69 dry matter tons per acre. Kansas was ranked 6th in the U.S. for hay and haylage production, which largely supports the state dairy (ranked 19th in the U.S. and valued at $482,765,000) and cattle (feedlot, background, and cow/calf) industries (ranked 2nd in the U.S. valued at $10,153,087,000). Dairy and beef cattle represented 58% of the total agriculture product of Kansas in 2014. Hay and grain commodities that support these two industries are critical for the state.

### *Study Objectives*

The objectives of the Kansas Spring Annual Forage Variety Trial are to evaluate the performance of released and experimental varieties, determine where these varieties are best adapted, and increase the visibility of spring annual forages in Kansas. Breeders, marketers, and producers use data collected from the trials to make informed variety selections. The Spring Annual Forage Trial is planted at locations across Kansas based on the interest of those entering varieties into the test.

## Procedures

The Spring Annual Forage Variety Test was only conducted at the Southwest Research-Extension Center near Garden City, KS and the Western Kansas Agriculture Research Center near Hays, KS, in 2015. All of the entries tested were commercially available and none were experimental. Three seed suppliers provided entries. Management guidelines

were provided to cooperators, but previous growing experience influenced final management decisions. All trials were planted in small research plots (approximately 225 $ft^2$) with three replications. Cultural practices, site descriptions, growing conditions, and performance data are provided for each harvested location (Tables 1-3). Since 2015 was the first year of this test there are no across year summaries available. Results are listed alphabetically, by seed supplier. No forage nutrient analysis was done this first year; in subsequent years, forage analysis will also be determined.

### *2015 Growing Conditions*

Temperature (Figures 1-2) and precipitation (Figures 3-4) data are shown. Thick black lines on the temperature graphs represent long-term average high and low temperatures (°F) for the location. The upper thin line represents actual daily high temperatures, and the lower thin line represents actual daily low temperatures. On the precipitation graph, the line labeled "normal" represents long-term average precipitation (1981-2010), and the line labeled "15" represents actual precipitation in 2015.

In general, the 2015 growing season saw favorable moisture conditions at planting and through the growing season. At both Garden City and Hays, ideal weather conditions occurred late in the growing season.

## Results and Discussion

Garden City and Hays, KS, are the two harvested locations included in this report (Table 4). All varieties were harvested between Feekes 10.3 and 10.5 on May 12, 2015. The oat variety Cosaque was a winter type and required vernalization to elongate. The variety did not receive enough cool temperatures after being planted March 10, 2015, to vernalize and needs to either be planted in the fall or earlier in the spring in this region. Spring triticale varieties Merlin and 141 yielded similar to each other across sites, but 141 averaged 400 lb/a more than Merlin; however, Merlin is an awnless type and 141 is awnletted. Feeding triticale with awns to cattle can result in lump jaw if the hay is not ground. The slightly higher average yield of 141 would be offset by the cost of having to grind the hay. It is advisable to select a variety based on more than one year of performance results. When comparing more than one site, often a value of "percentage of test average" yield calculation is included in the results. This relative yield calculation allows for some comparison of performance across environments. This value is provided for the two triticale varieties, since they were planted at all three sites. Entries yielding more than 100% percent of the test average across multiple locations merit some consideration. Due to the limited number of entries and sites, this value more accurately reflects the difference in yield potential across sites due to differences in precipitation.

Overall, yields were good to excellent, in part due to favorable growing conditions in May. The consistency of yields was excellent, with varieties averaging 2,800 lb/a of dry matter yield in the spring (Table 4). Caution should be used when evaluating data with coefficient of variation (CV) values greater than 20. Lower values suggest less error was observed. Inestimable differences in soil type, weather, and environmental conditions play a part in increasing experimental error and CV values. There was a large amount of variability in the stand at Hays due to poor moisture conditions at planting and those plots had to be harvested by hand. This poor stand is reflected by a high CV value. Lodging was not an issue in any variety. Lodging is an important trait to consider since

it affects the ability to harvest the crop. Other traits to consider would be forage nutritive value. One should use more than one year of data to make an informed variety selection decision.

## Acknowledgments

This work was funded in part by the Kansas Agricultural Experiment Station and by seed suppliers. Sincere appreciation is expressed to all participating researchers and seed suppliers who have a vested interest in expanding and promoting annual forage production in the U.S.

**Table 1. Spring annual small grain forage study, 2015, Southwest Research-Extension Center at Garden City, KS**

*Investigators: J. Holman, T. Roberts, and S. Maxwell*

Study Description

| Location | |
|---|---|
| County/area | Finney |
| Longitude | 100°48'49" |
| Latitude | 37°59'57" |
| Elevation | 2882 ft |
| Soil series | Ulysses Silt Loam |
| Soil texture | Silt Loam |
| Soil depth | >80" |

| Study design | |
|---|---|
| Replications | 4 |
| Plot length | 120 ft |
| Plot width | 15 ft |
| Drill row spacing | 8 in |
| Rows per plot | 22 |

| Seeding rate | |
|---|---|
| All entries | 76 lb/a |

| Management practices | | |
|---|---|---|
| Previous crop | Grain sorghum | |
| Planting date | 3/12/2015 | |
| Forage harvest | Single harvest per plot spring | |
| Growth stage at harvest | Heading, Feekes: 10.3 to 10.5 | |
| | Spring: | 5/27/2015 |

| Production inputs | | |
|---|---|---|
| Nutrient | Rate | Date |
| N | 20 lb/a | Carryover |
| P | 22 ppm | Carryover |
| N | 5.5 lb/a | 3/12/2015 |
| P | 26 lb/a | 3/12/2015 |

| Herbicides | Rate | Date |
|---|---|---|
| Glyphosate | 32 oz/a | 3/12/2015 |

| Other | Rate | Date |
|---|---|---|
| None | | |

| Growing conditions | Precip. | Avg. precip.[a] | Irrigation |
|---|---|---|---|
| | in. | | |
| January | 0.3 | 0.46 | 0 |
| February | 1.21 | 0.55 | 0 |
| March | 0.32 | 1.31 | 0 |
| April | 0.37 | 1.74 | 0 |
| May | 6.38 | 2.98 | 0 |
| Seasonal precipitation | 8.58 | 7.04 | |
| Total irrigation | | | 0 |

[a]Average precipitation is 30-yr mean

Field notes: Wetter and cooler than normal in May.

**Table 2. Spring annual small grain forage study, 2015, Agricultural Research Center, Hays, KS**

*Investigators: Augustine Obour; Joseph Kimzey*

Study Description

| Location | |
|---|---|
| County/area | Hays |
| Longitude | 38°86' N |
| Latitude | 99°27' W |
| Elevation | 2008 ft |
| Soil series | Crete Silty loam |
| Soil texture | Silty clay Loam |
| Soil depth | >68" |

| Study design | |
|---|---|
| Replications | 3 |
| Plot length | 30 ft |
| Plot width | 10 ft |
| Drill row spacing | 10 in |
| Rows per plot | 12 |

| Seeding rate | |
|---|---|
| Triticale | 76 lb/a |
| Oats | 64 lb/a |

| Management practices | |
|---|---|
| Previous crop | Winter wheat |
| Planting date | 3/10/2015 |
| Forage harvest | Single harvest per plot in June (8.6 sq ft) |
| Growth stage at harvest | Heading, Feekes: 10.3 |
| Harvest date | 6/12/2015 |

| Production inputs | |
|---|---|
| Nutrient | Soil test levels |
| N | 30 lb/a |
| P | 18 ppm |
| K | 513 ppm |
| SOM | 2.40% |

Fertilizer applied: None

| Herbicides | Rate | Date |
|---|---|---|
| Glyphosate | 32 oz/a | 3/5/2015 |

| Other | Rate | Date |
|---|---|---|
| None | | |

| Growing conditions | | | |
|---|---|---|---|
| | Precip. | Avg. precip.[a] | Irrigation |
| | in. | | |
| January | 0.46 | 0.5 | 0 |
| February | 0.71 | 0.7 | 0 |
| March | 0.09 | 1.81 | 0 |
| April | 0.96 | 2.13 | 0 |
| May | 6.44 | 3.26 | 0 |
| Seasonal precipitation | 8.66 | 8.4 | |
| Total irrigation | | | |

[a]Average precipitation is 30-yr mean

Field notes: Plots harvested by hand due to non-uniform stands.

**Table 3. Spring annual small grain forage yield, 2015, near Garden City and Hays, KS.**

| Location | Species | Variety | Company | Awn-type | Harvest date | Spring yield | Test average | Lodging |
|---|---|---|---|---|---|---|---|---|
| | | | | | | lb/a[a] | % | |
| Garden City | | | | | | | | |
| | Spring Triticale | Merlin | ProGene Plant Research | Awnless | 5/27/2015 | 1852 | 58% | 0 |
| | Spring Triticale | 141 | Syngenta | Awnletted | 5/27/2015 | 2330 | 73% | 0 |
| | Oat | Newburg | North Dakota State Univ. | Awned | 5/27/2015 | 1609 | - | 0 |
| Mean | | | | | | 1930 | - | 0 |
| CV | | | | | | 19 | - | - |
| LSD | | | | | | 847 | - | - |
| | | | | | | | | |
| Hays | | | | | | | | |
| | Spring Triticale | Merlin | ProGene Plant Research | Awnless | 6/12/2015 | 4097 | 130% | 0 |
| | Spring Triticale | 141 | Syngenta | Awnletted | 6/12/2015 | 4397 | 139% | 0 |
| | Oat | Cosaque | Caldbeck Consulting | NA[b] | 6/12/2015 | 2726 | - | 0 |
| Mean | | | | | | 3740 | - | 0 |
| CV | | | | | | 31 | - | - |
| LSD | | | | | | 2600 | - | - |

[a] Mean values and LSD by location significantly different at P≤0.05.

[b] All varieties cut at heading. The oat variety Cosaque was a winter type that never vernalized, and thus never elongated. Therefore the yield of Cosaque was lower than had it elongated.

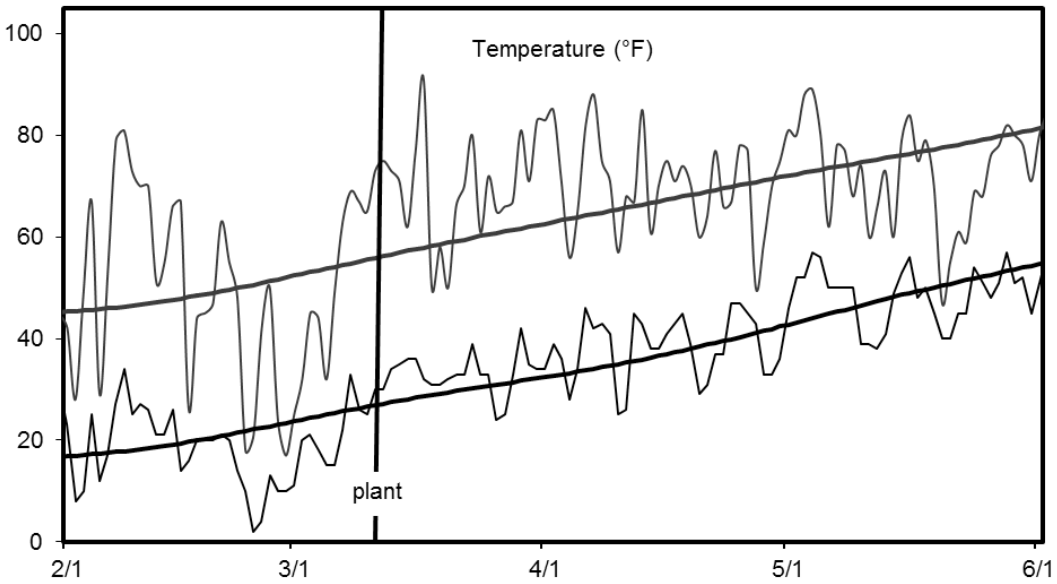


**Figure 1. Daily and mean (1981 to 2010) high and low temperatures during the growing season at the Southwest Research-Extension Center in Garden City, KS.**

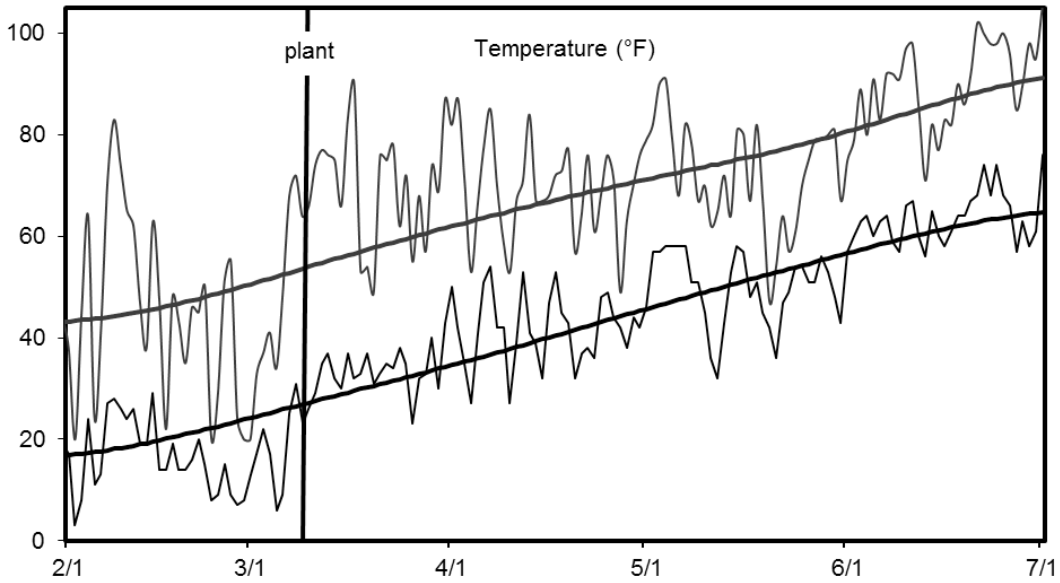


**Figure 2. Daily and mean (1981 to 2010) high and low temperatures during the growing season at the Southwest Research-Extension Center in Hays, KS.**

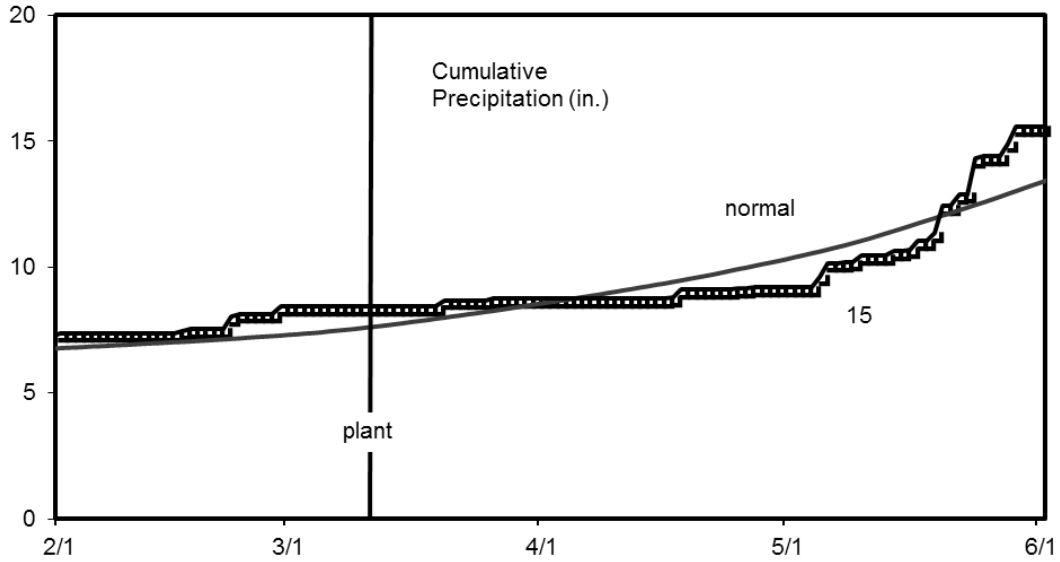


**Figure 3. Daily and mean (1981 to 2010) cumulative precipitation during the growing season at the Southwest Research-Extension Center in Garden City, KS.**

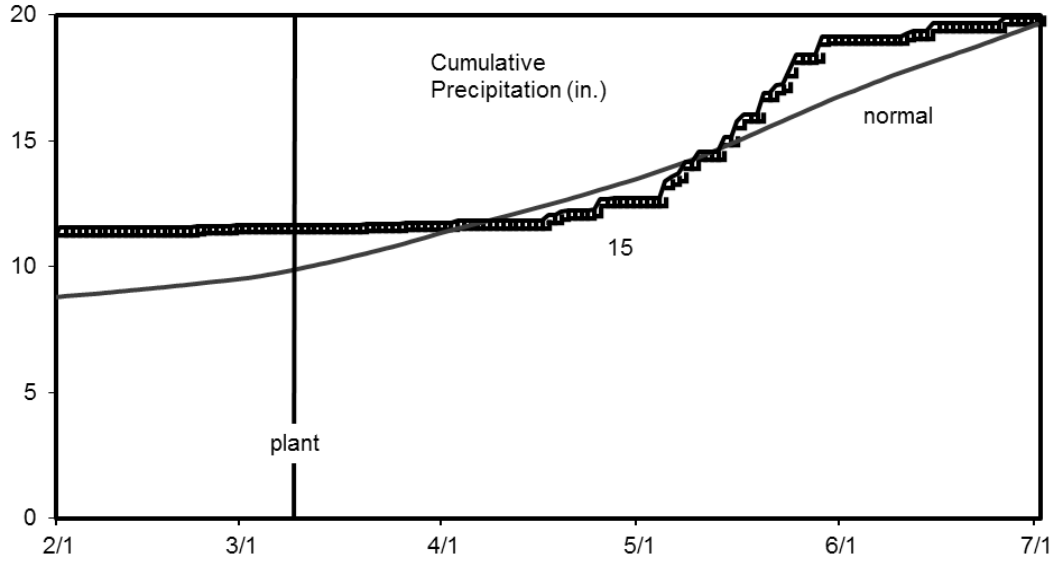


**Figure 4. Daily and mean (1981 to 2010) cumulative precipitation during the growing season at the Southwest Research-Extension Center in Hays, KS.**