CEREAL RUST BULLETIN

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- Wheat stem rust was at low levels in plots and fields 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 levels throughout much of the U.S.
- Oat stem rust levels were low throughout the U.S.
- Oat crown rust levels were low to severe throughout the U.S.
- Barley stem rust was at low levels throughout the U.S.
- Barley leaf rust was at low levels throughout the U.S.
- Stripe rust on barley was at low levels in the western U.S.
- Rye leaf rust was at moderate levels in the central plains in the U.S.
- Stem rust aecia were found on susceptible barberry bushes in Idaho, Minnesota, Washington and Wisconsin.

Wheat Stem Rust. ***Texas*** **-** The first report of wheat stem rust in 2009 was of low levels found on spelt wheat and barley planted as a windbreak for watermelons in Hidalgo County along the Rio Grande Valley in southeast Texas on March 23. Low levels of wheat stem rust were found on flag leaves and stems in McNair 701 disease detection plots in irrigated nurseries at Beeville and Castroville in south Texas on April 9. The pustules developed from spores that were likely rain deposited approximately 10-14 days earlier. On April 22, stem rust was developing slowly on susceptible cultivars (e.g., McNair 701), a few winter wheat lines and on a winter triticale (Tamcale 5019) in the Castroville irrigated plots in south Texas. On April 27, a few pustules of wheat stem rust were found in the McNair 701 stem rust trap plot at College Station in central Texas. In early May, wheat stem rust was found on the susceptible cultivar McNair 701, at McGregor and College Station and in plots of susceptible cultivars at Bardwell and Giddings in central Texas. On May 6, low levels of stem rust were found in a field in Jones County in northwest Texas. In late June, low levels of stem rust were reported in a Texas Panhandle wheat plot.

Oklahoma - In late May, low levels of stem rust were found in plots of two susceptible cultivars at Stillwater, Oklahoma.

Kansas - In late May, low levels of stem rust were found in plots in Reno County in south central Kansas. In early June, low levels of wheat stem rust were found on the

susceptible hard red winter cultivar Winterhawk in central Kansas plots in Ellsworth and Stafford counties. On June 3, low levels of wheat stem rust were also found on Winterhawk in plots at Belleville in north central Kansas. In all cases the infections were concentrated in small foci with lesions on both stems and leaves.

Colorado - In late June, low levels of stem rust were found on Winterhawk and Bill Brown varieties in northeastern Colorado plots.

Nebraska - On June 9, severe levels of stem rust were found on a susceptible line in the Lincoln, Nebraska breeding nursery. In late June, severe levels of stem rust were found in a susceptible triticale in an irrigated nursery in Mead, Nebraska. Severe levels of stem rust were also observed on wheat and triticale in the Lincoln nursery. In late June, high levels (20% severity) of stem rust were found in susceptible winter wheat fields at the hard dough maturity stage in Nuckolls and Franklin counties in south central Nebraska.

South Dakota - During the second week in July, low levels of stem rust were found on an experimental line in a regional nursery near Brookings, South Dakota.

North Dakota - On August 10 and 11, trace levels of wheat stem rust were found in plots of susceptible wheat in eastern and central North Dakota. No stem rust was found at the Minot plots in west central North Dakota.

Minnesota - On July 13, high levels of wheat stem rust were found on susceptible winter wheats near maturity in plots at Rosemount in southeastern Minnesota. Also on July 13, light levels of wheat stem rust were found on an "old timer" susceptible spring wheat cultivar 'Baart' in plots at Rosemount, Waseca and Lamberton experiment stations in southern Minnesota. On July 29, trace levels of stem rust were found in Baart rust trap plots at Morris, in west central Minnesota. Trace levels of stem rust were found in plots of Little Club wheat in northwest Minnesota in mid-August.

Louisiana - In early April, a center of stem rust was found in a disease detection plot of Panola at the Jeanerette experiment station in southern Louisiana. Severities ranged from trace to 40% in a 2 m x 2 m foci. On April 8, severe levels of stem rust were found in several wheat plots at the Winnsboro experiment station in northeastern Louisiana. The rust had not spread evenly across the nursery. Weather conditions had been ideal for rust development with adequate moisture (rain, dew and fog) and ideal temperatures across much of Louisiana. On April 22, low levels of wheat stem rust were found in the Crowley plots in south central Louisiana on the susceptible variety Panola and other varietal trial entries. The varieties matured rapidly and therefore the rust did not have much time to increase. In early May, wheat stem rust was increasing in plots at Winnsboro in northeast Louisiana. Many of the soft red winter wheats had severities of 40 to 60%.

Alabama - On April 21, low to moderate levels of stem rust were found in a plot of the susceptible cultivar McNair 701 at Headland in southeastern Alabama. By early May, severe levels of stem rust were found in the plots.

In summary, during the early spring of 2009, low levels of stem rust were found in susceptible plots of soft and hard red winter wheat in most southern states in the U.S.

Arkansas - In early May, wheat stem rust was found in plots in Crawford and Pope Counties (northeastern Arkansas) on Delta King 9577 and Panola, respectively. In the southeastern part of the state light levels of stem rust were found in a field.

Tennessee - In late May, moderate levels of wheat stem rust were found in a field near Jackson in west central Tennessee. This is the most stem rust seen in this area in the last 30 years.

Missouri - In early June, a stem rust collection was made in soft red winter wheat in Barton County in southwestern Missouri. On July 8, high levels of stem rust were found in a field of mature winter wheat in Harrison County in northwestern Missouri. Incidence was 100% and severity was more than 40%. The grain was severely shriveled, likely resulting in a significant yield loss in this field.

Illinois - In early June, low levels of stem rust were found in plots in Madison, Champaign and Montgomery Counties in southern Illinois. In late June, moderate levels of stem rust were found in plots in Dekalb County in north central Illinois.

Indiana - In early June, low levels of wheat stem rust were found on a commercial variety in research plots in Posey, Spencer and Vanderburgh Counties in southwest Indiana.

Michigan - On June 23, low levels of stem rust were reported in wheat research plots in Lenawee County in southeastern Michigan. On July 10, low levels of stem rust were found in soft winter wheat plots in Ingham and Saginaw counties in central Michigan.

Wisconsin –-In late July, low levels of wheat stem rust were found in a soft red winter wheat plot in Door County in northeastern Wisconsin.

In summary, during the months of July and August, low levels of wheat stem rust were found in susceptible winter wheat and spring wheat plots from northeastern Wisconsin through Minnesota to central North Dakota. Stem rust was not observed on any current wheat cultivars in research plots or in fields in this area.

Idaho – On June 23, 20% rust severities were reported in a spring wheat field close to barberry bushes (alternate host of wheat stem rust) in Latah County, Idaho. Plants with rust pustules were 20 feet from the bushes. Spring wheat and barley crops were planted later this year so stem rust will likely develop more than in the last two years in the

Palouse region. On July 7, light levels of stem rust were found on an experimental line at the soft dough growth stage in the soft white winter wheat nursery in Aberdeen, Idaho.

This year there were more stem rust reports on susceptible cultivars in the winter wheat growing area than recent years. The crop matured slower than normal, which allowed more stem rust than normal to develop.

Preliminary race identifications - 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. From rust collections made in a spring wheat field in Latah County, Idaho, the following Pgt races were identified: JCCD, QCMN, QFCJ, QFMN, QPCS, and SCCS. This diverse group of races was expected, as they were collected from wheat growing in close proximity to barberry infected with stem rust. Barberry is the alternate host for stem rust where sexual recombination occurs resulting in diverse races.

The 2009 U.S. stem rust observation map and results of race identification to-date can be found on the CDL website (http://www.ars.usda.gov/Main/docs.htm?docid=9757).

Stem Rust on Barberry. In mid-May, light pycnial infections were found on susceptible barberry bushes (alternate host for stem rust) growing in south central Wisconsin. In late May, moderate numbers of aecial infections were found on susceptible barberry bushes growing in southeastern Minnesota and Wisconsin. Aecia infections on common barberry from Latah County, Idaho, were observed in mid June.

In mid-July, light aecial infections were found on four common barberry bushes near Colville, in Stevens County, Washington. Infection occurred mostly on young fruits. This is the first time stem rust infections were observed on common barberry bushes located in this area.

Wheat Leaf Rust. ***Texas*** **–** In mid-February, low levels of leaf rust were found in central Texas. In late February, leaf rust was observed in irrigated plots in south Texas at Castroville. The most severe leaf rust was found in the Jagger (*Lr17* resistance), Jagalene (*Lr24*) and TAM 112 (*Lr41*) cultivars. By mid-March, leaf rust was severe in the plots. The rust in these irrigated plots was much more severe than in the past two years. In late February, low levels of leaf rust were found on the lower leaves of wheat growing in irrigated fields in the Rio Grande Valley. Dry land fields had lower incidence of leaf rust. In early March, low levels of leaf rust were found in southern and central Texas fields. By mid-March, leaf rust was severe on susceptible cultivars in the College Station nursery in central Texas. The severe drought this winter throughout much of Texas limited rust development. Mid-March rains improved conditions for rust development in Texas.

In early April, susceptible varieties Overley (*Lr41*), Jagalene (*Lr24*) and Jagger (*Lr17*) growing in nurseries at Castroville, Beeville, College Station and McGregor had 60% leaf rust severities on lower leaves. In more resistant varieties, like Fuller and Fannin, lower infection severities were observed. Fields in southern Texas were under drought stress and rust was found only in irrigated plots in this region. During the first week in April, low to moderate levels of leaf rust were noted in central Texas fields (Fig. 1).

In early May, high levels of leaf rust were found in plots of susceptible wheat while low levels were found in fields in central and northern Texas. In late May, low levels of leaf rust were found in the Rolling Plains, Texas Panhandle and North Texas High Plains fields. In much of Texas drought-like conditions hampered the crop and rust development. These Texas locations provided less rust inoculum for areas further north than usual.

Oklahoma - In mid-February, leaf rust was at trace to low levels in Oklahoma plots. In mid-March, low levels of leaf rust were found throughout Oklahoma. The most severe leaf rust was in early-planted Jagalene. In late April, only low levels of leaf rust were observed in Oklahoma. Last year by late April leaf rust was much more prevalent and severe throughout Oklahoma.

In early May, leaf rust was found in the canopy of Jagalene (*Lr24*) and Jagger (*Lr17*) plots at Stillwater, Oklahoma. Leaf rust was at the 15% severity level on flag leaves and at the 40-65 MS/S level on leaves below the flag. By early May, leaf rust increased with the ideal temperatures and abundance of free moisture. In mid-May, high levels of leaf rust were found on flag leaves of susceptible cultivars Jagger and Jagalene in the Stillwater plots. By late May, the incidence and severity of rust throughout Oklahoma increased dramatically. Leaf rust approached severity levels in the 65-90% range during the last week in May at locations where leaves were still green. In early June, high severity (60%) levels of wheat leaf rust were found in fields of Jagalene, Jagger and Overley throughout north central Oklahoma. In most cases the rust arrived too late to cause significant rust losses.

Kansas - In mid-February, traces of wheat leaf rust that over-wintered, were found in a southeast Kansas field. In late February, traces of leaf rust were detected in northeastern Kansas plots near Manhattan. In mid-March, low levels of leaf rust were found in an eastern Kansas field.

In early April, leaf rust was at low levels throughout south central and central Kansas. In early April, the lower leaves of the wheat in northeastern Kansas plots naturally deteriorated with age taking some of the over wintering leaf rust with it. Despite this decrease in incidence leaf rust was still found at trace levels in research plots of susceptible cultivars. In late April, leaf rust remained at low levels throughout south central and central Kansas. There were no reports of leaf rust in western Kansas in late April.

In mid-May, low levels of leaf rust were found on flag leaves in north central Kansas plots and fields. The rust infections originated from spores from rust infected wheat further to the south, which were deposited with rainfall.

In early June, high severity (60%) levels of wheat leaf rust were found in fields of Jagalene, Jagger and Overley in southeastern and south central Kansas (Fig. 1). Some fields had been sprayed with fungicide to control the rust. In unsprayed fields, leaf rust caused yield losses in susceptible varieties in south central and central Kansas. In varietal plots in south central Kansas, leaf rust was low in the resistant cultivars Fuller, Santa Fe and Art. In western Kansas, rust severity was less than 5% on most leaves. In early June, in north central Kansas fields of Overley, etc., leaf rust severities on flag leaves were increasing because of the ideal conditions for rust development. These areas provided more rust inoculum for areas further north. Losses due to leaf rust for 2009 in Kansas were estimated to be 1.4%. This estimate is considerably lower than the 20-year average of nearly 4%. The reduced losses due to leaf rust in 2009 were likely due to less leaf rust being produced in drought and freeze damaged wheat fields in Texas and Oklahoma.

Colorado - In early June, low levels of leaf rust were widespread in northeastern Colorado plots and by late June, severe levels of leaf rust were found in the same plots.

Nebraska - In early June, low levels of leaf rust were found in fields and plots in southeastern and the central Panhandle of Nebraska. In plots at Lincoln, severities ranged up to 80% in plots of the susceptible cultivar Overley (*Lr41*). In late June, high levels of wheat leaf rust were found in susceptible winter wheat fields from southern to northwestern Nebraska. In early July, high levels of wheat leaf rust were found in plots of susceptible wheat cultivars in the Nebraska Panhandle.

South Dakota - In early June, leaf rust was found on winter wheat at very low levels in the mid-canopy of several fields in southeastern South Dakota. Conditions were favorable for more rust infection with storms blowing up from the south and rust spores being deposited on the leaves with rain. In late June, low levels of wheat leaf rust were found in plots and fields of susceptible winter wheat cultivars in southern South Dakota. In early July, leaf rust was limited to only the most susceptible winter wheat cultivars in fields and plots in South Dakota. During the third week in July, leaf rust was at trace levels in spring wheat fields throughout eastern South Dakota.

North Dakota - In late June, trace levels of leaf rust were found in a plot of the susceptible winter wheat Jagalene in Dickey County in southeastern North Dakota. In early July, leaf rust was limited to only the most susceptible winter wheat cultivars in fields and plots in North Dakota. On July 13 in susceptible winter wheat plots in Ramsey County in southeastern North Dakota, 10-40% leaf rust severities were found on the flag leaves at the soft dough stage. Fungicide application at the flowering growth stage had effectively controlled leaf rust at this North Dakota location. During the third week in July, leaf rust was at trace levels in spring wheat fields throughout North Dakota. Low to

moderate levels of leaf rust were found in plots of susceptible and moderately resistant to susceptible spring wheat cultivars in eastern and central North Dakota on August 10 and 11. Increased amounts of leaf rust were found in plots of the cultivars Knudson and Briggs, which were highly resistant in previous years. No leaf rust was observed on cultivars with *Lr21*, e.g., Faller, Glenn, Steele, RB07 and others. Leaf rust was at trace levels on susceptible cultivars at Minot and Langdon in mid August.

Minnesota - In late June, low levels of wheat leaf rust were found in plots and fields of susceptible winter wheat cultivars in west central Minnesota. In early July, leaf rust was limited to only the most susceptible winter wheat cultivars in fields and plots in northwestern Minnesota. In plots of unsprayed susceptible spring wheats, high levels of leaf rust were found at Rosemount, Waseca, Lamberton and Morris on July 13-15. On July 29, wheat leaf rust was severe in plots of susceptible cultivars at Morris in west central Minnesota while leaf rust was low on currently grown cultivars. As of late July, leaf rust had not yet been observed in susceptible wheat plots in northwest Minnesota.

Northern Plains - In 2009, wheat leaf rust was widespread, but cool and dry conditions in the northern Great Plains in May and June delayed the arrival and drastically slowed the development of wheat leaf rust. The loss of many winter wheat fields in North and South Dakota due to winterkill also removed a susceptible early source of leaf rust in this region. Many of the wheat fields in the spring wheat region were treated with fungicide, which reduced losses due to leaf rust and FHB (scab).

Louisiana - In early March, infection levels of wheat leaf rust were much lower than normal in southern Louisiana. During the fourth week in March, low to moderate levels were found in plots and fields throughout Louisiana. Growers sprayed with fungicides to control the leaf rust. In late March, weather conditions were ideal for rust development with lots of moisture (rain, dew and fog) and ideal temperatures across Louisiana for a couple weeks. In mid-April, wheat leaf rust was severe on many susceptible lines and cultivars in the Louisiana plots.

In early May, high levels of leaf rust were observed in susceptible wheat plots in central and northeastern Louisiana. Significant levels of leaf rust were found in fields of LA841 in northern Louisiana. This variety has occupied a large portion of acreage in the region for the last five years and has the *Yr17/Lr37/Sr38* gene complex. It appears the *Yr17* gene is still effective against stripe rust in the region, but virulence on *Lr37* exists in the current leaf rust population.

Arkansas - In early March, low levels of wheat leaf rust were found in southwest Arkansas. In early April, low levels of wheat leaf rust were reported across southern Arkansas. Leaf rust was at lower levels than the past several years in Arkansas plots and fields.

In early May, low levels of leaf rust were reported throughout northern Arkansas fields. In mid May, high levels of leaf rust were reported on a few susceptible lines and cultivars

throughout Arkansas plots. This year little leaf rust over wintered in Arkansas and less rust arrived from southern locations (i.e., south Texas and Louisiana).

Mississippi - In mid-March, leaf rust was found on wheat in southern Mississippi plots. In early May, moderate levels of leaf rust were found in central Mississippi plots.

Alabama - In mid-April, leaf rust severities ranged from 1 to 70% in wheat varietal plots in Fairhope and Headland in southern Alabama. In early May, high levels (60-80%) of leaf rust were found in plots of susceptible wheat in central Alabama and in fields in southwestern Alabama. Leaf rust from this area provided leaf rust inoculum for northern wheat areas.

Georgia - In mid-March, leaf rust was found on the lower leaves of the most susceptible soft red winter wheat lines at the Plains nursery in southern Georgia. In early May, high levels of leaf rust were found in plots while low levels were found in fields in southwestern Georgia.

Illinois - In early June, low levels of leaf rust were found in fields while severe levels were found in plots of soft red winter wheat in southern Illinois. In mid-June, moderate levels of leaf rust were found in soft red winter wheat plots in east central Illinois. In late June, low levels of leaf rust were found in north central Illinois plots.

Indiana - In early June, low levels of leaf rust were found in fields in southwest and east central Indiana. In southwest Indiana plots infection on the flag leaves ranged from 5-15% severity on the Pioneer 25R47 variety.

Michigan - In mid-June, moderate levels of leaf rust were found in southeastern Michigan soft red winter wheat plots. In late June, low levels of leaf rust were found in southwestern Michigan plots.

Wisconsin - In mid-June, moderate levels of leaf rust were found in southeastern Wisconsin soft red winter wheat plots. In early July, high levels of leaf rust were found in fields of susceptible soft red winter wheat in Door County in northeastern Wisconsin.

South Carolina - In mid-April, low to moderate levels of leaf rust were observed in plots at Blackville in south central South Carolina.

North Carolina - In mid-May, severe levels of leaf rust were found on susceptible lines and cultivars in plots and light levels in fields in eastern North Carolina. Much of the acreage had been sprayed for wheat diseases.

Virginia - In mid-May, severe levels of leaf rust were found on susceptible lines and cultivars in plots and low levels in fields in northeastern Virginia. Much of the acreage had been sprayed for wheat diseases.

Maryland - In mid-May low levels of leaf rust were found in plots on the Delmarva Peninsula. Only a few pustules developed on the flag leaves, but conditions were good for continued development. Much of the acreage had been sprayed for wheat diseases.

Delaware - In mid-June, low levels of leaf rust were found in Delaware winter wheat plots and fields.

New York - On May 22, low levels of leaf rust were reported in Monroe County west of Rochester and along Lake Ontario. In mid-June, low levels of leaf rust were found in central and western New York winter wheat plots and fields.

California - During the second week in May, leaf rust was detected in plots in the nursery at Davis and by the third week in May 60% severities were reported in susceptible lines.

Washington - In late June, low levels of leaf rust were observed in wheat nurseries at Mt. Vernon and Walla Walla.

Ontario - Low levels of leaf rust (trace to 3%) were found in southwestern Ontario, Canada fields in late June.

Preliminary race identifications - From rust collections made in late February and April in Texas plots, the following leaf rust races were identified: TDBJH (*Lr24* and *42* virulence), TDBGG (*Lr24*), MFPSC (*Lr17,24,26,42*) and MLDSD (*Lr9,17,41*). From a collection made in late February in a nursery near Manhattan, Kansas the MLDSD race was identified. From collections made in southern Louisiana in early April the following races were identified: MFPSC (*Lr17, 24, 26, 42*), MCTSD (*Lr17, 26,41*) and TDBGH (*Lr2a, 24, 42*). These leaf rust races represent some of the most common races identified from rust collections made during the 2008 leaf rust survey.

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

Wheat Stripe Rust. ***Texas*** - During the fourth week in March, low levels of stripe rust were found in southeastern Texas. The severe drought during the winter throughout much of Texas limited rust development. On March 27, low levels of stripe rust were detected in the lower canopy of susceptible Pioneer 25R78 wheat fields in Hunt, Rockwall and Fannin counties in north central Texas. Weather conditions were conducive for the rust to move upwards to the F-2 and F-1 leaves. Detection of stripe rust in north Texas was similar in date to that of last year (2008).

In early April, low to heavy levels of stripe rust were observed in a field of Pioneer 26R61 near College Station in central Texas. On April 22, low levels of stripe rust were

found on a few winter wheat lines in the irrigated nursery at Castroville, Texas (Fig. 2). Stripe rust was extremely light and hard to find in the nursery at College Station.

Oklahoma - In early June, severe levels of stripe rust were found in a field in the Panhandle of Oklahoma. The rust arrived so late that it did not affect the wheat yield.

Kansas - On May 22, stripe rust was observed at trace levels in Saline County (central Kansas). In early June, low levels of stripe rust were observed in Reno county (central Kansas) and Sumner county (south central Kansas) plots of cultivars known to be susceptible to stripe rust. Lesions were 2 to 3 cm long and actively producing spores suggesting that the infections had taken place at least 3 weeks earlier. On June 8, several small foci of stripe rust were found in susceptible varieties 2137, TAM 110 and TAM ll2 in northwest Kansas. A few stripe rust lesions were identified on varieties previously identified as moderately resistant. This observation on the MR varieties has been reported late in the growing season the past two years. Losses to stripe rust were light in Kansas in 2009.

Colorado – In early June, low levels of wheat stripe rust were found at Julesburg, in northeastern Colorado plots.

Nebraska – In early June, trace levels of stripe rust were found in the central Panhandle of Nebraska. In late June, significant levels (40% severities) of wheat stripe rust were found in fields from Hemingford to Gordon in the northern panhandle of Nebraska. (Fig. 2).

South Dakota - In early July, low levels of stripe rust were found in a spring wheat plot at the Beresford research station in southeastern South Dakota.

North Dakota - On August 11, stripe rust was at trace levels on wheat cultivars with *Lr21*, in central North Dakota.

Montana - In early July, conditions were favorable for stripe rust development in the Gallatin Valley at the Post Research farm in Bozeman, Montana. The rust was first observed June 4. Plots that were sprayed with fungicide had minimal disease development.

Louisiana - During the fourth week in March in northeastern Louisiana at Winnsboro, high levels of stripe rust were observed in one wheat plot while surrounding plots were relatively clean. By late March, stripe rust had not been reported in other areas of the state. In Louisiana, stripe rust epidemics usually develop in the first half of March and peak by early April when temperatures surpass the optimum for stripe rust development. In early April, wheat rust stripe levels were lower than normal in Louisiana.

Arkansas - As of March 25, no stripe rust had been reported in Arkansas. In mid-April, wheat stripe rust was at lower levels than in the past several years in Arkansas.

Extension personnel reported light stripe rust in southwest Arkansas. In early May, no additional stripe rust was found in Arkansas. The threat of more stripe rust was low because the wheat crop was past the most favorable time for stripe rust development and most of the acreage was planted with varieties that have resistance.

Georgia - In late March, low levels of stripe rust were found in susceptible wheat fields from southwest to south central Georgia. During April, stripe rust developed slowly in this area because conditions were not conducive for rust development. In early May, severe levels of stripe rust were found in susceptible cultivars at the Plains, Georgia nursery. Stripe rust had been artificially inoculated in these plots.

Virginia - In mid-June, low levels of stripe rust were found on soft wheat varieties in the Montgomery, Virginia nursery.

Ontario, Canada - With the cooler than usual May and June weather, wheat stripe rust in late June was more prevalent in Essex and Chatham/Kent counties Ontario (adjacent to Detroit, Michigan) than in recent years.

California - In late March, stripe rust was found in nurseries in the Sacramento and San Joaquin Valleys. From April 20-23, high levels of wheat stripe rust were found in nurseries in the Sacramento Valley. Severities higher than 50% were observed on the susceptible wheat (D6301) at Davis. During early May, conditions were conducive for rust increase and stripe rust severities of up to 60% were found in the susceptible cultivars Anza and Yecora Rojo at Colusa. The resistance of the commonly grown wheat cultivars was holding up.

Pacific Northwest - In late February, wheat stripe rust was found in the Mount Vernon area of northwestern Washington. In early April, 30% wheat stripe rust severities were reported on susceptible entries in nurseries and 2-5% severities in some Mount Vernon area fields. The rust severities were less than normal for this time of the year. In mid-June in the Mt. Vernon nursery, 80% stripe rust severities were reported in susceptible winter wheat varieties and by late June 100% severities were reported in susceptible spring wheat entries.

In mid-April, low levels of stripe rust were found in the Horse Heaven Hills area in south central Washington and on a susceptible check in the winter wheat nursery near Walla Wall. In mid-May, foci of stripe rust (10-80% severity) were found in winter wheat nurseries in the Washington/Idaho Palouse region. In rust nurseries in Umatilla County, Oregon, stripe rust was developing on susceptible entries with 80% severities in foci. No stripe rust was found in any fields in the above area. In the Horse Heaven Hills area (Benton County) stripe rust development was under control after fungicide application.

On June 2, stripe rust on susceptible entries was found in the experimental plots near Pullman, Washington. The incidence was less than 1% and severity less than 5%. The first appearance of stripe rust near Pullman was about two weeks later than last year. In

late June, wheat stripe rust had increased rapidly (100% severities) on susceptible varieties growing in winter wheat nurseries in the Palouse region (Whitman County, Washington and Latah County, Idaho). At the Pendleton experiment station in Oregon, stripe rust reached 60% severity on susceptible entries. In the spring wheat nurseries, 40% severities were reported on susceptible entries. In the western Pacific Northwest area stripe rust was very severe in nurseries in Corvallis, Oregon. In late June, no stripe rust had been observed in spring wheat fields in eastern Washington and northern Idaho. Stripe rust did not cause significant damage on the winter wheat crop in this region.

In early July, low levels of wheat stripe rust were found in spring wheat fields in the Palouse and Dayton region of southeastern Washington.

Idaho - In late June, stripe rust was moderate in winter wheat fields and plots in southeastern Idaho and northern Utah. In early July, low levels of stripe rust were found in a soft white spring wheat Jubilee plot at Aberdeen, Idaho.

In summary, stripe rust did not cause significant damage on the winter and spring wheat crop in the Pacific Northwest.

Oat Stem Rust. ***Texas*** - On March 23, severe levels of stem rust were found on oat mixed in spelt that was planted as a windbreak for watermelons in Hidalgo County along the Rio Grande Valley in southeast Texas. In early April, trace to 5% severities of oat stem rust were found in irrigated plots of the variety Harrison at the Beeville and Castroville nurseries in southern Texas. The pustules developed from spores that were rain deposited approximately 10-14 days earlier. In some cases the stem rust had only developed on one side of the leaf.

On April 20, stem rust was severe in the oat variety Harrison and increasing on other oat plots in the irrigated nursery at Castroville. In early May, severe levels of oat stem rust were found in several plots at College Station while light levels were found at McGregor. Stem rust also was found on wild oats growing alongside the road in central Texas. In early May, low levels of oat stem rust were found in plots and fields in north central Texas.

Louisiana - In late March, oat stem rust was found in several plots in the Baton Rouge, Louisiana nurseries. Weather conditions were ideal for rust development with lots of moisture (rain, dew and fog) and ideal temperatures. In late April, oat stem rust was severe and spreading in plots at Baton Rouge, Louisiana. In early May, severe levels (20-40%) of stem rust were found in northeastern Louisiana oat plots at Winnsboro.

Kansas - In early June, low levels of oat stem rust were found in plots in Ellsworth County in central Kansas. In early June, low levels of stem rust were found in an oat field in Sumner County in south central Kansas. Infections were observed on leaves and stems in many foci throughout the field.

Minnesota - During the first half of July, low levels of oat stem rust were found in plots in St. Paul, Lamberton and a field in Waseca in southeastern Minnesota**.** In late July, low levels of stem rust were found in oat plots at Rosemount, Minnesota.

The 2009 U.S. oat stem rust observation map and results of race identification to-date can be found on the CDL website (http://www.ars.usda.gov/Main/docs.htm?docid=9757).

Oat Crown Rust. ***Texas*** - In early March, low levels of crown rust were found in oat in the College Station plots. By late March, crown rust was spreading rapidly in the nursery. In mid-March, crown rust was severe on the variety Brooks in Beeville plots. Crown rust infections are generally lighter than normal in the southern U.S. In early April, heavy levels of crown rust were found in susceptible varieties in irrigated nurseries at Beeville, Castroville and College Station. In late April, oat crown rust was lighter and later than normal on most varieties and lines in the College Station nursery, but increasing to 80S in some plots of Brooks. In early May, moderate levels of oat crown rust were found in plots in central Texas where conditions (moisture and temperature) favored rust development. Low levels were found in the fields.

Louisiana - In early March, crown rust was found on the susceptible oat variety Brooks in the Baton Rouge nursery. All infections were fairly young pustules, probably from a spore shower 10-14 days earlier**.** From late March to mid-April, crown rust was increasing in the oat plots at Baton Rouge. In early May, high levels of crown rust were found in susceptible oat plots in northeastern Louisiana at Winnsboro. Light levels were found in the fields in this area of Louisiana.

Alabama - In mid-April, 30% severities were observed on the susceptible variety Florida 501 in southern Alabama plots at Fairhope, Brewton and Headland and by early May, high levels (60-80%) of crown rust were found in these oat plots.

These southern locations from Alabama to Texas provided crown rust inoculum for oat growing areas further north.

Kansas - In early June, low levels of crown rust were found in a field in Sumner County in south central Kansas.

Nebraska - In late June, moderate levels of crown rust infection were found in oat plots in east central Nebraska.

Minnesota - In late June, low levels of crown rust infection were found in oat plots in southern Minnesota. Also, in late June, moderate levels of crown rust were observed on the upper leaves in oat spreader rows in the St. Paul buckthorn nursery. In mid July, low to heavy levels of crown rust were found in spring oat fields in southern Minnesota. The most severe rust was found in late-planted fields growing close to buckthorn from which the initial rust infecting spores arrived. In mid-July, moderate to heavy levels of oat

crown rust were found on susceptible oat at Rosemount, Waseca and Lamberton, Minnesota experiment station plots.

Wisconsin - In early July, low to moderate levels of crown rust were observed in plots in south central Wisconsin. In mid-July, low to moderate levels of crown rust were found in spring oat fields in southwestern Wisconsin and trace levels in eastern Wisconsin fields. The drought-like conditions in Wisconsin slowed crown rust development.

New York - In early July, low levels of oat crown rust were found in plots at Ithaca, New York.

Buckthorn. On April 17, buds on buckthorn, the alternate host for oat crown rust, were breaking dormancy in the buckthorn nursery at St. Paul, Minnesota. This date is a bit earlier than normal for buckthorn development in these plots. On May 8, light levels of aecial infections were observed on buckthorn in the nursery. Cooler and drier than normal conditions in May and June slowed aecial development. In early July, heavy amounts of crown rust had increased in the spreader rows and then moved into the plots at the St. Paul, Minnesota buckthorn nursery.

New York - In late May, aecia were common on buckthorn in central New York.

Barley stem rust. On April 20, low levels of stem rust were found in irrigated barley plots at the Castroville nursery in south Texas. On July 13, low levels of barley stem rust were found on the susceptible cultivar Hypana at the Rosemount, Waseca and Lamberton experiment stations in Minnesota. In early August, barley stem rust was found in plots in Sonoma County, California.

Barley leaf rust. In early April, low to severe levels of leaf rust were found in barley plots at College Station in central Texas. By late April, barley leaf rust had spread throughout the nursery at College Station, Texas. In mid-May, severe levels of barley leaf rust were found on susceptible cultivars in a Warsaw, Virginia nursery.

Stripe rust on barley. During the third week in April, 50% severities were reported on the susceptible variety Max in the Davis, California nursery. In mid-May, severe levels (60%) of stripe rust were found on the susceptible cultivar Max in the Fresno County nursery, California. In late June, stripe rust was light in experimental fields near Pullman, Washington. The disease was moderate on barley in nurseries at Mt. Vernon. In contrast, barley stripe rust was severe in breeding nurseries at Corvallis, Oregon. Some susceptible lines had 100% severity by the end of May.

Barley crown rust. Trace levels of crown rust were found on barley plots at the Brookings, South Dakota experiment station in mid-July.

Rye leaf rust. In early May, severe levels of rye leaf rust were observed in central Texas plots at Giddings. In early May, severe levels of rye leaf rust were observed in a Sumner

County field in south central Kansas. During late June, low levels of leaf rust were found in spring rye plots in southern Minnesota. In mid July, moderate levels of leaf rust were found on rye at the Rosemount, Waseca and Lambertion experiment stations in Minnesota and at the Brookings, South Dakota experiment station.

Rye stem rust. In mid-July, low levels of stem rust were found on winter rye plots at Brookings, South Dakota and Lamberton, Minnesota. These were the first reports of stem rust on rye in 2009. In late July, low levels of stem rust were found in spring rye plots at Rosemount, Minnesota.

Thank you!

This is the last issue of the Cereal Rust Bulletin for the 2008-2009 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 and race surveys would simply not be possible.

Cooperator	State	Cooperator	State
Kathy Burch	AL	Christina Cowger	NC
Gene Milus	AR	Paul Murphy	NC
Jason Kelley	AR	Marcia McMullen	ND
Michael Emerson	AR	Mike McMullen	ND
Rick Cartwright	AR	Stephen Baenziger	NE
Scott Monfort	AR	Stephen Wegulo	NE
Shawn Lancaster	AR	Gary Bergstrom	NY
Kim Shantz	AZ	Kevin Witkup	NY
Margaret Lloyd	CA	Pierce Paul	OH
Zewdie Abate	CA	Art Klatt	OK
Scott Haley	CO	Bob Hunger	OK
Bob Mulrooney	DE	Brett Carver	OK
Ron Barnett	FL	Joe McCray	OK
Dan Bland	GA	Stephanie Rogers	OK
Jerry Johnson	GA	Earl Flack	PA
Forrest Nutter	IA	Ben Edge	SC
Juliet Windes	ID	Jeff Stein	SD
Carl Bradley	IL	Larry Osborne	SD
J. Vonderwell	IL	Lon Hall	SD
Joe Vestal	IN	Vivek Gupta	SD
Jon Nuefelder	IN	Melvin Newman	TN
Richard Baylis	IN	John Armstrong	TX
Barton Fogleman	IN	Amir Ibrahim	TX
Kiersten Alane	IN	Brian Aldrich	TX
Herb Ohm	IN	Dave Worrall	TX
Bob Bowden	KS	Jackie Rudd	TX
Erick De Wolf	KS	Jacob Price	TX
Jon Appel	KS	Jason Baker	TX
Dave Van Sanford	KY	Jim Stewart	TX
Don Hershman	KY	John Goolsby	TX
Don Groth	LA	Ravindra Devkota	TX

Stephen Harrison	LA	Rex Herrington	TX
Arv Grybauskas	MD	Ronald French-Monar	TX
Lee Siler	MI	Russell Sutton	TX
Janet Lewis	MI	Todd Baughman	TX
Bruce Potter	MN	Carl Griffey	VA
Char Hollingsworth	MN	Anmin Wan	WA
Cindy Sparrow	MN	Dale Clark	WA
Deon Stuthman	MN	Kim Campbell	WA
Doug Holen	MN	Xianming Chen	WA
Jerry Ochocki	MN	Adrian Barta	WI
Jim Anderson	MN	Alan Roelfs	WI
Jochum Wiersma	MN	John Mochon	WI
Matt Rouse	MN	Paul Esker	WI
Robert Laudon	MN		
Ruth Dill-Macky	MN	Albert Tenuta	Ontario, CA
Laura Sweets	MO	Jason Voogt	Manitoba, CA
David Tague	MO	Richard Marsh	Saskatchewan, CA
Tom Allen	MS		
David Ingram	MS		
Bill Grey	MT		
Mary Burrows	MT		

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

I would also like to thank the CDL staff, particularly, Mark Hughes, Jim Kolmer, Yue Jin and Marty Carson. 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 (http://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 2009

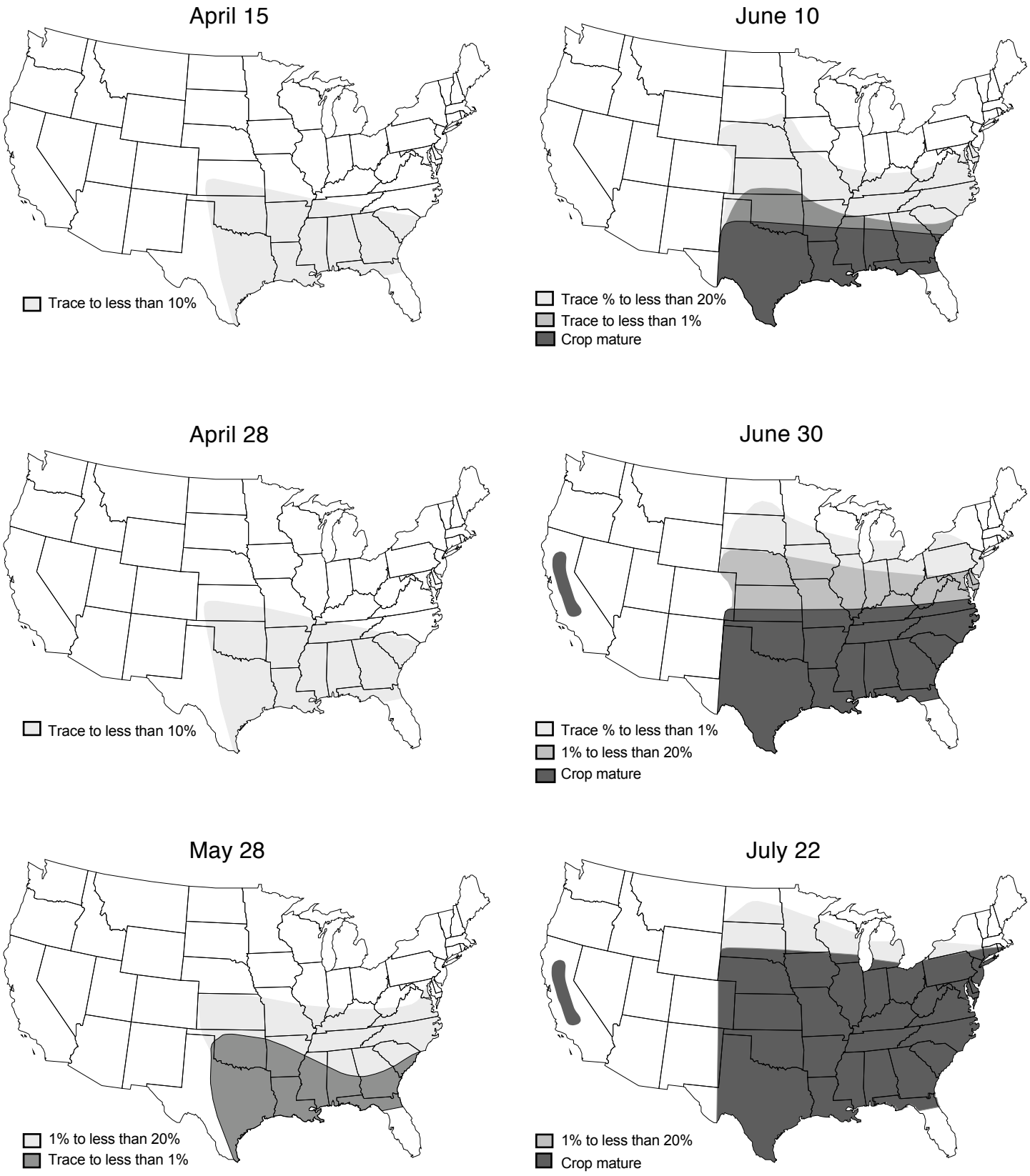

Fig. 2. Stripe rust severities in wheat fields and plots in 2009