



Issued by:

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Reports from this list as well as all Cereal Rust Bulletins are maintained on the CDL website (<http://www.ars.usda.gov/mwa/cdl>)

- Wheat stem rust was not severe or widespread in 2015.
- Wheat leaf rust was widespread east of the Rockies, but generally not severe.
- Wheat stripe rust was severe in much of the Great Plains.
- There were very few reports of oat stem rust in 2015.
- Oat crown rust was less severe in Minnesota in 2015 than 2014.
- There were few reports of barley leaf rust in 2015.
- *Thanks to all our cooperators!*

For original, detailed reports from our cooperators and CDL staff, please visit the [Cereal Rust Situation \(CRS\) reports page on the CDL website](#).

Significant rainfall in the Great Plains this spring effectively ended the persistent drought conditions there. The ample precipitation in combination with cooler than average temperatures created conditions conducive for stripe rust development throughout the Great Plains. Atlantic coastal states generally experienced drier than average conditions during the late growing season, thus greatly limiting rust development there. Much warmer and dry conditions in the Pacific Northwest hastened crop development and contributed to reduced stripe rust levels.

**Wheat stem rust.** Wheat stem rust was not widespread or severe in the U.S. in 2015. It was only reported in Texas, Louisiana, Nebraska, Kansas, Ohio, Michigan and Minnesota. All collections and observations were from nurseries with the exception of collections from a field in northwestern Ohio and fields in northeastern and west central Texas. Wheat stem rust was first reported on March 4 at Weslaco in extreme southern Texas. To date, race QFCSC, the most commonly identified wheat stem rust race in recent years, was the only raced identified.

*Texas* – Wheat stem rust at 1% severity was found on six lines, including Morocco and Line E the last week of February in nurseries at Weslaco in extreme southern Texas. By March 10, severities as high as 30% were observed on Morocco. The wheat was at Feekes 10.2 stage. Trace levels of wheat stem rust were found in nurseries at Uvalde in southern Texas by late March. Stem rust arrived early in some plots at Castroville in South Texas and had increased to 100S on susceptible lines that were grouped together in the nursery by April 24. The stem rust was not widespread in the Castroville nurseries, but developed in the clustered group of susceptible lines. In late April, despite ample moisture there was little wheat stem rust found in South Texas. On May 4, stem rust was observed in Ellis and Concho Counties, in northeastern and west central Texas, respectively. Cool spring temperatures likely limited stem rust development in the state. Additionally, fungicides were applied in many areas of eastern, central and northern Texas.



*Louisiana* – Stem rust was present at incidences of 20-80% with severities of 20-80% in nurseries at Alexandria in central Louisiana on May 1. Cooler temperatures earlier in the season in combination with fungicide applications limited stem rust development in the state.

*Kansas* – On June 19, wheat stem rust was found in a nursery at Hays in northwestern Kansas. There were no additional reports from the state.

*Nebraska* – Wheat stem rust was found on winter wheat in plots at Lincoln in southeastern Nebraska the third week of June. Lincoln received record rainfall in May and June. There were no additional reports from the state in 2015.

*Ohio* – Wheat stem rust (~30% severity) was found in a small patch of young plants about 50' from the edge of a mature field near Archibald in northwestern Ohio the first week of July. This was the only wheat stem rust found on a field survey from Indianapolis to west central Ohio north to southeastern Michigan conducted in late June to early July.

*Michigan* – Wheat stem rust at low incidence and severity was found in two nurseries in Ingham County in south central Michigan on July 8. Most wheat fields in southern Michigan had reached physiological maturity.

**Wheat stem rust map.** Please visit: <http://www.ars.usda.gov/Main/docs.htm?docid=9757>.

**Wheat leaf rust.** Wheat leaf rust was found throughout the Great Plains in 2015, but a cool spring with higher than average rainfall in Texas and Oklahoma was more conducive for stripe rust development. Additionally, the loss of leaves to stripe rust combined with fungicide applications (to control stripe rust) contributed to the limited leaf rust development. Leaf rust did not develop to any great extent in the Gulf States and there was very little or none found in the Atlantic coast states where conditions were dry during the season. Wheat leaf rust was found in the Willamette Valley in Oregon, where it has rarely been observed for the last 10-15 years. Warm spring and summer weather and adequate moisture created conditions for leaf rust development. Leaf rust was found in Minnesota, Wisconsin and Ohio, but severities were generally low.

*Texas* – Wheat leaf rust was spreading in plots at College Station in late February and had reached 100S on Baldwin and TAM 110 (*Lr37*). At Bushland in the Texas High Plains and Chillicothe in the Texas Rolling Plains leaf rust was easy to find, but at low severity. In late March, wheat leaf rust was uniformly distributed in the lower canopy of spreader rows in nurseries at Castroville in south central Texas. The borders/spreader rows had reached 100S in the mid-canopy. Rains and warm temperatures were conducive for further spread.

Leaf rust was prevalent and reached 80% or more on Morocco and 30-40% on Line E in a nursery at Weslaco in extreme south Texas the second week of March. Very little leaf rust was found on other lines. At Mission, in extreme southern Texas, leaf rust was found on a few plants mixed in with barley used as a windbreak in watermelon production fields.

Generally, wheat leaf rust at low severity was observed in edges of otherwise rust-free commercial fields in South Texas in late April, however, at Wharton and Uvalde severities reached 50% with incidences of 100%. Winter wheat further south near Beeville was approaching maturity. Leaf rust was moderate to severe on susceptible lines in nurseries at Howe, but much lighter at Leonard and Farmersville in northeastern Texas on May 4.

*Oklahoma* – Low levels of wheat leaf rust were observed on strips of Jagalene (*Lr24*) in a nursery at Stillwater in north central Oklahoma on February 10. By March 16, the cold weather in late February and



early March had killed the lower leaves where the leaf rust was originally found and no wheat leaf was observed. In mid-March leaf rust was active in south and central Oklahoma, however, stripe rust was more prevalent. Scattered pustules of leaf rust were found near Stillwater and Marshall in northern Oklahoma the first week of April. No real hot spots were observed. Much of the state was still dealing with very dry conditions. By late April, leaf rust has increased in north central and in far southwestern Oklahoma, but stripe rust had increased much more due to cooler temperatures and recent rains. Stripe was around 90% severity on flag leaves of Jagalene (*Lr 24*) in plots at Stillwater. Wheat in the state was generally between ¼ to nearly full berry. The second week of May leaf rust was found at Kingfisher in central Oklahoma and Kildare and Lahoma in north central Oklahoma. Wheat leaf rust was severe in some cases, but had not increased as much as stripe rust and was mostly found on leaves of cultivars resistant to stripe rust. Wheat was at full berry to nearly milk.

By May 15, wheat leaf rust development had increased rapidly around Stillwater. Susceptible cultivars such as OK Bullet were at 80-90S. Stripe rust susceptible cultivars had lost their leaves, but wheat leaf rust rapidly developed on cultivars that were stripe rust resistant and susceptible to leaf rust, e.g. the cultivars Jackpot (*Lr39/41*) and Greer (*Lr39/41*). While stripe rust was prevalent in nurseries at Goodwell in the panhandle the fourth week of May, leaf rust was increasing. The wheat was at milk stage. Wheat in areas of south central Oklahoma was at or near maturity.

*Kansas* – On March 11, leaf rust was not found in plots near Manhattan in northeastern Kansas that had leaf rust in the Fall of 2014. Cold temperature had caused severe tip die-back. Trace amounts of leaf rust were found in adjacent fields that were planted much later and exhibited less winter injury. Trace levels of leaf rust were observed on lower leaves in Reno and Sumner counties in south central Kansas on March 13. The incidence was very low, taking several minutes to find pustules. Trace amounts of leaf rust were found in many areas of southeastern and central Kansas the fourth week of April including known susceptible cultivars Fuller (*Lr17, 39/Lr41*) and WB4458 (*Lr39/41*). Cool temperatures, however, were more conducive for stripe rust development and spread.

Leaf rust, at generally low levels, was found in southeastern, south central, central and north central Kansas by May 4. The leaf rust was most common on the cultivars with *Lr39/41* resistance gene such as Fuller (*Lr17, 39/Lr41*) and WB4458 (*Lr39/41*). In south central Kansas the fourth week of May wheat leaf rust incidence was generally between 10-20% and severity was less than 1% on flag leaves. Leaf rust was heavier in nurseries near Hutchinson (south central Kansas) with severities approaching 10-15% on flag leaves of the susceptible cultivar Overley (*Lr39/41*). Many of the cultivars grown in the state are susceptible to leaf rust.

*Nebraska* – Leaf rust at low levels was found in the lower canopy of the cultivar Overley (*Lr41*) at Mead in eastern Nebraska on May 19. Cool, wet conditions in the state favored stripe rust development. Leaf rust was appearing on plants that had not lost their leaves to stripe rust in winter wheat nurseries at Lincoln in southeastern Nebraska the second week of June. Leaf rust was also found in a nursery in Furnas County in south central part of the state and at Crete in southeastern Nebraska. As in Lincoln, the leaf rust was found on stripe resistant cultivars and lines that had not lost their leaves to stripe rust. Leaf rust was actively developing in fields in southwestern Nebraska as well as southern areas of the Panhandle in late June and was found at moderate incidence and severity in the Box Butte County in the northern Panhandle.

*Colorado* – While stripe rust was widespread in eastern Colorado by early June, traces of wheat leaf rust were appearing on cultivars that had not lost their leaves to stripe rust late in the season and did not have a significant impact. Stripe rust was the predominant rust in the state this season.



*Arizona* – Leaf rust at low incidence and severity was easily found in nurseries south of Yuma in southwestern Arizona the second week of April. This was the first time cereal rusts have been found in the nurseries since they were established in 2010.

*Louisiana* – Leaf rust was present and developing on susceptible cultivars (boot stage) in nurseries at Baton Rouge and Winnsboro in southern and northeastern Louisiana, respectively, the first week of April. Warm temperatures and a few good dew periods were conducive for development. By late April, leaf rust had increased in the state reaching light to moderate severities in nurseries, however, the crop matured rapidly and minimal impact resulted.

*Mississippi* – Wheat leaf rust was the most prevalent rust in the state this season and was observed from Hattiesburg in the southeast to Shelby in the northwest. Stripe rust, when found in commercial fields, was at very low levels. The wheat crop maturity lagged behind average due to the wetter than normal winter.

*Tennessee* – Wheat leaf rust at variable incidence and severity was found in soft red winter wheat plots at Madison in western Tennessee in mid and late May.

*Virginia* – Wheat leaf rust was just appearing in plots at Painter in eastern Virginia the third week of May. Levels were not sufficient for sampling. Wheat headed at least a week later than average due to the cool spring. Wheat leaf rust was moderately heavy on susceptible lines in plots at Warsaw in eastern Virginia in late May. The second week of June, leaf rust was also found in nurseries at Blacksburg in western Virginia. Rust development in the state was limited due to dry conditions particularly following heading and only reached trace levels.

*Minnesota* – A single wheat leaf rust pustule was found in a winter wheat plot at Lamberton in southwestern Minnesota on May 28. By the second week of June leaf rust was found at low levels on both winter and spring wheat (lesser amounts) in nurseries at Lamberton. Wheat leaf rust was observed on the lower leaves of winter wheat in plots at St. Paul Minnesota on June 1. Incidence was very low with a trace level of severity. A few uredinia were fully erumpent, other uredinia had not yet broken through the leaf epidermis. On June 7 in the same plots, leaf rust infections were at trace levels with low incidence. The cultivars Marshall (*Lr2a*, 10 and 34) and Glenn (*Lr2a*, 21 and 34) had leaf rust severities of 5S and 40S, respectively, at Waseca in south central Minnesota on July 10. No leaf rust was found on Faller (*Lr21*) and Prosper (*Lr21*). In plots at Lamberton, in southwestern Minnesota, Marshall was at 40S, WB 907, Faller, Glenn and Prosper were at 10S. In the last week of July in the plots at Waseca and Lamberton, cultivars with *Lr21* had moderate levels of leaf rust infections. Other cultivars generally had lower leaf rust severities, although Marshall had been defoliated due to high leaf rust severity. Generally, leaf rust in the state did not develop to high severity levels this season.

*South Dakota* – Leaf rust was found at low severity in several winter and spring wheat fields in central South Dakota in late June.

*North Dakota* – Low levels of wheat leaf rust were found in southeastern North Dakota on June 30 while additional reports were received a few days later. Leaf rust was reported in very few fields in the state this season and while found in nurseries the leaf rust there was at low incidence. The low levels in the state are likely due to the cool weather, loss of leaves to stripe rust and the application of fungicides

*Wisconsin* – High levels of leaf (and stripe) rust were found in winter wheat variety trial plots at Arlington in south central Wisconsin on June 26. Both leaf and stripe rust were present on the flag leaves of many cultivars and incidence reached 100% with 60% or higher severities. Many farmers likely sprayed their



crops with fungicides and would not be expected to have such high levels of rust. Wheat leaf rust was most common in eastern Wisconsin this season.

*Indiana* – Wheat leaf rust was found in fields in central and east central Indiana on June 30. The wheat was at kernel hard growth stage.

*Ohio* – Wheat leaf rust was found in fields in west central and northwestern part of the state in late June and early July. Severities were high (~80%) in northwestern, Ohio. The wheat was from mealy ripe to kernel hard growth stage.

*Michigan* – Wheat leaf rust at trace incidence and trace to 10% severity was found in central and eastern Michigan on June 11 and was believed to be widespread across Michigan. High wheat leaf rust severities (~80%) were found in fields in Lenawee County in southeastern part of the state on July 1. The wheat was at mealy ripe growth stage. Most fields in southern Michigan had reached physiological maturity by July 9.

*New York* – Trace levels of wheat leaf rust were found in a single field in Orleans County in western New York the fourth week of May. Wheat was from late jointing to boot stages.

*Oregon* – Wheat leaf rust was found in plots and fields in several areas in both the southern and northern Willamette Valley in western Oregon in late May. Wheat leaf rust has rarely been found in Oregon the last 10-15 years, perhaps because some susceptible cultivars are no longer grown. The wheat leaf rust was found on the cultivars Bobtail and Cara. This year warm temperatures and moist weather early in the season were conducive for wheat leaf rust development.

#### Wheat leaf rust races identified to date from 2015 collections.

Virulence code	Virulences	State	No. of isolates
MBDSB	1,3,17,B,10,14a,	AZ	2
MBDSD	1,3,17,B,10,14a,39	AZ, KS, LA, OK, TX	14
MBPSD	1,3,3ka,17,30,B,10,14a,39	LA, TX	2
MBTNB	1,3,3ka,11,17,30,B,14a	LA	6
MBTSB	1,3,3ka,11,17,30,B,10,14a	LA	1
MCPSB	1,3,26,3ka,17,30,B,10,14a	LA, TX	2
MCTNB	1,3,26,3ka,11,17,30,B,14a	LA	1
MFPSB	1,3,24,26,3ka,17,30,B,10,14a	AZ	3
MFPSD	1,3,24,26,3ka,17,30,B,10,14a,39	TX	1
MLDSD	1,3,9,17,B,10,14a,39	KS	7
MLPSD	1,3,9,3ka,17,30,B,10,14a,39	AZ, KS, OK, TX	10
MMDSD	1,3,9,26,17,B,10,14a,39	KS, TX	6
MMPSD	1,3,9,26,3ka,17,30,B,10,14a,39	OK, TX	4
PBDGJ	1,2c,3,17,10,28,39	TX	5
TBBGJ	1,2a,2c,3,10,28,39	TX	1
TBBJJ	1,2a,2c,3,10,14a,28,39	TX	1
TBNGJ	1,2a,2c,3,3ka,17,10,28,39	KS	2
TBNJJ	1,2a,2c,3,3ka,17,10,14a,28,39	KS	1
TFTSB	1,2a,2c,3,24,26,3ka,11,17,30,B,10,14a	OK	1
TNBJJ	1,2a,2c,3,9,24,10,28,39	OK	3
TNBJJ	1,2a,2c,3,9,24,10,14a,28,39	OK, TX	2
Total			75



**Wheat leaf rust map.** Please visit: <http://www.ars.usda.gov/Main/docs.htm?docid=9757>.

**Wheat cultivar *Lr* gene postulation database.** Please visit: [Leaf rust resistance gene postulation in current U.S. wheat cultivars](#)

**2014 wheat leaf rust survey summary and results.** Please visit: [Wheat leaf rust race survey results](#).

**Wheat stripe rust.** Stripe rust appeared early this year (January and February) in Oregon, Louisiana, Arkansas, Mississippi and Texas. Oregon experienced a very mild winter while the Gulf States areas experienced a wet winter. Cool wet conditions this spring in the plains states were very conducive for stripe rust development. Stripe rust was particularly severe in Colorado and Nebraska and was found all the way to the Canadian border in North Dakota by early June. Stripe was active and developing in South Dakota, North Dakota and Minnesota in late June.

*Arizona* – Stripe rust at low incidence and severity was easily found in nurseries south of Yuma in southwestern Arizona the second week of April. Severities and incidences were highest in durum wheat. This was the first time cereal rusts have been found in the nurseries since they were established in 2010.

*California* – Stripe rust appeared in nurseries in both the Sacramento and San Joaquin Valleys the last few weeks of March. The wheat cultivar Joaquin was most severely impacted and had 90% severity and 100% incidence in a nursery at Corcoran in Kings County in the southern San Joaquin Valley. Moderate to severe infections were found on advanced lines (common wheat, durum, triticale and barley) in Arizona Plant Breeder's nursery in Yolo County in the Sacramento Valley. Severe drought conditions in the state limited stripe rust development in commercial fields.

*Oregon* – Stripe rust was observed in a nursery at Corvallis in western Oregon on January 10. The nursery was planted much earlier (September 16) than commercial fields in the Willamette Valley. Stripe rust was also found in the southern Willamette Valley January 7-12, about three weeks earlier than previously reported. The stripe rust was found in early-planted fields (September through first 10 days of October), but not found in later planted fields. By late February, stripe rust continued to develop on susceptible and moderately susceptible wheat cultivars in western Oregon.

Based on ratings from unsprayed plots in the southern Willamette Valley taken on April 8, stripe rust continued to be a concern in western Oregon. Stripe rust hot spots were found in plots of Rosalyn. Traces to higher levels of stripe rust were observed in Rosalyn plots and one commercial field in northern Willamette Valley. Rosalyn had shown excellent stripe rust resistance in the past. Stripe rust was not found in fields or in nurseries at Pendelton and Hermiston in Umatilla County in northeastern Oregon when surveyed on April 9.

*Washington* – No stripe rust was found in commercial fields on a survey through southeastern Washington on March 4. Wheat stripe rust was, however, found in nurseries near Walla Walla (southeastern Washington) planted on October 6. The plants were at Feekes 4-5 growth stage. As is typical, stripe rust was found in the nursery at Mt. Vernon in northwestern Washington. Susceptible checks were at 20-30% severity levels. Stripe rust was still not found in commercial fields surveyed in seven counties in southeastern Washington on April 9. However, stripe rust hot spots were rapidly developing in nurseries in Garfield and Walla Walla Counties in southeastern Washington. The rust was found from lower to upper leaves and had severities up to 90%. Conditions in the previous few weeks were conducive for further stripe rust development. At Mount Vernon in northwestern Washington, stripe rust severities had increased up to 50% on susceptible checks and border rows.

A single leaf was found with stripe rust in a nursery near Pullman in southeastern Washington on April 20. Stripe rust (7-10 spots in fields) was found in two of three nurseries near Pullman on susceptible checks or



border rows on April 28. A few spots of stripe rust were found in nurseries near Colfax in southeastern Washington. No rust was found in commercial fields surveyed in the Palouse region (Whitman County, Washington and Latah County, Idaho). Winter wheat ranged from Feekes 5-7 growth stages and spring wheat from planting to Feekes 3.

On May 20, wheat stripe rust, at generally low incidence and severity, was widespread in eastern Washington. Stripe rust was found in approximately 20% of the 80 commercial winter wheat fields surveyed between Lamont and Colfax. Near Walla Walla, stripe rust, in small hot spots, was more easily found in commercial fields. Most infections were found on upper leaves, but occasionally on the lower leaves. Higher stripe rust incidences and severities were found in nurseries at Walla Walla than in commercial fields. The relatively low levels found in commercial fields were mainly due to the use of resistant cultivars and applications of fungicides. Recent conditions in eastern Washington were conducive for stripe rust development after the dry conditions in April. As is typical, stripe rust was severe on winter and spring wheat in nurseries at Mt Vernon in northwestern Washington in late May. Susceptible checks and spreader rows had 85-100% severities.

Stripe was found in many fields of both winter and spring wheat in eastern Washington the second week of June, but at generally low levels. The low levels are likely due to the use of resistant cultivars, fungicide applications and warm, dry conditions. In contrast, susceptible cultivars in nurseries near Pullman developed to 100% incidence and 100% severity by June 11. At the Lind Dryland Station in Adams County stripe rust was found at low levels on susceptible winter wheat cultivars, but at higher levels on susceptible spring wheats. Hot, dry conditions have hastened crop maturity and minimized the development of stripe rust.

*Louisiana* – Stripe rust was observed on strips of a susceptible cultivar at Winnsboro in northeastern nursery Louisiana on January 21 and the rust was very active there by late March. Stripe rust was widespread and active in Baton Rouge in southern Louisiana in late March, however, stripe rust development slowed due to warm temperatures in late March and early April. Stripe rust severities continued to increase in nurseries at Winnsboro the first week of April. The temperatures there were a bit cooler and rainfall had been more frequent. Overall, stripe rust did not develop to significant levels in commercial fields in the state this season.

*Arkansas* – In January and February wheat stripe rust was widespread across the state and stripe rust hot spots were easily found in eastern Arkansas in early February. Very cool weather in February minimized additional spread. In late April foliar diseases were generally at low levels throughout the state, however, stripe rust was severe on susceptible cultivars not treated with fungicides. Adult plant resistance and fungicide applications were effective in mitigating the effects of stripe rust this season.

*Tennessee* – Stripe rust at very low levels was found on the tips of lower leaves in a field in Haywood County in western Tennessee the second week of April. On subsequent visits to the field stripe rust was harder to find. It does not appear the stripe rust developed to any extent in the state.

*Texas* – Stripe rust was observed on the lower leaves in fields in west central Texas at the end of February and the beginning of January. Fungicides were applied in mid-February, the wheat was fully tillered at the time. Some cultivars that had stripe rust included TAM 113, Coronado, Greer, Redhawk, Cedar and TAM 304. Stripe rust severities of 80% or higher were observed in some spots of Sisson plots at Weslaco in extreme southern Texas the second week of March while Panola exhibited chlorotic reaction, but with no sporulation. No stripe rust was observed on other wheat entries in the nursery. Early stripe rust infections could be found in fields around Kingsville. Spring wheat was at tillering to late joint stages. In late March, stripe rust was not uniform in the nurseries at Castroville, however, stripe rust had reached 70S on the flag leaves in rows of Patton. The wheat was at Feekes stages 9-10.5. Fungicides were applied to commercial fields in many areas of eastern, central and northern Texas to control stripe rust.



*Oklahoma* – Stripe was found in Stillwater in northern Oklahoma on March 21. Conditions were conducive for infection with light rains and cool days. By the first week of April, scattered pustules of stripe rust were found near Stillwater and Marshall in northern Oklahoma. No real hot spots were observed. A few stripe rust infections were found in a survey of Custer County in western Oklahoma on April 6. Generally, conditions were dry, but some wheat fields looked good. Wheat ranged from Feekes 7 to 8 stage. A few spots of stripe rust were found near Frederick and south of Apache in south central Oklahoma on April 7. No rust was found at other survey stops in the general area. Some fields in Tillman County looked good, but others were very dry. One field looked very good and had been timely sprayed with fungicides, but a 20 foot strip was not sprayed and stripe rust was severe on leaves below the flag leaf in the unsprayed strip while the sprayed areas were completely green. Wheat ranged from Feekes 9-10 stage. Stripe was active and increasing in north central and southwestern Oklahoma the fourth week of April. Cool temperatures and rains were conducive for further stripe rust development and spread in the state.

Stripe rust was prevalent in nurseries at Goodwell in the panhandle the fourth week of May, but leaf rust was increasing. The wheat was at milk stage. Wheat in areas of south central Oklahoma was at or near maturity. Stripe rust was widespread in the state by early May and developed to severe levels on some cultivars. Leaf rust was appearing on many cultivars with resistance to stripe rust that still had green leaves.

*Kansas* – Stripe rust was found at low levels in several fields in southeastern and central Kansas the fourth week of April. The stripe rust was most often found in the lower to mid-canopy, but found in the upper canopy in a few fields. Cultivars with stripe rust included Everest, Armour, Garrison and Ruby Lee suggesting a similar stripe rust population as in 2012. Cultivars with *Yr17* (Fuller, WB4458) only had trace levels of stripe rust.

By early May, stripe rust was reported in many areas of the state. The rust had moved into the upper leaves, where the disease can be most impactful, in many fields in the southeastern and south central areas of the state. Wheat in these areas was at heading to flowering stages. In the central, north central and some western areas stripe rust was at low levels and primarily on lower leaves. Recent conditions were conducive for further stripe rust development in the state. By the fourth week of May, stripe rust was very severe in areas of south central Kansas, with incidence near 100% and severity ranging from 20-80%. Wheat was in early grain development stages. Some of the cultivars with the most stripe rust included Armour, Everest, Garrison, LCS Wizard, Ruby Lee, TAM 111 and WB Redhawk while cultivars with a Jagger pedigree, e.g. 1863, Danby, Fuller and WB 4458 (*Yr17*) appeared moderately resistant. Stripe rust had moved to the upper leaves in fields in central and western Kansas and there were a few reports of severe stripe rust on flag leaves. Recent conditions were conducive for further stripe rust development in the state.

*Nebraska* – Stripe rust was widespread in the southernmost tier of counties in the state on April 28. Incidences ranged from 15% to > 80% with severities at trace to low levels in some fields. A few leaves were found with severities greater than 50%. Wheat was mostly at Feekes 6 growth stage, but ranged from Feekes 6 to 10. Stripe rust was found in eastern Nebraska on May 4. Recent rains and cool temperatures were conducive for further stripe rust development. Stripe rust was widespread in southwestern, south central and southeastern areas of the state the fourth week of May. Wheat stripe rust severities and incidences were very high in fields of susceptible cultivars not sprayed with fungicides in southern Nebraska. Many fields were extremely yellow due to stripe rust. Severely impacted fields may realize a 40-50% yield loss to stripe rust. Many fields were either not sprayed or sprayed too late with fungicide. Wheat in southern Nebraska ranged from flowering to the beginning of ripening. Conditions continued to be very conducive for stripe rust development, i.e. cool, wet weather.

Stripe rust was found in the southwestern Panhandle near the Wyoming border the second week of June. Stripe rust incidence and severity were at trace to low levels in fields in Box Butte County in the northern Panhandle





in late June. While stripe rust was still active in the Panhandle, the stripe rust development slowed with the warmer temperatures. By late June, stripe rust development in southern Nebraska had mostly stopped due to the lack of healthy leaf tissue left to infect. Stripe rust in the state this season was the most severe Stephen Wegulo, Extension Plant Pathologist, had every seen.

*Colorado* – Stripe rust was widespread in eastern Colorado with severities up to 100% in many areas by June 9. This was the worst stripe rust year in Colorado since it appeared as an issue in 2001. Leaf rust was appearing at trace levels on cultivars that have not lost their leaves to stripe rust. Cool, wet weather this spring created conditions very favorable for stripe rust development.

*Wyoming* – Light levels of stripe rust were found in both irrigated and dryland nurseries near Lingle in southeastern Wyoming in early June.

*South Dakota* – Stripe rust, at low incidence and severity, was observed in a winter wheat field near Winner in Tripp County in south central South Dakota the fourth week of May. No stripe rust, or other cereal rusts, were found in other winter wheat fields surveyed in central South Dakota. The recent cool, wet conditions were conducive for stripe rust development. Winter wheat was at boot to heading growth stages. By the last week of May stripe rust was found in several wheat fields in south central South Dakota. Stripe was found at low to moderate severity in winter wheat fields in several counties near the Nebraska border on June 4. A field in Gregory County had spots of severe stripe rust. Winter wheat was between heading and flowering. Recent cool, wet conditions were conducive for stripe rust development.

Stripe rust was prevalent in winter wheat trials across the state by June 15. Stripe rust was severe in some winter wheat fields not treated with fungicides in central South Dakota and was just beginning to develop in untreated spring wheat fields in late June. In winter wheat plots in Sully and Brookings Counties varying levels of susceptibility were observed in the Crop Performance Test nursery. By June 15, stripe rust was prevalent in winter wheat trials across the state. By the third week of July, hot daytime and nighttime temperatures slowed stripe rust development in the state.

*North Dakota* – Stripe rust was found in a spring wheat field in southeastern North Dakota and confirmed in areas from central part of the state to the northern border by June 1. The infections were found on the oldest leaves. Spring wheat ranged from tillering to jointing and winter wheat was at boot. Conditions were conducive for further stripe rust development. Stripe rust had moved to the flag leaves of both spring and winter wheat in fields in North Dakota by late June. The highest levels of incidence were in the eastern half of the state and highest severities were noted in fields not treated with fungicides or treated too late to be effective. June and early July were cooler than normal while hot daytime and nighttime temperatures arrived in mid-July. Despite the high temperatures stripe rust was still abundant in hard red spring wheat plots in eastern and central areas of the state in late July, however, sporulation was greatly reduced and leaves were prematurely drying to the rust. Most hard red spring wheat cultivars grown in the state are susceptible to wheat stripe rust.

*Minnesota* – Stripe rust was found in trace amounts at low incidence in winter wheat plots in St. Paul on June 7. Wheat stripe rust was found at low levels on both winter and spring wheat (lesser amounts) in nurseries at Lamberton in southwestern Minnesota the second week of June. Leaf rust was found at somewhat lower levels. Winter wheat was at flowering and spring wheat was at boot to heading growth stages. By early July, stripe rust was generally at moderate levels, but severe on some spring wheat cultivars in plots at Lamberton. The wheat was at early dough. At Waseca stripe rust was found at levels up to 60S (WB 907). Recent hot daytime and nighttime temperatures in the state limited further stripe rust development.



Stripe was much more prevalent in the state than the past two years. Higher levels of inoculum arrived from states to the south which in combination with a cooler early season were conducive for stripe rust development. More acres were planted to the hard red spring wheats Faller and Prosper that are more susceptible to wheat stripe rust than many of the other cultivars grown in the state.

*Illinois* – Stripe rust was found in border rows of AgriPro W1566 in a nursery in Pope County in southeastern Illinois on May 7. The rust was not widespread in the nursery. Stripe rust was found on three of the four cultivars in nurseries at Champaign and Urbana in east central Illinois the third week of May. The rust was found on AgriPro W1566, Dynagro 9441, Monier 844, but not on Pioneer 25R32. Wheat heads were just beginning to emerge in some cultivars. Stripe rust was also found in nurseries in Fayette County in south central Illinois. Stripe rust was widespread on susceptible wheat not treated with fungicides in the southern half of Illinois.

*Indiana* – Stripe rust was observed on P25R46 and Becks 113 near Evansville in southwestern Indiana the third week of May. Stripe rust was found in all fields of P25R46 surveyed, but severity was very low.

*Michigan* – Wheat stripe rust at trace incidence and trace to 10% severity was found in central and eastern Michigan on June 11 and it was believed to be widespread across Michigan.

*Wisconsin* – Wheat stripe rust was found in a winter wheat plot at Sharon in southeastern Wisconsin in early June. The pustules were only found on a single cultivar. This was the first report of stripe rust in Wisconsin in 2015. On June 11, wheat stripe rust was found in winter wheat nurseries at Fond du Lac and Chilton in eastern Wisconsin. At Fond du Lac stripe rust was only found in a few plots and high severities were found on flag leaves of some plants. Stripe rust was more widespread in the Chilton nursery, but severity was at low to trace in all plots. Wheat was in full flower at both locations. High levels of stripe (and leaf) rust were found in winter wheat variety trial plots at Arlington in south central Wisconsin on June 26. Both stripe and leaf rust were present on the flag leaves of many cultivars and incidences reached 100% with 60% or higher severities. Many farmers likely sprayed their crops with fungicides and would not be expected to have such high levels of rust. Stripe rust was predominant disease in central Wisconsin this season.

*Mississippi* – Wheat stripe rust was found at very low levels in the few nurseries it was found in the state and at extremely low levels in commercial fields this season. Leaf rust was the predominant rust in the state.

*Georgia* – Low levels of stripe rust were found on a few cultivars in a nursery in Floyd County in northwestern Georgia in late April. The infections appear to have come in late. There were no reports of natural stripe rust infection elsewhere in the state.

*Virginia* – Stripe rust was found in a plot of Tribute at Warsaw in eastern Virginia on May 4. Stripe rust was severe in a corner of a plot at Blacksburg in western Virginia in early June. Dry conditions following heading were not conducive cereal rust development in the state.

*Montana* – Stripe rust was widespread across the state by June 4. The cultivar Yellowstone was holding up well in the golden triangle area of the state.

*Idaho* – Stripe rust was found on winter wheat in a nursery at Parma in western Idaho in late April. The wheat was at the boot stage. It was believed the stripe rust was widespread and would continue developing to the east. On May 6, stripe rust was found on both the lower leaves and in the mid-canopy of winter wheat lines at late tillering to jointing stages at the Tetonia Research Station in eastern Idaho. Conditions were conducive for stripe rust development. There was no stripe rust observed in these plots when visited on April 21. Stripe was developing in susceptible spring wheat cultivars in late June. The hard red spring wheat cultivar Kelse was



particularly hard hit while stripe rust was also developing on hard white and soft white spring cultivars. Spring wheat growth stages ranged from late boot to early grain fill. Stripe rust was heavy on some winter wheat lines.

*Utah* – Stripe rust was found on the soft white winter wheat Lewjain and hard red winter wheat Lucin CL in a nursery at Logan in north central Utah in late April.

*Manitoba, Canada* – The first report of stripe rust in Manitoba was from a field southwest of Killarney in south central Manitoba near the North Dakota border in mid-June. The field was split between the winter wheat cultivars Emerson and CDC Falcon with more stripe rust found on CDL Falcon than Emerson. Winter wheat was at full flag leaf to early heading stage.

**Wheat stripe rust map.** Please visit: <http://www.ars.usda.gov/Main/docs.htm?docid=9757>.

**Oat stem rust.** Trace amounts of oat stem rust were observed on the leaves in plots of Marvelous oat at Weslaco in extreme southern Texas the second week of March. At Uvalde, in South Texas, trace amounts of oat stem rust were found in winter oat plots in late March. One pustule of oat stem rust was found in nurseries at Baton Rouge in southern Louisiana on March 25. By the second week of April, oat stem rust was actively increasing and spreading in the nurseries. Most lines were in early grain filling stages.

Oat stem rust was found in plots at Lincoln in southeastern Nebraska on June 17. This was the first report of oat stem rust since it was reported in nurseries in southern Louisiana and southern Texas in March. Oat stem rust was moderately severe on some oat lines in nurseries at Beresford in southeastern South Dakota in early July. Oat stem rust was found in plots at Kimball in central Minnesota in late July. To date, race TGN has been identified from a Marvelous oat collection made in a nursery at Weslaco in extreme southern Texas.

**Oat stem rust map.** Please visit: <http://www.ars.usda.gov/Main/docs.htm?docid=9757>.

**Oat crown rust.** Oat crown rust, at 25% incidence with severities as high as 35%, was observed around the Kingsville area of South Texas on March 3. The second week of March crown rust had reached 20% on some leaves of Marvelous in plots at Weslaco in extreme southern Texas. *Avena strigosa* (sometimes referred to as black oat) and Rodney Pg16 were crown rust free in plots at Weslaco. By late March, crown rust was widespread in the nurseries at Baton Rouge with ~5% severity in susceptible spreader rows. New infections were beginning to show and conditions were favorable for further spread and development. Oat crown rust at light prevalence and moderate severity was observed in nurseries at Uvalde in South Texas in late March. Crown rust was increasing and spreading rapidly in nurseries at Baton Rouge (southern LA) the first and second weeks of April. Severities had reached 70% on the susceptible spreader Brooks. Most lines were in early grain filling stages the second week of April.

Oat crown rust was found in plots at Lincoln and Mead in southeastern Nebraska on June 17. Oat crown rust, at very low levels, was found in nurseries at Lamberton in southwestern Minnesota on June 18. The oats were at heading to flowering at Lamberton. Oat crown rust, at 5% incidence and 30% severity, was found in a field in Logan County in northwestern Ohio on June 30. No other crown rust was found on the survey from Indianapolis to west central Ohio north to southeastern Michigan. The oats were at late milk to early dough. Oat crown rust was at very low levels in these plots at Lamberton on June 18. Oat crown rust appeared in commercial fields in Minnesota in mid to late June, appearing somewhat later than in 2014. It was noted that the crown rust infections on common buckthorn were also a bit later. By early July, oat crown rust had increased rapidly on some cultivars in plots at Lamberton in southwestern Minnesota. Incidences ranged from 30-100% with severities ranging from 5-20%. Oat crown was severe in the Matt Moore Buckthorn nursery at St. Paul in southeastern Minnesota by the second week of July. Crown rust was at low levels and scattered among cultivars in plots at Rosemount in southeastern



Minnesota in early July. Oat crown rust was widespread and developing in southeastern South Dakota by early July.

**Oat crown rust map.** Please visit: <http://www.ars.usda.gov/Main/docs.htm?docid=9757>.

**Barley stem rust.** A few stem rust pustules were observed on hooded barley, used in watermelon windbreaks, in the Lower Rio Grande Valley the second week of March. The barley ranged from jointing stage to heading. Barley stem rust was found in plots at Lincoln in southeastern Nebraska the third week of June. This was the first barley stem rust report since it was reported in watermelon windbreaks, in the Lower Rio Grande Valley of Texas the second week of March. In mid-July, trace amounts of barley stem rust at moderate severity were found in plots at soft dough at St. Paul in southeastern Minnesota. On July 24, very light amounts of barley stem rust were found in plots at hard dough stage in plots at McArthur in northern Sacramento Valley in California.

**Barley leaf rust.** Barley leaf rust was observed in alleys and a few limited areas in watermelon windbreaks in the Lower Rio Grande Valley the second week of March. The barley leaf rust was at early infection stage and not yet widespread. Trace levels of barley leaf rust were found on barley at a farm in Shandon in the southern area of the San Juan Valley of California on April 1. The barley was at mid-dough. Barley leaf rust at 50% incidence and 40% severity was found in a regional barley nursery at Davis, California on April 24. By May 6, the barley leaf rust had increased to 80% incidence with 40% severity in a nursery at Davis.

At Blackstone, in south central Virginia, barley leaf rust was found on a susceptible check in a nursery the third week of May. There was not enough rust present to rate the plots. No rust was found at Holland in southeastern Virginia. Barley headed at least a week later than average due to the cool spring. In plots at Blacksburg in western Virginia barley leaf rust was observed at 50% incidence and 60% severity on May 15.

Barley leaf rust was common on winter barley lines and cultivars in nurseries at Mt Vernon in northwestern Washington in late May. The barley was at flowering growth stage. By late June the barley leaf rust had increased to 100% incidence and 50% severity in the nursery. The barley was at milky ripe growth stage.

**Barley leaf rust map.** Please visit: <http://www.ars.usda.gov/Main/docs.htm?docid=9757>.

**Barley stripe rust** – Stripe rust was found on barley in a nursery near Walla Walla in eastern Washington on May 21. Barley stripe rust at high severity was found on the susceptible check, Steptoe, in nurseries at Mt Vernon in northwestern Washington in late May. Barley stripe rust was not found on other lines or cultivars in the nurseries.

**Rust on barberry.** Light amounts of rust aecia were appearing on common barberry (*Berberis vulgaris*), the alternate host for stem rust, in Dane County in south central Wisconsin the third week of May. On May 21, light amounts of pycnia were appearing on common barberry in southeastern Minnesota while early signs of aecial development were observed on some of the more mature leaves. Light to moderate aecial infections were found on common barberry in Manitowoc County in eastern Wisconsin on June 16. Rye stem rust, *Puccinia graminis* f. sp. *secalis*, was identified from aecial samples collected from Wisconsin and Minnesota.

**Rust on buckthorn.** Pycnia were appearing on common buckthorn (*Rhamnus cathartica*), the alternate host for oat crown rust, in the Matt Moore Buckthorn Nursery at St. Paul in southeastern Minnesota on May 8. Aecia were observed in areas of southern Minnesota. Aecia from buckthorn can infect oat resulting in oat crown rust and in 2014 oat crown rust was severe in Minnesota resulting in a 50% oat loss statewide. Crown rust aecia were prevalent on common buckthorn in New York the fourth week of May. Crown rust infections were severe on common buckthorn in the Matt Moore Buckthorn Nursery at St. Paul by late May. Crown rust aecia were found on common buckthorn throughout Michigan and at Lamberton in southwestern Minnesota in late May. The infections at



Lamberton were much less severe than in 2014. Crown rust had spread to the oat spreader rows by June 2 in the Matt Moore Buckthorn Nursery at St. Paul in southeastern Minnesota.

**Rust on other grasses.** Stem rust was found on tall fescue a mile north of Bay City in southeastern Texas in late April and in early August in Minnesota.



## Thank you!

This is the final Cereal Rust Bulletin for 2015. We would particularly like to thank the following people for their timely observations, comments and collections. Without our cooperators' assistance the bulletins and race surveys would simply not be possible.

Cooperator	State	Cooperator	State	Cooperator	State
Kira Bowen	AL	Kristi Ledman	MN	Chris Mundt	OR
Barton Fogleman	AR	Kun Xiao	MN	Mike Flowers	OR
Jason Kelley	AR	Lucy Wanschura	MN	Mike Flowers	OR
Terry Spurlock	AR	Madeleine Smith	MN	Patrick Hayes	OR
Lee Jackson	CA	Matt Rouse	MN	David Gunter	SC
Gordon Cisar	CO	Roger Caspers	MN	Emmanuel Byamukama	SD
Ned Tisserat	CO	Ruth Dill-Macky	MN	Heather Marie Kelly	TN
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John Pike	IL	Maricelis Acevedo	ND	David Hole	UT
Robert Bellm	IL	Dewey Lienemann	NE	Bob Pitman	VA
Kiersten Wise	IN	Jennifer Rees	NE	Carl Griffey	VA
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Doug Shoup	KS	Stephen Wegulo	NE	Wynse Brooks	VA
Erick De Wolf	KS	Gary Bergstrom	NY	Anmin Wan	WA
Jon Appel	KS	K Witkup	NY	Brook Brouwer	WA
Don Hershman	KY	Aaron Henson	OK	John Moffat	WA
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*Our sincere apologies if by oversight we did not include someone in the list.*

