Tam 304 New Release 09/16/08 10:03:34

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Plant Materials Release Proposal

Date: October 11, 2006

1. Crop: Wheat Type of Release: Cultivar
2. Proposed Name(s) or Identification(s): TAM 304
3. Designation or Name in developmental Stages: TX01D3232
4. Primary features or advantages:
   Texas Blacklands and South Central Texas adaptation
   Excellent grain yield
   Short stature and strong straw
   Good bread-making quality
   Leaf rust resistant
5. Plant Variety Protection: Yes X No ___ Undecided _____
6. Seed available and date:
   Foundation seed will be produced by TFSS for distribution fall 2007.
7. Proposed Seed Distribution:
   To TFSS for increase and distribution Fall 2007, small samples distributed by
   Breeder _____ TFSS Yes Exclusive Yes
   (1) Royalty Yes
8. Provisions: TLO .
9. Suggested Fees: _____
10. Supportive Documents:
    a. Release Proposal
    b. Registration Article to Crop Science
    c. Objective description
11. Submitted:

Breeder/Date Unit Head/Date

_____ _____

_____ Original signed by _____

Proposal to Release TX01D3232 as **TAM 304** Hard Red Winter Wheat

Jackie Rudd, Ravindra Devkota, David Marshall, Russell Sutton, Jason Baker, Gary Peterson, Rex Herrington, Lloyd Rooney, Lloyd Nelson, Gaylon Morgan, Allan Fritz, Charles Erickson, and Brad Seabourn

Introduction

TX01D3232 is an awned, semi-dwarf, hard red winter wheat (*Triticum aestivum* L.) with white chaff. It is adapted to all wheat growing areas in Texas, but has shown particularly exceptional performance in grain only systems of the Blacklands and South Central areas of Texas (map of districts can be found at http://www.nass.usda.gov/Statistics_by_State/Texas/Charts_&_Maps/distmap2.htm). TX01D3232 is a medium-early maturing wheat with excellent grain yield potential, short stature, strong straw, resistance to shattering, and good hard red winter wheat quality. It is resistant to leaf rust (caused by *Puccinia triticina* Eriks.) and is moderately susceptible to stripe rust (caused by *Puccinia striiformis* Westend). Authorized seed classes of TX01D3232 in the U.S. will be Breeder, Foundation, Registered, and Certified. An application for Plant Variety Protection will be made.

Breeding History

TX01D3232 is an F_4 derived line from the cross TX92U3060/TX91D6564 (=X95U104-P66). Charles Erickson, TAES-College Station, made the cross during the winter of 1994-95. The pedigree of TX92U3060 is WO541A/W2440//W2407/'Arkan' and the pedigree of TX91D6564 is TX85V1326/TX86D1312. The F_3 generation was grown as a bulk population on the Texas Agricultural Experiment Station (TAES) farm at

McGregor in 1998 (year of harvest). In the fall of 1998, seed of the F_4 bulk was shared with the TAES wheat breeding programs of other parts of the state, including TAES-Dallas. Random heads were harvested from the F_4 population being grown at Dallas and these were planted as head-rows at the TAES-Prosper research farm in the fall of 1999. The line that became TX01D3232 was visually selected for its agronomic characteristics and was grown as a single plot in 2001 and in replicated trials thereafter. The selection criteria were foliar disease resistance, grain yield, and end-use quality. TX01D3232 was tested in the Texas Uniform Advanced 1 (UA1) in 2002 and in The Texas Elite trial (TXE) in 2003 and 2004. It was tested in the Southern Regional Performance Nursery (SRPN) in 2004 and 2005, and the Texas Uniform Variety Trial (UVT) in 2005 and 2006. Seed increase started in the fall of 2003 by planting 36 head-rows in Yuma, Arizona. These were visually evaluated for uniformity and 2 were eliminated because they were 6 inches taller. The remaining 34 rows were harvested in bulk. This seed was used to plant one acre in the fall of 2004 and this harvest was used to plant 20 acres in 2005. Plant uniformity was excellent in both years. A variant 4 to 6 inches taller than the other plants may occur at a low percentage (less than 0.01%) in future seed increase generations. Texas Foundation Seed Service will be producing Foundation seed during the 2006-2007 growing season.

Grain Yield

Performance trial data for 5 wheat production regions of Texas are presented in Tables 1-5. Four years (2003-2006) of grain yield at individual location-years and a 4-year summary are on each table. The 5 cultivars that were tested in all 4 years of trials are included in the tables. A brief description of these 5 cultivars follows:

TAM 110 (TAES, 1996) is considered an excellent High Plains dryland cultivar.
TAM 111 (TAES, 2002) has shown exceptional yield on both irrigated and dryland trials on the High Plains and Rolling Plains.
Cutter (Agripro, 2001) has a wide adaptation and is a popular dual purpose cultivar in the Rolling Plains.
Jagger (Kansas AES, 1994) has a wide adaptation and has been considered the end-use quality standard in Kansas.
Ogallala (Agripro, 1992) has a wide adaptation and is still grown some in the Blacklands and South Central regions of Texas.

Performance data of TX01D3232 compared to other wheat cultivars can be found in the complete data sets for the 40 entry UVT trials of 2005 and 2006 (http://varietytesting.tamu.edu/wheat/index.htm).

Across multiple locations and 4 years, TX01D3232 was one of the highest yielding entries in High Plains Irrigated (Table 1), Rolling Plains (Table 3), Blacklands (Table 4), and South Central Texas (Table 5). It was average yielding in High Plains Dryland trials (Table 2). The data from individual locations indicates that in comparison to currently grown cultivars, TX01D3232 performs best under adequate rainfall or irrigation and does not perform as well under extended drought. It performs exceptionally well under foliar disease pressure, such as the Blacklands and South Central Texas. Across 10 location-years in the Blacklands and 11 location-years in South Central Texas, the grain yield of TX01D3232 was 7 and 4 bu/a, respectively, higher yielding than the highest yielding check cultivar. TX01D3232 appears to have a wide area of adaptation. The SRPN represents 9 states throughout the Great Plains. TX01D3232 ranked 5th/50 entries across 33 locations in 2004 (Table 8) and 11th/48 entries across 36 locations in 2005 (Table 9).

The 2003, 2004, and 2005 yield trials at Claude were grazed until late February and the 2003 trial at Chillicothe was clipped in mid February to simulate grazing. The

grain yield for these four location-years indicates that TX01D3232 withstands grazing as well as the check cultivars, and can be used in a dual-purpose (grazing plus grain) system.

Test Weight

Compared to the check cultivars, the test weight of TX01D3232 was similar at the Blacklands and South Central Texas locations (Tables 4 and 5), 1 lb/bu lower at High Plains irrigated and Rolling Plains locations (Tables 1 and 3), and 2 lb/bu lower than the check cultivars at High Plains Dryland locations (Table 2). This corresponds with the grain yield data, indicating that relative performance is best under foliar disease pressure and lowest under drought stress.

Forage Yield

Forage trials were conducted at Overton in 2004-2006 and at McGregor and Olney in 2006 (Table 6). The data was somewhat variable, but generally indicates that the forage production is similar to other currently grown wheat cultivars.

Agronomic data

In Texas, TX01D3232 is early to head (similar to Jagger and TAM 110), and short in stature (similar to Ogallala) (Tables 1-4). It was among the earliest to head and one of the shortest wheats at most locations where these measurements were taken (data not presented). Data from the SRPN confirm that TX01D3232 is medium-early maturity and short in height (Tables 8 and 9). Significant lodging and shattering occurred at 3 of the 15 location-years in the High Plains Irrigated trials and TX01D3232 was equal to or better than the check cultivars (Table 1). We normally get an estimate of winter hardiness from northern state participants in the SRPN, but no differential winter-kill was reported

in either 2004 or 2005. We did not observe any winter injury on TX01D3232 or on any of the check cultivars during the 4 years of yield trials in Texas.

Disease Resistance

TX01D3232 has excellent leaf rust resistance (Tables 4, 5, and 10), is moderately susceptible to stripe rust (Tables 4 and 5), and has resistance to the most prevalent stem rust race (TPMK), but is susceptible to some races of stem rust (Table 10). Green leaf scores were taken at many of the trial locations where foliar diseases were causing differential injury. Although the causal pathogen or pathogens were not identified, TX01D3232 generally scored among the least damaged cultivars (data not presented).

Quality

Throughout the 4 years of testing, protein content of TX01D3232 was generally average (similar to TAM 111), kernel size was small (similar to Jagger and Ogallala) and test-weight was medium-low (similar to Jagger and TAM 110) (Tables 1-5). The mixograph and baking data presented for Texas trials (Table 7) and SRPN trials (Tables 11-12) indicate that TX01D3232 has good baking quality. It is strong mixing, has good mixing tolerance, and generally has good loaf volume.

Summary

TX01D3232 is a medium-early maturing hard red winter wheat with excellent grain yield potential, short stature, strong straw, resistance to shattering, and good hard red winter wheat quality. It has a good yield record across a wide range of environments, but is particularly well suited for grain only systems in the warmer and more humid wheat growing areas of Texas. It is resistant to leaf rust and is moderately susceptible to stripe rust.

Release proposal for TX01D3232

Data Table Contents

Table 1. **High Plains Irrigated** data from 2003 through 2006. 2003 and 2004 data is from the TXE. 2005 and 2006 data is from the UVT (complete dataset is available at <http://varietytesting.tamu.edu/wheat/index.htm>).

----------Grain Yield (bu/a)----------															
	2003	2004		2005						2006					
NAME	Bushland	Bushland	Etter	Bushland	Etter	Dalhart	Dimmitt	Perryton	Clovis	Bushland	Etter	Dalhart	Dimmitt	Perryton	Clovis
TX01D3232	91	116	81	41	81	103	65	81	96	85	37	89	99	62	82
TAM 110	73	98	80	36	67	105	56	61	68	78	36	85	97	58	90
TAM 111	90	113	73	80	77	120	82	95	64	73	36	87	105	56	94
Cutter	86	90	54	57	77	113	58	75	53	67	39	80	104	53	68
Jagger	76	93	59	60	78	107	57	85	52	72	37	76	85	61	86
Ogallala	84	96	55	41	68	103	57	81	68	64	35	78	92	56	75
Mean	85.7	100.8	68.3	40.1	64.4	101.3	56.2	71.0	67.3	72.9	37.4	79.1	95.1	52.7	78.7
CV	3.5	6.9	7.8	8.2	12.7	6.0	12.4	7.2	15.5	8.1	8.9	7.6	11.7	7.0	11.3
LSD(5%)	4.9	11.3	8.7	5.3	11.5	9.8	11.3	8.3	17.0	9.5	5.4	9.8	22.5	6.0	14.4

High Plains Irrigated data from 2003 through 2006 Across Locations and Years								
	Grain Yield	Test Weight	Kernal Weight	Flour Protein (14%mb)	Heading	Height	Shattering	Lodging
	bu/a	lb/bu	mg	%	doy	cm	%	%
TX01D3232	80.5	59.5	29.3	12.9	119.5	73.4	5.8	10.0
TAM 110	72.5	59.6	31.5	12.4	118.3	78.4	0.0	15.0
TAM 111	82.9	61.3	32.5	12.9	122.1	85.0	6.7	10.0
Cutter	71.6	61.4	32.6	13.3	122.2	85.3	21.1	13.3
Jagger	72.2	59.6	29.9	13.7	119.2	82.1	12.2	16.7
Ogallala	70.3	61.7	27.1	13.7	122.0	75.6	17.8	10.0
Mean	75.0	60.5	30.5	13.1	120.5	80.0	10.6	12.5
CV	14.0	3.2	5.2	5.0	1.3	12.7		
LSD(5%)	4.8	1.3	1.9	0.9	1.1	7.1		
location-years	15	11	6	5	5	6	3	3

Proposal to release TX01D3232 as TAM 304.

Table 2. **High Plains Dryland** data from 2003 through 2006. 2003 and 2004 data is from the TXE. 2005 and 2006 data is from the UVT (complete dataset is available at <http://varietytesting.tamu.edu/wheat/index.htm>).

----------Grain Yield (bu/a)----------													
	2003	2004			2005						2006		
NAME	Claude	Bushland	Etter	Claude	Etter	Claude	Hereford	Canadian	Perryton	Clovis	Bushland	Claude	Clovis
TX01D3232	29	37	20	25	49	40	29	45	46	58	15	30	14
TAM 110	25	55	30	22	52	28	25	28	46	48	18	31	22
TAM 111	23	38	29	23	34	47	44	64	57	56	20	31	23
Cutter	27	37	34	27	46	44	41	56	51	52	21	31	17
Jagger	29	39	32	25	52	45	35	55	58	59	20	31	17
Ogallala	22	37	27	25	37	39	37	51	43	51	16	25	15
Mean	23.3	37.6	29.1	24.6	44.7	35.7	30.4	41.4	48.1	51.5	18.6	28.8	18.7
CV	24.8	6.7		6.5	18.4	8.1	13.6	8.1	6.9	12.3	10.0	7.1	23.6
LSD(5%)	9.1	4.1	ns	2.6	8.3	4.0	6.7	5.4	5.4	10.3	3.0	3.3	7.2

High Plains Dryland data from 2003 through 2006 Across Locations and Years						
	Grain Yield	Test Weight	Kernal Weight	Flour Protein (14%mb)	Heading	Height
	bu/a	lb/bu	mg	%	doy	cm
TX01D3232	33.7	55.1	22.0	15.3	117.8	54.0
TAM 110	33.0	56.2	26.3	14.5	117.2	55.9
TAM 111	37.6	58.1	24.9	14.9	121.0	61.1
Cutter	37.2	58.1	24.9	15.9	121.8	60.8
Jagger	38.4	56.9	23.2	15.7	118.2	61.3
Ogallala	32.8	58.5	22.2	15.8	121.8	51.3
Mean	35.4	57.2	23.9	15.3	119.6	57.4
CV	28.3	4.3	8.3	2.0	3.8	8.8
LSD(5%)	4.6	1.6	3.0	0.5	ns	3.4
location-years	13	12	4	4	4	6

Table 3. **Rolling Plains** data from 2003 through 2006. 2003 and 2004 data is from the TXE. 2005 and 2006 data is from the UVT (complete dataset is available at <http://varietytesting.tamu.edu/wheat/index.htm>).

----------Grain Yield (bu/a)----------												
	2003		2004		2005				2006			
NAME	Chillicothe	Munday	Chillicothe	Abilene	Chillicothe	Vernon	Chillicothe HG	Abilene	Chillicothe	Abilene	Lockett dry	Lockett irr
TX01D3232	51	33	59	53	51	57	34	59	20	11	26	45
TAM 110	40	30	60	51	40	20	34	35	22	13	26	50
TAM 111	51	37	54	56	54	39	33	50	18	19	23	53
Cutter	55	39	58	57	53	49	33	47	22	18	26	57
Jagger	45	39	58	59	49	43	42	52	18	11	19	46
Ogallala	48	31	53	52	52	44	33	44	13	12	14	48
Mean	45.7	32.4	56.8	53.3	44.1	36.8	31.5	42.0	19.9	15.9	22.7	48.9
CV	8.0	7.2	6.0	9.2	10.7	23.0	14.4	12.4	9.3	19.3	15.3	10.1
LSD(5%)	6.0	3.8	5.5	8.0	7.7	11.9	7.4	8.4	3.0	5.0	5.7	8.1

Rolling Plains data from 2003 through 2006 Across Locations and Years						
	Grain Yield	Test Weight	Kernal Weight	Flour Protein (14%mb)	Heading	Height
	bu/a	lb/bu	mg	%	doy	cm
TX01D3232	41.7	59.5	27.2	13.1	101.3	71.0
TAM 110	35.1	60.0	30.2	12.1	100.2	78.0
TAM 111	40.6	61.4	32.6	12.7	105.1	81.1
Cutter	42.8	61.4	30.7	13.6	105.9	81.9
Jagger	40.0	59.9	29.7	13.3	101.0	82.3
Ogallala	37.1	61.8	26.7	13.8	105.2	69.7
Mean	39.5	60.7	29.5	13.1	103.1	77.3
CV	33.9	3.0	7.0	3.1	1.0	4.6
LSD(5%)	7.0	1.7	3.1	0.6	1.4	4.8
location-years	12	10	4	4	3	3

Table 4. **Blackland** data from 2003 through 2006. 2003 and 2004 data is from the TXE. 2005 and 2006 data is from the UVT (complete dataset is available at <http://varietytesting.tamu.edu/wheat/index.htm>).

----------Grain Yield (bu/a)----------										
	2003		2004			2005			2006	
NAME	Prosper	McGregor	Prosper	Ellis Co	McGregor	Prosper	Ellis Co	McGregor	McGregor	Hillsboro
TX01D3232	55	66	60	63	50	64	66	63	51	33
TAM 110	51	52	38	50	29	43	32	41	31	19
TAM 111	54	70	55	45	35	66	54	51	37	26
Cutter	44	73	55	44	55	60	35	38	26	19
Jagger	56	64	42	45	26	45	37	36	24	20
Ogallala	54	57	54	41	37	61	52	52	29	17
Mean	51.1	58.3	54.3	50.4	44.6	59.0	51.0	48.9	40.6	27.5
CV	9.3	5.3	8.6	7.2	10.2	10.7	8.6	12.3	10.0	9.7
LSD(5%)	7.7	2.5	7.6	5.9	7.4	7.5	7.1	9.7	6.7	4.4

Blackland data from 2003 through 2006
Across Locations and Years

	Grain Yield	Test Weight	Kernal Weight	Flour Protein (14%mb)	Leaf Rust	Stripe Rust
	bu/a	lb/bu	mg	%		
TX01D3232	57.0	57.4	26.8	12.4	5R	60MS
TAM 110	38.7	55.3	24.9	11.9	80S	80S
TAM 111	49.2	58.0	26.2	12.3	60S	5R
Cutter	45.0	58.3	25.9	12.8	80S	5R
Jagger	39.5	56.3	24.4	12.8	80S	10MR
Ogallala	45.5	59.1	23.6	13.0	40MS	30MS
Mean	45.8	57.4	25.3	12.5		
CV	12.4	2.5	8.6	6.1		
LSD(5%)	3.1	1.9	ns	ns		
location-years	10	6	6	6	4	3

Field Rust sores: Percent severity in the field at soft dough stage where ‘S’ = susceptible (large pustules with little or no chlorosis; ‘MS’ = moderately susceptible (medium-size pustules typically with chlorosis; ‘MR’ = moderately resistant (small pustules typically with chlorosis or necrosis); and ‘R’ = resistant (no pustules or minute pustules with necrosis).

Table 5. **South Central Texas** data from 2003 through 2006. 2003 and 2004 data is from the TXE. 2005 and 2006 data is from the UVT (complete dataset is available at <http://varietytesting.tamu.edu/wheat/index.htm>).

----------Grain Yield (bu/a)----------											
	2003				2004		2005		2006		
NAME	Brady	College St	Luling	Uvalde	Brady	Uvalde	Brady	Uvalde	Uvalde 50PET	Uvalde 75PET	Uvalde 100PET
TX01D3232	58	67	45	38	74	55	50	72	29	38	46
TAM 110	47	43	17	34	45	24	49	22	23	20	27
TAM 111	57	56	24	43	60	38	51	44	25	26	36
Cutter	55	62	56	66	68	49	44	48	26	21	33
Jagger	56	42	28	17	56	52	43	54	26	35	37
Ogallala	54	53	38	53	64	43	44	59	21	28	40
Mean	51.6	56.5	38.8	39.5	66.1	43.7	40.1	44.8	22.7	29.7	38.2
CV	5.0	4.7	8.1	8.5	7.6	14.1	16.1	15.2	27.7	18.4	13.4
LSD(5%)	4.2	4.3	5.1	5.5	8.1	10.0	8.5	10.8	10.2	8.9	8.3

South Central Texas data from 2003 through 2006
Across Locations and Years

	Grain Yield	Test Weight	Leaf Rust	Stripe Rust
	bu/a	lb/bu		
TX01D3232	51.8	57.3	5R	50MS
TAM 110	32.0	55.3	80S	80S
TAM 111	41.7	57.8	80S	5R
Cutter	48.1	58.6	80S	5R
Jagger	40.5	57.4	80S	10MR
Ogallala	45.2	58.6	60MS	30MS
Mean	43.2	57.5		
CV	21.8	3.4		
LSD(5%)	4.7	1.7		
location-years	11	15	4	3

Field Rust sores: Percent severity in the field at soft dough stage where ‘S’ = susceptible (large pustules with little or no chlorosis; ‘MS’ = moderately susceptible (medium-size pustules typically with chlorosis; ‘MR’ = moderately resistant (small pustules typically with chlorosis or necrosis); and ‘R’ = resistant (no pustules or minute pustules with necrosis).

Table 6. **Forage yields**. Overton data was collected by Lloyd Nelson, TAES, Overton (complete dataset is available at <http://overton.tamu.edu/ryegrass/index.htm>). Olney and McGregor data was collected by Gaylon Morgan, TCE, Soil and Crop Science, TAMU (complete dataset is available at <http://varietytesting.tamu.edu/wheat/index.htm>).

	----------pounds of dry matter per acre----------				
	2004	2005	2006		
	Overton	Overton	Overton	McGregor	Olney
TX01D3232	5031	3872	4049	5346	3500
TAM 111	5548		3363	4203	3716
Sturdy 2K	5875	4022		5299	3451
Fannin				6030	3514
Cutter				3117	3049
Coker 9553			4148	5620	4190
Coker 9663	5159	3243		4738	2616
Crawford			3659	4210	2269
Mean	5703	3968	3966	4908	2916
LSD (5%)	494	568	546	1714	1080

Table 7. **Baking and mixograph data of grain harvested from the 2004 and 2005 TAES High Plains Trials**. USDA-ARS Hard Winter Wheat Quality Laboratory, Manhattan, KS.

Name	Chemical				Mixograph			Bake		
	wheat		flour		Water Absorp.	Peak time	Tolerance	Water Absorp.	Mix time	Loaf Volume
	Protein	Milling Yield	Ash	Protein						
	(%)	(%)	(%)	(%)	(%)	(min)		(%)	(min)	(cc)
2004 Bushland Irrigated										
TX01D3232	13.1	67.9	0.37	11.3	62.8	3.44	1	62.5	4.12	870
TAM W-101	13.9	66.6	0.33	12.1	63.0	2.63	2	62.2	3.38	900
TAM 110	12.9	67.0	0.36	11.0	62.2	2.09	2	60.5	2.85	910
TAM 111	13.0	67.6	0.36	11.1	62.5	2.23	1	60.4	2.86	840
Cutter	13.8	69.6	0.35	12.1	64.0	3.50	3	63.6	4.50	915
Jagger	14.6	68.5	0.40	12.7	65.0	3.38	1	62.9	3.75	920
Ogallala	14.6	67.9	0.37	12.9	65.5	2.88	0	60.4	3.50	970
2005 Etter Irrigated										
TX01D3232	14.2	68.3	0.42	12.8	64.2	3.75	0	63.4	4.63	1000
TAM W-101	14.4	65.5	0.37	12.3	63.4	2.75	1	62.5	3.25	920
TAM 110	13.1	68.4	0.40	11.7	62.4	2.40	1	60.7	2.88	950
TAM 111	15.1	67.0	0.35	13.2	65.0	2.50	1	60.5	3.00	935
Cutter	15.5	68.1	0.34	14.0	66.3	3.50	3	62.7	4.00	1005
Jagger	15.0	69.6	0.37	13.6	65.6	3.38	1	60.6	3.50	955
Ogallala	17.1	68.5	0.36	15.6	68.5	2.50	0	59.3	2.75	1130
2005 Claude										
TX01D3232	13.0	69.2	0.39	11.6	61.2	5.69	6	63.3	9.25	865
TAM W-101	13.8	64.9	0.38	12.1	62.1	3.63	3	62.4	4.25	925
TAM 110	13.0	67.6	0.39	11.1	61.5	2.68	2	60.5	3.69	910
TAM 111	14.0	66.9	0.36	12.3	63.5	3.88	4	63.6	4.13	885
Cutter	14.9	67.5	0.38	13.1	64.8	4.50	4	62.7	5.00	900
Jagger	15.1	68.1	0.34	13.2	64.9	4.24	4	64.7	4.50	910
Ogallala	15.0	69.9	0.39	13.3	65.2	3.75	2	62.7	4.38	1025

Table 8. **Mean grain yields (kg/ha) of entries in the 2004 Southern Regional Performance Nursery** for regional production zones (after Peterson, 1992, Crop Science 32: 907). Irrigated trials = Bushland, TX, Clovis and Farmington, NM, Goodland, OK and Ft. Collins, CO. Complete dataset can be found at <http://www.ars.usda.gov/Research/docs.htm?docid=11932>.

Name	region		Southern Plains		Southern High Plains		Central Plains		North-central Plains		Northern High Plains		Intermountain		Irrigated trials		Volume weight, kg/hl	Heading, day of year	Plant height, cm
	mean	rank	mean	rank	mean	rank	mean	rank	mean	rank	mean	rank	mean	rank	mean	rank	mean	mean	mean
TX01D3232	4218	5	4897	3	2690	5	4683	1	5038	16	3214	28	4826	24	5861	7	72.2	127	70
Kharkof	2585	50	2135	50	1619	50	2374	50	3741	50	2482	50	3797	50	3636	50	72.2	137	91
Scout 66	3247	49	3313	48	2158	44	3052	49	4032	49	3060	40	4283	45	4707	46	74.9	132	88
TAM 107	3694	44	3928	39	2489	19	3518	48	4394	47	3255	25	4716	27	5060	38	74.1	126	74
Trego	3939	23	4411	16	2428	28	4231	17	4994	22	3174	34	4716	26	5486	20	76.6	130	71
Fannin	3726	40	3661	45	2347	35	4003	36	5070	13	2770	48	5002	17	4891	41	75.6	128	75
mean	3887		4159		2418		4066		4875		3241		4797		5327		74.6	129	75
cv (%)	11		10		15		9		9		12.6		15		12.9				
l.s.d. (0.05)	250		175		154		534		598		417		892		842				
locations	33		7		4		4		5		5		5		5		21	21	19

Table 9. **Mean grain yields (kg/ha) of entries in the 2005 Southern Regional Performance Nursery** for regional production zones (after Peterson, 1992, Crop Science 32: 907). Irrigated trials = Clovis and Farmington, NM, Goodland, OK and Ft. Collins, CO. Complete dataset can be found at <http://www.ars.usda.gov/Research/docs.htm?docid=11932>.

Name	region		Southern Plains		Southern High Plains		Central Plains		North-central Plains		Northern High Plains		Intermountain		Irrigated trials		Volume weight, kg/hl	Heading, day of year	Plant height, cm
	mean	rank	mean	rank	mean	rank	mean	rank	mean	rank	mean	rank	mean	rank	mean	rank	mean	mean	mean
TX01D3232	3829	11	3639	11	4399	9	4172	9	4117	23	2035	29	5658	8	5716	3	75.0	130	75
Kharkof	2530	48	2028	48	3095	48	2087	48	2598	48	1881	39	3969	48	3527	48	76.2	141	99
Scout 66	2873	47	2670	43	3317	47	2771	47	2731	47	1962	32	4365	43	3837	47	77.0	132	93
TAM 107	3045	46	2568	44	3594	43	2773	46	2912	46	1916	36	5078	31	4880	28	75.7	129	76
Trego	3284	43	2826	41	3464	46	3478	31	3647	41	1897	38	5387	21	4481	42	77.4	131	77
Fannin	3759	13	3667	8	4133	23	4024	12	4204	15	1806	42	5534	13	5303	15	78.4	131	82
mean	3559		3230		4081		3621		4001		2059		5181		4985		76.6	131	80
cv (%)	12.7		12.2		11.8		9.5		11.1		17.7		13.7		14.7				
l.s.d. (0.05)	273		479		830		698		754		451		993		1070				
locations	36		6		4		5		5		7		4		5		20	14	19

Table 10. **Seedling leaf rust and stem rust scores** of entries in the 2004 and 2005 Southern Regional Performance Nursery. Tests conducted by USDA-ARS Cereal Disease Lab, St. Paul, MN. Complete dataset can be found at <http://www.ars.usda.gov/Research/docs.htm?docid=11932>.

	2004												
	Leaf rust								Stem Rust				
	isolates							Postulated	isolates				
NAME	CBMT	MCDS	MBDS	MHDS	MCRK	THBJ	TNRJ	Genes	TPMK	QTHJ	TTTT	RCRS	QFCS
TX01D3232	;	;	;	;	;1c	;	;	+	2	3,2	3	3	1
Kharkof	3	3	3	3	3	3	3	0	4	4,2	4,;/;	;1-	4
Scout 66	3-;	3	3	3	3-;	3-;	3	0	4/;1	2/3	;123/3-	;1-/4	;1-/4
TAM 107	3	3	3	3	3	3	3	0	0;/2-	;/2	;1,2/3-	0;	;
Trego	;	;	;	;	;	;	;	+	0	2-	2	;	0;

	2005												
	Leaf rust								Stem Rust				
	isolates							Postulated	isolates				
Line/selection	KDBG	MCDS	TCTD	MFBJ	THBJ	MJBJ	TNRJ	Genes	TPMK	QFCS	TTTT	RCRS	RKQQ
TX01D3232	;	;	;	;1-	;	3	;1c	16,24	2	2	S	S	S
Kharkof	3;	3	3;	3+	3+	3+	3	0	S	S	S	S	S
Scout 66	;lc3	3	3	3+	3+	4	3	14a	S	2+/S	S	S	S low IF
TAM 107	3	3	3-;	3+	3+	4	3;	0	2	1	2	1	0;
Trego	;lc	;	;	0;	;	0;	;	+	;	;	2	;	2

Seedling infection types: 0=immune response, no sign of infection; ;=hypersensiteve chlorotic or necrotic flecks; 1=small uredinia surrounded by necrosis; 2=small uredinia surrounded by chlorosis; 3=moderate size uredinia without necrosis or chlorosis; 4=large uredinia without necrosis or chlorosis; +=uredinia larger than normal; -=uredinia smaller than normal. A range of infection types is indicated by more than one infection type, with the predominant type listed first.
Postulated genes: + = not able to identify Lr genes with races used in this test.

Table 11. **Baking and mixograph data from 2004 Southern Regional Performance Nursery.** USDA-ARS Hard Winter Wheat Quality Laboratory, Manhattan, KS. Complete dataset can be found at <http://hwwql.gmprc.ksu.edu>.

Name	Chemical				Mixograph			Bake		
	wheat		flour		Water Absorp.	Peak time	Tolerance	Water Absorp.	Mix time	Loaf Volume
	Protein	Milling Yield	Ash	Protein						
	(%)	(%)	(%)	(%)	(%)	(min)		(%)	(min)	(cc)
Composite of South Central Plains										
TX01D3232	12.9	67.0	0.41	11.4	63.0	4.32	5	62.4	5.60	975
Kharkof	14.3	60.2	0.45	12.3	63.4	3.50	4	62.8	5.88	883
Scout 66	13.4	68.0	0.44	11.9	63.7	2.95	3	59.6	3.69	935
TAM 107	12.8	65.0	0.41	11.1	62.0	2.68	3	61.8	3.69	910
Trego	12.8	66.7	0.39	10.9	62.0	2.27	1	59.7	2.70	850
Fannin	13.6	64.2	0.47	11.7	62.5	4.23	4	60.4	5.43	940
Composite of Southern High Plains										
TX01D3232	14.9	61.8	0.43	13.6	65.7	4.38	2	64.4	5.13	910
Kharkof	15.2	59.9	0.41	12.8	64.7	3.63	4	63.2	4.75	960
Scout 66	14.7	65.7	0.41	13.7	65.7	3.13	4	65.1	4.63	975
TAM 107	15.3	63.6	0.40	13.6	66.2	3.13	3	61.7	4.00	995
Trego	15.3	64.9	0.43	13.5	66.0	2.88	1	59.5	2.88	905
Fannin	14.9	60.6	0.44	13.3	65.6	4.38	4	64.0	4.13	1000

Table 12. **Baking and mixograph data from 2005 Southern Regional Performance Nursery.** USDA-ARS Hard Winter Wheat Quality Laboratory, Manhattan, KS. Complete dataset can be found at <http://hwwql.gmprc.ksu.edu>.

Name	Chemical				Mixograph			Bake		
	wheat		flour		Water Absorp.	Peak time	Tolerance	Water Absorp.	Mix time	Loaf Volume
	Protein	Milling Yield	Ash	Protein						
	(%)	(%)	(%)	(%)	(%)	(min)		(%)	(min)	(cc)
Composite of South Central Plains										
TX01D3232	11.3	65.8	0.38	9.8	60.2	4.49	6	62.6	4.94	795
Kharkof	13.9	59.6	0.40	11.9	63.7	4.18	4	61.4	5.66	980
Scout 66	12.7	66.4	0.38	11.3	62.8	2.75	3	62.7	4.01	910
TAM 107	11.8	64.7	0.39	10.2	61.4	2.85	4	60.9	3.92	945
Trego	11.8	66.2	0.37	10.1	60.7	2.69	4	60.8	3.26	860
Fannin	12.4	64.7	0.42	10.7	60.8	4.00	5	63.5	4.53	920
Composite of Southern High Plains										
TX01D3232	13.1	65.7	0.36	11.4	63.9	3.71	4	64.9	5.10	870
Kharkof	15.1	59.3	0.42	12.8	65.3	3.88	2	61.8	4.50	925
Scout 66	13.0	67.5	0.38	11.5	63.1	2.34	2	60.9	3.98	835
TAM 107	12.9	64.6	0.37	11.0	62.8	2.53	3	60.9	3.73	875
Trego	13.0	66.2	0.37	11.2	63.5	2.92	2	60.8	3.49	865
Fannin	13.6	64.9	0.44	11.7	64.9	3.96	4	62.6	4.68	845

Proposal to release TX01D3232 as TAM 304