CEREAL RUST BULLETIN

Final 2006 Report
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- Wheat stem rust was at low levels on susceptible winter and spring wheat.
- Wheat leaf rust was widespread and at low to moderate levels throughout the U.S.
- Wheat stripe rust was at low levels throughout the U.S.
- Oat stem rust and oat crown rust were common in upper Midwest fields.
- Barley stripe rust was at low levels in the western U.S.

Wheat stem rust. The first reports of wheat stem rust were in mid-April in soft red winter wheat plots at Crowley, in south central Louisiana, with severities of up to 40%. Stem rust was found in 28 of the 102 plots, which were located near rice paddies. The regular dew formation in these plots provided a suitable environment for stem rust infections.

On April 18, wheat stem rust was at low levels in plots at Baton Rouge, Louisiana. These plots of wheat matured14 days earlier than normal because of minimal rainfall. By late May, severe stem rust was observed on late-planted wheat nurseries at this same location.

In late April, wheat stem rust was found in a field in Ellis County in north central Texas. This was the first report of wheat stem rust in Texas in 2006.

In mid-May, low levels of wheat stem rust were found in southwestern Georgia plots at Plains.

From collections made from the above locations, 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. Race MCCD (variant of old race 56) was found from a collection in Texas.

In late May, traces of stem rust were observed on late-maturing lines of wheat at Kinston, North Carolina.

In mid-July, the susceptible spring wheat cultivar Baart in southern and west central Minnesota and east central North Dakota plots had trace to 10% severities of wheat stem. Race QFCS was identified from these collections. In late July, 5 to 10% stem rust severities were reported

in plots of Baart in east central South Dakota and trace levels in northwestern Minnesota. All of the currently grown spring wheat cultivars are resistant to the prevalent U.S. races .

In late July, low levels of wheat stem rust were found in plots at Colfax in Whitman County, Washington.

In early August, light to moderate levels of stem rust were observed in spring wheat plots in Aberdeen, Idaho. The rust appeared to come in late as most infection was on late tillers or late maturing lines.

Stem rust observation maps are now available on the CDL website (http://www.ars.usda.gov/Main/docs.htm?docid=9757).

Wheat Leaf Rust. ***Southern Plains – Texas.*** The 2006 fall and winter were the driest on record in the state of Texas. In late January, low levels of leaf rust were reported in irrigated central Texas wheat plots. In early March, leaf rust was found in varietal plots at College Station, Texas. In a few of the susceptible cultivars, e.g. Jagger, leaf rust severities of 5% were observed on the flag leaves and in a few others, e.g. Cutter in an early planted test, 70% severities were observed on the lower leaves. In mid-March, only traces of leaf rust were found in the irrigated nursery at Castroville, Texas. The wheat crop throughout south Texas was under severe drought stress. By the second week of April, the susceptible cultivars Jagelene and Jagger had 80% leaf rust severities in nurseries at Castroville and College Station, Texas. In the highly resistant cultivars Fannin and Endurance, no infections were found. Only low levels of rust were reported in grower's fields in southern and central Texas because of the dry conditions (Fig. 1).

- *Oklahoma*. In mid-January, leaf rust was found in southern Oklahoma, but conditions were not conducive for infection, spread, and development of leaf rust. By the first week in March, a few pustules of leaf rust were observed on lower leaves in the wheat varietal plot at Stillwater, Oklahoma. In late March, low levels of leaf rust were reported in grower's fields ?in Oklahoma.

On May 1, traces of leaf rust were found in plots at Stillwater in northeastern Oklahoma. This year leaf rust development was less than normal in Oklahoma because of drought conditions throughout the state.

Central Plains – Kansas. In mid-March, no rust pustules were found on wheat that previously had infections in late fall in Kansas. In late April, traces of leaf rust were found in south central Kansas where wheat was under extreme drought stress. In mid-May, low levels of leaf rust were found in fields and plots in central Kansas. During the third week in May, 1% severities were observed on flag leaves of susceptible cultivars in northeastern Kansas plots. This year leaf rust losses were less than normal in Kansas because of the persistent drought throughout much of the state.

- *Nebraska*. In early March, traces of leaf rust were found on the lower leaves of wheat in plots and fields in central Nebraska. In mid-May, low levels of leaf rust were found on lower leaves of wheat plants in research plots in central Nebraska. By early June, leaf rust developed to 15 to 25% severity levels on flag leaves in central and eastern Nebraska, and in irrigated wheat in

southwestern Nebraska. As in the southern Great Plains, continued hot dry weather slowed leaf rust development in the central Great Plains.

Northern Plains - Minnesota, South Dakota, North Dakota. On May 8, leaf rust infections that had apparently over-wintered were found on the lower leaves of the susceptible winter wheat Cheyenne at the Rosemount Experiment Station in east central Minnesota. On May 26, 5% severities were found on flag-2 leaves in susceptible winter wheat plots at Rosemount. In early June, traces of leaf rust were found on the spring wheat Alsen in Bottineau County in north central North Dakota, which is near the Canadian border. Drier than normal conditions in May and June slowed leaf rust development in most areas of the northern plains.

In late June, plots of susceptible winter wheat cultivars in east central Minnesota and east central South Dakota had 60% rust severities, while resistant cultivars had only trace levels of infection on the flag leaves. By late June, spring wheat had leaf rust severities of trace to 1% on lower leaves in southern Minnesota and North Dakota fields (Fig. 1). Susceptible spring wheat cultivars in southern Minnesota plots had 20% rust severities on the lower leaves.

In early July, high levels of leaf rust were found in susceptible winter wheat in plots in southeastern North Dakota and in mid-July high levels of infection were found in spring wheat fields in north central North Dakota. By mid-July, trace to 60% leaf rust severities were observed on flag leaves of spring wheat cultivars in fields and plots from north central South Dakota to west central Minnesota (Fig. 1). In late July, wheat leaf rust was at trace to moderate severity levels in spring wheat fields in northern Minnesota and North Dakota. Plots of susceptible cultivars in the same area had moderate to high leaf rust severities.

This year leaf rust was widespread, but at lower levels than normal in the upper Midwest on both spring and winter wheat. Lower amounts of rust inoculum than in previous years arrived from the winter wheat region because of the persistent drought–like conditions in the southern plains, which reduced rust infections in the winter wheat. Hot and dry conditions in the northern plains in June and July also reduced the incidence and severity of leaf rust. Many spring wheat fields were sprayed with fungicide, further reducing leaf rust infections and also the incidence of leaf spot diseases.

Southeast – Louisiana. In mid-February, leaf rust was found on susceptible winter wheat cultivars throughout Louisiana in plots and fields. By early March, cultivars growing in plots in southeast Louisiana had up to 70% leaf rust severity.

In late March in wheat plots at Alexandria, Louisiana, susceptible winter wheat cultivars had 20% leaf rust severities on the lower leaves. Some of the fields infected with rust were sprayed for rust control in the southern U.S. During the second week in April, plots in southern Louisiana had leaf rust severities up to 70%.

By late April, plots of susceptible wheat cultivars in northeastern Louisiana had leaf rust severities up to 80% on flag leaves.

- Arkansas. In early February, leaf rust had survived as far north as northeast Arkansas, however, a mid-February cold snap combined with freezing rain and snow appeared to kill the rust. In mid-March, leaf rust was light in the southern part of the state. By mid-April, leaf rust was found in areas of Arkansas that had sufficient moisture. In late April, plots in east central Arkansas had 0-50% leaf rust severities. In Arkansas leaf rust was more widespread than in the last few years, but the high severities occurred too late to cause much yield loss.

-Mississippi, Georgia, Alabama, South Carolina. In mid-March, leaf rust was at low levels in southern Georgia plots. In early April, leaf rust was found on the lower leaves of the most susceptible cultivars in southwestern and south central Georgia. In late April, in the area from central Mississippi to central Georgia, plots of susceptible wheat cultivars had leaf rust severities up to 80%. Fields in the same area had severities from 0 to 10% (Fig. 1). In mid-May, susceptible soft red winter wheat cultivars in northern Alabama plots had 60% severities. In early May flag leaves of soft red winter wheat in central South Carolina plots had 5% leaf rust severity. This year in the southeast U.S. leaf rust was widespread, but light and losses were minimal.

Mid-Atlantic - North Carolina. In late March, the cultivar McCormick in southeastern North Carolina plots had low levels of leaf rust on lower leaves. In the second week in May, severe leaf rust infections were reported in plots at the Kinston station in east central North Carolina. In North Carolina, wheat leaf rust was widespread in the central Coastal Plain and particularly severe in the Neuse River basin; only traces of wheat leaf rust were observed in the Piedmont.

- Virginia. In the first week in May, severe leaf rust infections were reported in the wheat-breeding nursery at Warsaw in northeast Virginia. By mid-May, wheat leaf rust was widespread and severities up to 65% were reported on susceptible cultivars McCormick (Lr24) and USG3209 (Lr26), in plots on the eastern shore of Virginia. Leaf rust was earlier and more severe than normal across the state of Virginia. There appeared to be little virulence to the Lr9 gene in the rust population, as Tribute, Coker 9835 and Coker 9663 were virtually clean. In contrast, there seems to be significant virulence to genes Lr24 and Lr26 and to a lesser extent, Lr18.

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

Pennsylvania. In early June, leaf rust that over wintered was limited to the lower canopy of wheat in Pennsylvania.

New York. In early July, low levels of leaf rust were found in winter wheat plots at Ithaca, New York.

Midwest - In early June, wheat leaf rust was found in fields from east central Missouri to southern Illinois at 20% severity on flag leaves. The first report of leaf rust in Ohio was during the second week in May in south central Ohio, where the rust may have over-wintered. By early June, trace levels of leaf rust were found on flag leaves of wheat in fields from northwestern Ohio to south central Wisconsin. In mid-June, plots in west central and northwestern Indiana had 40% severities

on lower leaves. By mid-June, leaf rust was severe on the upper leaves of susceptible cultivars throughout the northern Ohio. More leaf rust was found in Ohio than last year, as moisture conditions throughout this area were conducive for rust development and some losses occurred in susceptible cultivars.

California - In mid-May, leaf rust severities up to 80% were observed in susceptible cultivar plots in Kern County and Madera County late in the growing season.

Washington - In mid-July, leaf rust was very light in experimental plots at Pullman and Mt. Vernon, Washington. No leaf rust was found in farm fields.

Idaho - In early August, light to moderate levels of leaf rust were observed in spring wheat and triticale plots in Aberdeen, Idaho. The rust appeared to come in late as most infection was on late maturing lines.

Preliminary race identifications - From rust collections made in early November in north eastern Oklahoma plots, the following leaf rust races were identified: TBBJ (Lr2a virulence), TDBJ (Lr24 virulence) and TDDS (Lr17 & 24 virulence). From collections made in early December in central Texas, the TDBJ (Lr24 virulence) race and in northwest Arkansas the TBRK (Lr11 and Lr18 virulence) race were identified. From collections made in early March in central Texas the following races were identified: TDBJ (Lr24 virulence), TJBG (Lr16 and Lr24 virulence) and MFPS (Lr17, Lr24, and Lr26 virulence). These leaf rust races also were identified from rust collections made during the 2005 leaf rust survey (http://www.ars.usda.gov/mwa/cdl/).

Wheat stripe rust. ***Southern Plains*** – In early March, wheat stripe rust was present at low levels on the upper leaves of a cultivar growing in a plot at College Station, Texas. In mid-March, traces of stripe rust were found in the nursery at Giddings in central Texas. In late March, wheat fields and plots in southern and central Texas had low levels of wheat stripe rust (Fig. 2). Conditions were not favorable for rust development (limited moisture and few cool nights). In early April, only traces of stripe rust were found in southern and central Texas. By mid-April, stripe rust had not been found in Oklahoma or states to the north. In late April, hot and dry conditions slowed stripe rust development in plots and fields throughout the southern U.S. (Fig. 2). This year stripe rust development in the southern plains was much less than last year because of the limited moisture and high daytime temperatures. The southern states provided a reduced amount of inoculum for the northern regions of the U.S.

Central Plains - On May 22, traces of wheat stripe rust were found on the flag leaves of susceptible cultivars in plots at Manhattan, Kansas, but hot dry weather slowed further rust development.

In early June**,** traces of stripe rust were found in a winter wheat nursery at Mead in east central Nebraska and in winter wheat plots in northeast South Dakota. This year stripe rust was very light in the central and northern plains because inoculum from the southern plains was light and drought conditions persisted in much of the area.

Northern Plains - On April 26, light amounts of stripe rust were reported on winter wheat in plots at St. Paul, Minnesota. This may have been an over-wintering site. In early May, stripe rust infections that had apparently over-wintered were observed on susceptible winter wheat cultivars in the Gallatin Valley in southwestern Montana. On May 26, flag leaves of susceptible winter wheat in east central Minnesota plots had 10% stripe rust severities.

By the third week in June, traces of stripe rust were found on a few winter wheat cultivars in east central South Dakota and east central Minnesota plots (Fig. 2). Hot weather slowed rust development in these plots. Many wheat fields were sprayed with fungicide to prevent losses due to rust and scab. By mid-July, hot dry weather had stopped most development of stripe rust on spring wheat in the northern Great Plains.

Cool and wet weather the first half of June were favorable to stripe rust development in Montana winter wheat. In central and east central Montana 15,000 – 20,000 acres of winter wheat were sprayed with fungicides. There were sporadic reports of stripe rust on spring wheat, but the severity was low. Dry and warm weather in early July slowed stripe rust.

In mid-June, wheat stripe rust foci of 60-80% severity where observed in winter wheat nursery plots at Winnipeg, Manitoba, Canada. Infections were noted on lower leaves thus indicating that over wintering may have occurred. Very mild winter conditions with adequate snow cover occurred in 2005-2006, and near normal spring temperatures were favorable for stripe rust infection.

Louisiana – In mid-February, stripe rust was increasing in wheat plots at Winnsboro in north central Louisiana and by mid-March was severe throughout the plots. In mid-March, stripe rust was severe on a few susceptible cultivars in the nursery at Baton Rouge, Louisiana. In late March, some fields were sprayed for rust control. In wheat plots in south central Louisiana, susceptible cultivars had 60% stripe rust severities. Higher day and night temperatures during the last week of March slowed stripe rust development. In early April, high levels of stripe rust were observed in northeast Louisiana plots, but infections in fields were light.

Arkansas - In early February, wheat stripe rust was found throughout Arkansas. However, a mid-February cold snap slowed rust development in the state. By mid-March, only low levels of stripe rust in east central Arkansas had been found. In late March, stripe rust was at low levels in fields in southern Arkansas. By early April, stripe rust was increasing throughout Arkansas, but conditions did not favor development of high rust severities.

Southeast - In early April, stripe rust was found in southern Georgia. In late April, high severities of stripe rust were observed in late maturing susceptible cultivars in the nursery at Plains in southwestern Georgia. In the nursery most of the stripe rust infections had occurred earlier in March and April when temperatures were cooler. By late April leaf rust was the most prevalent rust on wheat at Plains. In mid-May, light levels of wheat stripe rust were found in Limestone county plots in north central Alabama.

Midwest - In early May, plots in Urbana, Illinois had low levels of stripe rust incidence and severity. The drier and warmer than normal weather in April and May slowed the increase and spread of stripe

rust. In early June, traces of stripe rust were found in east central Missouri fields. In early June, 40% wheat stripe rust severities were observed on flag leaves in plots in northwestern Indiana; trace severities were found in fields. The only report of stripe rust this year in Ohio was in a wheat breeding line. Last year stripe rust was found at a number of locations in Ohio.

North Carolina - Heavy stripe rust was reported in fields in the Albermarle/Pamlico Sounds region in east central North Carolina in early May. This year insignificant levels of wheat stripe rust were present throughout the Coastal Plain of North Carolina.

Virginia and Maryland - In mid-May, hotspots of stripe rust were found in wheat plots in the eastern shore of Virginia and Maryland.

California - In mid-March, low levels of stripe rust were found in plots in the southern San Joaquin Valley. In March, California had cool and very wet conditions, which was favorable for stripe rust development. In early April, the susceptible forage wheat cultivar Dirkwin had stripe rust severity of 30% in the Imperial Valley. Infections also were noted in fields of Orita durum wheat in the Imperial Valley. Light infections of wheat stripe rust were reported in the southern portion of the San Joaquin Valley and more severe infections were reported from scattered areas further north in the San Joaquin Valley and throughout the Sacramento Valley. In some Sacramento Valley fields, 80% severities were recorded in hot spots. By late May, wheat stripe rust was severe throughout the Central Valley of California. The two most widely grown cultivars, Summit and Blanca Grande, are now both fully susceptible to the races of stripe rust that occur in California. Statewide, yield losses to wheat stripe rust may approach 15% this season.

Pacific Northwest - By the second week in April, nursery plots at Mt. Vernon (northwestern Washington) had 40% stripe rust severity. Rust also was found in some surrounding fields. During the second week in April wheat stripe rust was not found from central to eastern Washington. By the third week in April, susceptible entries in winter wheat nurseries at Mount Vernon in northwestern Washington had 60% levels of stripe rust infection. In south central and southeastern Washington, early-planted winter wheat fields had 5% stripe rust severity. In this area the initial stripe development was much later than last year, but about normal for this area.

In late May, stripe rust was starting to increase on susceptible winter wheat entries in nurseries in the Palouse region of Eastern Washington. Severities ranged from 1 to 10% with less than 1% of the plants infected. The stripe rust appeared one month later that last year in the Palouse region.

On May 22, stripe rust was found in a field in Franklin County, in southeastern Idaho, which is about 6 miles north of the Idaho-Utah border. Pustules were just beginning to show on the flag leaves.

By mid-June, stripe rust was widespread in eastern Pacific Northwest fields and plots. On June 16, 30% severities were reported on susceptible winter wheat entries and 10% on susceptible spring wheat entries in disease monitoring nurseries at the Pendleton Experiment Station in Oregon. In nurseries near Walla Walla, Washington stripe rust severities reached 100% on susceptible entries in both winter wheat and spring wheat nurseries. Stripe rust was found in commercial spring wheat fields in the Palouse area, where 10% of the plants were infected with severities less than 5% on

lower leaves. The wet and cool conditions the first 3 weeks in June were conducive for rust production.

By mid-July, stripe rust development had slowed in Pacific Northwest fields because of the hot dry weather. In early-July, 70-100% severities were reported on susceptible entries in plots where moisture was not limiting. Compared to last year, wheat stripe rust was lighter in the Pacific Northwest.

Utah. In early June, light stripe rust was found on Garland wheat under irrigation in Logan, Utah. Stripe rust was not found in the dryland area in northwestern Utah. This is typical, since rust is rarely seen in Utah. Last year (2005) was an anomaly with quite severe stripe rust in Logan which started much earlier in the growing season. Prior to last year, the previous year that had significant stripe rust (or any rust) was 1993 (which was similar in temperature and moisture to 2005).

Oat Stem Rust. In mid-March, traces of stem rust were found in oat varietal plots at the Baton Rouge, Louisiana nursery. In mid-April, oat stem rust was at low levels in oat demonstration plots in southwest Louisiana. During the last week in April, oat stem rust was at high severity on susceptible oat lines at Baton Rouge.

During the second week in April, traces of oat stem rust were found in the plots at Castroville and College Station, Texas. In mid-May, oat lines in plots at McGregor Texas had 20-100% severities. This was the most oat stem rust seen at the McGregor nursery in many years.

During the last week in April, oat stem rust was observed in plots in south central Alabama and northeastern Florida. In mid-May, light oat stem rust was found in plots at Plains, Georgia.

In mid-May, 10% stem rust severities were found in a forage oat field in Madera County in California. In late May, plots at Davis, California had 100% severity.

In early June, traces of stem rust were observed on late-maturing lines of oat at Kinston, North Carolina.

In late June, 1% of the plants in an oat plot at Lincoln, Nebraska had 20% stem rust severities. The initial rust infection occurred in early June.

During mid-July, fields and plots at the soft dough growth stage throughout southeastern South Dakota, southern Minnesota, northern Iowa and southwestern Wisconsin had trace to 40% stem rust severities. In late July, east central Wisconsin oat fields had trace to 20% severities of stem rust. Most current oat cultivars are not highly resistant to stem rust.

In early August, light to moderate levels of stem rust were observed in spring oat plots in Aberdeen, Idaho. The rust appeared to come in late as most infection was on late tillers or late maturing lines.

Oat stem rust races identified so far in the U.S. include: NA 5, NA 29, NA 67, NA 78 (NA 67 + Pga virulence) and NA 79 (NA 29 + Pga virulence). The latter two are relatively new races.

Oat Crown Rust. In early March, traces of oat crown rust were found on the lower leaves of the cultivar Brooks at the College Station nursery in central Texas. In mid-March, crown rust was observed in a spreader oat plot at Baton Rouge, Louisiana.

In late March, low levels of crown rust were found in the drought area of southern Texas. In early April, oat crown rust was increasing on susceptible cultivars and severities as high as 80-100% were observed in College Station plots in central Texas.

By the second week in April, crown rust was found in irrigated oat plots in southern Texas. During the second week of April, oat plots at College Station Texas in central Texas had up to 100% severities of crown rust. In early April, crown rust was increasing in oat plots in southeast Louisiana. In mid-April, low levels of crown rust were found in a field in west central Georgia. Oat crown rust infections were much lighter than last year in the southern U.S.

In the second week in April, crown rust was found on wild oats in the Sacramento Valley of California.

In late April, central Texas fields had trace–20% severities while trace severities were reported in northern Texas. In early May, oat plots in southern Alabama and the Florida panhandle had 80% rust severities. These southern locations provided less inoculum than last year for the northern oat growing areas.

In mid-May, plots in northern Alabama had 40% severities and a field in Fresno County, California had 20% severity.

In late May, crown rust made its initial appearance in oat plots near the buckthorn nursery at St. Paul, Minnesota. By late May, oat crown rust was moderate at Kinston, North Carolina.

In the second week in June, moderate to heavy crown rust infection was observed on upper leaves of oat in spreader rows in the St. Paul, Minnesota buckthorn nursery and had spread rapidly into research plots. In oat plots at Rosemont, Minnesota traces of crown rust were found in early June.

By the third week in June, fields from northeastern Nebraska, central Minnesota to southern Wisconsin had trace to 20% rust severities. Most of the infections in this area originated from infected buckthorn (alternate host for crown rust). Crown rust on oat in the buckthorn nursery at St. Paul, Minnesota had severity levels of up to 25-30% on flag leaves.

During the second week in July, fields and plots throughout west central Wisconsin to eastern South Dakota had trace to 80% oat crown rust severities. Much of the primary inoculum originated from buckthorn, the alternate crown rust host, common throughout the Upper Midwest. Based on

observations in the buckthorn nursery in St. Paul, the only resistance gene conferring complete resistance to the crown rust population is Pc94.

In late July, trace to moderate levels of oat crown rust were found in wild and cultivated oat in northwest Minnesota.

Buckthorn. In mid-April, buds on buckthorn, the alternate host for oat crown rust, were beginning to break in the buckthorn nursery at St. Paul, Minnesota. This was ahead of normal maturity for buckthorn development in these plots.

Light pycnial infections were observed on emerging buckthorn leaves in the nursery at St. Paul, Minnesota on May 2. Cooler than normal temperatures slowed down pycnia development..

By the second week in May, pycnial development was moderate on buckthorn at the St. Paul, Minnesota nursery. Despite the slow leaf emergence of the buckthorn, due to the cool temperatures in early May, pycnial development was normal.

In early June, aecial infections were common on buckthorn in hedgerows in central New York.

Barley stem rust. In mid-July, the first reports of barley stem rust this year were trace severities in plots of the susceptible two-row cultivar Hypana in east central and south central Minnesota plots. Low levels of barley stem rust were widespread in a field in Roseau County in northwestern Minnesota.

In early August, light to moderate levels of stem rust were observed in spring barley plots in Aberdeen, Idaho. The rust appeared to come in late as most infection was on late tillers or late maturing lines.

Barley leaf rust. In late March, low amounts of barley leaf rust were found on susceptible lines in a southeastern North Carolina plot.

By mid-May, barley leaf rust was widespread and severe in nurseries in eastern Virginia and eastern Maryland.

In mid-May, a 100% severity was reported on a susceptible cultivar in a nursery in Merced County, California. By late May, moderate to severe barley leaf rust developed on susceptible cultivars in nurseries in the Central Valley of California.

In early June, barley leaf rust that over wintered was limited to the lower canopy in most cultivars but the cultivar Barsoy had a 30% severity on the flag leaf in southeastern Pennsylvania plots.

In late June, 10% barley leaf rust severities were observed on the upper leaves of winter barley in east central Nebraska plots at Mead and traces on lower leaves in spring barley in southern and east central Minnesota plots. In mid-July, 10% severities of leaf rust were found on upper leaves of susceptible spring barley in east central and southwestern Minnesota plots.

Stripe Rust on Barley. In mid-March, stripe rust was observed in 6-rowed barley plots at Yuma, Arizona. There was one hot spot in the early generation material.

In the second week of April, barley stripe rust was found in nurseries at Davis, California, Corvallis, Oregon and Mt. Vernon, (northwestern Washington). Some susceptible entries had stripe rust severities of 30-50%. In the second week in April, stripe rust was found on wild barley grasses growing in orchards and along roadsides in the Sacramento Valley of California. Some of the wild barley grasses were heavily infected (100% incidence and 100% severity). The stripe rust on wild barley grasses could be the wheat stripe rust or barley stripe rust pathogen, or another form specific on wild barley grass as reported in Australia.

By mid-May, barley stripe rust was found on susceptible cultivars in nurseries throughout the Central Valley of California. Rust was also found in a few fields.

On June 16, 30% barley stripe rust severities were observed on susceptible entries in the disease monitoring nurseries near Walla Walla, Washington.

In mid-July, low levels of stripe rust were found in barley fields in Washington and 50% severities were reported on susceptible entries in experimental fields near Pullman. In Mt. Vernon, Washington severities ranged up to 100% on susceptible barley entries and 10 to 30% at Walla Walla and Lind, Washington. Barley stripe rust was lighter this year than last year in the Pacific Northwest.

In mid-July, traces of stripe rust on barley were observed by cooperators in plots at Crookston in northwest Minnesota and Fargo in east central North Dakota.

Barley crown rust. In early June, low amounts of crown rust were found on barley growing near buckthorn in St. Paul, Minnesota. In mid-July, 20% severities of crown rust were observed in barley plots in southern Minnesota and traces in east central North Dakota barley plots.

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

Rye leaf rust. In late March, low amounts of leaf rust were observed on rye in central Texas plots. During the last week in April, high levels of rye leaf rust were found in fields in southwestern Georgia and southern Alabama. In mid-May, rye fields in north central Oklahoma had 20% leaf rust severities. In early June, rye plots in southwestern Indiana had 40% rye leaf rust severities. In mid-June, upper leaves of winter rye had 60% leaf rust severities and trace severities on lower leaves of spring rye in southern and east central Minnesota plots. By mid-July, high levels of rye leaf rust were found on the upper leaves of spring rye in southern and west central Minnesota plots.

Stem rust on barberry. In mid-May, aecial development was light on infected susceptible barberry bushes (alternate host for stem rust) growing in south central Wisconsin. In early June, aecial infections were light on susceptible common barberry in southeastern Minnesota. Aecial infections were not observed on common barberry plants located in Ithaca, New York.

Aecial infections were mostly due to *Puccinia graminis* f. sp. *secalis* (the form attaching rye) as *P. graminis* f. sp. *tritici* (the form attacking wheat) or *P. graminis* f. sp. *avenae* (attacking oats) was not identified from the barberry samples.

Rusts on other grasses. In mid-June, a perennial ryegrass seed production field at Roseau, Minnesota had 50% severities of stem rust. High levels of crown rust (caused by *Puccinia coronata* f. sp. *lolii*) also were found in nearby fields of ryegrass. In the third week in June in southern Wisconsin, 40% severities of crown rust infections were observed on quack grass (*Elytrigia repens*). In the buckthorn nursery in St. Paul, heavy crown rust infections were observed on quack grass, slender wheat grass (*Elymus trachycaulus*), western wheat grass (*Pascopyrum smithii*), Russian wild rye (*Psathyrostachys juncea*), Canada wild rye (*E. canadensis*), and foxtail barley (*Hordeum jubatum*). These grasses normally harbor the barley crown rust *(Puccinia coronata* var. *hordei)*. Crown rust infections were also observed on redtop (*Agrostis gigantea*), tufted hairgrass (*Deschampsia caespitosa*), tall fescue (*Festuca arundinacea*), and smooth brome (*Bromus inermis*). Crown rust infections on smooth brome were widespread across Minnesota, Wisconsin, and the Dakotas. In mid-July, heavy crown rust infections were observed on quack grass (*Elytrigia repens*) in east central South Dakota and west central Wisconsin.

Thank you!

This is the last issue of the Cereal Rust Bulletin for the 2005-2006 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
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Adam Sparks	KS	Craig Siegerist	TX
Stephen Harrison	LA	Russell Sutton	TX
Stephanie Dahl	MN	David Hole	UT
Jill Garvin	MN	Carl Griffey	VA
Paul Groneberg	MN	Bob Pitman	VA
Char Hollingsworth	MN	Kim Campbell	WA
Robert Laudon	MN	Xianming Chen	WA
Bruce Potter	MN	Adrian Barta	WI
Howard Rines	MN	John Mochon	WI
Brian Steffenson	MN	Alan Roelfs	WI
Deon Stuthman	MN	Tom Fetch	Winnipeg
David Ingram	MS	Brent McCallum	Winnipeg
Mareike Johnston	MT		

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, Yue Jin, Marty Carson 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 (davidl@umn.edu)

All messages from our cereal rust survey mail list 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 fields in 2006

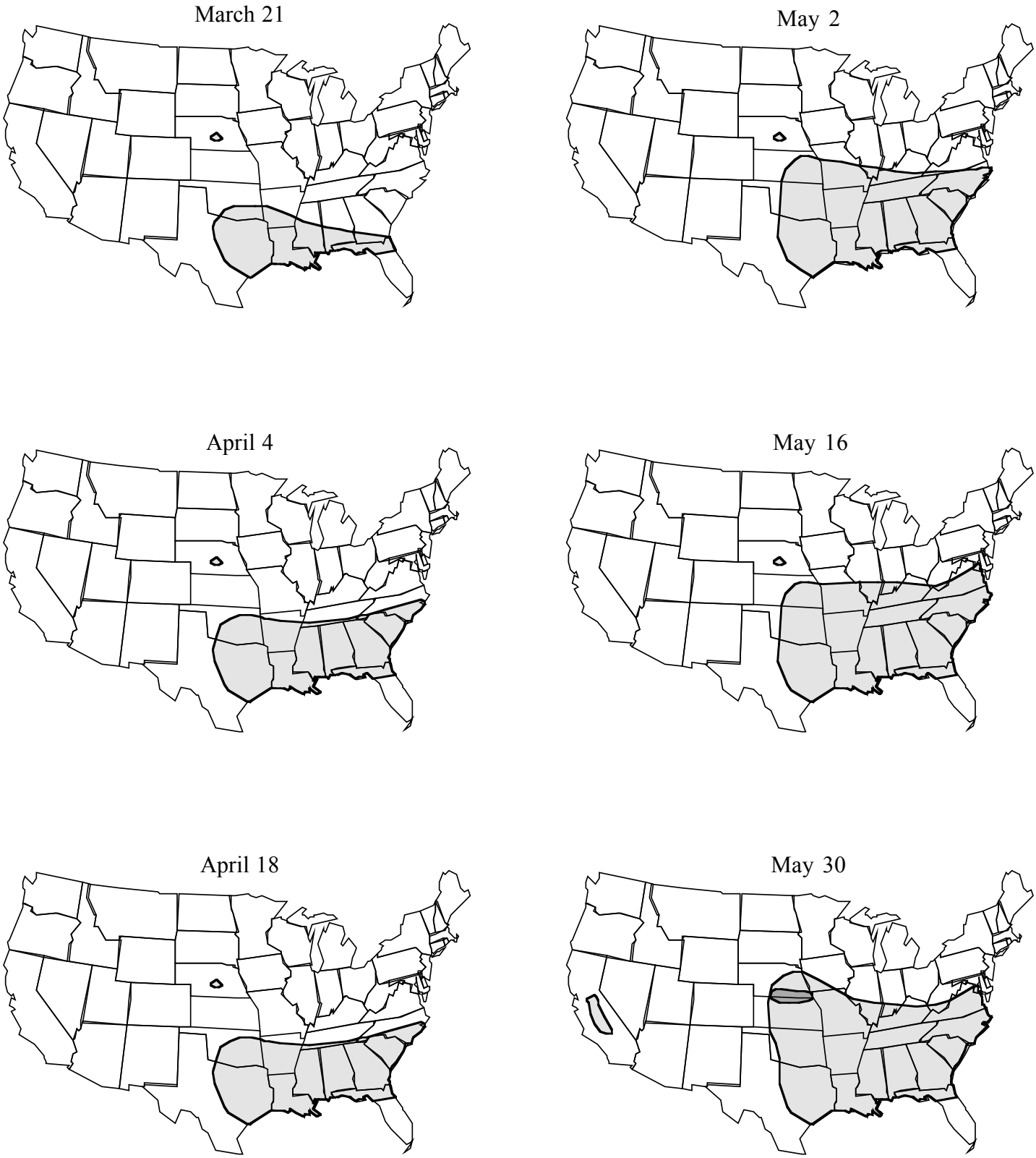

Fig. 1. Leaf rust severities in wheat fields in 2006 (cont)

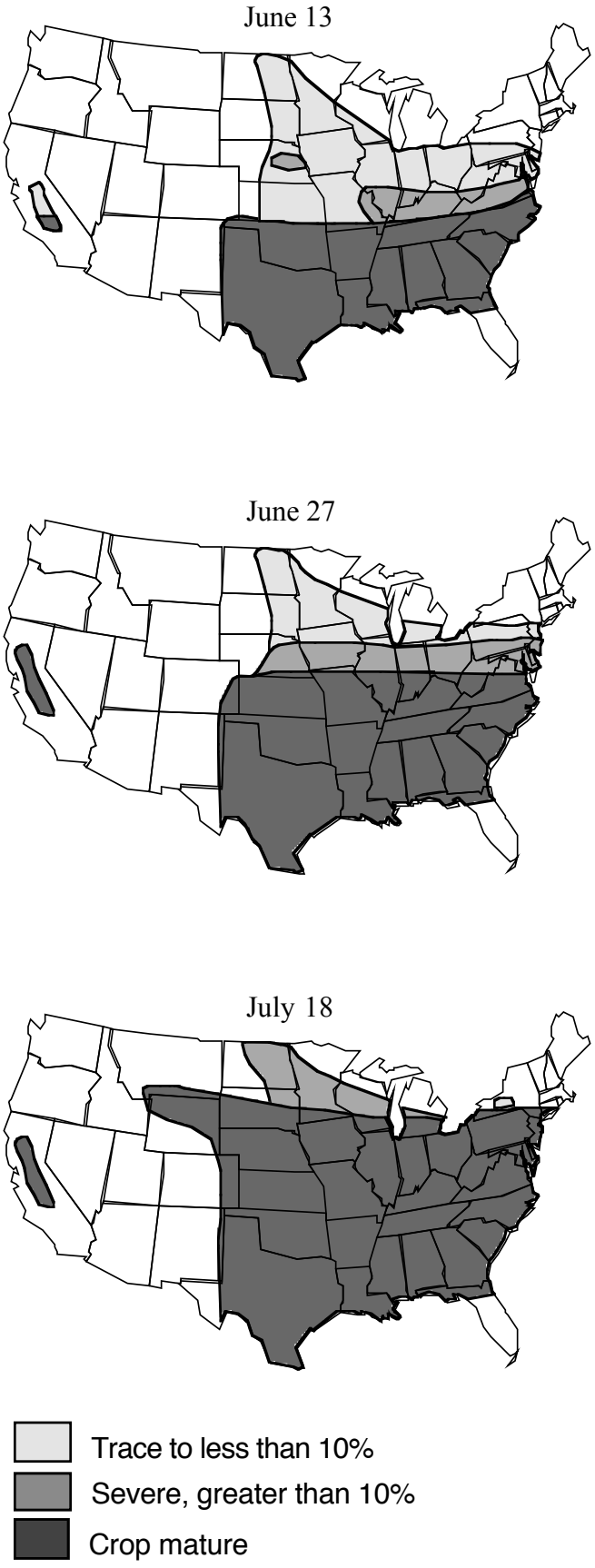

Fig. 2. Stripe rust severities in wheat fields in 2006