CEREAL RUST BULLETIN

Report No. 10 (Final)
August 29, 2007

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) 625-7081 FAX (651) 649-5054
markh@umn.edu

For the latest cereal rust news from the field, subscribe to the cereal-rust-survey listserv list. To subscribe, please visit: http://www.ars.usda.gov/Main/docs.htm?docid=9970

Or, send an email to: markh@umn.edu

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

- Wheat stem rust was at low levels in isolated plots of susceptible winter and spring wheat.
- Wheat leaf rust was widespread and at low to severe levels throughout the U.S.
- Wheat stripe rust was at low to moderate levels throughout the U.S.
- Wheat leaf rust caused an estimated 13.9% loss in wheat in Kansas, the most loss due to any disease since 1976.
- Oat stem rust and oat crown rust were common in upper Midwest fields.
- Barley stem rust was at low levels in upper Midwest plots.
- Barley leaf rust was at low levels throughout the U.S.
- Barley stripe rust was at low levels in the western U.S.

Wheat stem rust - The first reports of wheat stem rust in 2007 were in soft red wheat winter varietal plots in south central Louisiana at Crowley and in southwest Louisiana at Jeanerette on April 23. Stem rust was severe in some plots, but the distribution of infections was not uniform throughout the nursery. Hot dry weather accelerated the crop to maturity in these plots.

On April 23, traces of stem rust were found in two wheat plots in southern Texas at Castroville. On May 8, a hot spot of wheat stem rust was found in a soft red winter wheat plot in central Texas at McGregor. On May 10, stem rust severities ranged from 5-75% with 50% of the plants infected on the susceptible cultivar 'Winmaster' in plots at Castroville and Uvalde in southern Texas.

On May 23, low levels of wheat stem rust were found in the susceptible McNair 701 plot at Stillwater, in north central Oklahoma.

In the spring of 2007, stem rust was found in susceptible plots of soft and red winter wheat in the southern U.S., but stem rust was not found in any fields.

The next reports of wheat stem rust in 2007 were in late June when an infection site was observed in a plot of the susceptible winter wheat cultivar McNair 701 at the Rosemount experiment station in Minnesota and low levels were found on susceptible lines in spreader rows at Brookings, South Dakota. In early July, low levels of stem rust were found in plots

of the susceptible spring wheat cultivar Baart at Waseca and Lamberton, Minnesota. During the second week in July, low levels of stem rust were found in a Baart plot at the west central experiment station at Morris, Minnesota.

In mid-July, trace levels of stem rust were observed in a plot of Radiant winter wheat at Lisbon, ND. Moderate levels of stem rust were observed on a triticale line on July 23 at the Fargo, ND Experiment Station. In late July, trace levels of stem rust were found in the susceptible spring wheat cultivars Baart and Max at Carrington and Langdon experiment stations in North Dakota. In summary, during the month of July, trace levels of wheat stem rust were found in susceptible winter wheat and spring wheat plots from southeastern Minnesota to east central South Dakota and onto northeastern North Dakota. Stem rust was not observed in any current wheat cultivars in research plots or in fields in this area.

In mid-July, stem rust was found in winter wheat breeding plots near Pullman, Washington.

The wheat stem rust observation map is now available on the CDL website (http://www.ars.usda.gov/SP2UserFiles/ad_hoc/36400500Cerealrustbulletins/2007wsr.pdf).

Preliminary race identifications - From collections made from the above locations (including samples from the Triticales) race QFCS was identified as the predominant race. This is a common race that has been found in the U.S. the past several years. This race is relatively avirulent - the majority of the U.S. cultivars are resistant to QFCS.

In late July, stem rust was not observed in Manitoba and eastern Saskatchewan, Canada commercial wheat fields, but was found on the susceptible line Little Club at Indianhead, Saskatchewan.

Stem rust on barberry (Alternate host for stem rust) - On May 22, aecial development was light on infected susceptible barberry (*Berberis vulgaris)* bushes growing in southeastern Minnesota. In early June, no aecial development was found on susceptible barberry bushes growing in south central Wisconsin. Infections on the common barberry from southeast MN were *Puccinia graminis* f. sp. *secalis*. *Puccinia graminis* f. sp. *tritici* and *P. graminis* f. sp. *avenae* were not isolated from barberry samples.

Wheat leaf rust. **Southern Plains – Texas.** In early February, low levels of leaf rust were reported in central Texas wheat plots and by late February, high levels of rust were found in the plots. In mid-March, low amounts of leaf rust were found on lower wheat leaves in the irrigated nursery at Castroville, Texas. Moisture was limited from late January to mid-March in much of the state of Texas. In plots at College Station, leaf rust was at low levels except for high severities in Jagelene (Lr24 resistance). By the second week of April, susceptible varieties like Jagalene and Jagger (Lr17 resistance) in nurseries at Castroville and College Station, Texas had 80% leaf rust severities on lower leaves. On highly resistant varieties like Fannin and Endurance, no infections were found. Low to moderate levels of rust were reported in Texas fields. In early June, high severity (100%) levels of leaf rust were reported in irrigated nursery plots of susceptible winter wheat cultivars at Bushland, Texas (Fig. 1). At the same time leaf rust was not present in the dryland nurseries.

- **Oklahoma**. In early February, traces of leaf rust were found on susceptible varieties in the plots at Stillwater, Oklahoma. In late February, leaf rust was light in southwest Oklahoma fields. By mid-March leaf rust still was light in plots and fields in Oklahoma. In mid-April, severe levels of leaf rust had been reported on susceptible varieties in north central Oklahoma plots. And by late April, high severity levels of leaf rust had been reported on susceptible varieties in north central Oklahoma plots. During the first two weeks in May, high levels of leaf rust were observed in central Oklahoma on susceptible varieties. In late May, high severity (80%) levels of wheat leaf rust were found in fields throughout the state of Oklahoma (Fig. 1). With adequate moisture for rust development, leaf rust increased throughout Oklahoma and Texas and provided inoculum for the northern wheat growing areas.

Central Plains - Kansas, Nebraska, Colorado. In mid-March, traces of leaf rust were found in Manhattan, Kansas plots. The leaf rust appeared to have overwintered since it was limited to the lower leaves. In early April, low levels of rust were found in the lower and middle canopy of susceptible wheat in plots at Manhattan. In mid-April, 5% severities were reported on the lower leaves of Jagger and Jagalene in south central Kansas. Leaf rust was scattered and at high levels in locations where moisture was sufficient for rust infections.

During the first two weeks of May, wheat leaf rust was found in plots and fields from southeastern Colorado to south central Nebraska. High levels of leaf rust were observed from central Oklahoma to central Kansas on susceptible varieties. With adequate moisture for rust development, leaf rust increased throughout this area.

In late May, high severity (80%) levels of wheat leaf rust were found in fields throughout Kansas and Nebraska. Many fields were sprayed for rust control and some fields of susceptible cultivars were almost a total loss due to leaf rust. Commonly grown cultivars such as Jagalene and Jagger are susceptible.

During the first week in June in northwestern Kansas, high severity levels of leaf rust were found in susceptible cultivars of hard red and white winter wheat. By the first week in June, high levels of wheat leaf rust were found in south central and southeastern Nebraska winter wheat fields.

In 2007, the overall estimated loss due to leaf rust in Kansas was 13.9 % (roughly 50 million bushels) which is well above the 20-year average of 3.8%. The 13.9% loss was the highest for leaf rust or any disease in Kansas since 1976 when disease loss estimates were initiated. Yield losses were estimated from fungicide plot data, cultivar surveys, cultivar disease ratings and disease surveys.

Northern Plains – Minnesota, South Dakota, North Dakota, Montana. During the first two weeks of May, wheat leaf rust was found in plots and fields in south central South Dakota. On May 23, traces of wheat leaf rust were found on susceptible winter wheat cultivars in the Rosemount, Minnesota nursery and on May 25, low levels of leaf rust were found on winter wheat in southeastern North Dakota fields. On June 1, traces of wheat leaf

rust were found on susceptible spring wheat cultivars in the St. Paul, Minnesota nursery. In early June, leaf rust was increasing in southern South Dakota winter wheat fields and plots.

During the third week in June, plots of susceptible winter wheat cultivars such as Jagalene, in east central Minnesota, east central South Dakota and southwestern Nebraska had 60% rust severities, while resistant cultivars had only trace levels of infection on the flag leaves. Throughout this area fungicide usage on winter wheat was very common this year with many fields receiving multiple applications. By late June, spring wheat had leaf rust severities of trace to 5% on lower leaves in southern Minnesota and South Dakota fields (Fig. 1). Susceptible spring wheat cultivars in southern Minnesota plots had 20% rust severities with most infections on the lower leaves.

This year there was more leaf rust than normal in the upper Midwest on both spring and winter wheat. Increased amounts of rust inoculum than in previous years arrived from the winter wheat region because of ideal conditions for infection in the southern plains, which increased the rust severities on the winter wheat. Regular rainfall in May and June in many areas of the northern Great Plains further increased rust development. Over 50% of the wheat fields in the spring wheat region were treated with fungicide, which prevented losses due to leaf rust and FHB (scab).

During the last week in June, high levels of leaf rust were found in spring wheat plots at Lamberton in southwest Minnesota. Leaf rust was found at high severity levels on cultivars Knudson and Ada that had been previously rated as resistant to moderately resistant. In mid-July, trace to 80% leaf rust severities were observed on flag leaves of spring wheat cultivars in fields and plots from south central Minnesota (Fig. 1) to east central South Dakota and east central North Dakota. Hot dry weather combined with severe leaf rust infections killed the flag leaves of spring wheat.

During the fourth week in July, wheat leaf rust was widespread and at high severity levels on susceptible and moderately resistant spring wheat cultivars in research plots in North Dakota and northwestern Minnesota. The cultivars Knudson and Briggs with Lr16 and Lr34 had low to moderate levels of leaf rust infection, a significant increase from previous years. Cultivars postulated to have Lr21 (RB07, Glenn, Steele, Faller, Howard) were highly resistant. In western North Dakota and eastern Montana high temperatures and leaf rust defoliated leaves in susceptible wheat lines in research plots. No leaf rust was observed on durum wheat cultivars. In fields throughout North Dakota trace to moderate levels of leaf rust were observed in a small number of fields due to highly resistant cultivars and common use of fungicide sprays. Many fields that had been sprayed had no rust infections.

In early July, low levels of leaf rust were found in spring wheat plots at Sidney in northeastern Montana.

Louisiana. In late February, leaf rust was found on susceptible cultivars in statewide variety trails in southwest Louisiana. During the second week in April, plots in southern Louisiana had high levels of leaf rust while levels were light in fields. Many of these southern areas provided rust inoculum for areas further north.

Arkansas. In early April, leaf rust was light throughout Arkansas. In mid-April, freezing temperatures slowed further leaf rust development.

Southeast -Mississippi, Georgia, Alabama, South Carolina. In late April, plots of susceptible wheat cultivars in southern Alabama and southwestern Georgia had leaf rust severities up to 20% on lower leaves. Leaf rust was either absent or at trace levels in commercial fields in Georgia and Alabama. Dry conditions in March and April slowed rust development throughout much of the southeastern U.S. soft red winter wheat area.

Mid-Atlantic – North Carolina, **Virginia**. Trace amounts of leaf rust were found in plots in the Coastal Plain area of North Carolina in early April (Fig. 1). In the last week in April, 10% leaf rust severities were observed on lower leaves of wheat in southeastern and eastern North Carolina plots.

In late April, high levels of leaf rust were found on the lower leaves of susceptible lines in a nursery at Warsaw, Virginia. The rust was found on the closest leaves to the ground level, indicating that leaf rust may have over wintered at this location. During the first two weeks in May, light levels of leaf rust were found in plots and fields in the coastal plains of Virginia.

In late May, wheat leaf rust was increasing in fields and plots in the coastal plains of Virginia. High leaf rust severity levels were observed in nurseries in northeastern South Carolina and eastern Virginia.

This year wheat leaf rust development was greater than normal in the Mid-Atlantic state and losses occurred in a few areas.

New York. In mid-June, low levels of wheat leaf rust were found in plots in Cayuga County, New York.

Midwest - In early June, wheat leaf rust was found in fields from northeastern Missouri to southern Illinois at 60% severity on flag leaves. There were yield losses to leaf rust in the soft red winter cultivars in this area. In early June, trace levels of leaf rust were found on flag leaves in wheat fields from northwestern Ohio, northwestern Indiana, to south central Wisconsin. In plots in west central and northeastern Indiana, 20% severities were found on lower leaves. In early June, leaf rust was found on several breeding lines in a nursery at Wooster, in north central Ohio. In early July, low levels of leaf rust were found in winter wheat fields in eastern Wisconsin. Lack of moisture limited rust development in some locations in the northern soft red winter wheat area.

Western U.S. - In mid-May, no leaf rust was detected in nurseries throughout the San Joaquin Valley in California. In the Pacific Northwest, wheat leaf rust was found at low levels in northwestern Washington and in irrigated fields in central Washington.

Canada - In early June, light levels of wheat leaf rust were found in winter wheat cultivars at the University of Manitoba, Canada and other locations in southern Manitoba and on susceptible spring wheat cultivars at Homewood, Manitoba. On July 23 and 24, wheat fields were surveyed in Manitoba and eastern Saskatchewan. Leaf rust was widespread and severe in Manitoba fields that were not sprayed with fungicide. Severities of 80% were observed on the flag leaves in some fields, although the average level of infection was approximately 20%. Highest severities in Saskatchewan were near the Manitoba border and declined to trace levels near Regina.

Preliminary race identifications - From rust collections made in late March in southern and central Texas plots, the following leaf rust races were identified: MDPS (Lr17 & 24 virulence), MFPS (Lr17, 24 & 26 virulence) and TDBJ (Lr2a and 24 virulence). From collections made in late March in southern Louisiana, the following leaf rust races were identified: MBTS (Lr11 & 17 virulence), MFPS (Lr17, 24 & 26 virulence) and TDBJ (Lr2a & 24 virulence). These leaf rust races also were identified from rust collections made during the 2006 leaf rust survey (http://www.ars.usda.gov/mwa/cdl/).

Wheat stripe rust. Southern Plains - In early February, wheat stripe rust was found at low severities in plots at College Station and McGregor in central Texas. Dry conditions were not favorable for rust development in February and early March. By late March, stripe rust development in Texas was equal to last year. In mid-April, only low levels of stripe rust were found in plots in southern, central and north central Texas. In late April, in north central Texas fields, trace levels of active sporulating stripe rust infections were found, while at the same locations leaf rust was increasing rapidly in the fields and plots (Fig. 2). During the first two weeks of May, traces of wheat stripe rust were reported in north central Oklahoma plots. Most of these infections were found on the F-1 or flag leaves. In late May, severe levels of stripe rust were reported in irrigated plots in the Oklahoma panhandle (Fig. 2). However, little stripe rust was found in dryland plots and fields. In comparison, leaf rust was heavy in both irrigated and dryland plots in the same area. In early June, high severity (100%) levels of stripe rust were observed in irrigated nursery plots of susceptible winter wheat cultivars at Bushland, Texas. No stripe rust was found in the dryland nurseries. The southern plains infection sites provided a reduced amount of inoculum for the northern regions of the U.S.

Central Plains -During the first two weeks of May, traces of wheat stripe rust were reported in southeastern Colorado plots, east central Nebraska plots, central and north central Kansas plots and fields. Most of these infections were found on the F-1 or flag leaves. In late May, stripe rust was present at many Kansas locations but appeared to be a heavier in western Kansas. Leaf rust was the predominant disease in western Kansas and many growers in this area responded to the disease threat with timely fungicide applications. Stripe rust was found at many locations in central Kansas, but the disease appeared to be held in check by the widespread use of resistant varieties. In early June, in an irrigated nursery in northwestern Kansas, 70% stripe rust severities were observed in susceptible cultivars. Low levels were found on previously resistant cultivars. In 2007, the overall estimated loss due to wheat stripe rust in Kansas was 0.2% which is below the 20-year average of 1.31%.

In early June, stripe rust was found in wheat plots in southern Nebraska and in northeastern Colorado fields.

By the third week in June, light levels of stripe rust (1-10% severities) were found in winter wheat in northwestern Nebraska fields and southwestern South Dakota plots (Fig. 2). In the roadside ditch near one of the fields, 40% severities were observed on *Aegilops cylindrica* (jointed goatgrass).

Northern Plains - By late June, hot and dry conditions brought stripe rust infections to almost a complete remission in the Great Plains states. In late July, no stripe rust was detected in spring wheat in northwest Minnesota or northern North Dakota.

In late May, heavy wheat stripe rust was found in Bozeman, Montana plots, but was spotty throughout the rest of the state. Susceptible winter wheat varieties were more affected than spring wheat varieties. Some growers in the golden triangle of north central Montana sprayed for stripe rust control in winter wheat. Hot dry conditions throughout June prevented stripe rust from becoming a problem.

Louisiana - In late February, light levels of stripe rust were found in wheat fields and plots in southern Louisiana. One crop consultant suggested spraying for stripe rust. In early April, traces of stripe rust were found in wheat plots in Louisiana. In late April, dry and warm conditions slowed stripe rust development in plots and fields in Louisiana.

Arkansas - In early March, wheat stripe rust was reported in southeast and southwest Arkansas fields. Hot spots were seen from the road in a few fields by March 13. Stripe rust was reported in many varieties and there may be one new race attacking the formerly resistant varieties. Fungicides were recommended for all fields with stripe rust and several fields were sprayed. By early April, stripe rust was increasing throughout Arkansas, but freezing temperatures in mid-April affected further stripe rust development.

Southeast - In late April, dry and warm conditions slowed stripe rust development in plots and fields throughout the southeastern U.S. For example, in southern Alabama and southwestern Georgia traces of wheat stripe rust were found in a few plots. In these locations most of the stripe rust infections had occurred earlier, in mid to late winter, when temperatures were cooler.

This year there were few stripe rust inoculum sources in the southern U.S. Then as day and nighttime temperatures continued to increase, they surpassed the optimum for stripe rust development and this lead to a reduced amount of rust for the northern wheat growing regions of the U.S.

Midwest - In early June, foci of stripe rust were noted in plots at Saint Jacob, Illinois (near St. Louis, MO) and traces were found in plots at Owensboro in western Kentucky. These are the only two locations in the northern soft red winter wheat area where stripe rust was reported this year.

California - The growing season in California was extremely dry this year. The overall disease impact, even on susceptible varieties, was less than in 2006. However, rain showers and cool temperatures in mid-late April in the Sacramento Valley, allowed stripe rust to reach very high severity levels in that area on susceptible varieties not treated with fungicide. In early May, only trace levels of wheat stripe rust developed in the drier San Joaquin Valley. By mid-May, despite the very dry conditions, severe levels of rust developed in small areas of fields of susceptible varieties in the San Joaquin Valley. Because of the late development and limited spread of the disease, yield losses were minimal.

Pacific Northwest -. As usual, stripe rust reached 50% severity by the first week in April and 60% severity during the third week in April on susceptible entries in winter wheat nurseries at Mount Vernon in northwestern Washington. By the end of May in northwestern Washington, 100% stripe rust severities were observed on susceptible winter wheat entries and 40% severities on susceptible spring wheat entries.

In mid-April, early-planted hard red winter wheat fields had up to 10% stripe rust severity in south-central Washington. Timely application of fungicides prevented further development of stripe rust in this region and prevented further spread of the disease to other regions. The dry weather conditions from late April to late May and reduced rust inoculum, made rust development slow and light in the major wheat growing regions in the Pacific Northwest. In mid-May, low levels of stripe rust were found in nurseries in the Palouse region with some hot spots of severities up to 40%. In early June, stripe rust severities ranged from 10% to 40% in eastern Washington winter and spring wheat plots.

By the end of May, wheat stripe rust was reported in experimental fields in Pendleton, Oregon and Moscow, Idaho. In mid June, wheat stripe rust developed in eastern and central Washington fields and in dryland and irrigated fields in northeastern Oregon. In mid June, stripe rust severities reached 100% on susceptible entries around Pullman and Walla Walla and 60-80% at Lind, Pendleton and Hermiston on winter wheat and 40-60% on susceptible entries at these locations on spring wheat. However, stripe rust was light in commercial wheat fields due to resistance of cultivars, low inoculum, and dry weather conditions from late April to late June.

Also, hot and dry weather conditions during the first two weeks of July stopped the stripe rust season in most of the Pacific Northwest. Similar to 2006, stripe rust of wheat was light in commercial fields and therefore, yield losses caused by stripe rust were low. However, stripe rust did develop to 100% severity on susceptible entries in non-irrigated experimental plots of both winter and spring wheat under natural infection in Washington, and 60-80% severities in wheat nurseries in northeastern Oregon and northern Idaho.

In Mid July, stripe rust developed up to 40-100% severities on susceptible winter and spring wheat entries in the monitoring nurseries at Tule Lake, a high elevation area in northeastern California. The rust level was relatively low compared to those in the past several years.

In late July, isolated pustules of stripe rust were observed in some fields in Saskatchewan, Canada, but the severity was very low.

Oat stem rust - On January 11, oat stem rust was found on one volunteer plant in the College Station, Texas nursery, which was the earliest stem rust was ever found at this location. None of the surrounding plants were infected. In mid-March, traces of stem rust were found on the variety Otana in the Castroville, Texas nursery. By mid-April, oat stem rust was increasing in plots at Castroville and College Station, Texas. During the first week in May, oat stem rust was heavy across central and southern Texas. Due to the cooler and wetter than normal spring, there still were green plants along the roadside in central Texas in late May on which stem rust could increase. Many of these southern areas provided rust inoculum for oat growing areas further north.

In early January, traces of stem rust were found in oat varietal plots at the Baton Rouge, Louisiana nursery. In mid-April, oat stem rust levels were severe in southeastern Louisiana plots. During the last week in April, oat stem rust severity levels were high in plots in southwestern and southeastern Louisiana. Stem rust was found at trace to moderate levels in oat plots in northern Florida and southern Alabama. Many of these southern areas provided rust inoculum for the northern oat growing area.

During the third week in June, light levels of oat stem rust were observed in fields and plots in southeastern Nebraska.

In mid-July, trace to 20% severities of oat stem rust were found in fields and plots at the soft dough growth stage from east central South Dakota to east central Minnesota and to south central Wisconsin. Most current oat cultivars are not highly resistant to the current races of stem rust.

In late July, oat stem rust was found on wild oat (*Avena fatua*) in south central North Dakota wheat fields.

The oat stem rust observation map is now available on the CDL website (http://www.ars.usda.gov/SP2UserFiles/ad_hoc/36400500Cerealrustbulletins/2007osr.pdf).

Oat crown rust - In mid-February, light levels of crown rust were found in varietal plots at College Station, Texas. By mid-March, 5% severities were found on the lower leaves of the cultivar Brooks at the Castroville, Texas nursery and 20% severity on wild oat (*Avena fatua*) at Luling, Texas. In mid-April, moderate levels of crown rust were found in south central Texas fields. By the second week in April, severe levels of crown rust were found on susceptible varieties in southern and central Texas plots. In late April, central Texas fields had trace to 20% severities while trace severities were reported in northern Texas. In early May, oat crown rust was heavy across central and south Texas in fields and plots. In mid-May, oat crown rust was heavy across central Texas fields and plots. These southern locations provided inoculum for oat growing areas further north.

In early January, crown rust was found and by late February crown rust of oats continued to spread rapidly in a susceptible, early-planted field in Baton Rouge, Louisiana. In mid-April, crown rust was increasing in southeast Louisiana oat plots. Oat crown rust infections were

heavier than last year in the southern U.S. because moisture was not a deterrent to rust development from January to March. In late April, oat plots in southern Alabama and the Florida panhandle had 60% rust severities. Crown rust was found at moderate levels in several commercial oat fields in these areas. These southern locations provided inoculum for the northern oat growing area.

In late May, crown rust made its initial appearance in oat plots near the buckthorn nursery at St. Paul, Minnesota. By the second week in June, heavy crown rust infection was observed on upper leaves of oat in spreader rows in the St. Paul, Minnesota buckthorn nursery. In oat plots at Rosemont, Minnesota, traces of crown rust were found in early June. High levels of crown rust were observed in a field in south central Minnesota.

By the third week in June, light levels of crown rust infection were found in oat fields and plots in southern Nebraska, southern South Dakota and southwestern Minnesota. In late June, high amounts of crown rust were observed on upper leaves of oat in spreader rows in the St. Paul, Minnesota buckthorn nursery. In mid-July, trace to 60% severities of oat crown rust were found in fields and plots from east central South Dakota to east central Minnesota. Much of the primary inoculum originated from buckthorn, the alternate crown rust host, common throughout the Upper Midwest. There has been less crown rust this year than last year in eastern Minnesota and western Wisconsin because of the hot dry weather in June and July.

In late July, crown rust levels were moderate to severe in fields and plots throughout south central North Dakota.

Buckthorn (Alternate host for crown rust) - As of mid-April, buds on buckthorn were not developing in the buckthorn nursery at St. Paul, Minnesota. This is normal for buckthorn development in these plots. Moderate pycnial infections were observed on emerging buckthorn in the nursery at St. Paul on April 30. Cooler than normal temperatures slowed down pycnial development. By mid-May, moderate numbers of aecial infections were observed on buckthorn in the nursery at St. Paul. Warmer than normal temperatures accelerated aecial development. By late May, moderate to heavy numbers of aecial infections were observed on buckthorn in the nursery at St. Paul. In early June, severe levels of aecial infections were found on buckthorn in hedgerows in western Minnesota.

Crown rust aecia were observed on buckthorn near Saskatoon in south central Saskatchewan in early June.

Barley stem rust - The first report of barley stem rust in 2007 was in mid-July when light levels of barley stem rust were found on the 2-row susceptible variety Hypana in plots in south central and west central Minnesota. Stem rust also was found in a plot of six-row barley in east central South Dakota. In mid-July, trace levels of barley stem rust were found in the nursery at Sidney, in east central Montana.

Barley leaf rust - In mid-March, traces of leaf rust were reported on an Idaho barley line at the Castroville, Texas nursery.

In mid-June, traces of barley leaf rust were found in plots in east central and southwestern Minnesota. In mid July, light levels of barley leaf rust were found in plots in northeast South Dakota and southwest Minnesota. In late July, barley leaf rust light levels of infection were found in northern North Dakota.

In late April, barley leaf rust was observed throughout head rows in a Lenoir County, North Carolina nursery. In early May, trace levels of barley leaf rust were found in Blacksburg, Virginia nursery plots. In mid-May, 80% severity levels of barley leaf rust were observed in Warsaw and Blackstone, Virginia nursery plots. The barley leaf rust occurred earlier and was more severe than in recent years, which means the rust over wintered in these nursery plots.

Barley leaf rust levels were severe in northwestern Washington plots in early June, but were not observed in fields in Idaho, Oregon and Washington.

Stripe rust on barley - In late June, stripe rust on barley was found on experimental lines at the Fort Collins, Colorado experiment station. This was the first barley stripe rust seen at this location in the last 8 years. Barley stripe rust this year was generally at very low levels of infection.

By the third week in April, susceptible entries in winter barley nurseries at Mount Vernon in northwestern Washington had 60% levels of stripe rust infection. In early June, high levels of barley stripe rust were found in northwestern Washington plots while none was found in eastern Washington fields and nurseries. In late June, stripe rust on barley was light in the nurseries near Pullman, Washington.

By early May, barley stripe rust had reached high levels on susceptible entries in a stripe rust screening nursery at UC-Davis, but no infections were detected in the commercial crop. The infections were first detected on April 17.

Rye stem rust - There were no reports of rye stem rust this year.

Rye leaf rust - In mid-May, 40% leaf rust severities were observed in rye fields in north central Oklahoma. Light levels of leaf rust were found in mid-June in spring rye plots from west central to east central Minnesota. In mid-July, 40% severities were observed on the susceptible variety Prolific in south central and west central Minnesota plots.
In mid-May, 40% leaf rust severities were observed in a rye field in southwestern Indiana.

Rusts on other grasses - In late June, various levels (from trace to 50%) of stem rust were found in perennial ryegrass seed production fields at Roseau, Minnesota. This is the second consecutive year that high levels of stem rust were found on perennial ryegrass in the early season.

Thank you!
This is the last issue of the Cereal Rust Bulletin for the 2006-2007 small grain-growing season. We would particularly like to thank the following people for their timely observations, comments and collections. Without our cooperators help, the bulletins would simply not be possible.

Cooperator	State	Cooperator	State
Kathy Burch	AL	David Marshall	NC
Gene Milus	AR	Paul Murphy	NC
Jason Kelley	AR	Jim Miller	ND
Rick Cartwright	AR	Marcia McMullen	ND
Sam Markell	AR	Mike McMullen	ND
Lee Jackson	CA	Stephen Baenziger	NE
Linnea Skoglund	CO	Stephen Wegulo	NE
Scott Haley	CO	Gary Bergstrom	NY
Tamla Blunt	CO	Pierce Paul	OH
Dan Bland	GA	Bob Hunger	OK
Jerry Johnson	GA	Ben Edge	SC
John Roberts	GA	Jay Chapin	SC
Forrest Nutter	IA	Brenda Sievers	SD
Juliet Windes	ID	Chris Nelson	SD
Barton Fogleman	IN	Jeff Stein	SD
Greg Shaner	IN	Larry Osborne	SD
Herb Ohm	IN	Lon Hall	SD
Bob Bowden	KS	Will Vogel	SD
Doug Jardine	KS	Jackie Rudd	TX
Erick DeWolf	KS	Jason Baker	TX
Jon Appel	KS	Ravindra Devkota	TX
Stephen Harrison	LA	Rex Harrington	TX
Brian Steffenson	MN	Russell Sutton	TX
Bruce Potter	MN	Carl Griffey	VA
Char Hollingsworth	MN	Xianming Chen	WA
Deon Stuthman	MN	Adrian Barta	WI
Howard Rines	MN	Alan Roelfs	WI
Robert Laudon	MN	John Mochon	WI
Roger Caspers	MN		
Stephanie Dahl	MN	Jason Voogt	Manitoba, CA
David Ingram	MS	Richard Marsh	Manitoba, CA
Mareike Johnston	MT	Curt McCartney	Saskatoon, CA
Mary Burrows	MT	Brent McCallum	Winnipeg, CA
Christina Cowger	NC	Tom Fetch	Winnipeg, CA

Our sincere apologies if by oversight we have omitted anyone from this list.

I would also like to thank the CDL staff, particularly, Jim Kolmer, Marty Carson, Yue Jin

and Mark Hughes. I would also be interested in any comments you might have on the Cereal Rust Bulletins. Thanks again for all your help and interest.
- David Long (david.long@ars.usda.gov)

All messages from our cereal rust survey mail list and past issues of the Cereal Rust Bulletins are archived on our web page (www.ars.usda.gov/mwa/cdl) and used in the preparation of the Cereal Rust Bulletins.

Fig. 1. Leaf rust severities in wheat plots and fields in 2007.

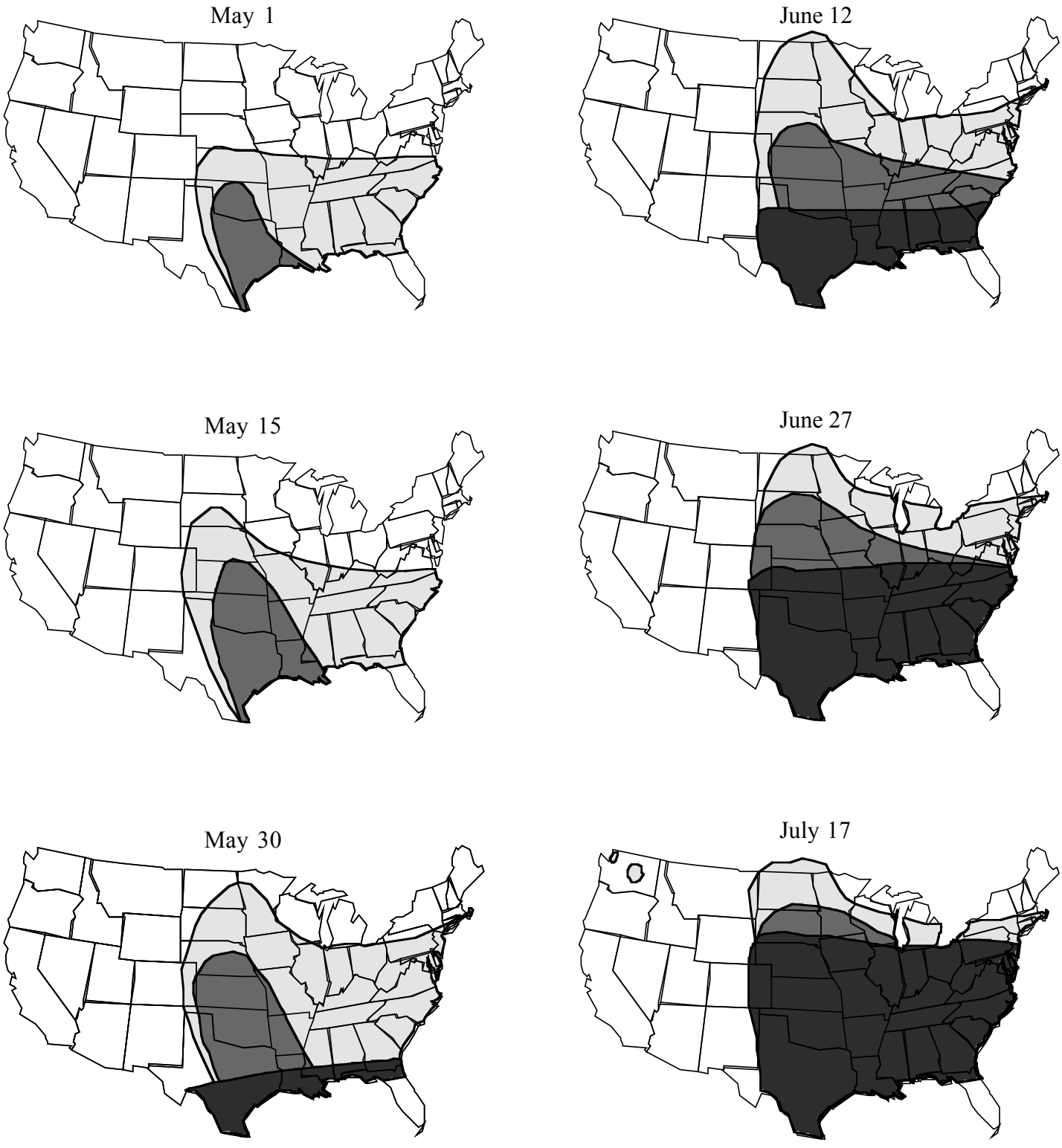

Fig. 2. Stripe rust severities in wheat plots and fields in 2007