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Wheat rusts in the United States in 2011.

Wheat stem rust (*Puccinia graminis* f. sp. *tritici*). Wheat stem rust was first reported in mid-April in Texas and Louisiana. Extreme drought conditions in the southern and central plains limited stem rust development and inoculum production for areas further north. Generally, wheat stem rust was found at low levels in scattered plots and fields in the Great Plains, Ohio Valley, and Great Lakes regions in 2011. The exception was northeastern Wisconsin, where 1 to 40% severities were found in commercial soft red winter wheat fields located within 5 miles of Lake Michigan. Race QFCSC was the predominantly identified race from wheat, the only other race identified from wheat was race QCCDC from a collection made in a plot at Crowley, Louisiana (see wheat stem rust observation map, Fig. 1, p. 226-227).

Wheat stem rust was found in areas of Texas, Louisiana, Oklahoma, Kansas, Nebraska, North Dakota, Minnesota, Arkansas, Missouri, Kentucky, Illinois, Indiana, Wisconsin, and Michigan in 2011. Nationally, wheat only incurred a trace loss due to wheat stem rust (Table 3, p. 231, and Table 4, p. 232).

Texas. Wheat stem rust was first reported in southeastern Texas in McNair 701 plots on 15 April. By 18 April, stem rust had been found in McNair 701 plots at Castroville and Uvalde in south-central Texas and by 23 April, it was found in McNair 701 plots at McGregor in central Texas. Stem rust also was found on emmer, barley, and triticale used as windbreaks in watermelon fields in the Rio Grande Valley in southern Texas on 20–21 April. The infection was sparse on emmer and barley with severities from trace to 20%, whereas the triticale was highly susceptible with severities up to 80S. The persistent and widespread drought conditions limited the spread and development of stem rust in the state.

Louisiana. Trace amounts of wheat stem rust were found in plots of an unknown cultivar at Crowley in southern Louisiana on 22 April.

Oklahoma. Stem rust was found in a McNair 701 trap plot at Stillwater in north central Oklahoma the week of 9 May.

Arkansas. Stem rust was found late in the season in one plot at Keiser in northeastern Arkansas in mid-May.

Kansas. Low levels of stem rust (severity 1% or less, incidence 2%) were found on the susceptible cultivar Winterhawk in Barber County in south central Kansas on 25 May. Stem rust was found at trace to moderate levels in plots in Sumner, Labette, and Ellis counties in Kansas in early June. In mid-June, stem rust was found on Winterhawk at late milk stage in two locations in Republic County in north-central Kansas. The severities ranged from 1–20% on flag leaves with incidences in the 10–15% range. Wheat stem rust did not cause significant wheat yield loss in Kansas in 2011.

Missouri. Low levels of stem rust were found in a field in Chariton County in north-central Missouri in early June.

Nebraska. Stem rust was found on wheat and barley at the Havelock Farm in Lincoln in Lancaster County in southeastern Nebraska on 13 June.

Indiana. Stem rust was found at low levels in a plot in west-central Indiana on 6 June.

Illinois. Stem rust was found in plots in central and northern Illinois in late July.

Michigan. Light to moderate stem rust severities were observed in plots in two counties in south-central Michigan on the cultivar Jupiter and two nursery lines in late June and early July.

Minnesota. Stem rust was found at low levels in Panola and McNair 701 plots in southeastern Minnesota on 24 June. Low levels of stem rust were found scattered across southern Minnesota in late July.

Wisconsin. Stem rust was found in plots at Arlington in south-central Wisconsin and at Oconto in northeastern Wisconsin in late June; the infections at the latter site were not as full developed. By the time the plots reached maturity the fully susceptible cultivars (Ambassador, Envoy, and IL05-4236) were reading 100S. Stem rust also was observed on the check cultivar Pioneer 25R47, averaging 10–20 MR/MS throughout the nursery. This is the highest level of stem rust observed in the nursery in the last eight years. Significant levels of stem rust (1–40% severity) were found in commercial soft red winter wheat fields located within 5 miles of the Lake Michigan shoreline between Sturgeon Bay and Manitowoc in northeastern Wisconsin on 14 July. The crop was maturing rapidly and was harvested by the end of July.

North Dakota. Stem rust was found in some plots (overall uncommon in the nursery) at Williston in northwestern North Dakota on 14 July. Field scouts found no rust in the 137 commercial wheat fields scouted in North Dakota in early July. Race QCCJB and rye stem rust (*P. graminis* f. sp. *secalis*) were identified from collections on barley plots in Cass County.

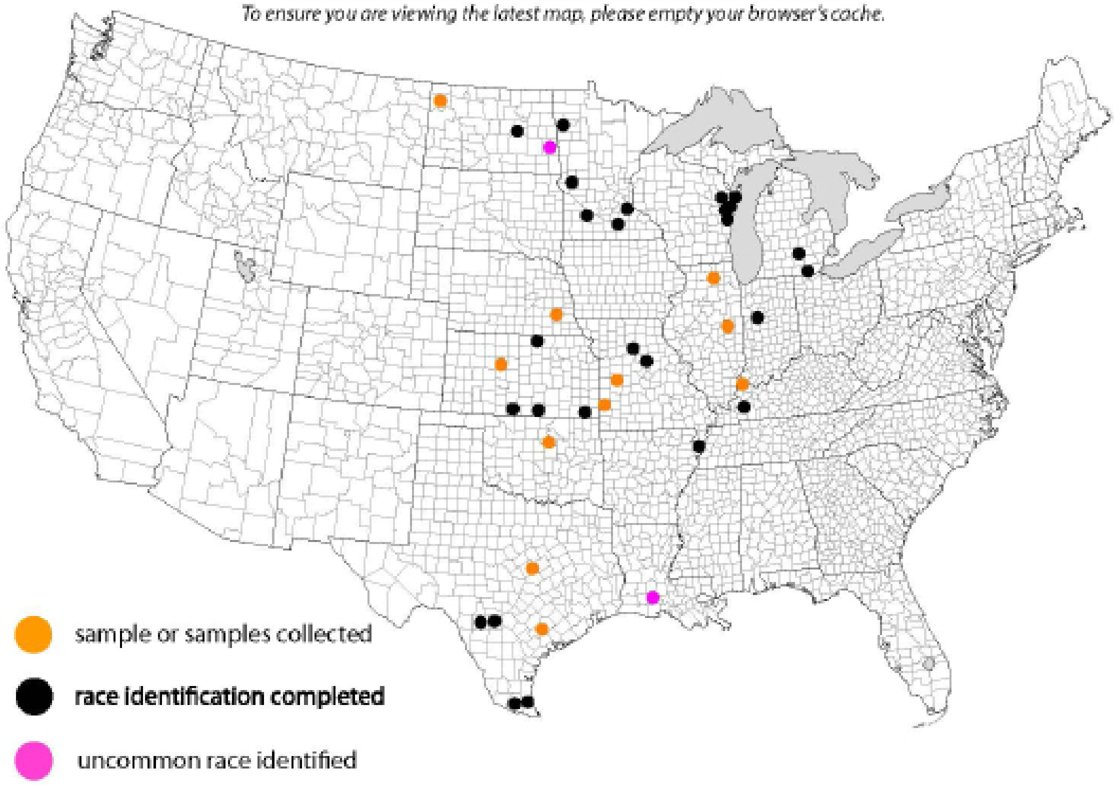
Wheat leaf rust (*Puccinia recondita*). Wheat leaf rust was first found in early March in commercial fields southwest of Houston, Texas, and in a nursery in north-central Oklahoma. Generally, leaf rust was widespread, but a low levels throughout plots and fields in the Great Plains and eastern U.S. in 2011. Extreme drought conditions in the southern and central Great Plains limited leaf rust development and inoculum production for areas further north. Additionally, widespread use of fungicide throughout commercial fields in the eastern states and northern spring wheat area further limited leaf rust development. Losses due to wheat leaf rust were minimal in the U.S. in 2011 (see Table 3, p. 231, and Table 4, p. 232).

Texas. Leaf rust was found on the cultivar Jackpot (*Lr39/41*) at high severity in commercial fields in two counties (Colorado and Jackson) southwest of Houston the first week of March. Fungicide was applied in this area and further south. Generally, trace to low levels of wheat leaf rust were found in plots in southeastern and south-central Texas in early March. However, wheat leaf rust was very active in irrigated plots at Yoakum in mid-April and could be found on flag leaves. By early April, leaf rust was increasing in irrigated plots at Castroville in south central Texas. Susceptible lines such as Jagger (*Lr17*), Jagalene (*Lr24*), and Bullet (*Lr39/41*) had 70S severity on 18 April. At Uvalde on 18 April, trace amounts of leaf rust were found in a few plots, but none higher than 10% severity. The plots were drying up due to lack of moisture. The persistent and widespread drought conditions limited the spread and development of leaf rust in the state.

Fig. 1. 2011 Wheat Stem Rust Observations in the U.S.

Prepared by USDA-ARS Cereal Disease Laboratory, St. Paul, MN

To ensure you are viewing the latest map, please empty your browser's cache.



Date*	Location	Field/Plot	Cultivar/line	Race(s) identified
4/7	Yoakum, Lavaca County, Texas	Plot	McNair 701	
4/18	Castroville, Medina County, Texas	Plot	McNair 701	QFCSC
4/18	Uvalde, Uvalde County, Texas	Plot	McNair 701, Wintex?	QFCSC
4/19	McAllen, Hidalgo County, Texas	Field	Unknown	QFCSC
4/20	McGregor, McLennan County, Texas	Plot	McNair 701	
4/21	Mission, Hidalgo County, Texas	Field	Unknown barley, Emmer	QFCSC
4/22	Lasara, Willacy County, Texas	Field	Unknown triticale	QFCSC
4/22	Crowley, Acadia Parish, Louisiana	Plot	Unknown	QFCSC, QCCDC
5/16	Stillwater, Payne County, Oklahoma	Plot	McNair 701	
5/17	Keiser, Mississippi County, Arkansas	Plot	Progeny PGX10	QFCSC
5/25	Isabel, Barber County, Kansas	Plot	Winterhawk	QFCSC
6/1	Parsons, Labette County, Kansas	Plot	Pioneer 25R40	QFCSC
6/1	Barton County, Missouri	Field	Unknown	
6/2	Anson, Sumner County, Kansas	Plot	Jagger	QFCSC
6/2	Ellis County, Kansas	Field	Unknown	
6/3	Posey County, Indiana	Field	Baker 200S, Pioneer 25R62	
6/4	Salisbury, Chariton County, Missouri	Field	Unknown	QFCSC
6/4	W. of Calhoun, Henry County, Missouri	Field	Unknown	
6/6	Battle Ground, Tippecanoe County, Indiana	Plot	Nursery line	QFCSC
6/6	Caldwell County, Kentucky	Plot	Unknown	QFCSC
6/8	Belleville, Republic County, Kansas	Field	Winterhawk	QFCSC
6/8	Cuba, Republic County, Kansas	Field	Winterhawk	QFCSC
6/13	Lincoln, Lancaster County, Nebraska	Plot	Unknown	
6/14	Columbia, Boone County, Missouri	Plot	Unknown	QFCSC
6/24	Rosemount, Dakota County, Minnesota	Plot	Panola, McNair 701, Pio 25R30	QFCSC

*If multipe observations at a site, earliest date listed.

Fig. 1 (continued). **2011 Wheat Stem Rust Observations in the U.S.**

Prepared by USDA-ARS Cereal Disease Laboratory, St. Paul, MN

Date*	Location	Field/Plot	Cultivar/line	Race(s) identified
6/27	Oconto, Oconto County, Wisconsin	Plot	Pioneer 25R47, Envoy, line	QFCSC
6/27	Urbana, Champaign County, Illinois	Plot	Unknown	
6/28	DeKalb, DeKalb County, Illinois	Plot	Unknown	
6/29	East Lansing, Ingham County, Michigan	Plot	Jupiter, two nursery lines	QFCSC
7/3	Lenawee County, Michigan	Plot	Nursery line	QFCSC
7/7	Rosemount, Dakota County, Minnesota	Plot	McNair 701	QFCSC
714	Forestville, Door County, Wisconsin	Plot	Unknown	QFCSC
7/14	Two Creeks, Manitowoc County, Wisconsin	Field	Unknown	QFCSC
7/14	Francis Creek, Manitowoc County, Wisconsin	Field	Unknown	QFCSC
7/14	Cooperstown, Manitocowc County, Wisconsin	Field	Unknown	
7/14	Alaska, Kewaunee County, Wisconsin	Field	Unknown	QFCSC
7/14	Kewaunee, Kewaunee County, Wisconsin	Field	Unknown	QFCSC
7/14	New Franklin, Brown County, Wisconsin	Field	Unknown	QFCSC
7/15	Williston, Williams County, North Dakota	Plot	Unknown	
7/20	Morris, Stevens County, Minnesota	Plot	Baart	QFCSC
7/25	Lamberton, Redwood County, Minnesota	Plot	Unknown	QFCSC
7/26	Waseca, Waseca County, Minnesota	Plot	Unknown	QFCSC
8/2	Crookston, Polk County, Minnesota	Plot	Little Club	QFCSC
8/2	Carrington, Foster County, North Dakota	Plot	Baart	Rye stem rust
8/17	Fargo, Cass County, North Dakota	Plot	Land race, barley cvs	QFCSC, QCCJB, rye stem rust
8/17	Sheboygan, Sheboygan County, Wisconsin	Plot	Unknown	QFCSC

*If multipe observations at a site, earliest date listed.

Oklahoma. Trace levels of sporulating leaf rust pustules were noted in a strip of Jagalene (*Lr24*) in a nursery at Stillwater (north-central Oklahoma) in early March. By the end of March, the wheat leaf rust had increased only slightly. No rust samples were received at the Oklahoma State diagnostic lab by late March from western and southwestern Oklahoma where drought conditions were more severe. By mid-May, leaf rust increased to 65–80% severity in plots around Stillwater where there was more rain. However, leaf rust levels on susceptible cultivars were not consistent from field to field. In fields north and west of Stillwater, leaf rust was at low incidence. Despite rains in some areas, extremely dry to drought conditions persisted in much of the state, particularly the western half of the state that was classified as an exceptional drought area as of 24 May. Much like Texas, the persistent and widespread drought conditions limited the spread and development of leaf rust in the state.

Kansas. Trace amounts of overwintering leaf rust were found in plots near Manhattan (northeast Kansas) in mid-March. Low levels of wheat leaf rust were found in wheat at the jointing stage in southeastern Kansas and in the lower third of the canopy on known susceptible cultivars in Saline County in central Kansas in early April. By early May, low levels of leaf rust were found in central and south-central parts of the state. By late May, leaf rust was still at low levels in most areas in the state. Leaf rust increased slightly in plots and fields in north central Kansas in early June. The persistent dry conditions in many areas of the state limited the development of wheat leaf rust in the state.

Nebraska. Leaf rust was found in plots at Lincoln in Lancaster County in southeastern Nebraska on 3 June. Low levels of leaf rust were found in most fields surveyed in the southern tier of counties on 10 June.

Minnesota. Trace levels of leaf rust were found in plots at Rosemount in southeastern Minnesota on 26 May. By 24 June, leaf rust was heavy on flag leaves of susceptible cultivars and at lower severity in resistant cultivars in the plots. Low levels of leaf rust were found on the cultivar Marshall (*Lr2a*, *Lr10*, and *Lr34*) in plots in central and northwestern Minnesota in mid-July. The cultivars Faller and Prosper, which likely have *Lr21*, had low to moderate levels of leaf rust, whereas other cultivars with *Lr21* had no leaf rust. Low levels of leaf rust were found across southern–northern Minnesota in late July. Generally, leaf rust was at low levels in the northern hard red spring wheat region in 2011.

North Dakota. Trace amounts of leaf rust were found in a plot of Alsen spring wheat (*Lr2a*, *Lr10*, *Lr23*, and *Lr34*) at Fargo, in east-central North Dakota on 30 June. Trace amounts of leaf rust were found on Darrell winter wheat at Jamestown in central North Dakota on 30 June. These initial reports of leaf rust were about three weeks later than normal.
In the second week of July, leaf rust was common in plots at Williston in northwestern North Dakota, but could not be

Table 1. Number and frequency (%) of virulence phenotypes of *Puccinia triticina* in the United States in 2011 identified by virulence to 19 lines of wheat with single genes for leaf rust resistance. Lines tested were Thatcher lines with genes *Lr1*, *Lr2a*, *Lr2c*, *Lr3a*, *Lr9*, *Lr16*, *Lr24*, *Lr26*, *Lr3ka*, *Lr11*, *Lr17*, *Lr30*, *LrB*, *Lr10*, *Lr14a*, *Lr18*, *Lr21*, *Lr28*, and winter wheat lines with gene *Lr41*.

Pheno-type	Virulences	AR, DE, GA, LA, MD, MS, NC, VA		NY		IL, IN, eastern MO, WI		OK, TX		IA, KS, western MO		MN, ND, SD		Total	
		#	%	#	%	#	%	#	%	#	%	#	%	#	%
BBBDG	14a,28	1	1.1	0	0.0	0	0.0	0	0.0	3	3.8	2	1.5	6	1.4
LBBTG	1,B,10,14a,18,28	0	0.0	1	4.8	0	0.0	0	0.0	0	0.0	0	0.0	1	0.2
MBBJG	1,3,10,14a,28	0	0.0	0	0.0	1	2.5	0	0.0	0	0.0	1	0.7	2	0.5
MBDSD	1,3,17,B,10,14a,39/41	1	1.1	0	0.0	1	2.5	1	1.4	3	3.8	2	1.5	8	1.8
MBJJG	1,3,11,17,10,14a,28	0	0.0	0	0.0	0	0.0	0	0.0	1	1.3	0	0.0	1	0.2
MBPNB	1,3,3ka,17,30,B,14a	0	0.0	0	0.0	1	2.5	0	0.0	0	0.0	0	0.0	1	0.2
MBPSB	1,3,3ka,17,30,B,10,14a	0	0.0	0	0.0	0	0.0	0	0.0	2	2.6	1	0.7	3	0.7
MBTNB	1,3,3ka,11,17,30,B,14a	5	5.4	1	4.8	4	10.0	0	0.0	0	0.0	4	2.9	14	3.2
MBTSB	1,3,3ka,11,17,30,B,10,14a	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.7	1	0.2
MCDSB	1,3,26,17,B,10,14a	0	0.0	0	0.0	2	5.0	0	0.0	1	1.3	2	1.5	5	1.1
MCDSD	1,3,26,17,B,10,14a,39/41	0	0.0	0	0.0	0	0.0	1	1.4	0	0.0	0	0.0	1	0.2
MCGJG	1,3,26,11,10,14a,28	0	0.0	3	14.3	0	0.0	0	0.0	0	0.0	0	0.0	3	0.7
MCJSB	1,3,26,11,17,B,10,14a	0	0.0	0	0.0	2	5.0	0	0.0	0	0.0	0	0.0	2	0.5
MCLRG	1,3,26,3ka,B,10,18,28	0	0.0	1	4.8	0	0.0	0	0.0	0	0.0	0	0.0	1	0.2
MCPSB	1,3,26,3ka,17,30,B,10,14a	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.7	1	0.2
MCPSD	1,3,26,3ka,17,30,B,10,14a,39/41	0	0.0	0	0.0	0	0.0	0	0.0	2	2.6	0	0.0	2	0.5
MCPTB	1,3,26,3ka,17,30,B,10,14a,18	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.7	1	0.2
MCRGG	1,3,26,3ka,11,30,10,28	0	0.0	1	4.8	0	0.0	0	0.0	0	0.0	0	0.0	1	0.2
MCRKG	1,3,26,3ka,11,30,10,14a,18,28	1	1.1	0	0.0	0	0.0	1	1.4	0	0.0	0	0.0	2	0.5
MCTNB	1,3,26,3ka,11,17,30,B,14a	10	10.8	3	14.3	6	15.0	0	0.0	1	1.3	0	0.0	20	4.5
MCTQB	1,3,26,3ka,11,17,30,B,10	1	1.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.2
MCTSB	1,3,26,3ka,11,17,30,B,10,14a	2	2.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.5
MDDSB	1,3,24,17,B,10,14a	0	0.0	0	0.0	0	0.0	2	2.8	0	0.0	0	0.0	2	0.5
MDPSB	1,3,24,3ka,17,30,B,10,14a	1	1.1	0	0.0	0	0.0	0	0.0	3	3.8	2	1.5	6	1.4
MDTSB	1,3,24,3ka,11,17,30,B,10,14a	0	0.0	0	0.0	0	0.0	1	1.4	0	0.0	0	0.0	1	0.2
MFDSB	1,3,24,26,17,B,10,14a	2	2.2	0	0.0	0	0.0	10	13.9	3	3.8	6	4.4	21	4.8
MFGJG	1,3,24,26,11,10,14a,28	2	2.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.5
MFNSB	1,3,24,26,3ka,17,B,10,14a	4	4.3	0	0.0	0	0.0	2	2.8	0	0.0	7	5.1	13	3.0
MFNSL	1,3,24,26,3ka,17,B,10,14a,21	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.7	1	0.2
MFPSB	1,3,24,26,3ka,17,30,B,10,14a	5	5.4	0	0.0	0	0.0	0	0.0	1	1.3	4	2.9	10	2.3
MFQSB	1,3,24,26,3ka,11,B,10,14a	0	0.0	0	0.0	0	0.0	1	1.4	0	0.0	0	0.0	1	0.2
MFRJG	1,3,24,26,3ka,11,30,10,14a,28	5	5.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	5	1.1
MFTSB	1,3,24,26,3ka,11,17,30,B,10,14a	0	0.0	0	0.0	0	0.0	2	2.8	0	0.0	1	0.7	3	0.7
MGDSD	1,3,16,17,B,10,14a,39/41	0	0.0	0	0.0	0	0.0	1	1.4	0	0.0	0	0.0	1	0.2
MKDSB	1,3,16,24,26,17,B,10,14a	1	1.1	0	0.0	0	0.0	1	1.4	0	0.0	0	0.0	2	0.5
MLDSD	1,3,9,17,B,10,14a,39/41	10	10.8	3	14.3	0	0.0	8	11.1	2	2.6	10	7.4	33	7.5
MLNSD	1,3,9,3ka,17,B,10,14a,39/41	1	1.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.2
MLPSD	1,3,9,3ka,17,30,B,10,14a,39/41	0	0.0	0	0.0	0	0.0	1	1.4	0	0.0	0	0.0	1	0.2
MMDSD	1,3,9,26,17,B,10,14a,39/41	1	1.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.2
MMNSD	1,3,9,26,3ka,17,B,10,14a,39/41	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.7	1	0.2
MMPSD	1,3,9,26,3ka,17,30,B,10,14a,39/41	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.7	1	0.2
NBBRG	1,2c,B,10,18,28	3	3.2	1	4.8	0	0.0	2	2.8	1	1.3	2	1.5	9	2.0
NBBSG	1,2c,B,10,14a,28	0	0.0	2	9.5	0	0.0	0	0.0	0	0.0	0	0.0	2	0.5
NBBTG	1,2c,B,10,14a,18,28	0	0.0	2	9.5	0	0.0	0	0.0	0	0.0	0	0.0	2	0.5
SBBGG	1,2a,2c,10,28	0	0.0	0	0.0	0	0.0	0	0.0	1	1.3	0	0.0	1	0.2
TBBBG	1,2a,2c,3,28	0	0.0	0	0.0	0	0.0	1	1.4	0	0.0	0	0.0	1	0.2
TBBBJ	1,2a,2c,3,28,39/41	0	0.0	0	0.0	0	0.0	1	1.4	0	0.0	0	0.0	1	0.2
TBBDJ	1,2a,2c,3,14a,28,39/41	0	0.0	0	0.0	1	2.5	0	0.0	0	0.0	0	0.0	1	0.2
TBBGD	1,2a,2c,3,10,39/41	0	0.0	0	0.0	0	0.0	1	1.4	0	0.0	0	0.0	1	0.2
TBBGG	1,2a,2c,3,10,28	0	0.0	0	0.0	0	0.0	0	0.0	3	3.8	1	0.7	4	0.9

Table 1. Number and frequency (%) of virulence phenotypes of *Puccinia triticina* in the United States in 2011 identified by virulence to 19 lines of wheat with single genes for leaf rust resistance. Lines tested were Thatcher lines with genes *Lr1*, *Lr2a*, *Lr2c*, *Lr3a*, *Lr9*, *Lr16*, *Lr24*, *Lr26*, *Lr3ka*, *Lr11*, *Lr17*, *Lr30*, *LrB*, *Lr10*, *Lr14a*, *Lr18*, *Lr21*, *Lr28*, and winter wheat lines with gene *Lr41*.

Pheno-type	Virulences	AR, DE, GA, LA, MD, MS, NC, VA		NY		IL, IN, eastern MO, WI		OK, TX		IA, KS, western MO		MN, ND, SD		Total	
		#	%	#	%	#	%	#	%	#	%	#	%	#	%
TBBGJ	1,2a,2c,3,10,28,39/41	0	0.0	0	0.0	3	7.5	12	16.7	16	20.5	20	14.7	51	11.6
TBBJG	1,2a,2c,3,10,14a,28	0	0.0	0	0.0	0	0.0	0	0.0	1	1.3	0	0.0	1	0.2
TBBQJ	1,2a,2c,3,B,10,28,39/41	0	0.0	0	0.0	0	0.0	0	0.0	1	1.3	0	0.0	1	0.2
TBGJG	1,2a,2c,3,11,10,14a,28	0	0.0	0	0.0	0	0.0	0	0.0	1	1.3	0	0.0	1	0.2
TBHKG	1,2a,2c,3,11,30,10,14a,18,28	0	0.0	0	0.0	0	0.0	0	0.0	1	1.3	0	0.0	1	0.2
TBJJG	1,2a,2c,3,11,17,10,14a,28	1	1.1	0	0.0	0	0.0	0	0.0	0	0.0	1	0.7	2	0.5
TBMKG	1,2a,2c,3,3ka,30,10,14a,18,28	1	1.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.2
TBPSB	1,2a,2c,3,3ka,17,30,B,10,14a	0	0.0	0	0.0	0	0.0	0	0.0	1	1.3	0	0.0	1	0.2
TBRKG	1,2a,2c,3,3ka,11,30,10,14a,18,28	2	2.2	1	4.8	6	15.0	0	0.0	1	1.3	0	0.0	10	2.3
TCBGJ	1,2a,2c,3,26,10,28,39/41	0	0.0	0	0.0	0	0.0	1	1.4	0	0.0	2	1.5	3	0.7
TCBJG	1,2a,2c,3,26,10,14a,28	5	5.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	5	1.1
TCGJG	1,2a,2c,3,26,11,10,14a,28	0	0.0	1	4.8	0	0.0	0	0.0	0	0.0	0	0.0	1	0.2
TCJSB	1,2a,2c,3,26,11,17,B,10,14a	2	2.2	0	0.0	0	0.0	0	0.0	0	0.0	1	0.7	3	0.7
TCJSG	1,2a,2c,3,26,11,17,B,10,14a,28	2	2.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.5
TCRKG	1,2a,2c,3,26,3ka,11,30,10,14a,18,28	10	10.8	1	4.8	8	20.0	1	1.4	5	6.4	4	2.9	29	6.6
TCTBG	1,2a,2c,3,26,3ka,11,17,30,28	1	1.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.2
TCTSB	1,2a,2c,3,26,3ka,11,17,30,B,10,14a	0	0.0	0	0.0	3	7.5	0	0.0	0	0.0	0	0.0	3	0.7
TDBGG	1,2a,2c,3,24,10,28	0	0.0	0	0.0	0	0.0	1	1.4	5	6.4	13	9.6	19	4.3
TDBGJ	1,2a,2c,3,24,10,28,39/41	0	0.0	0	0.0	0	0.0	1	1.4	0	0.0	0	0.0	1	0.2
TDBGQ	1,2a,2c,3,24,10,21,28	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	15	11.0	15	3.4
TDBJG	1,2a,2c,3,24,10,14a,28	1	1.1	0	0.0	2	5.0	0	0.0	3	3.8	4	2.9	10	2.3
TDBJQ	1,2a,2c,3,24,10,14a,21,28	0	0.0	0	0.0	0	0.0	3	4.2	0	0.0	1	0.7	4	0.9
TDDJG	1,2a,2c,3,24,17,10,14a,28	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.7	1	0.2
TFBGG	1,2a,2c,3,24,26,10,28	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	1.5	2	0.5
TFBGJ	1,2a,2c,3,24,26,10,28,39/41	0	0.0	0	0.0	0	0.0	1	1.4	0	0.0	1	0.7	2	0.5
TFBGQ	1,2a,2c,3,24,26,10,21,28	0	0.0	0	0.0	0	0.0	0	0.0	1	1.3	5	3.7	6	1.4
TFBJG	1,2a,2c,3,24,26,10,14a,28	1	1.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.2
TFBJQ	1,2a,2c,3,24,26,10,14a,21,28	1	1.1	0	0.0	0	0.0	0	0.0	0	0.0	1	0.7	2	0.5
TFBKG	1,2a,2c,3,24,26,10,14a,18,28	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.7	1	0.2
TFJGG	1,2a,2c,3,24,26,11,17,10,28	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.7	1	0.2
TFLJJ	1,2a,2c,3,24,26,3ka,10,14a,28,39/41	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.7	1	0.2
TFPSB	1,2a,2c,3,24,26,3ka,17,30,B,10,14a	2	2.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.5
TFRJG	1,2a,2c,3,24,26,3ka,11,30,10,14a,28	1	1.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.2
TGBJG	1,2a,2c,3,16,10,14a,28	0	0.0	0	0.0	0	0.0	0	0.0	1	1.3	0	0.0	1	0.2
THBJG	1,2a,2c,3,16,26,10,14a,28	1	1.1	0	0.0	0	0.0	1	1.4	0	0.0	0	0.0	2	0.5
TJBGQ	1,2a,2c,3,16,24,10,21,28	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	1.5	2	0.5
TLBJJ	1,2a,2c,3,9,10,14a,28,39/41	0	0.0	0	0.0	0	0.0	0	0.0	1	1.3	1	0.7	2	0.5
TNBGJ	1,2a,2c,3,9,24,10,28,39/41	0	0.0	0	0.0	0	0.0	8	11.1	12	15.4	6	4.4	26	5.9
TNBJJ	1,2a,2c,3,9,24,10,14a,28,39/41	3	3.2	0	0.0	0	0.0	0	0.0	0	0.0	1	0.7	4	0.9
TNGFJ	1,2a,2c,3,9,24,11,14a,18,28,39/41	0	0.0	0	0.0	0	0.0	1	1.4	0	0.0	0	0.0	1	0.2
TNRJJ	1,2a,2c,3,9,24,3ka,11,30,10,14a,28,39/41	3	3.2	0	0.0	0	0.0	3	4.2	0	0.0	0	0.0	6	1.4
TPBGJ	1,2a,2c,3,9,24,26,10,28,39/41	0	0.0	0	0.0	0	0.0	2	2.8	1	1.3	1	0.7	4	0.9
Total		93		21		40		72		78		136		440	

Table 2. Number and frequency (%) of isolates of *Puccinia triticina* in the United States in 2011 virulent to 19 lines of wheat with single resistance genes for leaf rust resistance.

Resistance gene	AR, DE, GA, LA, MD, MS, NC, VA		NY		IL, IN, MO, WI		OK, TX		IA, KS, NO		MN, ND, SD		Total	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Lr1	92	98.9	21	100.0	40	100.0	72	100.0	75	96.2	134	98.5	434	98.6
Lr2a	37	39.8	3	14.3	23	57.5	38	52.8	55	70.5	86	63.2	242	55.0
Lr2c	40	43.0	8	38.1	23	57.5	40	55.6	56	71.8	88	64.7	255	58.0
Lr3	89	95.7	15	71.4	40	100.0	70	97.2	73	93.6	132	97.1	419	95.2
Lr9	18	19.4	3	14.3	0	0	23	31.9	16	20.5	21	15.4	81	18.4
Lr16	2	2.2	0	0	0	0	3	4.2	1	1.3	2	1.5	8	1.8
Lr24	32	34.4	0	0	2	5.0	39	54.2	29	37.2	77	56.6	179	40.7
Lr26	60	64.5	10	47.6	21	52.5	24	33.3	15	19.2	45	33.1	175	39.8
Lr3ka	55	59.1	8	38.1	28	70.0	12	16.7	16	20.5	30	22.1	149	33.9
Lr11	48	51.6	11	52.4	29	72.5	10	13.9	10	12.8	13	9.6	121	27.5
Lr17	52	55.9	7	33.3	19	47.5	30	41.7	20	25.6	49	36.0	177	40.2
Lr30	50	53.8	7	33.3	28	70.0	9	12.5	17	21.8	20	14.7	131	29.8
LrB	53	57.0	14	66.7	19	47.5	33	45.8	21	26.9	48	35.3	188	42.7
Lr10	76	81.7	17	81.0	28	70.0	69	95.8	74	94.9	130	95.6	394	89.5
Lr14a	88	94.6	18	85.7	37	92.5	41	56.9	37	47.4	65	47.8	286	65.0
Lr18	17	18.3	7	33.3	14	35.0	5	6.9	8	10.3	8	5.9	59	13.4
Lr21	1	1.1	0	0	0	0	3	4.2	1	1.3	25	18.4	30	6.8
Lr28	45	48.4	14	66.7	21	52.5	40	55.6	59	75.6	90	66.2	269	61.1
Lr39/41	19	20.4	3	14.3	5	12.5	43	59.7	38	48.7	47	34.6	155	35.2
Total	93		21		40		72		78		136		440	

found in fields in the Dickinson area in the southwestern part of the state. Field scouts found no rust in the 137 commercial wheat fields scouted in the state the second week of July. On 28 July, high levels of leaf rust (20–30S) were found in plots of the cultivars Faller (*Lr21*) and Prosper (*Lr21*) at Carrington in east-central North Dakota. Until the summer of 2010, these cultivars were resistant to leaf rust since, because carry the gene *Lr21*. However, RB07, which also carries *Lr21*, had lower leaf rust severity. In plots at Fargo, both Faller and the Thatcher line with *Lr21* had susceptible leaf rust reactions. This follows the identification of new races of *P. triticina* in 2011 carrying *Lr21* virulence in the North Dakota and Minnesota.

Montana. Leaf rust was present in the Yellowstone Valley by mid-June. Low levels of leaf rust were found on the cultivar Yellowstone near Manhattan in the Gallatin Valley in southwestern Montana on 23 June. Leaf rust reports had come in from throughout the state by late June. On 12 July, leaf rust (100% incidence, 5% severity on flag leaves) was found in winter wheat fields south of Malta in north-central Montana. Generally, leaf rust was at low levels throughout the state in 2011.

Louisiana. Leaf rust was actively increasing, but at relatively low levels in plots throughout the state on 25 March. There were no reports of rust issues in commercial fields by late March. Leaf rust was still very active in plots of susceptible wheat at Baton Rouge and Winnsboro (northeastern Louisiana) in mid-April. Generally, wheat leaf rust arrived late in the state and caused little damage to commercial fields that matured earlier than normal.

Mississippi. Low levels of wheat leaf rust were found in edges of a Croplan 8868 field (near boot stage) in northwestern Mississippi in late March. On 15 April, low levels of leaf rust were found in a field of Pioneer 26R22 (*Lr11*) in Winston County in east central Mississippi. Generally, low levels of leaf rust were found in most wheat producing areas in the state in 2011.

Alabama. Low levels of leaf rust were observed in plots in southern and central Alabama in early May. No rust was found in the northeastern part of the state at that time.

Georgia. Wheat leaf rust was found in early planted plots and had spread to susceptible plots in Plains (west-central Georgia) by early March. Low levels of leaf rust were found in susceptible plots by mid-April. No leaf rust was found in surveys of several commercial fields in south central Georgia. Traces of leaf rust were observed in a field in Lee County

Table 3. Estimated losses in winter wheat due to rust in 2011 (T = trace, less than 1% loss statewide). Stripe rust disease pressure was great in the Pacific Northwest (even greater than in 2010), however, the widespread use of fungicides greatly mitigated potential yield losses in this area. — No reports or surveys conducted in the state by CDL staff. Total does not include states for which loss or production data is not available.

State	1,000 acres harvested	Yields in bushels per acre	Production in 1,000 of bushels	Losses due to:					
				Stem rust		Leaf rust		Stripe rust	
				%	1,000 bu	%	1,000 bu	%	1,000 bu
AL	195	73.0	14,235	0.0	0	T	T	T	T
AZ	6	70.0	420	—	—	—	—	—	—
AR	520	58.0	30,160	0.0	0	T	T	T	T
CA	420	85.0	35,700	0.0	0	T	T	6.0	2,279
CO	2,000	39.0	78,000	T	T	T	T	T	T
DE	75	69.0	5,175	0.0	0	T	T	0.0	0
FL	8	45.0	360	0.0	0	0.0	0	0.0	0
GA	200	55.0	11,000	0.0	0	T	T	T	T
ID	770	82.0	63,140	0.0	0	0.0	0	7.0	4,752
IL	765	61.0	46,665	0.0	0	T	T	0.0	0
IN	400	62.0	24,800	T	T	1.0	251	T	T
IA	16	45.0	720	0.0	0	T	T	0.0	0
KS	7,900	35.0	276,500	T	T	T	T	T	T
KY	440	70.0	30,800	0.0	0	T	T	0.0	0
LA	235	63.0	14,805	T	T	T	T	T	T
MD	190	66.0	12,540	0.0	0	T	T	T	T
MI	680	75.0	51,000	T	T	T	T	T	T
MN	26	56.0	1,456	T	T	T	T	T	T
MS	335	64.0	21,440	0.0	0	0.0	0	T	T
MO	680	50.0	34,000	0.0	0	2.0	694	0.0	0
MT	2,190	41.0	89,790	0.0	0	0.0	0	10.0	9,977
NE	1,450	45.0	65,250	0.0	0	T	T	T	T
NV	9	115.0	1,035	—	—	—	—	—	—
NJ	31	49.0	1,519	—	—	—	—	—	—
NM	95	22.0	2,090	—	—	—	—	—	—
NY	93	56.0	5,208	0.0	0	T	T	0.0	0
NC	610	68.0	41,480	T	T	T	T	0.0	0
ND	375	37.0	13,875	0.0	0	1.0	140	1.0	140
OH	850	58.0	49,300	--	—	—	—	—	—
OK	3,200	22.0	70,400	0.0	0	1.0	711	0.0	0
OR	825	77.0	63,525	0.0	0	T	T	7.0	4,781
PA	170	51.0	8,670	—	—	—	—	—	—
SC	180	60.0	10,800	T	T	1.0	109	0.0	0
SD	1,590	42.0	66,780	0.0	0	0.0	0	0.0	0
TN	310	69.0	21,390	—	—	—	—	—	—
TX	1,900	26.0	49,400	0.0	0	1.0	499	0.0	0
UT	124	50.0	6,200	0.0	0	0.0	0	T	T
VA	250	71.0	17,750	0.0	0	1.0	179	T	T
WA	1,730	75.0	129,750	0.0	0	0.0	0	3.5	4,706
WV	6	59.0	354	—	—	—	—	—	—
WI	335	65.0	21,775	T	T	T	T	0.0	0
WY	130	34.0	4,420.0	—	—	—	—	—	—
Total above	32,314	46.2	1,493,677		0		2,583		26,635
U.S. % loss				T		0.2		1.8	
U.S. total	32,314	46.2	1,493,677		T		2,583		26,635

Table 4. Estimated losses in spring and durum wheat due to rust in 2011 (T = trace, — = states for which loss or production data is not available).

SPRING WHEAT									
				Losses due to:					
	1,000 acres	Yields in bushels	Production in 1,000	Stem rust		Leaf rust		Stripe rust	
State	harvested	per acre	of bushels	%	1,000 bu	%	1,000 bu	%	1,000 bu
CA	—	—	—	0.0	0	T	—	1.0	—
CO	44	87.0	3,828	T	T	T	T	T	T
ID	620	84.0	52,080	0.0	0	0.0	0	4.0	2,170
MN	1,500	46.0	69,000	T	T	T	T	T	T
MT	2,400	32.0	76,800	0.0	0	T	T	5.0	4,042
NV	3	90.0	270	—	—	—	—	—	—
ND	5,500	31.5	173,250	0.0	0	0.0	0	0.0	0
NY	—	—	—	0.0	0	T	—	0.0	0
OR	157	70.0	10,990	0.0	0	T	T	7.0	827
SD	20	46.0	920	0.0	0	0.0	0	0.0	0
UT	1,220	31.0	37,820	—	—	—	—	—	—
TX	—	—	—	0.0	0	1.0	—	0.0	—
WA	615	61.0	37,515	0.0	0	0.0	0	2.5	962
Total above	12,079	38.3	462,473		0		T		8,001
U.S. % loss				T		T		1.7	
U.S. total	12,079	38.3	462,473		0		T		8,001
DURUM WHEAT									
				Losses due to:					
	1,000 acres	Yields in bushels	Production in 1,000	Stem rust		Leaf rust		Stripe rust	
State	harvested	per acre	of bushels	%	1,000 bu	%	1,000 bu	%	1,000 bu
AZ	79	101.0	7,979	—	—	—	—	—	—
CA	115	109.0	12,535	0.0	0	0.0	0	T	T
ID	11	69.0	759	0.0	0	0.0	0	0.0	0
MT	390	30.0	11,700	0.0	0	0.0	0	5.0	616
ND	720	26.0	18,720	0.0	0	0.0	0	0.0	0
OR	—	—	—	0.0	0	T	T	0.0	0
SD	7	28.0	196	0.0	0	0.0	0	0.0	0
Total above	1,322	39.3	51,889		0		0		616
U.S. % loss				0.0		T		1.2	
U.S. total	1,322	39.3	51,889		0		0		616

in southwestern Georgia in late April. Otherwise, no rust was found in commercial fields in several counties surveyed in the southwestern part of the state by late April.

South Carolina. Leaf rust was found in the susceptible plots of USG 3209 (*Lr26*, +) and Panola (*Lr11*) in Barnwell County in the southern coastal plain on 22 April.

North Carolina. Wheat leaf rust was very light or absent in commercial fields in late May in eastern North Carolina due to widespread fungicide use. Leaf rust was heavy in susceptible plots in eastern North Carolina on 20 May, indicating inoculum was present. Generally, leaf rust was at low levels throughout the state in 2011. However, a late, moderate leaf rust epidemic occurred in Robeson County in south-central North Carolina.

Virginia. Traces of wheat leaf rust were found in plots at Warsaw in eastern Virginia on 14 April. Wheat leaf rust was very light or absent in commercial fields in eastern Virginia due to widespread fungicide use. Leaf rust was heavy in susceptible plots in eastern Virginia on 20 May, indicating inoculum was present.

Delaware, Maryland. Low levels of leaf rust were found on lower leaves in a plot in southern Delaware on 9 May and on the eastern shore areas of Delaware and Maryland on 20 May.

Arkansas. Heavy amounts of leaf rust were found in a 120-acre field of Jackpot grown for seed in central Arkansas in mid-March. This was the only known leaf rust in the state by 22 March. Trace levels of leaf rust were found in plots at Kibler in northwestern Arkansas in early May and by 18 May, severities up to 70% were observed on flag leaves in the plots (late soft dough stage). Trace amounts of leaf rust were found on some cultivars (no leaf rust found on most cultivars) in northeastern Arkansas in mid-May. In late May, trace amounts of leaf rust were found in plots at Fayetteville in northwestern Arkansas. Generally, leaf rust was at low levels in the state in 2011.

Missouri. Low levels of leaf rust were found in fields throughout much of the state in early June.

Iowa. Low levels of leaf rust were found in a field at mealy ripe stage in Wayne County in south-central Iowa on 4 June.

Kentucky. In early June, leaf rust was widespread on susceptible cultivars (at late grain fill) not treated with fungicide. However, the rust arrived too late to cause any significant yield loss.

Illinois. Low levels of leaf rust were found in a soft red winter wheat nursery (at soft dough stage) in Pope County in southeastern Illinois on 1 June.

Indiana. Leaf rust was found throughout the state and was moderately severe on some cultivars in early June.

Wisconsin. Leaf rust was found at trace levels in fields in Dodge and Jefferson Counties in southeastern Wisconsin in early June. Plots of unsprayed soft red winter wheat at the University of Wisconsin Experiment Station at Sturgeon Bay in northeastern Wisconsin had leaf rust severities 0 to 40% on 8 July. Unsprayed soft red winter wheat fields (soft dough growth stage) located within 5 miles of the Lake Michigan shoreline from Sturgeon Bay to Manitowoc, had leaf rust severities of 40% on 14 July.

New York. Leaf rust from a suspected overwintering site was found in Cayuga County in north central New York on 2 June. Low incidences of leaf rust were found across central, western, and southern New York by 20 June. Most fields had infections on the upper leaves, but a small number of fields with more severe rust had infections all over the plants typical of overwintering local infections. In western New York, a field of the cultivar Richland was nearly killed by leaf rust and an adjacent field of the cultivar Caledonia had green leaf tissue remaining only on the flag leaves. Low levels of wheat leaf rust were found on various soft red winter wheat lines in mowed alleyways in the nursery at Aurora in central New York in mid-July. Very little rust was found in the plots.

Washington. A few leaves with wheat leaf rust pustules were found in a field in south-central Washington in mid-March. A single wheat leaf rust pustule was found on the cultivar Farnum in a field in southeastern Washington on 15 April. In 2010, leaf rust was severe on Farnum in the same county.

California. Leaf rust was moderately severe in Dirkwin plots at Colusa in the Sacramento Valley in early April and by late April it was severe in Dirkwin and Mika plots. Leaf rust was found in plots, particularly on the hard white spring cultivar Blanca Grande and some advanced breeding lines, at the UC Davis Agronomy Farm in the Sacramento Valley on 23 May. Leaf rust was observed in nurseries in California's Central Valley where normal crop maturity was delayed by cooler and wetter than normal weather.

Ontario, Canada. In early July plots in southwestern Ontario (Windsor to north of London), had leaf rust incidence of 10% and trace to 40% severities on flag leaves. The late development of leaf rust was expected to have limited impact on yield.

The number and frequency of virulence phenotypes of *P. triticina* found in 2011 in the U.S. can be found in Table 1 (pp. 228-229) and Table 2 (p. 230).

The 2011 wheat leaf rust observation map can be found at http://www.ars.usda.gov/SP2UserFiles/ad_hoc/36400500Cerealrustbulletins/2011wlr.pdf.

Lr gene postulations of current soft red winter, hard red winter, and hard red spring wheat cultivars are available in a searchable database at http://160.94.131.160/fmi/iwp/cgi?-db=Lr%20gene%20postulations&-loadframes.

Wheat stripe rust (*Puccinia striiformis* f. sp. *tritici*). Generally, wheat stripe rust was widespread and severe in the Pacific Northwest, Sacramento Valley in California, and Montana in 2011. Stripe rust was active very early in the Pacific Northwest, e.g. mid-February in Washington and Oregon. Very little stripe rust was found in Texas and Oklahoma, whereas it was at low levels in Kansas and Nebraska except for scattered hot spots in some fields. Stripe rust was mostly at low levels and widely scattered in the eastern U.S. Significant wheat yield losses due to stripe rust occurred in the Pacific Northwest, California, and Montana (see Tables 3 and 4).

Texas. Stripe rust was found in south central Texas plots on 8 March, but by mid-April development and spread had ended.

Kansas. Low levels of stripe were found in many locations in the state by late May. By early June, stripe rust could be found in most locations in the state and the levels had increased slightly. However, a few hot spots were found in fields in Ellis (central Kansas) and Smith County (north-central Kansas). Susceptible cultivars in an irrigated nursery in Hays had nearly 100% incidence with severities in the range of 5 to 70%. The cultivars with severe disease depended on *Yr17* for resistance. Moderate levels of stripe rust (90% incidence, 10–50% severity) were found in a field in Smith County in north-central Kansas in early June. By mid- June, stripe rust was inactive in north-central Kansas. Dry conditions in many areas of the state limited stripe rust development in 2011.

Nebraska. A small focus of stripe rust (trace to 35% severity) was found in a commercial field (Feekes 10.5.1) in Polk County in southeastern Nebraska on 30 May. Severe levels of stripe rust were found scattered throughout a field in Adams County in south-central Nebraska on 10 June.

Colorado. Very low levels of stripe rust were found in plots of susceptible cultivars at Fort Collins in north-central Colorado on 13 June.

Louisiana. Stripe rust was found at very low levels in very susceptible plots at Winnsboro (northeastern Louisiana) on 3 March. By late March the stripe rust was very active in the plots. Some lines and several commercial cultivars heavily infected in 2010 were clean in 2011, whereas some lines and cultivars that were clean in 2010 were susceptible in 2011 suggesting perhaps a population change in the area. By mid-May, stripe rust had developed around the state, but was not a significant problem for growers.

Mississippi. Stripe rust hot spots were detected in a commercial field of Croplan 8868 (near boot stage) in northwestern Mississippi in late March. Much lower levels were detected in a field of Dixie 427 two miles away.

Arkansas. Stripe rust was the most prevalent wheat disease in the state in mid-April, but levels were low due a combination of dry, warm weather, effective resistance in many cultivars and fungicide use. It appears most stripe rust development was restricted to the fields where it overwintered. Rains and cool evenings in late April were favorable for stripe rust development, but development generally slowed by late May. There were, however, some areas where spore production persisted in late May.

Missouri. Traces of stripe rust were found in many areas of the state in early June.

Kentucky. Low levels of stripe rust were detected in a commercial field of Pioneer 25R35 (Feeke's 6 growth stage) in southwestern Kentucky in late March.

Illinois. Low levels of stripe rust were found in plots in east central Illinois on 13 May. Stripe rust was found at very low incidence in plots (near soft dough stage) in Pope County in southeastern Illinois on 1 June.

Indiana. Stripe rust was found in a southern Indiana field (Feekes 10.5.3 to 10.5.4 stage) at low incidence and severity the second week of May. Low levels of stripe rust were found in plots and fields in west-central and central Indiana, respectively in early June.

California. Cool, wet weather combined with late fall planting of fall-sown spring wheat and barley extended the time of exposure for wheat and barley to stripe rust in the Central Valley (Sacramento and San Joaquin Valleys) and surrounding areas in 2011. Stripe rust was severe on some plots at heading at Colusa in early March. A commercial field of Joaquin (heading stage) in the same county had severe stripe rust (80% severity, 100% incidence) despite two fungicide applications applied too late for control. A severe natural stripe rust infection developed in the UC Davis Agronomy farm in mid-April where spreader rows had 60–100% severities. Stripe was severe on several cultivars in plots at Grimes and Clarksburg (early dough and anthesis to early dough, respectively) in the Sacramento Valley in late April. The commonly grown hard red wheat Joaquin (reported at 139,000 acres in commercial production) incurred severe levels of stripe rust throughout the area. Relatively few other commercial wheat cultivars were affected. There was an estimated 6% winter wheat loss and 1% spring wheat loss to stripe rust in California in 2011.

Washington. Generally, stripe rust was active much earlier in 2011 than 2010 throughout the Pacific Northwest with active sporulation noted in areas in Washington and Oregon in mid-February. Despite the cold weather in late February, stripe rust was active in mid-March in many fields in southeastern and central Washington. In mid-April, stripe rust was found at low incidence on lower leaves in winter wheat fields in southeastern Washington. This was the earliest detection of stripe rust in the area in many years. Stripe rust was found in nearly every field checked in Adams and Franklin Counties in central Washington. Incidences ranged from 1 to 10% (except for one field with incidence greater than 30%) and the rust was appearing on some upper leaves. Many fields in central and south-central Washington were sprayed with fungicides. Stripe rust severities up to 60% (normal for the area) were found in the Mount Vernon winter nursery in northwestern Washington in late April. Low levels of stripe rust were found in fields in eastern Washington by late April. Fungicide applications had stripe rust under control in many commercial winter wheat fields in southeastern Washington in mid-May where conditions had been favorable for stripe rust development. Up to 30% of the winter wheat in Garfield County in southeastern Washington was affected by stripe rust by mid-June. Fungicides continued to be applied to control stripe rust. Stripe rust increased rapidly in much of the state, particularly the Palouse region in southeastern Washington by late June. Susceptible winter wheat entries in plots around Pullman (southeastern Washington) had 100% severities, all from natural infection. Due to the extended rust season and extremely high spore load this year fungicide treatment was economical even on resistant cultivars. High-temperature-adult-plant resistance held up, but not to its full extent due to the early season low temperatures and heavy spore load. There was an estimated 3.5% winter wheat loss and 2.5% spring wheat loss to stripe rust in Washington in 2011.

Oregon. Stripe rust was widespread in western and northeastern Oregon in mid-April. There was an estimated 7% winter wheat loss and 7% spring wheat loss to stripe rust in Oregon in 2011.

Idaho. Stripe rust was found in a row of the hard red winter wheat Moreland in southeastern Idaho in late March. The rust had overwintered, something uncommon in this area. Stripe rust was widely distributed in northern and southern Idaho in mid-April. Stripe rust was increasing on lower leaves in plots at jointing stage at Aberdeen (southeastern Idaho) on 11 May and was increasing in commercial winter wheat fields throughout southern Idaho in mid-May. The cool, wet weather was very conducive for stripe rust development and fields not sprayed with fungicides were likely severely impacted. Fungicide applications had stripe rust under control in many commercial winter wheat fields (Feekes 5) in Latah County in northwestern Idaho in mid-May. Unsprayed fields in the county had 10% severity and 40% prevalence. Stripe rust continued to be an issue in northwestern Idaho in mid to late June. Stripe rust development in winter wheat nearly ceased by mid-August, particularly in cultivars with high-temperature adult plant resistance. Some spring wheat cultivars were exhibiting higher than expected stripe rust infection (e.g., UI Pettit), whereas others (e.g., Alturas) were still holding up. Spring wheat fields sprayed with fungicides at herbicide timing had reduced infection compared to unsprayed fields; however, stripe rust redeveloped when a second application was not applied. There was an estimated 7% winter wheat loss and 4% spring wheat loss to stripe rust in Idaho in 2011.

Montana. Stripe rust was found in plots and fields in northwestern Montana on 10 May. No stripe rust was found in Pondera, Choteau, and Teton counties east of the Rockies. In mid-May stripe rust was found at very low incidence on an unknown cultivar in Choteau County. By mid-June, stripe rust was severe in many areas of the state including Hill, Prairie, Big Horn, Lake, and Flathead Counties. The resistance in the cultivar Yellowstone was holding up, whereas the reactions on the cultivars Genou and Jagalene varied by location. Stripe rust was very active and severe throughout most wheat producing counties in the state by late June. According to a retired plant pathologist, this is the worst stripe rust he had seen in 30 years. The resistance in the cultivar Yellowstone and AP503 were holding up, whereas the cultivar Genou was very susceptible. Stripe rust was widely prevalent in both winter and spring wheat in Fergus, Phillips, and Valley counties in north-central Montana in mid-July. Despite the high daytime temperatures (90–100+°F) in mid-August, stripe rust was still active in much of the state. Nighttime temperatures ranged from 55–70°F with high humidity and significant dews. Stripe rust was widespread and severe in Montana in 2011. Most wheat fields were fungicide sprayed at least once. There was an estimated 10% winter wheat loss and 5% spring wheat loss to stripe rust in Montana in 2011.

Utah. High levels of stripe rust were found in commercial winter wheat fields in Weber and Box Elder Counties in north central Utah the second week of June. Most fields had been treated with fungicides, but some untreated fields were significantly impacted. Some irrigated fields in the Bear River Valley of northern Utah likely experienced yield reductions due to stripe rust. Many producers sprayed fungicides to mitigate the possible damage.

Alberta, Canada. Stripe rust was found at Vulcan in south central Alberta on the winter wheat AC Intrepid (full boot to 50% headed) and the hard white spring wheat Snowstar (6 leaf, 3 tillers) in early July.

Ontario, Canada. Stripe rust was found in a winter wheat nursery at Ridgetown in southwestern Ontario in late June. Incidences ranged from trace to 20% with severities up to 30%.

The 2011 stripe rust observation map can be found at http://www.ars.usda.gov/SP2UserFiles/ad_hoc/36400500Cerealrustbulletins/2011wstr.pdf.

NEBRASKA

UNIVERSITY OF NEBRASKA AND THE USDA–ARS GRAIN, FORAGES AND BIOENERGY UNIT.
Lincoln, NE, USA.

The 2009–10 Nebraska wheat crop.

Wheat production. In 2011, 1,500,000 acres of wheat were planted in Nebraska and 1,400,000 were harvested with an average yield of 45 bu/acre for a total production of 63,000,000 bu. In 2010, 1,600,000 acres of wheat were planted in Nebraska and 1,490,000 were harvested with an average yield of 43 bu/acre for a total production of 64,070,000 bu. In 2009, 1,700,000 acres of wheat were planted in Nebraska and 1,600,000 were harvested with an average yield of 48 bu/acre for a total production of 76,800,000 bu. Despite continued genetic improvement, the main determinant in wheat production seems to be acres harvested, government programs, the price of corn, and weather (which also affects disease pressure and sprouting). This is an economic reality in understanding wheat yields and productivity in Nebraska.

Cultivar distribution. In 2011, Overland was the most widely grown wheat cultivar in Nebraska (10.8%), closely followed by Pronghorn (10.4%). Pronghorn and Goodstreak are tall (conventional height) wheat cultivars that have consistently done well in the drought-prone areas of western Nebraska. Interestingly, the Buckskin acreage increased slightly, indicating that tall wheats, which are adapted to drought in the west, remain very popular. TAM 111 became the third most popular wheat in Nebraska, followed by Millennium, Buckskin, Jagalene, and Goodstreak (Table 1, p. 237).

New cultivars. Two new cultivars were increased and formally released in 2010. No new line was released in 2011. The two lines released in 2010 were **NE01481** and **NI04421**.

NE01481 will be marketed as Husker Genetics Brand McGill in honor of a legendary professor of genetics at the University of Nebraska. McGill is recommended for release, primarily due to its superior adaptation to rainfed wheat production systems in eastern and west-central Nebraska and its excellent resistance to wheat soil borne mosaic virus (WSBMV), a trait that is very rare in recent Nebraska releases. Additional information can be found at: http://agronomy.unl.edu/c/document_library/get_file?uuid=af82c455-7c15-48b7-ac84-c84ec9a4332f&groupId=4128273.

The second line is NI04421,which will be marketed as Husker Genetics Brand Robidoux, in honor of a pioneer French trapper who had a trading post between Nebraska and Wyoming. Robidoux was released primarily for its superior