

2013-2014 Wheat Research Summary
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Selecting the Best Wheat Varieties for Your Farm

Varietal selection is one of the most important decisions a wheat grower will make. The best adapted varieties can produce up to 50 percent more grain than the poorly adapted ones. In addition, bushel weights vary widely among varieties, and it is important to select varieties with both high yield potential and good bushel weights.

This summary is intended to assist in that decision making process. Pay particular attention to tables 4 and 5, as they represent the performance of varieties over a two and three year period. Yield stability is the most important single factor in selecting varieties for your farm. Growing conditions vary widely from year to year, and the varieties that perform well over multiple years are the safest choices.

2013-2014 in Review

The 2013-2014 growing season was atypical for the production of soft red winter wheat in the Northern Texas Blacklands. Wet soils in late October delayed planting, and most of the commercial wheat was planted in the second and third week of November. Cold, wet conditions following planting slowed growth, and wheat plants were small with few tillers in January. Colder than normal January and February temperatures further slowed plant growth going into March. Temperatures across the region plummeted into the low teens during the first few days of March, freezing most area wheat plants back to the crowns, and killing plants and tillers in the early maturing varieties. An April 15 frost damaged some October planted wheat that was heading, but did very little damage to the November planted wheat, as it was mostly in Feekes 8 to 9, and not headed at the time. April and May growing conditions were excellent, and the overall wheat crop turned out to be the best on record. Most of the growers produced yields averaging 75 to 80 bushels per acre, with the later maturing varieties producing the highest yields. In almost all cases, wheat planted in October produced less grain than wheat planted in mid-November.

Leaf and stripe rust pressure was very low across the region, and even susceptible varieties did not sustain significant losses from these pathogens. Stripe rust never developed beyond trace levels, and leaf rust did not appear until the grain filling process was almost complete. Consequently, yield increases with a foliar fungicide were minimal.

None of the experiments in this summary were sprayed with a foliar fungicide. This phase of our program is intended to measure genetic resistance to foliar plant diseases. We will address foliar fungicides and their profitability in an additional publication to be released later this year.

This paper is divided into two sections. The first will address the performance and characteristics of soft red winter wheat varieties (SRWWs) in this region. The second section is a summary of the performance of soft red winter wheat varieties in comparison with selected hard red winter wheat varieties (HRWWs). A significant focus of this research program is to search for HRWWs that are competitive in yield with SRWWs. Competitive HRWWs would be attractive to growers because they usually have a price advantage over SRWWs.

In 2013-2014, we planted studies in three locations: Royse City, Leonard, and Howe. We were able to successfully harvest all locations in a timely manner.

Table 1: Summary – Performance of Selected Soft Red Winter Wheat Varieties in Leonard, Texas. 2014

Variety	Yield Bu/A	Test Weight Lb/Bu	Percent Stand following March 1 Freeze
USG 3201	121.1a	61.7a	95.8abc
Pioneer 25R39	119.1ab	59.0cde	98.3ab
Dyna-Gro 9012	116.7abc	61.0ab	95.8abc
Dyna-Gro 9171	116.0abc	57.5fgh	100.0a
Pioneer 25R30	114.7abc	59.9bc	90.8abc
Progeny P870	113.5abcd	57.4fgh	100.0a
Terral TV 8525	113.4abcd	59.2cd	92.5abc
Terral TV 8861	112.5abcd	58.7def	88.3abc
Syngenta Coker 9553	112.1abcd	60.5ab	82.5cde
Terral TV 8535	111.9abcd	56.9h	100.0a
Terral TV 8848	110.5bcd	58.1defg	95.8abc
USG 3404	110.5bcd	58.0defgh	94.2abc
Pioneer 25R40	109.4cde	58.5defg	90.0abc
USG 3120	108.4cde	60.1bc	73.3ef
USG 3555	107.9cde	58.1defgh	75.0def
USG 3251	104.3def	57.7efgh	95.8abc
Syngenta Harrison	101.5efg	57.1gh	86.7abcd
L-Brand 343	100.0fgh	60.1bc	82.5cde
Syngenta Oakes	97.6fghi	60.7ab	84.2bcde
TXE21	95.1ghi	57.1gh	60.8g
Syngenta Magnolia	93.6ghi	57.8efgh	83.3cde
Dyna-Gro 9053	92.1hij	54.3i	93.3abc
USG 3209	91.6ij	57.9defgh	67.5fg
Terral LA 754	85.8jk	57.1gh	43.3h
AGS 2035	83.7k	58.9cde	35.8h
Mean	105.7	58.5	84.2

Table 2: Summary – Performance of Selected Soft Red Winter Wheat Varieties in Roysse City, Texas. 2014

Variety	Yield Bu/A	Test Weight Lb/Bu	Plant Height (Inches)
USG 3201	102.6a	60.5a	30.0bcde
Pioneer 25R30	102.5a	58.8a	30.2bcd
Dyna-Gro 9012	101.6ab	60.0a	29.8bcde
Pioneer 25R39	101.0abc	58.8a	31.8b
Terral TV 8535	100.7abc	58.3ab	30.3bcd
Progeny P870	100.6abc	59.2a	30.5bcd
USG 3404	98.0abc	57.9ab	31.5bc
Syngenta Coker 9553	96.6abcd	60.2a	29.4cde
Pioneer 25R40	96.1abcd	58.4ab	28.4def
Terral TV 8861	95.8abcd	57.6ab	28.7def
USG 3555	93.5abcde	57.4ab	27.0f
Dyna-Gro 9171	92.8abcdef	56.4ab	30.2bcd
Terral TV 8848	92.1abcdefg	57.8ab	31.3bc
Syngenta Harrison	90.8bcdefg	56.4ab	29.5bcde
Terral TV 8525	90.3cdefg	59.0a	30.0bcde
Terral LA 754	86.8defg	58.7a	30.3bcd
L-Brand 343	86.6defg	59.3a	27.8ef
TXE 21	86.1defg	56.6ab	27.3f
USG 3120	84.6efg	58.0ab	30.3bcd
Syngenta Magnolia	84.1efg	57.9ab	33.3a
USG 3209	83.0efg	57.8ab	27.0f
USG 3251	82.1fg	56.5ab	31.5bc
AGS 2035	81.4g	59.2a	29.7bcde
Dyna-Gro 9053	70.0h	54.4b	30.0bcde
Syngenta Oakes	67.3h	58.2ab	30.7bcd
Mean	90.7	58.1	29.9

Table 3: Summary – Mean Performance of Selected Soft Red Winter Wheat Varieties in Two locations (Leonard and Royse City, Texas. 2014)

Variety	Yield Bu/A	Test Weight Lb/Bu
USG 3201	111.9	61.1
Pioneer 25R39	110.1	58.9
Dyna-Gro 9012	109.2	60.5
Pioneer 25R30	108.6	59.4
Progeny P870	107.1	58.3
Terral TV 8535	106.3	57.6
Dyna-Gro 9171	104.4	57.0
Syngenta Coker 9553	104.4	60.4
USG 3404	104.3	58.0
Terral TV 8861	104.2	58.1
Pioneer 25R40	102.8	58.5
Terral TV 8525	101.9	59.1
Terral TV 8848	101.3	58.0
USG 3555	100.7	57.8
USG 3120	96.5	59.1
Syngenta Harrison	96.2	56.8
L-Brand 343	93.3	59.3
USG 3251	93.2	57.1
TXE 21	90.6	56.9
Syngenta Magnolia	88.9	57.9
USG 3209	87.3	57.9
Terral 754	86.3	57.9
AGS 2035	82.6	59.1
Syngenta Oakes	82.5	59.5
Dyna-Gro 9053	81.1	54.4
Grand Mean	98.2	58.3

2014 SRWW Highlight Summary

- The Leonard location was planted on November 13 and harvested on June 24. The Royse City location was planted on November 19 and harvested on June 19.
- USG 3201 was the top yielder in both locations, and also had the highest bushel weights.
- AGS 2035 and Terral LA 754 are very early maturing varieties, and sustained severe freeze damage at Leonard following the freezing temperatures we received during the first few days of March. Temperatures in the low teens were recorded across the region. Stands were reduced by over 50 percent in these two varieties (Table 1). USG 3120 is also a very early maturing variety, but it was not damaged as severely as AGS 2035 and Terral LA 754.
- Leaf rust (*Puccinia recondita*) infection levels were very low in both locations, and did not surpass 10 percent leaf infection in any of the varieties tested. Stripe rust (*Puccinia striiformis*) infection pressure was very low.

Yield stability is the most important consideration when selecting wheat varieties to plant in northeast Texas. It is risky to make varietal choices based on one year's results because weather conditions and disease pressures vary greatly from year to year. Therefore, performance over a number of years and locations is the best indicator of varietal stability.

The tables below represent a summary of the top ten performing varieties over a two and three year period from 2012-2014.

Table 4: Two Year Summary – Yield (Bushels/Acre) of the Top Ten Soft Red Winter Wheat Varieties in Northeast Texas. 2013 (Bailey) and 2014 (Leonard and Royse City)

Varieties	Mean
Syngenta Coker 9553	96.9
USG 3120	94.0
USG 3201	92.2
USG 3555	92.0
Pioneer 25R30	85.5
AGS 2035	85.3
Terral 8525	84.7
Pioneer 25R40	84.3
Terral 8848	83.4
Terral 8861	82.6

Table 5: Three Year Summary – Yield (Bushels/Acre) of the Top Ten Soft Red Winter Wheat Varieties in Northeast Texas. 2012 (Leonard), 2013 (Bailey), 2014 (Leonard and Royse City)

Varieties	Mean
USG 3120	96.5
Syngenta Coker 9553	93.5
USG 3201	92.6
USG 3555	90.6
AGS 2035	90.3
Pioneer 25R30	87.9
Pioneer 25R40	87.6
Terral 8525	86.9
Terral 8848	86.0
Terral 8861	85.2

Note:

USG 3120 and AGS 2035 performed very well in 2012 and 2013, but they are the earliest maturing varieties we have seen in a number of years. Both were damaged by the hard freeze during the first few days of March in 2014, and the AGS 2035 was severely damaged. If planted at our normal time (late October-early November), they are more likely to experience freeze damage than any of the other varieties being grown here.

Maturity Groups

We have more good SRWW wheat varieties to choose from than ever. Below is a table listing the relative maturities of selected varieties.

Variety	Maturity Group
USG 3120 AGS 2035	Early
USG 3555 USG 3295 Syngenta Coker 9553 USG 3409 Syngenta Magnolia	Medium
Syngenta Oakes Terral TV 8525	Medium Late
Pioneer 25R30 Pioneer 25R40 Terral TV 8861 USG 3201 Syngenta Harrison	Late

To hedge against weather risks, it would be advisable to plant multiple varieties from more than one maturity group. Start by planting the later maturing varieties, and finish with the earlier ones. The later maturing varieties are less likely to experience freeze damage in March, but are more subject to hot, dry conditions during the grain filling period. The medium early varieties are at more risk from a late freeze, but will likely experience more favorable weather conditions during the grain filling period.

Our research over the past 31 years has shown the optimum planting date in Northeast Texas to be the last few days in October through the first week in November. Planting prior to October 25 is not advisable, as it exposes the crop to more potential damage to the Hessian fly, foliar plant diseases, and freeze injury in the spring.

Early maturing varieties are a fit for late planting (after November 15), but are more likely to suffer freeze injury when planted at the normal time. Earlier maturing varieties are better forage producers than later maturing ones, and can be planted earlier if they are grazed. An effective grazing program will delay their maturity.

A Comparison of Selected SRWW and HRWWs in the Northern Texas Blacklands

Table 6: Summary – Average Yield of Selected Hard and Soft Red Winter Wheat Varieties in Leonard, Royse City, and Howe, Texas 2014

Variety	Leonard Yield Bu/A	Royse City Yield Bu/A	Howe Yield Bu/A	3 Location Average
Pioneer 25R30	120.2a	105.5ab	94.2a	106.6
Terral TV 8861	112.6bc	109.1a	86.3abc	102.7
Pioneer 25R40	111.3bc	103.7ab	89.2ab	101.4
Terral TV 8525	116.4ab	94.4cd	89.2ab	100.0
Syngenta Harrison	106.1cd	94.6cd	89.4ab	96.7
Syngenta Coker 9553	110.9bc	98.8bc	76.0def	95.2
USG 3555	104.4cde	102.4ab	73.1efg	93.3
USG 3120	104.8cde	90.3d	82.6bcd	92.6
WB4458 (<i>HRWW</i>)	99.1def	90.4d	73.3efg	87.6
Iba (<i>HRWW</i>)	96.3efg	78.3e	79.5cde	84.7
Gallagher (<i>HRWW</i>)	92.0fg	72.8e	76.3def	80.4
Armour (<i>HRWW</i>)	88.1g	76.3e	71.8efg	78.7
AGS 2035	77.9h	89.5d	66.3g	77.9
Billings (<i>HRWW</i>)	88.2g	75.1e	65.9g	76.4
TAM 305 (<i>HRWW</i>)	91.8fg	67.3f	67.7fg	75.6
Cedar (<i>HRWW</i>)	99.1def	54.0g	70.0efg	74.4
Grand Mean	101.2	87.7	78.2	

A Comparison of Selected SRWW and HRWWs in the Northern Texas Blacklands

Table 7: Summary – Average Bushel Weight of Selected Hard and Soft Red Winter Wheat Varieties in Leonard, Royse City, and Howe, Texas 2014

Variety	Leonard Lb/Bu	Royse City Lb/Bu	Howe Lb/Bu	3 Location Average
Iba (<i>HRWW</i>)	61.9a	60.8a	63.8a	62.2
WB 4458 (<i>HRWW</i>)	60.9b	60.8a	62.1bc	61.3
Billings (<i>HRWW</i>)	60.6bc	60.5a	62.9b	61.3
Gallagher (<i>HRWW</i>)	60.1bc	60.6a	62.7bc	61.1
Syngenta Coker 9553	60.2bc	60.3ab	61.9bc	60.8
Pioneer 25R30	60.0c	59.3abc	61.7bc	60.3
USG 3120	59.8c	59.0abcd	62.2bc	60.3
TAM 305 (<i>HRWW</i>)	60.0c	58.9abcd	61.5c	60.1
Cedar (<i>HRWW</i>)	59.9c	57.5cde	62.2bc	59.9
Terral TV 8525	59.7c	58.1bcd	61.7bc	59.8
Terral TV 8861	58.5d	58.2bcd	60.6d	59.1
AGS 2035	57.9def	59.3abcd	59.8d	59.0
Armour (<i>HRWW</i>)	58.2de	58.2bcd	60.1d	58.8
Pioneer 25R40	58.2de	57.2cde	59.6d	58.3
USG 3555	57.6ef	57.0de	58.4e	57.7
Syngenta Harrison	57.2f	55.7e	58.6e	57.2
Grand Mean	59.4	58.8	61.2	

Table 8: Summary – Other Agronomic Characteristics of Selected HRWW and SRWW Varieties, Royse City, Texas. 2014

Variety	Lodging Rating at Harvest (Angle to Ground ⁰)	Plant Height (Inches)	Head Type
USG 3120	80.8a	31.2b	Awed
USG 3555	78.3a	27.2e	Semi-Awed
AGS 2035	78.3a	30.6bc	Awed
Syngenta Coker 9553	71.7ab	31.0b	Awed
Pioneer 25R30	68.3ab	30.0bcd	Awed
Terral TV 8525	68.3ab	30.7bc	Awed
Terral TV 8861	68.3ab	30.0bcd	Awed
WB 4458 (<i>HRWW</i>)	68.3ab	32.8a	Awed
Syngenta Harrison	65.0ab	29.3bcd	Awed
Pioneer 25R40	57.5bc	28.7cde	Awed
Iba (<i>HRWW</i>)	48.3cd	30.5bc	Awed
Armour (<i>HRWW</i>)	46.7cd	27.5e	Awed
TAM 305 (<i>HRWW</i>)	40.8de	28.9cde	Awed
Gallagher(<i>HRWW</i>)	37.5de	29.7bcd	Awed
Billings (<i>HRWW</i>)	32.5de	28.2de	Awed
Cedar (<i>HRWW</i>)	26.7e	27.3e	Awed
Grand Mean	58.6		

HRWW vs. SRWW Highlight Summary

- The Howe location was planted on November 4 and harvested on June 11. The Leonard location was planted on November 13 and harvested on June 24. The Royse City location was planted on November 19 and harvested on June 19.
- AGS 2035 was severely damaged by the freezing conditions during the first week of March, and significant plant and tiller loss was recorded. USG 3120 also sustained some freeze damage during that period, but recovered to produce normal yields. Both are very early maturing varieties that should not be planted before mid to late November.
- Leaf rust and stripe rust infection levels were very low across the region.
- The SRWWs produced an average of 13.7 more bushels per acre than the HRWWs at Leonard. The SRWWs produced an average of 25.3 more bushels per acre than the HRWWs at Royse City; The SRWWs produced an average of 10.8 more bushels per acre than the HRWWs at Howe.
- HRWW bushel weights averaged 1.5 pounds heavier than SRWWs
- Straw strength in SRWWs was significantly better than HRWWs in Royse City and Leonard. There was no significant lodging recorded at the Howe location. Lodging issues continue to be the major limitation to the adoption of HRWWs in this region.