

2014-2015 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.

2014-2015 in Review

The 2014-2015 growing season was atypical for the production of soft red winter wheat in the Northern Texas Blacklands. Although most of the commercial wheat crop was planted in a timely manner from mid-October to mid-November, cold, wet conditions late in the growing season slowed growth, and wheat plants did not tiller well. Colder than normal January and February temperatures further slowed plant growth going into March as did the extremely wet spring. The growing conditions for April and May were extremely wet and required the aerial application of fungicides to control rust. Most of the growers produced very low yields averaging 30 - 40 bushels per acre where they did not spray a fungicide, and 50 – 60 bushels where they sprayed a fungicide.

Leaf and stripe rust pressure was very high across the region, and susceptible varieties sustained significant losses from these pathogens. Stripe rust arrived early and had a significant impact on a few varieties. Consequently, yield increases with a foliar fungicide were significant.

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 2014-2015, 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, 2015

Variety	Yield (Bu/A)	Test Weight (Lb/Bu)	Plant Height (inches)	Stripe Rust Infection (%)	Leaf Rust Infection (%)
Terral LA 754	55.9 a	55.5 abcd	37.5 a	0.0 a	0.0 a
Terral LA 841	53.9 a	56.1 abc	35.3 c	0.0 a	0.0 a
USG 3120	51.5 ab	56.8 ab	37.2 ab	12.2 a	0.5 a
Syngenta Coker 9553	48.0 abc	57.5 a	35.8 bc	0.0 a	12.5 abc
USG 3201	44.0 bcd	54.5 abcde	33.8 d	0.3 a	30.8 cde
Syngenta Oakes	43.8 bcd	55.2 abcd	36.1 abc	0.3 a	8.3 ab
Dyna-Gro 9012	40.2 cde	52.2 defgh	33.8 d	0.0 a	35.8 def
USG 3555	39.9 cde	52.1 defgh	30.7 e	0.0 a	18.3 abcd
Syngenta Experimental B08-91993	37.0 def	52.5 defgh	37.0 ab	0.2 a	16.7 abcd
Pioneer 25R40	36.4 def	55.2 abcd	32.3 d	39.2 b	6.8 ab
Dyna-Gro 9171	35.6 def	50.9 fgh	33.0 d	0.0 a	34.2 def
USG 3209	35.4 def	54.0 bcdef	32.4 d	0.0 a	55.0 f
Pioneer 25R50	33.7 defg	53.0 cdefg	32.3 d	39.2 b	2.7 a
USG 3404	31.4 efgh	52.3 defgh	35.7 bc	0.0 a	25.0 bcd
Syngenta SY Harrison	28.2 fgh	49.5 gh	33.8 d	0.0 a	51.7 ef
Terral TV 8848	27.0 fgh	49.4 h	35.3 c	0.0 a	49.2 ef
Terral TV 8525	26.3 fgh	52.4 defgh	33.5 d	0.2 a	50.0 ef
Syngenta Magnolia	24.9 gh	49.9 gh	35.7 bc	0.0 a	83.3 g
Terral TV 8861	22.6 h	51.3 efgh	33.5 d	0.0 a	53.3 f
Mean	37.7	53.2	34.5	4.8	28.1

Table 2: Summary – Performance of Selected Soft Red Winter Wheat Varieties in Royse City, Texas. 2015

Variety	Yield (Bu/A)	Test Weight (Lb/Bu)	Lodging – Angle to Ground (degrees)	Stripe Rust Infection (%)	Leaf Rust Infection (%)
Syngenta Oakes	61.6 a	61.8 a	60.0 de	0.0 a	22.5 b
Dyna-Gro 9012	59.1 ab	60.4 abcd	75.0 abc	0.0 a	48.8 c
Syngenta Experimental B08-91993	58.9 abc	59.3 bcdef	56.7 e	0.0 a	65.0 cde
USG 3201	57.4 abcd	60.4 abcd	70.0 abcde	0.0 a	52.5 cd
Dyna-Gro 9171	57.3 abcd	57.6 efgh	73.3 abcd	0.0 a	72.5 def
Syngenta Coker 9553	57.0 abcd	61.8 a	76.7 ab	0.0 a	10.0 ab
Terral LA 754	56.2 abcd	60.4 abcd	65.0 bcde	0.3 a	0.0 a
USG 3404	55.9 abcd	57.3 fgh	71.7 abcd	0.0 a	65.0 cde
Pioneer 25R40	55.4 abcd	60.7 ab	70.0 abcde	26.3 c	76.3 ef
Terral LA 841	53.1 abcde	58.2 defg	70.0 abcde	0.0 a	0.3 a
Terral TV 8848	51.6 bcde	56.5 ghi	63.3 cde	0.0 a	72.5 def
Pioneer 25R50	51.3 bcde	58.6 bcdefg	60.0 de	15.3 b	16.3 ab
USG 3120	51.0 bcde	60.6 abc	70.0 abcde	17.5 b	0.0 a
Syngenta Magnolia	50.6 bcde	58.3 cdefg	80.0 a	0.0 a	93.8 f
Terral TV 8861	49.6 bcde	57.2 fghi	61.7 de	0.0 a	83.8 ef
Syngenta SY Harrison	49.2 cde	55.7 hi	60.0 de	0.0 a	85.0 ef
Terral TV 8525	48.8 de	59.7 abcde	46.7 f	2.5 a	82.5 ef
USG 3555	44.2 e	55.7 hi	45.0 f	0.0 a	53.8 cd
USG 3209	34.1 f	55.2 i	30.0 g	0.0 a	88.8 ef
Mean	52.8	58.7	63.4	3.3	52.1

Table 3: Summary – Mean Performance of Selected Soft Red Winter Wheat Varieties in Two locations (Leonard and Royse City, Texas. 2015)

Variety	Yield Bu/A	Test Weight Lb/Bu
Terral LA 754	56.1	58.0
Terral LA 841	53.5	57.2
Syngenta Oakes	52.7	58.5
Syngenta Coker 9553	52.5	59.7
USG 3120	51.3	58.7
USG 3201	50.7	57.5
Dyna-Gro 9012	49.7	56.3
Syngenta Experimental B08-91993	48.0	55.9
Dyna-Gro 9171	46.5	54.3
Pioneer 25R40	45.9	58.0
USG 3404	43.7	54.8
Pioneer 25R50	42.5	55.8
USG 3555	42.1	53.9
Terral TV 8848	39.3	53.0
Syngenta SY Harrison	38.7	52.6
Syngenta Magnolia	37.8	54.1
Terral TV 8525	37.6	56.1
Terral TV 8861	36.1	54.3
USG 3209	34.8	54.6
Grand Mean	45.2	56.0

2015 SRWW Highlight Summary

- The Leonard location was planted on October 29 and harvested on June 5. The Royse City location was planted on November 13 and harvested on June 12.
- The earlier maturing varieties performed best, as they were able to mature ahead of the heavy leaf rust and glume blotch infections that came later.
- Terral LA 754 was the top yielder in the Leonard location and Syngenta Oakes was the top yielder in the Royse City location.
- Syngenta Coker 9553 had the highest bushel weight in both locations.
- Stripe Rust (*Puccinia striiformis*) infected wheat in the region early and moderate infection levels were observed in Pioneer 25R40, Pioneer 25R50 and USG 3120 in both locations.
- Leaf rust (*Puccinia recondita*) infection levels were very high in both locations, severely affecting bushel weight and yield.
- Wet conditions throughout the growing season greatly impacted yield and bushel weight in both locations, as these conditions promoted foliar plant disease development in the spring (stripe rust, leaf rust, and glume blotch).

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 performing varieties over a two year period (2014-2015) and the top eight over a three year period (2013, 2014, and 2015).

Table 4: Two Year Summary – Yield (Bushels/Acre) of the Top Ten Soft Red Winter Wheat Varieties in Northeast Texas. 2014 (Leonard and Royse City) and 2015 (Leonard and Royse City)

Varieties	Mean
USG 3201	81.3
Dyna-Gro 9012	79.5
Syngenta Coker 9553	78.5
Dyna-Gro 9171	75.5
Pioneer 25R40	74.4
USG 3120	73.9
USG 3555	71.4
Terral TV 8848	70.3
Terral TV 8861	70.2
Terral TV 8525	69.8

Table 5: Three Year Summary – Yield (Bushels/Acre) of the Top Eight Soft Red Winter Wheat Varieties in Northeast Texas. 2013 (Bailey), 2014 (Leonard and Royse City), 2015 (Leonard and Royse City)

Varieties	Mean
Syngenta Coker 9553	82.1
USG 3120	79.8
USG 3201	78.3
USG 3555	75.4
Pioneer 25R40	71.5
Terral TV 8525	69.0
Terral TV 8848	68.7
Terral TV 8861	67.1

Note:

USG 3120 was among the highest yielding varieties in the past four years, but it is the earliest maturing variety we have evaluated in a number of years. If planted at our normal time (late October-early November), it is more likely to experience freeze damage than any of the other varieties being grown in this region.

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	Early
USG 3555 Syngenta Coker 9553 Syngenta Magnolia	Medium
Syngenta Oakes Terral TV 8525 Dyna-Gro 9012 Dyna-Gro 9171	Medium Late
Pioneer 25R30 Pioneer 25R40 Terral TV 8861 USG 3201	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 2015

Variety	Leonard Yield Bu/A	Royse City Yield Bu/A	Howe Yield Bu/A	3 Location Average
Syngenta Coker 9553	44.9 abc	60.5 a	43.5 a	49.6
USG 3120	51.0 a	46.0 cd	43.0 a	46.7
USG 3201	46.9 ab	57.9 ab	32.4 bcd	45.7
Syngenta SY Monument (<i>HRWW</i>)	44.6 abc	46.2 cd	38.1 ab	43.0
Pioneer 25R40	38.8 cde	48.3 cd	35.0 abc	40.7
Gallagher (<i>HRWW</i>)	34.0 def	45.3 cd	38.6 ab	39.3
Monsanto WB-Cedar (<i>HRWW</i>)	42.9 bc	38.5 de	34.5 abcd	38.6
Iba (<i>HRWW</i>)	34.3 def	42.9 cde	36.1 abc	37.8
Pioneer 25R50	39.3 cd	40.5 de	25.7 def	35.2
Terral TV 8861	25.9 gh	53.4 abc	25.5 def	34.9
TAM 305 (<i>HRWW</i>)	31.1 fg	39.3 de	30.7 bcdef	33.7
Syngenta SY Harrison	30.3 fg	44.8 cd	22.8 efg	32.6
Syngenta Greer (<i>HRWW</i>)	32.4 defg	42.2 cde	21.8 fg	32.1
Ruby Lee (<i>HRWW</i>)	33.9 def	29.3 f	31.2 bcde	31.5
Monsanto WB-Redhawk (<i>HRWW</i>)	31.7 efg	33.3 ef	27.2 cdef	30.7
Terral TV 8525	23.2 h	50.5 bcd	15.8 gh	29.8
TAM 114 (<i>HRWW</i>)	14.8 i	40.7 de	11.1 h	22.2
Grand Mean	35.3	44.7	30.2	

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 2015

Variety	Leonard Lb/Bu	Royse City Lb/Bu	Howe Lb/Bu	3 Location Average
Syngenta Coker 9553	57.5 a	61.2 a	54.3 a	57.7
USG 3120	57.6 a	57.5 bcd	52.5 bc	55.8
Iba (<i>HRWW</i>)	56.4 ab	58.2 bc	52.7 b	55.8
Syngenta SY Monument (<i>HRWW</i>)	55.1 bc	58.0 bc	50.8 bcd	54.6
Gallagher (<i>HRWW</i>)	54.1 bcd	58.6 bc	51.1 bcd	54.6
Pioneer 25R40	55.4 bc	58.4 bc	49.6 d	54.5
USG 3201	54.5 bcd	59.4 ab	47.6 e	53.8
Ruby Lee (<i>HRWW</i>)	55.5 bc	55.0 de	50.4 cd	53.6
TAM 305 (<i>HRWW</i>)	52.3 de	57.2 bcd	50.7 bcd	53.4
Monsanto WB-Cedar (<i>HRWW</i>)	54.3 bcd	55.9 cde	49.6 d	53.3
Monsanto WB-Redhawk (<i>HRWW</i>)	53.8 cd	53.9 e	52.3 bc	53.3
Pioneer 25R50	53.3 cde	54.2 e	45.8 f	51.1
Terral TV 8525	51.3 e	57.4 bcd	43.7 g	50.8
Terral TV 8861	52.2 de	56.2 cde	44.1 g	50.8
TAM 114 (<i>HRWW</i>)	48.9 f	56.5 bcde	42.1 g	49.2
Syngenta Greer (<i>HRWW</i>)	49.3 f	53.9 e	44.1 g	49.1
Syngenta SY Harrison	48.8 f	54.2 e	42.8 g	48.6
Grand Mean	53.5	56.8	48.5	

Table 8: Summary – Other Agronomic Characteristics of Selected HRWW and SRWW Varieties, Leonard, Texas. 2015

Variety	Leaf Rust Infection (%)	Stripe Rust Infection (%)	Plant Height (Inches)	Head Type
Syngenta SY Monument (<i>HRWW</i>)	0.0 a	0.0 a	35.2 bc	Awned
TAM 305 (<i>HRWW</i>)	0.0 a	0.0 a	33.0 de	Awned
Gallagher (<i>HRWW</i>)	0.0 a	0.0 a	33.7 cde	Awned
Ruby Lee (<i>HRWW</i>)	0.0 a	78.3 c	37.7 a	Awned
Monsanto WB-Redhawk (<i>HRWW</i>)	0.0 a	50.8 b	34.7 bcd	Awned
Iba (<i>HRWW</i>)	0.3 a	8.3 a	34.7 bcd	Awned
USG 3120	0.5 a	12.2 a	37.2 a	Awned
Pioneer 25R50	2.7 a	39.2 b	32.3 e	Awnless
Monsanto WB-Cedar (<i>HRWW</i>)	4.7 a	13.3 a	33.3 cde	Awned
Pioneer 25R40	6.8 a	39.2 b	32.3 e	Awned
Syngenta Coker 9553	12.5 a	0.0 a	35.8 b	Awned
Syngenta Greer (<i>HRWW</i>)	15.8 a	0.0 a	34.0 bcde	Awned
USG 3201	30.8 b	0.3 a	33.8 cde	Awned
TAM 114 (<i>HRWW</i>)	48.3 c	0.0 a	37.3 a	Awned
Terral TV 8525	50.0 c	0.2 a	33.5 cde	Awned
Syngenta SY Harrison	51.7 c	0.0 a	33.8 cde	Awned
Terral TV 8861	53.3 c	0.0 a	33.5 cde	Awned
Grand Mean	16.3	14.2	34.5	

Table 9: Summary – Other Agronomic Characteristics of Selected HRWW and SRWW Varieties, Royse City, Texas. 2015

Variety	Leaf Rust Infection (%)	Stripe Rust Infection (%)	Lodging (Angle to Ground)
USG 3120	0.0 a	17.5 bc	63.3 ab
Syngenta SY Monument (<i>HRWW</i>)	0.0 a	0.0 a	56.7 abcd
TAM 305 (<i>HRWW</i>)	0.0 a	1.0 a	55.0 abcde
Gallagher (<i>HRWW</i>)	0.0 a	0.0 a	55.0 abcde
Ruby Lee (<i>HRWW</i>)	0.0 a	100.0 e	43.3 cde
Monsanto WB-Redhawk (<i>HRWW</i>)	0.0 a	100.0 e	40.0 de
Iba (<i>HRWW</i>)	0.3 a	1.8 a	55.0 abcde
Syngenta Coker 9553	10.0 ab	0.0 a	70.0 a
Pioneer 25R50	16.3 b	15.3 b	51.7 bcde
Monsanto WB-Cedar (<i>HRWW</i>)	17.5 b	67.5 d	38.3 e
Syngenta Greer (<i>HRWW</i>)	28.8 c	0.0 a	51.7 bcde
USG 3201	52.5 d	0.0 a	66.7 ab
Pioneer 25R40	76.3 e	26.3 c	61.7 ab
TAM 114 (<i>HRWW</i>)	80.0 e	0.0 a	50.0 bcde
Terral TV 8525	82.5 e	2.5 a	50.0 bcde
Terral TV 8861	83.8 e	0.0 a	63.3 ab
Syngenta SY Harrison	85.0 e	0.0 a	60.0 abc
Grand Mean	31.3	19.5	54.8

Table 10: Summary – Other Agronomic Characteristics of Selected HRWW and SRWW Varieties, Howe, Texas. 2015

Variety	Leaf Rust Infection (%)	Stripe Rust Infection (%)	Lodging (Angle to Ground)
USG 3120	0.0 a	37.5 c	70.0 abcde
Syngenta SY Monument (<i>HRWW</i>)	0.0 a	0.0 a	80.8 a
TAM 305 (<i>HRWW</i>)	0.0 a	0.0 a	60.0 de
Ruby Lee (<i>HRWW</i>)	0.0 a	86.3 d	75.0 abc
Monsanto WB-Redhawk (<i>HRWW</i>)	0.0 a	100.0 e	56.7 e
Gallagher (<i>HRWW</i>)	2.8 a	0.0 a	65.0 bcde
Iba (<i>HRWW</i>)	5.0 a	17.5 b	63.3 cde
Pioneer 25R50	28.8 b	47.5 c	81.7 a
Pioneer 25R40	32.8 b	45.0 c	78.3 ab
Syngenta Coker 9553	37.5 bc	0.0 a	68.3 abcde
Monsanto WB-Cedar (<i>HRWW</i>)	50.0 c	40.0 c	61.7 cde
USG 3201	65.0 d	0.0 a	80.8 a
Syngenta Greer (<i>HRWW</i>)	80.0 e	0.0 a	66.7 bcde
Terral TV 8861	82.5 e	0.0 a	68.3 abcde
Terral TV 8525	87.5 e	0.0 a	71.7 abcd
Syngenta SY Harrison	87.5 e	0.0 a	75.0 abc
TAM 114 (<i>HRWW</i>)	90.0 e	0.0 a	78.3 ab
Grand Mean	38.2	22.0	70.7

HRWW vs. SRWW Highlight Summary

- The Leonard location was planted on October 29 and harvested on June 5. The Howe location was planted on October 30 and harvested on June 10. The Royse City location was planted on November 13 and harvested on June 12.
- Leaf rust (*Puccinia recondita*) infection levels were very high in all locations, severely affecting bushel weight and yield.
- Stripe Rust (*Puccinia striiformis*) infected the crop early, and moderate infection levels were observed in all locations.
- Syngenta Coker 9553 was the top yielder across all locations, and also had the highest bushel weights.
- The SRWWs produced an average of 4.2 more bushels per acre than the HRWWs at Leonard. The SRWWs produced an average of 10.5 more bushels per acre than the HRWWs at Royse City; The SRWWs produced an average of 0.6 more bushels per acre than the HRWWs at Howe.
- HRWW bushel weights were comparable to that of the SRWWs.
- Straw strength in SRWWs and HRWWs were similar in Howe with some significant differences among the varieties. Lodging in the Royse City location was more predominant with significant differences between varieties. There was no significant lodging recorded at the Leonard location. Lodging issues continue to be the major limitation to the adoption of HRWWs in this region.