



CEREAL RUST BULLETIN

Issued by:

Cereal Disease Laboratory

U.S. Department of Agriculture
Agricultural Research Service
1551 Lindig St, University of Minnesota
St. Paul, MN 55108-6052
(612) 625-6299
FAX (651) 649-5054
Katie.Liberatore@ars.usda.gov

For the latest cereal rust news from the field, subscribe to the cereal-rust-survey listserv. To subscribe, please visit:

<http://www.ars.usda.gov/Main/docs.htm?docid=9970>

Or, send an email to: Sam.Gale@ars.usda.gov

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 leaf rust was observed at low to moderate levels in the upper Midwest Area (Michigan, Minnesota), the Plains (North Dakota), and the Pacific Northwest (Washington).
- Wheat stripe rust has now been reported in 27 US states and four Canadian provinces.
- Barley stripe rust was reported in the Pacific Northwest Area (Washington, Idaho), the Plains Area (North Dakota), and Canada (Alberta, Saskatchewan).
- Oat crown rust was observed in St. Paul, MN buckthorn nursery experimental plots.
- New observations of wheat stem rust, oat stem rust, and barley leaf rust were not received in July.
- *Request for cereal rust observations and samples in 2017.*

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

Weather conditions. As reported in the [USDA Weekly Weather and Crop Bulletin](#), higher than normal temperatures affected most of the western half of the US the first two weeks of July. In contrast, the upper Midwest (Great Lakes) states experienced average to cooler temperatures in the first half of the month. The Pacific Northwest saw a return to average temperatures in the latter half of July, while high temperatures remained across the Plains Area. Sustained high temperatures and lack of rainfall in the northern Plains resulted in extreme, longterm drought conditions across large portions of Montana and the Dakotas for all of July, which accelerated crop maturity. In the beginning of the month, rainfall was light across the Midwest and favored crop development. The latter half of July brought heavy rain to the Midwest Area, which resulted in pockets of flooding and crop damage. Overall, days suitable for fieldwork exceeded 6 days per week in the Pacific Northwest, northern Great Plains, and upper Midwest Areas where small grains were still maturing.

Crop conditions. According to the [USDA National Agricultural Statistics Service](#), by July 30, 88% percent of the winter wheat crop had been harvested. Thirty-one percent of the spring wheat crop was reported in good to excellent condition compared to 68% of the crop last year. Nine percent of the spring wheat had been harvested. Fifty-one percent of the oat crop was reported in good to excellent condition, compared to 64% of the crop this time last year. Thirty-five percent of the oat crop had been harvested, which is 10% behind the previous five-year averages. Forty-nine percent of the barley crop was reported in good to excellent condition, falling 23% short of the previous five-year average. Six percent of the barley crop had been harvested, which falls 3% short of the previous five-year average.



Wheat stem rust. Wheat stem rust has not been reported since mid-June in the Ohio Valley. So far this year, wheat stem rust has been observed in the Ohio Valley (Illinois and Indiana), the Plains Area (Texas), the Southeast Area (Arkansas, Georgia, Louisiana), and the Mid-Atlantic Area (Virginia). Race QFCSC was identified from the samples collected in Texas, Louisiana, Georgia, Arkansas, and Virginia. Race QFCSC has been the most prevalent wheat stem rust race in the US over the past decade.

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

Wheat leaf rust. In July, new observations of wheat leaf rust were reported in the Midwest Area (Michigan and Minnesota), the Plains Area (North Dakota), and the Pacific Northwest (Washington). In the spring, wheat leaf rust was also observed in the Southeast Area, Mid-Atlantic Area, and at trace amounts in an overwintering focus in Ontario, Canada.

Midwest Area. New reports from Minnesota and Michigan are described below. So far this year, wheat leaf rust has been observed in Illinois, Indiana, Minnesota, Michigan, and Ohio. The first observation of wheat leaf rust in this region was on June 1 in susceptible winter wheat cultivar experimental plots in Minnesota.

Minnesota – Wheat leaf rust was observed at low levels in northwest Minnesota research plots. The highest incidence was observed on susceptible cultivar Thatcher, which had a severity of 10-20%. Other cultivars in the area had only trace to 5% severity.

Michigan – Low levels of wheat leaf rust were observed across the state on wheat in the grain-filling maturity stages.

Plains Area. New reports from North Dakota are described below. Aside from these observations, wheat leaf rust was previously observed in Texas, Oklahoma, Kansas, Nebraska, and South Dakota this season.

North Dakota – On July 18, leaf rust was reported at increasing levels in spring wheat variety trails in the eastern part of the state. In addition, at the end of July, leaf rust was observed in east central and central North Dakota at moderate to low levels. In demonstration plots, wheat cultivars with Lr21, such as Glenn, Prosper, and Faller had the highest severity of leaf rust. Leaf rust was at lower severity levels in the other cultivars. Leaf rust susceptible cultivars Max and Baart has leaf rust severity of 40-80% in the demonstration plots.

Southeast Area. Wheat has been harvested in these states, therefore, there were not new observations of wheat leaf rust in this region. Earlier this year, wheat leaf rust was reported in Louisiana, Mississippi, and Georgia.

Mid-Atlantic Area. Wheat has been harvested in these states, therefore, there were not new observations in the Mid-Atlantic Area. Previously, isolated leaf rust observations were reported from eastern Virginia in early May.

Pacific Northwest Area. Leaf rust was observed in early July in the Palouse region (including Whitman County, Washington and Latah County, Idaho) and in western Washington. In the Palouse region, leaf rust was found at very low incidence and low severity on winter wheat experimental and commercial fields near Farmington, Washington and Potlatch, Idaho. Wheat leaf rust was also observed at low incidence and severity in experimental nurseries in Mount Vernon, Washington. These are the first observations of wheat leaf rust in this region this year.

Canada. There have not been new reports of leaf rust since CRB#4 where the disease remained at trace levels in southern Ontario. In late April, an overwintering focus was identified in winter wheat fields northwest of Toronto on variety WB425.

Wheat leaf rust races identified to date from 2017 collections.

Virulence Code	Virulences	State	No. of isolates
MBDSB	1,3,17,B,10,14a	TX	3
MBDSD	1,3,17,B,10,14a,39	LA, TX	10
MBPSB	1,3,3ka,17,30,B,10,14a	TX	4
MBPSD	1,3,3ka,17,30,B,10,14a,39	LA, TX	5
MCDSB	1,3,26,17,B,10,14a	TX	1
MCPSD	1,3,26,3ka,17,30,B,10,14a,39	TX	1
MDPSD	1,3,24,3ka,17,30,B,10,14a,39	LA	4
MFPSD	1,3,24,26,3ka,17,30,B,10,14a,39	TX	2
MLPSD	1,3,9,3ka,17,30,B,10,14a,39	LA, TX	4
MMDSB	1,3,9,26,17,B,10,14a,39	TX	1
MMPSD	1,3,9,26,3ka,17,30,B,10,14a,39	LA, TX	2
MNPSD	1,3,9,24,3ka,17,30,B,10,14a,39	LA, TX	8
MPDSD	1,3,9,24,26,17,B,10,14a,39	TX	1
MPPSD	1,3,9,24,26,3ka,17,30,B,10,14a,39	LA, OK, TX	15
TBBGS	1,2a,2c,3,10,21,28,39	KS, OK, TX	7
TDPSB	1,2a,2c,3,24,3ka,17,30,B,10,14a	TX	1
TFTSB	1,2a,2c,3,24,26,3ka,11,17,30,B,10,14a	TX	40
TNBJG	1,2a,2c,3,9,24,10,28,39	TX	6
TNBJJ	1,2a,2c,3,9,24,,10,14a,28,39	LA, OK, TX	4
TNPSD	1,2a,2c,3,9,24,3ka,17,30,B,10,14a,39	TX	1
Total			120

Wheat leaf rust collection 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](#)

2016 wheat leaf rust survey summary and results are now available.

Please visit: [Wheat leaf rust race survey results](#).

Wheat stripe rust. Wheat stripe continues to be the most prevalent cereal rust threat throughout the US and Canada. This year, wheat stripe rust has been reported in 27 states (Arizona, Arkansas, California, Colorado, Delaware, Georgia, Idaho, Indiana, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Montana, Nebraska, North Carolina, North Dakota, New York, Oklahoma, Oregon, South Dakota, Tennessee, Texas, Virginia, Washington, and Wisconsin) and four Canadian provinces (Alberta, Manitoba, Ontario, and Saskatchewan). In July, new reports were received from the Pacific Northwest (Washington, Idaho), Plains Area (North Dakota), Midwest Area (Michigan), and in Canada (Alberta, Manitoba, Saskatchewan).

Pacific Northwest Area. Wheat stripe rust was observed previously across Washington, Oregon, and Idaho. In early to mid July, winter wheat was nearing maturity and spring wheat was at boot to milk stages. In commercial fields, stripe rust was kept mostly under control through use of resistant varieties and fungicide-treated fields. New observations from Washington and Idaho are summarized below.

Washington and Idaho – In early July wheat stripe rust remained active in both commercial and experimental fields in the Palouse Region (Washington and Idaho neighboring counties). In Pullman, WA, stripe rust reach 100% on susceptible spring wheat varieties in experimental plots. In nearby commercial fields, stripe rust was kept under control (<1% incidence, 10% severity) due to cultivar selection and early fungicide use. Hot and dry conditions were preventing further development and spread of the disease. In western Washington, wheat stripe rust also reached 100% severity on susceptible varieties in experimental plots of spring wheat.

Southeast Area. Earlier this year, wheat stripe rust was observed across Louisiana, Mississippi, Georgia, and in an isolated case in North Carolina. Though widespread and persistent through May, stripe rust was not reported to be a major problem in commercial fields. Wheat has been harvested in these states.

Mid-Atlantic Area. New reports have not been received since the May. Wheat stripe rust was observed in Delaware, Maryland, and Virginia beginning in early April and persisting through early May. By late May, wheat stripe rust was observed in an overwintering focus in a single field in Yates County, New York. Additional reports indicated high incidence, but low severity infections across several counties in western New York.

Plains Area. Wheat stripe rust has been widespread this year across the entire region. Previous observations from Texas, Oklahoma, Kansas, Tennessee, Colorado, Nebraska, South Dakota, Montana, and North Dakota are detailed in the previous bulletins and the CRS database. New observations from North Dakota are summarized below.

North Dakota – By early to mid July, most small grains were nearing maturity across the state. Wheat stripe rust was found in mid July in spring wheat variety trails in eastern North Dakota. Previously, in June, wheat stripe rust had been observed at low incidence in winter wheat including in western (Dunn County), northeastern (Langdon), southeast (Fargo), and central (Carrington) locations. In late May, stripe rust was found at low incidence in a northwestern North Dakota field planted with old bin run seed.

Midwest Area. This year, wheat stripe rust has been observed in Kentucky, Indiana, Michigan, Minnesota, and Wisconsin. Wheat stripe rust first appeared in the Midwest in south-central Wisconsin in March and had spread to southeastern and central portions of the state by April. By late May, it was observed at epidemic levels in susceptible winter wheat varieties. In June, stripe rust was observed at varying degrees of severity across Minnesota. Additional details can be found in the previous bulletins and in the CRS database. Newly reported observations (summary of the season), not previously included in the bulletin, are summarized below.

Michigan – Wheat stripe rust was widespread across the state this year. Most observations were made in experimental plots in June at heading where susceptible varieties were reported to have infection levels of 5-10% of flag leaf area. An isolated incident was reported in a commercial field in May. In early July, the wheat harvest had begun in the southern part of the state.

Canada. Wheat stripe rust has been observed across four Canadian provinces this year (Alberta, Manitoba, Ontario, Saskatchewan). A single, early report was received from an overwintering focus in Alberta. Low severity was observed in fields near Austin, Manitoba in late May/early June. Wheat stripe rust was persistent in fields across Southwestern Ontario. New observations from Alberta, Manitoba, and Saskatchewan are summarized below.

Manitoba – On July 11, wheat stripe rust was observed at low incidence (5%) and moderate severity (25%) on spreader rows containing ‘Morocco’ wheat. Several distinct foci were observed in the nursery and the inoculum is suspected to have arrived by wind from the US. The infection is reportedly much higher than average for late July, likely due to highly favorable weather conditions at this time.

Alberta – Wheat stripe rust was observed in Beaverlodge research plots on July 5 and 13. The disease was mostly observed on susceptible wheat varieties in the upper canopy. It is suspected that the inoculum arrived by wind from southern Alberta or the US Pacific Northwest.

Saskatchewan – On July 8, wheat stripe rust was observed at low incidence and severity in south-central Saskatchewan. Stripe rust was present at trace levels in one winter wheat field near Davidson, SK, but was absent from Outlook, SK differential lines. The hot and dry weather was preventing further development and spread of the disease.

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

Please send wheat and barley stripe rust collections as soon as possible after collection to: Dr. Xianming Chen, USDA-ARS (Washington State University; see details in attached rust collection guide).

Oat stem rust. New observations have not been received since the previous bulletin. Earlier, oat stem rust was observed in the southern Plains (Texas), Southeast Area (Arkansas, Georgia, Louisiana, Missouri), and the Midwest Area/Ohio Valley (Illinois, Indiana). Two races virulent on *Pga*, TGN and TJS, have been identified in some of the samples collected from Texas and Louisiana.

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

Oat crown rust. Oat crown rust was observed throughout July in the St. Paul, MN buckthorn nursery experimental plots. Earlier this year, oat crown rust was observed in the Southeast Area (Georgia, Louisiana, Mississippi), the Plains Area (South Dakota), and in the Midwest Area (Illinois, Indiana, Minnesota).

Minnesota – Vigorous, well-maintained plots in the St. Paul buckthorn nursery presented ideal conditions to achieve uniform rust pressure across the field. Trace amounts of rust was observed on resistant varieties, while high severity was observed on susceptible lines.

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

Barley leaf rust. New observations of barley leaf rust have not been reported since mid May. At that time, an unprecedented observation of barley leaf rust in the Pacific Northwest Area east of the Cascade Range was reported at high incidence and moderate to high severity. In early spring, barley leaf rust was also observed in the Mid-Atlantic Area (Maryland, Delaware, Virginia).

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

Barley stripe rust. In July, new observations of barley stripe rust were reported in the Pacific Northwest Area (Washington and Idaho), the Plains Area (North Dakota), and Canada (Alberta, Saskatchewan). Previously, barley stripe rust was observed in California, Oregon, and Washington.

Pacific Northwest Area. In early July, barley stripe rust was reported at low to moderate levels in the Palouse Region (Washington/Idaho) experimental fields and at very low levels in commercial fields in Latah County, Idaho. In western Washington, barley stripe rust was more severe (up to 60% severity) than in the eastern part of the state, though for the region it was much lower than previous seasons.

Plains Area. Barely stripe rust was found at low incidence and severity in growers' fields in the northeastern part of North Dakota. Rust was found on flag leaves and flag-1 leaves.

Canada. In early July, an isolated observation of barley stripe rust present at trace levels in south-central Saskatchewan. On July 21, trace levels of barley stripe rust was observed in susceptible research plots in Beaverlodge, Alberta.

Barley stem rust. Barley stem rust has not been reported this season.

Rust on barberry. New reports have not been received since May when rust infections (pycnial and aecial stages) on common barberry (*Berberis vulgaris*) were observed in southern Minnesota as well as eastern and southern Wisconsin. Collections were made for race typing and analysis is in process.

Identifying rust diseases of wheat and barley

A guide developed by the multi-state extension and research committees for small grain diseases, NCERA-184 & WERA-97, is available at: http://www.ars.usda.gov/SP2UserFiles/ad_hoc/36400500Publications/Rust_Diseases_National.pdf

Current cereal rust situation

For the latest cereal rust situation reports, please subscribe to the cereal rust survey listserv list*.

Instructions can be found at:

<http://www.lsoft.com/scripts/wl.exe?SL1=CEREAL-RUST-SURVEY&H=LISTS.UMN.EDU>

Or, if you prefer, simply send a subscription request to Sam Gale (Sam.Gale@ars.usda.gov).

All messages sent to the list are archived on the CDL website: <http://www.ars.usda.gov/Main/docs.htm?docid=9757>

*The sole purpose of the Cereal Rust Survey listserv list is to provide a format for cereal researchers and extension personnel to share observations of cereal rusts and other cereal diseases. We make no warranty about any information shared on this listserv or its utility or applicability. Mention of any product, brand, or trademark does not imply endorsement or recommendation of that product, brand, or trademark by USDA-ARS, or any of the participants on this listserv. By enrolling on this listserv list, participants understand and agree to abide by these conditions.

Request for cereal rust observations and samples

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

(Please save this for future reference)

Cooperators' assistance is critical to our work

We depend on the assistance of our cooperators for cereal rust observations and samples (as well as other significant small grain disease observations). Without this assistance our job would be much more difficult. We sincerely thank all those who have assisted us in the past and hope the assistance continues this year and in future years.

Observations

If you have information on the cereal rust situation in your area that you would be willing to share with the group, please email your observations to:

CEREAL-RUST-SURVEY@LISTS.UMN.EDU *

Or, to: Katie Liberatore (Katie.Liberatore@ars.usda.gov)

We would like to include your name and email address so others can contact you. If, however, you prefer not having your name or email address appear with the information, please let us know when submitting your observations.

Information of most importance

We welcome any information you can provide, but are particularly interested in:

- ∞ Location (state, county, city)
- ∞ Rust (leaf rust, stem rust, stripe rust, crown rust)
- ∞ Host (wheat, barley, oat, grasses, etc.)
- ∞ Cultivar or line name if known
- ∞ Grain class if known
- ∞ Severity and prevalence
- ∞ Growth stage: when the rust likely arrived, when infection was first noted and current growth stage
- ∞ Where rust is found on the plants, e.g., lower leaves, flag leaf, etc.

Guidelines for making cereal rust uredinial collections**

Reports on the distribution of races of cereal rust fungi are an important part of our annual cereal rust surveys. We routinely collect and test isolates of stem rust (wheat, oat, and barley), wheat leaf rust, oat crown rust and barley leaf rust. We are most interested in small grain collections (wheat, barley, oat and rye), but are also interested in stem rust, leaf rust, and stripe rust collections from grasses, e.g.:

Jointed goatgrass (*Aegilops cylindrica*) Ryegrasses

(*Elymus* spp.) Wheatgrasses (*Elytrigia* spp.)

Wild barleys (*Hordeum* spp.) Wild oat (*Avena fatua*)

Common grasses, e.g., *Agropyron*, *Agrostis*, *Festuca*, *Leymus*, *Lolium*, *Phleum*, and *Psathyrostachys* spp.

Images and descriptions of the above grass species can be found on the USDA Natural Resources Conservation Service's [PLANTS Database](#) website

1. Rust pustules should be fresh and fully developed, except when this may not be possible, i.e., the first uredinial collections found early in the season.
2. When rusted small grain or grass plants are encountered, please cut 5 to 10 sections of plant stem (if possible, avoid including plant nodes as they do not readily air dry) or leaf, 4 inches long with large and small pustules and place in a regular paper mail envelope (**Please Do Not use plastic or waterproof envelopes**). Do not staple or tape the envelope, instead fold the flap shut.
3. Important information should be recorded for each collection, e.g., date, county, state, cultivar or line, crop stage, whether collection is from a nursery or commercial field, etc. Please use our data collection form ([standard pdf](#) or [fillable pdf](#)) if possible. If the grass genus or species is unknown to the collector, please send a head in a separate bag or envelope if possible, indicating which collection it is associated with to aid in identification.
4. Please avoid exposing samples to direct sunlight or unusual heat of any kind, e.g. car dashboard, outside mailboxes, etc. Samples should be kept at room temperature for 24 hours to allow the plant material to dry. Afterwards the samples should be placed in a cooler or refrigerator before they are mailed. Please do not keep samples in a freezer. The samples should be sent to us as soon as possible after the samples have dried.
5. Please promptly mail the envelope(s) with the appropriate collection form inside each envelope to:

Cereal Disease Laboratory, USDA-ARS 1551 Lindig Street
University of Minnesota St. Paul,
Minnesota 55108

**** Stripe rust collections should be sent to:**

By FedEx or UPS:

Dr. Xianming Chen USDA-ARS
361 Johnson Hall Washington State University Pullman, WA 99164-6430

By regular mail: Dr. Xianming Chen 361 Johnson Hall
P.O. Box 646430 Washington State University Pullman, WA 99164-6430

Note: Stripe rust collections are vulnerable to heat and do not survive long at warm temperatures; therefore, if shipment of collections for race identification is delayed their viability will be greatly reduced. An overnight courier service is preferred for sending stripe rust collections.

If you have any questions regarding stripe rust samples, contact: Xianming Chen, Phone 509-335-8086; e-mail: xianming@wsu.edu or xianming.chen@ars.usda.gov

Thank you in advance for your assistance!

Cereal Disease Laboratory
(www.ars.usda.gov/mwa/cdl)

