CEREAL RUST BULLETIN

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- Wheat stem rust was at low levels in 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 levels throughout the U.S.
- Oat stem rust and crown rust levels were low to severe throughout the U.S.
- 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 report of wheat stem rust in 2008 was from a plot of the susceptible soft wheat McNair 701 in South Texas at Castroville on April 3. The pustules developed from spores that were likely rain deposited approximately a week earlier and the severity of the infections was low. On April 9, wheat stem rust was found scattered throughout plots in south central Louisiana at Crowley. One soft wheat variety, CK 9553 had significant stem rust infection. Hot dry weather accelerated the crop to maturity in these plots.

On April 22, low levels of wheat stem rust were found scattered throughout susceptible cultivars and experimental lines at Castroville in south Texas. On April 24, low levels of wheat stem rust were found on the susceptible variety McNair 701 in plots at College Station in central Texas. On April 28, traces of wheat stem rust were found in plots of McNair 701 and an unknown cultivar at Bardwell in central Texas. In late April, low levels of wheat stem rust were found in plots at Prosper in northern Texas. Traces of wheat stem rust were also found in a field near Abilene, Texas.

On April 24, traces of stem rust were found at Baton Rouge, Louisiana. On April 29, low levels of stem rust were found in plots at Quincy in the panhandle of Florida. In both cases the wheat was near maturity and therefore rust did not increase much more.

The first wheat stem rust identifications of 2008 from Castroville, Texas and Crowley, Louisiana were identified as race QFCS. This race has been the most commonly identified race from U.S. collections in the past few years, and is avirulent to most of the winter and spring wheats in the U.S.

In mid May, low levels of stem rust were found on stems in plots of the cultivars Winmaster and Deliver at College Station, Texas. Uredinia were found on only 4-5 stems. In mid-May, low levels

of stem rust were found in plots of McNair 701 at Stillwater, Oklahoma and 40 miles west at Marshall. On May 24, low levels of wheat stem rust were found in the susceptible McNair 701 plot at Lahoma in north central Oklahoma. In late May, stem rust was severe in some wheat head-rows of a late planted nursery, at Chillicothe in north Texas.

In late May, wheat stem rust was found in east central and northeastern Arkansas. The disease developed too late to cause much damage, but these are the first reports of stem rust in Arkansas in the past 10 years.

On May 8, low levels of stem rust were found in a wheat nursery at Blackville in south central South Carolina. In late May, during harvest, wheat stem rust was found in a breeding nursery at Plains and in early June stem rust was found in a Pike County plot in west central Georgia.

In summary, during the spring of 2008, low levels of stem rust were found in susceptible plots of soft and hard red winter wheat in the southern U.S. and in one field at Abilene, Texas.

On June 10, a center of wheat stem rust infection was observed in a research plot at Owensboro in northwestern Kentucky. In early June, low levels of stem rust were found on the susceptible line Bezostaya at Hutchinson in south central Kansas and on McNair 701 at Manhattan, Kansas. In mid-June, low levels of wheat stem rust were found in a plot at Lexington, Kentucky. In late June, high levels of wheat stem rust were found in varietal plots at Belleville in north central Kansas. This was the most stem rust observed in these plots in the last 10 years. Also in late June, high levels of wheat stem rust were observed in the southern part of Nebraska in plots at Lincoln to low levels at North Platte and Sidney. In all cases there was no wheat stem rust found on the commonly grown varieties.

On June 30, low levels of wheat stem rust were found in entries in the stripe rust winter wheat nursery at Brookings, South Dakota. The pustules had developed in the previous seven days. Pustules were primarily on the stems although some also were found on the leaves.

On July 1, light levels of wheat stem rust were found on the leaves and stems of susceptible winter wheat cultivars (e.g. McNair 701) at the Rosemount, Minnesota nursery.

On June 21, several infection sites of wheat stem rust were found in plots at Delphos in west central Ohio.

In early July, low levels of stem rust were found in winter wheat plots at Lancaster in southwestern Wisconsin and Urbana, Illinois. On July 10, low levels of wheat stem rust were found in a soft red winter wheat field and plots in Door County in northeastern Wisconsin.

High levels of wheat stem rust were found on flag leaves of susceptible spring wheats (e.g. Baart) in plots at Rosemount in southeastern Minnesota on July 16. Wheat stem rust was also found on susceptible winter wheat, which had not reached maturity. During the week of July 21, high levels of stem rust were found on the susceptible spring wheat cultivar Baart at Waseca, Lamberton and Morris experiment stations in Minnesota.

During the second week in July, low levels of stem rust were detected on the winter wheat cultivar 'Radiant' in a Ransom County plot in southeastern North Dakota and on a winter wheat line at the Waseca plots in south central Minnesota. On July 13, low levels of stem rust were found in plots of a rust spreader mix (highly susceptible lines) at Groton and Redfield in northeastern South Dakota.

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

In early August, trace levels of stem rust were found on susceptible spring wheats (Baart and Little Club) at Carrington in east central North Dakota and at Crookston in northwestern Minnesota.

In early July, significant levels of wheat stem rust were found in a field of irrigated winter wheat in east central Colorado. In the second week of July, there were low levels of wheat stem rust in northeastern Colorado plots.

In early July, low levels of stem rust were found in winter wheat plots near Pullman, Washington. This was the only report of stem rust in the Palouse region of eastern Washington this year.

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

Wheat stem rust observations map and race identification can be found on the CDL website: http://www.ars.usda.gov/SP2UserFiles/ad_hoc/36400500Cerealrustbulletins/2008wsr.pdf.

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.

Stem rust on barberry (Alternate host for stem rust). In early May, light pycnial infection were found on susceptible barberry **(***Berberis vulgaris)* bushes growing in south central Wisconsin. The infection was lighter than in years past. In late May, severe aecial infection was found on susceptible barberry bushes growing in southeastern Minnesota. The infection was heavier than last year.

Aecial collections from southeastern Minnesota and south central Wisconsin were identified as rye stem rust *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 late February, low levels of leaf rust were reported in central Texas wheat plots. Moisture had been limited from late January to mid-March in western Texas. In mid-March, 30% leaf rust severities were found on the susceptible varieties, Cutter (*Lr24* resistance), Jagger (*Lr17* resistance), Overley (*Lr41* resistance) and TAM 110 in the nursery at

Castroville, Texas. During the fourth week in March in College Station plots, leaf rust severities ranged from 30% on TAM 110 to traces on Fuller (*Lr17*+*Lr41*).

In early April, susceptible varieties TAM 110, Jagalene (*Lr24*) and Jagger in nurseries at Castroville and College Station, Texas had 60% leaf rust severities on lower leaves. On the highly resistant varieties Fannin and Endurance, no infections were found. In the first week in April, low to moderate levels of leaf rust were noted in fields in north central Texas. In early April, no rust was found in the Rolling Plains, Texas Panhandle or North Texas High Plains fields (Fig. 1).

By the third week of April, the susceptible varieties TAM 110, Jagalene and Jagger had 60% leaf rust severities on flag leaves in nurseries at Castroville Texas. In northeastern Texas, leaf rust was beginning to appear on susceptible wheat varieties (Pio 25R78, Terral 8558, Coker 9553). Most of the fields received a foliar fungicide application. This year leaf rust appeared much earlier than normal in this area. In late April, central Texas plots of susceptible wheat cultivars had leaf rust severities up to 80%.

In early May, fields of Jagger and Jagalene in northern Texas had severities up to 30% (Fig. 1), while the majority of the fields had traces of leaf rust.

- Oklahoma. In mid-March, leaf rust was not found in the Stillwater, Oklahoma plots. In mid-April, susceptible cultivars had severities of 10-20% on the lowest leaves in plots at Minco. On April 21, leaf rust was found in many fields in southwestern Oklahoma. The rust was visible on most of the lower leaves with flecking occurring on the upper leaves. In central Oklahoma, widely scattered pustules of leaf rust were found on lower yellowing/dying leaves.

In late April, leaf rust was observed on Jagalene and Jagger in commercial fields and variety evaluations in northern Oklahoma. By early May, leaf rust increased rapidly in plots near Stillwater and Lahoma, Oklahoma, with severity levels of 65% on flag leaves of Jagger and Jagalene.

During early May, wheat leaf rust was severe on susceptible varieties in plots, trials and fields in Oklahoma where conditions (moisture and temperature) favored rust development. In central Oklahoma, leaf rust covered the flag leaves of unsprayed fields of Jagger. In western Oklahoma, the incidence and severity of rust decreased dramatically due to drier conditions.

Central Plains – Kansas. In late February, leaf rust infections that had over-wintered were found in plots at Manhattan, Kansas. In mid-March, traces of leaf rust were found in central Kansas fields. The leaf rust pustules were actively producing spores.

In early April, low levels of rust were found in a wheat field of Jagger in south central Kansas. In fields near Manhattan, Kansas, leaf rust was increasing. Leaf rust was actively producing spores at both locations. The top three wheat varieties in the state [Jagalene (*Lr24*), Overley (*Lr41*) and Jagger (*Lr17*)] are susceptible to leaf rust. The apparent over-wintering of leaf rust and delay in crop maturity increased the risk of severe leaf rust in Kansas this year.

In early May, leaf rust was observed in additional counties from south central Kansas to north central Kansas. The highest rust severities were found on Jagger and Jagalene with traces levels on

Overley and Fuller (*Lr17* + *Lr41*). The rust on Fuller was not completely unexpected because virulence to *Lr17* and *Lr41* were detected in 2007.

In mid-May, wheat leaf rust was increasing in fields of susceptible varieties (e.g. Jagger and Jagalene) throughout the state of Kansas. Many fields were sprayed with fungicide to control the rust.

In late May, high severity levels (60%) of leaf rust were found in fields of Jagalene, Jagger and Overley throughout southeastern and south central Kansas (Fig. 1). In some fields of susceptible cultivars there was a significant loss to leaf rust. In varietal plots in south central Kansas, leaf rust was low in the resistant cultivars Santa Fe and Duster. In late May, north central Kansas fields (e.g., Jagger) had low leaf rust severities on flag leaves. Only trace levels of leaf rust were reported in western Kansas because of the drought-like conditions.

In mid-June, leaf rust was increasing in north central and northwestern Kansas where environmental conditions were conducive for rust increase.

- Nebraska. In mid-May, trace levels of leaf rust were found in south central Nebraska fields in counties that border Kansas. During the fourth week in June, plots of susceptible winter wheat cultivars such as Jagalene in southern Nebraska had high levels of rust severities, while resistant cultivars had 0 to trace levels of infection on the upper leaves. In late June, high levels of wheat leaf rust were found in fields of susceptible varieties in southern Nebraska. Throughout this area fungicide usage on winter wheat was very common this year with many fields receiving multiple applications.

Northern Plains - In late May, low levels of leaf rust were reported in a field of Jagalene in central South Dakota. In mid-June, low levels of leaf rust were were found in the winter wheat nursery at Brookings in east central South Dakota on older susceptible varieties (e.g., Scout 66). On June 13, low levels of leaf rust were found in winter wheat plots at Lamberton in southwestern Minnesota and in spring wheat plots at St. Paul. Minnesota.

On June 16, low levels of leaf rust were found in two spring wheat fields in Richland County, in southeastern North Dakota. Scouts in North Dakota found wheat leaf rust in 11 of the 117 fields they surveyed the fourth week of June. Five of the fields with wheat leaf rust were winter wheat fields; the other six were spring wheat fields. The spring wheat fields were in east central North Dakota and had severities of 1% or less; the winter wheat fields were in southeastern and south central North Dakota and had severities as high as 25%.

In late June, high levels of wheat leaf rust were found in plots of susceptible winter wheat cultivars in east central South Dakota and east central Minnesota (e.g. Jagalene 60%). In late June, susceptible spring wheat cultivars had leaf rust severities of trace to 5% on lower leaves in southern Minnesota and southern South Dakota fields (Fig. 1).

During the second week in July, leaf rust was increasing in spring wheat fields and plots throughout southern Minnesota, eastern South Dakota and southeastern North Dakota. In susceptible winter wheat fields in southeastern North Dakota, average severities were close to 10%. Many of the wheat

fields in the spring wheat region were treated with fungicide, which helped prevent losses due to leaf rust and FHB (scab). High levels of wheat leaf rust were found on susceptible spring wheats at Rosemount, Minnesota on July 16. In late July, high levels of leaf rust were found in spring wheat plots in eastern South Dakota and southern Minnesota. In this same area low levels of leaf rust were found in spring wheat fields while high levels of leaf rust were observed in winter wheat fields that still had green leaves.

In early August, low to moderate levels of leaf rust were found on susceptible spring wheat in North Dakota. Trace to low levels of rust were found on currently grown cultivars in the plots.

This year wheat leaf rust was widespread, but the rust was at lighter levels than last year in the northern plains on both spring and winter wheat. Onset of wheat leaf rust was 2-3 weeks later than normal on susceptible wheat in this area. This delayed the rust epidemic in July and August. Many of the wheat fields in the spring wheat region were treated with fungicide, which prevented losses due to leaf rust and FHB (scab).

In early July, low levels of leaf rust were found in irrigated spring wheat plots near Billings in south central Montana.

Louisiana - In mid-February, leaf rust was increasing on susceptible varieties, McCormick (*Lr24)* in Baton Rouge, Louisiana plots. In early March, leaf rust was active and at significant levels in the Baton Rouge plots and growers applied fungicides in many fields.

During the first week in April, wheat plots in south central Louisiana had high levels of leaf rust on the lower leaves. In the plots at Baton Rouge leaf rust was moderately heavy on susceptible lines. In mid-April, leaf rust was increasing in plots and fields throughout southern and central Louisiana. In late April, plots of susceptible wheat cultivars had leaf rust severities up to 80% in northern Louisiana.

Arkansas - In mid- March, low levels of leaf rust were found in susceptible varieties in southeastern Arkansas fields. Rust was severe in susceptible varieties in disease management plots which were planted very early and were more mature than most of the wheat in the state.

In early April, leaf rust was heavy on the lower leaves of early-planted wheat fields (early October) and was very low on late-planted fields (early November) and plots in central and southern Arkansas. In west central Arkansas, lines in one nursery had 10% severity levels.

This year a significant amount of leaf rust over wintered in southern Arkansas. Most of the commonly grown cultivars appear to have some resistance and by mid-April some fields had been sprayed with a fungicide.

In early May, small pustules were found on older leaves, but upper leaves were free of leaf rust. In mid-May, the Arkansas wheat crop was in good shape, but high levels of leaf rust were found in many fields that were not sprayed with fungicide. In some fields the fungicides were applied too early and therefore they were not effective when the rust arrived. On May 20, severe levels of leaf rust were reported in varietal plots in northeastern Arkansas at Kibler.

Southeast - In mid-March, low levels of leaf rust were found in southern Mississippi fields.

In mid-April, plots of susceptible wheat cultivars in southern and central Alabama and southern Georgia had severe levels of infection on the lower leaves and a few pustules on the flag leaves. Rainfall in March and April made conditions more conducive for rust development in this area than in the past two years.

In late April, susceptible cultivars had severities of 40% on flag leaves from southern Alabama to southern Georgia. Many fields in the southern U.S. were sprayed with fungicide to control rust development. Dry conditions in early May slowed rust development throughout much of the southeastern U.S.

Mid-Atlantic - In mid-March, leaf rust was widespread but not severe in plots at Kinston and Plymouth, North Carolina. Leaf rust was present in lower canopies of susceptible varieties such as Saluda (*Lr11*) in late March at Plymouth in eastern North Carolina. In late April, rust moved up the canopy and covered 15% of the flag leaf area on varieties such as Saluda, McCormick (*Lr24*) and USG 3209 (*Lr11, Lr26*). Rust covered approximately 1% of the mid-canopy of Tribute (*Lr9, Lr24*) and Coker 9511 (*Lr9*). Leaf rust likely over-wintered in the region and advanced faster than normal.

In early May, in the eastern soft red winter wheat region, leaf rust was found from South Carolina to Maryland. In Maryland a few widely scattered fields with leaf rust were found on the Delmarva Peninsula, in Caroline and Queen Anne counties. Only a few pustules developed on the flag leaves, but conditions were good for continued development. Much of the acreage was sprayed for wheat diseases. In late May, leaf rust was increasing in some Maryland fields.

In early May, leaf rust developed in the nurseries at Blacksburg (southwestern Virginia) and Warsaw (northeastern Virginia). In late May, trace to low levels of leaf rust were reported at the northern (Blackstone, VA) and southern (Orange, VA) Piedmont experiment stations. The heaviest rust was found at the eastern shore station (Painter, VA) where cultivars with *Lr26* (USG 3209, Sisson) and *Lr24* (McCormick were heavily infected. At the Warsaw station leaf rust was light to moderate while severe leaf rust was observed at the Blacksburg (western VA) location. In early June, severe leaf rust was observed at the Blacksburg experiment station in western Virginia.

Pennsylvania - In mid-June, moderate levels of leaf rust were found in winter wheat plots in south central Pennsylvania.

New York - In early July, wheat leaf rust was present at low to moderate levels on flag leaves across western and central New York.

Kentucky - In late May, leaf rust was light in central and western Kentucky wheat fields. In much of this area many of the fields were sprayed with fungicide to control the rust. In early June, leaf rust levels ranged from low to severe in western Kentucky plots.

Midwest - In early June, wheat leaf rust was found in fields from northeastern Missouri to southern Illinois to southern Indiana to west central Ohio at 20 to 60% severities on flag leaves. There were

yield losses to leaf rust in the soft red winter cultivars in this area. In early June, low levels of leaf rust were found on flag leaves in wheat fields and plots from northwestern Ohio, northwestern Indiana, to south central Wisconsin.

In mid–June, low to moderate levels of leaf rust were found in a winter wheat plots in east central and southwestern Wisconsin. In early July, high levels of leaf rust were found in winter wheat plots in Grant County in southwestern Wisconsin. On July 10, high levels of wheat leaf rust were found in soft red winter wheat fields and plots in Door County in northeastern Wisconsin.

California - In mid-May, a foci of leaf rust (50% severity) was found in wheat plots near Fresno, California.

Washington - In late April, leaf rust was observed on the lower wheat leaves in a field in Horse Heaven Hills in southeastern Washington.

Canada - In early June, leaf rust infection levels ranged from trace to 30% in plots in southwestern Ontario, Canada. In early July, low levels of leaf rust were found on hard red spring wheat in the Red River Valley in Southern Manitoba, Canada.

Preliminary race identifications - From rust collections made in late March in southern Texas plots, the following leaf rust races were identified: MLDSD (*Lr17* and *41* virulence) from Overley; TDBGH (*Lr2a* and *24* virulence) from Jagalene and Cutter; and TFBJH (*Lr2a*, *24* and *26*) from TAM 110. From collections made in southeastern Arkansas in late March the following races were identified: MCGJG (*Lr11*, *26* virulence); MFTNB (*Lr11*, *17*, *24*, *26*); MCPSC (*Lr17*, *26*); TBRKG (*Lr2a*, *11,18*) and TDBGH (*Lr2a*, *24*). From rust collections made in early April in central Texas plots, the following leaf rust races were identified: MLDSD (*Lr17* and *41* virulence); MFPSC (*Lr17, 24, 26, 42* virulence); TDBGH (*Lr2a, 24, 42* virulence) and TFBJH (*Lr2a, 24, 26* and *42* virulence). From collections made in southern Louisiana in early April the following races were identified: MFPSC (*Lr17, 24, 26, 42*); TBRKG (*Lr2a, 11, 18*); TCRKG (*Lr2a, 11, 18, 26*) and TDBGH (*Lr2a, 24, 42*). These leaf rust races represent some of the most common races identified from rust collections made during the 2007 leaf rust survey (http://www.ars.usda.gov/Main/docs.htm?docid=10493).

Wheat stripe rust. Southern Plains - As of mid-March, no stripe rust had been reported in Texas or Oklahoma. In early April, low amounts of stripe rust were found on flag leaves of wheat in south central Texas plots at Castroville (Fig. 2). The pustules developed from spores that were likely rain deposited approximately 7 -14 days earlier. In early April, trace to high levels of stripe rust were found in north Texas plots. As of early April, no stripe rust had been found in Oklahoma or states to the north. In late April, hot spots of stripe rust were found in breeding lines planted at the Lahoma and Stillwater experiment stations in Oklahoma

This year there were few stripe rust inoculum sites reported in the southern U.S. As day and nighttime temperatures continued to increase after late April, the conditions for stripe rust development were less favorable. This lead to a reduced amount of stripe rust for the northern wheat growing regions of the U.S.

Central Plains - On May 8, wheat stripe rust was found for the first time in Kansas in Sedgwick County in the south central part of the state. The rust was light on the variety 2137, which is known to be susceptible to the disease. In late May, low to moderate levels of stripe rust were found in variety demonstration plots in south central and central Kansas. The disease was limited to susceptible varieties such as 2137, 2174 and Above which are grown on limited acreage. In a few fields in central Kansas near Lincolnville, hot spots of 60-80% severity were observed. The disease did not cause widespread infections and yield loss in Kansas because most varieties of wheat grown in Kansas were resistant to stripe rust, the weather was hot and dry in May and stripe rust arrived too late. In mid-June, low levels of stripe rust were found in susceptible entries in northeastern Colorado plots. In late June, low levels of wheat stripe rust were found at Sidney in the southern Panhandle of Nebraska.

Northern Plains - In early June, low levels of stripe rust were found in one plot at Aberdeen in east central South Dakota. In late June, low levels of wheat stripe rust were found in south central South Dakota winter wheat plots. By late June, hot temperatures slowed stripe rust infections to almost a complete remission in the Great Plains states. In mid-July, low levels of stripe rust were observed on a few entries in the nursery at Watertown in northeastern South Dakota.

In mid-June, low levels of stripe rust were found in field plots near Bozeman, Montana in the southwestern part of the state. In early July, stripe rust was found on susceptible winter wheat varieties in fields at Bozeman, Montana. There were low severities (<10% of leaf area) on flag leaves and incidences were high in infection sites but low through the field.

Louisiana – In mid-March, stripe rust was increasing in Baton Rouge and Winnsboro plots. Growers applied fungicides to rust-infected fields. 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 mid-March, traces of stripe rust were found in wheat plots at Crowley in south central Louisiana, but by late March no stripe rust was found. Hot spots of severe stripe rust were observed in late maturing susceptible cultivars in nurseries in north central Louisiana in late April.

Arkansas – In mid-March, stripe rust was found in southeastern Arkansas plots. By early April, stripe rust was found in plots and fields in central Arkansas. Stripe rust was scattered with little evidence of hot spots and most of the commonly planted cultivars have some resistance. One hot spot of stripe rust was found in a plot in west central Arkansas. This year stripe rust over wintered in Arkansas but at a much lower level than leaf rust. Very susceptible varieties are no longer grown and the acreage planted to susceptible varieties is small. Most cultivars have adult-plant resistance to the current pathogen population. The combination of resistance and fungicides controlled stripe rust.

Southeast– In mid-March, low levels of stripe rust were found in a southern Mississippi field. In late March, hot spots of stripe rust were reported in Griffin, Georgia fields and low levels were reported in the Tifton, Georgia area. In mid-April in southern Alabama and southwestern Georgia, low levels of wheat stripe rust were found in a few plots (Fig. 2). In these locations most of the stripe rust infections had occurred earlier in mid to late winter when temperatures were cooler**.** As

day and nighttime temperatures continued to increase, the conditions for stripe rust development were less favorable. This lead to a reduced amount of stripe rust inoculum for the eastern wheat growing regions of the U.S. In late April, hot and dry conditions slowed stripe rust development in plots and fields throughout the southeastern U.S. (Fig. 2). Hot spots of severe stripe rust were observed in late maturing susceptible cultivars in nurseries in southwestern Georgia. Most of the infections had occurred when conditions were cooler. In early May, stripe rust levels were fairly high in many fields in western Tennessee

Midwest - In early May, a field in southwest Kentucky had low levels of stripe rust. In late May, stripe rust was at low levels in central and western Kentucky wheat fields. In much of this area many of the fields had been sprayed with fungicide to control rust.

On May 20, a few stripe rust hot spots were found in research plots at Mount Vernon, Illinois. In late May, low levels of stripe rust were found in southwestern Missouri fields. In early June, low levels of stripe rust were found in northeastern Missouri and west central Indiana fields and plots. On June 10, a center of wheat stripe rust infection was observed in a research plot at Napoleon in northwestern Ohio. In mid-June, low levels of stripe rust were found in susceptible entries in plots in southwestern Wisconsin (Fig. 2).

Virginia - Trace amounts of stripe rust were found in wheat breeding nurseries at Blacksburg and Warsaw, Virginia in early June.

California – On February 27, two infection foci of 25 sq ft and 50 sq ft were detected in plots of the variety (D6301) in Davis, California. The foci were severely diseased, so the initial infections probably occurred at least two weeks previous to detection. In mid-March, stripe rust was confirmed in a few commercial fields in the Yolo and Colus counties in the Sacramento Valley on susceptible cultivars (Blanca Grande, Summit) and on the previously resistant cultivar Cal Rojo. Disease severity was relatively light overall, but within the infection foci severity was up to 50%. In early April, stripe rust was found in the Central Valley of California.

By the second week in April, wheat stripe rust was increasing in the northern part of the Central Valley of California (Sacramento Valley and the Sacramento/San Joaquin Delta), but the rust was not uniformly severe. Only a few commercial fields were not treated with a fungicide and these fields had severe infection levels (80%). Only light infections were observed in the southern part of the Valley (San Joaquin Valley).

Cool conditions were favorable for continued development of wheat stripe rust in California's Central valley and surrounding areas through the middle of May. Several varieties that were not infected earlier in the season had susceptible infection types in mid-May, possibly indicating that new races had become established. With few exceptions, fungicides were applied to fields of known susceptible varieties, so yield losses will be minimal. Five consecutive days of extremely hot weather (high 90's and 100's) beginning on May 15 terminated the epidemic and hastened the Central Valley's crop toward maturity. Many entries in the wheat stripe rust screening nurseries at the UC Davis Agronomy Farm had final disease severities of 60-100%.

Pacific Northwest – By early April, wheat stripe rust had not been found in the major eastern wheat-growing areas of the Pacific Northwest. In the first week in April, susceptible varieties in winter wheat nurseries in northwestern Washington had 50% levels of stripe rust infection. Similar levels of rust severities were observed in commercial fields that were planted with susceptible varieties. In the second week of April, low levels of stripe rust were found in south central Washington fields, which was much less rust than was found last year in the same area. In late April, stripe rust was found in southeastern Washington. Some early-planted fields had severities up to 10% incidence and 5% severity. Application of fungicides in these fields stopped rust development and prevented rust spread to other regions. In general, stripe rust developed slowly in eastern Washington. In the Mount Vernon area in western Washington, stripe rust had developed up to 100% severity on highly susceptible entries by April 24.

On May 14, trace levels of stripe rust were found on a susceptible spreader row in a winter wheat nursery near Pullman, Washington. This was the first observation of stripe rust in the Washington/Idaho Palouse region this year.

On June 10, no stripe rust was found in the Mosses Lake area in central Washington. Low levels of stripe rust were found in the susceptible spreader rows in the rust-monitoring nursery at the Lind Dryland Experiment Station in east central Washington. In mid-June, wheat stripe rust was severe on susceptible spreader rows in the winter wheat nurseries near Pullman, Washington, but few winter wheat entries in the nurseries had stripe rust. No stripe rust was found in the spring wheat and barley nurseries or fields near Pullman. In general stripe rust infections were low in the eastern Pacific Northwest.

In early July, wheat stripe rust was developing at a slow pace in the Pacific Northwest due to the dry and hot conditions. No rust was found in winter wheat fields in the Palouse area. Low levels of stripe rust were found in spring wheat fields in east central Washington. On July 1, highly susceptible winter wheat entries in experimental fields at Walla Walla in southeastern Washington had 80% stripe rust severities. In the third week of July, stripe rust developed to 100% on susceptible winter wheat entries in experimental plots near Pullman and breeding nurseries south west of Colfax. In general, stripe rust was either absent or at very low levels in commercial fields in eastern Washington, except for one field in southwest of Colfax planted with the spring wheat cultivar 'Nick' which had 100% stripe rust severity.

In mid-June, high levels of wheat stripe rust were reported on susceptible winter wheat and low levels on spring wheat plants in nurseries at the Pendleton Experiment Station in northeastern Oregon. In late June, high levels of stripe rust were found in susceptible winter wheat entries in nurseries at Corvalis, Oregon and Moscow, Idaho. In Pendleton and Hermiston, Oregon nurseries susceptible spring wheat entries had 20% rust severities. In mid July, small amounts of stripe rust were found in the Treasure Valley, in southern Idaho. On July 23, significant infection occurred on about 30-40% of the total leaf surface in Moreland hard red winter wheat in Ririe, in southern Idaho. Spread of the infection from this focus was limited by hot, dry weather conditions.

Oat Stem Rust. In late February, low levels of stem rust were found in oat varietal plots at the Baton Rouge, Louisiana nursery. By mid-March, stem rust was increasing in these plots. In early April, oat stem rust levels were moderate and spreading rapidly in southeastern Louisiana plots. In

late April, oat stem rust was severe (40% severities) and spreading rapidly in plots at Baton Rouge, Louisiana.

On April 29, up to 10% severities of oat stem rust were found in a hot spot in the irrigated nursery at Marianna in the panhandle of Florida.

In early April, no oat stem rust was found in the plots at Castroville, College Station and McGregor Texas. Usually stem rust is found by early April in southern Texas. On April 12, oat stem rust was first found at College Station, Texas on the spreader rows of Brooks and Harrison on both the upper leaves and stems. This was later than normal for this location. On April 22, low amounts of oat stem rust were found in the plots at Castroville, Texas. On April 23, light oat stem rust was found in oat growing alongside the roadside in central Texas. In the same area oat stem rust was found on *Avena fatua* (wild oat).

On May 18, low amounts of oat stem rust were found in a plot of Jim at the Ashland Agronomy farm in northeastern Kansas at Manhattan. On May 22, light amounts of oat stem rust were found in several other entries at Manhattan.

On July 14, low levels of stem rust were found in oat plots at Brookings, South Dakota and in oat plots in the buckthorn nursery at St. Paul, Minnesota. During the week of July 21 throughout the northern oat growing area from eastern South Dakota through central and southern Minnesota to western Wisconsin low levels of stem rust were found in almost every field and in a few plots the levels of oat rust were more severe.

In mid-May, low levels of oat stem rust were found on wild oats (*Avena fatua*) growing along the roadside in Yolo and Solano counties in the Sacramento Valley in California.

Oat stem rust observations map can be found on the CDL website:
http://www.ars.usda.gov/SP2UserFiles/ad_hoc/36400500Cerealrustbulletins/2008osr.pdf

Several races of oat stem rust were identified from samples collected from FL, LA and TX, including TGD (NA29), TGL (NA28), TGN (NA79 or NA29+*Pga* virulence), TJN (NA30+*Pg12* virulence but avirulent on *Pga*), and TJS (NA78 or NA67+*Pga* virulence). Races with *Pga* virulence are common and predominant.

Oat Crown Rust. In early February, severe levels of crown rust were found in the College Station, Texas area on oat that had been planted along the roadside by the highway department personnel for erosion control. In early March, low levels of crown rust were found in College Station, Texas plots. In mid-March, 20% severities were observed on the spreader rows of Brooks oat in the Castroville, Texas nursery plots. In early April, trace to 60% levels of crown rust were found in south central Texas plots. Heavier levels (80-90%) of crown rust were found in a field south of College Station. In late April, central Texas fields had trace-20% severities while trace severities were reported in northern Texas. In plots in central Texas 60% severities were observed. Oat crown rust was lighter at College Station than at Castroville in south Texas, but was still severe on susceptible cultivars.

In early April, crown rust was severe in southeastern Louisiana oat plots. By mid-April, crown rust had killed some susceptible varieties in southeastern Louisiana oat plots. In mid-April, low to moderate levels of crown rust were found in oat plots in central and southern Alabama. In late April, low to severe levels of crown rust were found in oat plots from northwestern Florida to north central Louisiana.

In early June, low levels of oat crown rust were found in south central Kansas plots.

In mid June, heavy crown rust infection was observed on upper leaves of oat spreader rows in the St. Paul, Minnesota buckthorn nursery. In early July, the rust had moved slowly into the rest of the entries in the St. Paul, Minnesota buckthorn nursery.

In late June, low levels of crown rust infection were found in oat plots in northeastern Kansas, southeastern Nebraska, east central South Dakota and southern Minnesota. In early July, low levels of oat crown rust were found in plots in northern Iowa and southern Minnesota. High levels of oat crown rust were found on susceptible oat at Rosemount, Minnesota on July 16. During the week of July 21, throughout the northern oat growing area from eastern South Dakota thru central and southern Minnesota to western Wisconsin high levels of oat crown rust were found in fields and plots. In early August, moderate crown rust levels were found in plots in southeastern North Dakota.

In mid-May, low levels of crown rust were found in plots at Davis, California.

In early July, low levels of crown rust were found on oat in the Red River Valley in Southern Manitoba, Canada.

Buckthorn (Alternate host for crown rust). In early May, no pycnial infections were observed on buckthorn in the nursery at St. Paul, Minnesota. Cooler than normal temperatures slowed bud development. On May 12, low levels of aecial infections were observed on buckthorn in the nursery at St. Paul. Cooler than normal temperatures slowed aecial development. On May 26, moderate levels of aecial infections were observed on buckthorn in the nursery at St. Paul. In mid June, a second increase of aecia was observed on the buckthorn. The warm and wet conditions were ideal for aecial development at this location.

In mid-May, aecial development was observed on buckthorn near Brookings, South Dakota and in central New York. In mid-June, aecial development was observed on buckthorn at Fargo, North Dakota.

Barley stem rust. On July 14, a single plant of 'Bailey' spring barley was found infected with stem rust in the nursery at Ithaca, New York. Race identification suggested that the stem rust infection on barley at Ithaca was not due to *Puccinia graminis* f. sp. *tritici*. On July 14, heavy levels of stem rust were found on winter barley in the Brookings, South Dakota nursery. Moderate levels of stem rust were found on susceptible spring barleys at Rosemount, Minnesota on July 16. During the week of July 21, at Waseca, Lamberton and Morris experiment stations in Minnesota low levels of barley stem rust were found on the susceptible 2-rowed cultivar Hypana. Barley stem rust samples from South Dakota and Minnesota were identified as QFCS.

Barley leaf rust. On May 21, severe barley leaf rust was found in north central Virginia plots. In late May, severe barley leaf rust was found in southeastern Pennsylvania. In mid-June, high levels of barley leaf rust were found at Cumberland, Pennsylvania.

In late June, traces of barley leaf rust were found in plots in west central Minnesota. On July 10, low levels of leaf rust were detected in a six-row barley field in Griggs County in east central North Dakota. On July 22, low levels of leaf rust were found in late planted barley fields in east central South Dakota and southwest Minnesota.

In mid-May, leaf rust was moderate in barley plots near Fresno, California.

Stripe rust on barley. In the second week in April, stripe rust infection levels ranged from trace amounts to 80% severity in the Barley CAP screening nursery at the University of California-Davis Agronomy Farm. In mid-May, stripe rust was found on wild barley along the roadside in Merced and Yolo, counties in California. Many entries in the barley stripe rust screening nurseries at the UC Davis Agronomy Farm had final disease severities of 60-100%. In mid April 5-20% stripe rust severities were recorded on susceptible winter barley entries in experimental plots at Mount Vernon, northwestern Washington. In early July, stripe rust reached 100% severity on susceptible spring barley entries in the same location. In early July, low levels of stripe rust were found on susceptible barley entries and the rust reached 60% severities in eastern Washington nurseries.

In early June, barley stripe rust was found in experimental plots near Corvalis, in western Oregon. In eastern Oregon, up to 60% stripe rust severities were observed on susceptible barley entries in the Hermiston Experiment Station in northeastern Oregon. Barley stripe rust was basically absent in commercial fields in eastern Pacific Northwest.

Rye leaf rust. In late April, severe levels of leaf rust were observed in rye plots at Mariana, Florida. In plots at Giddings,Texas in late April, 60% rye leaf rust severities were found. In late May, 10% leaf rust severities were observed in rye plots at Hutchinson, Kansas. High levels of leaf rust were found on Hypana rye at Rosemount, Minnesota on July 16. In mid July, low levels of leaf rust were found on winter rye at Door County, Wisconsin and Brookings, South Dakota.

Rye stem rust. On July 14, low levels of stem rust were found on winter rye plots at Brookings, South Dakota. This was the only report of stem rust being found on rye this year.

Thank you!

This is the last issue of the Cereal Rust Bulletin for the 2007-2008 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	Marcia McMullen	ND
Gene Milus	AR	Mike McMullen	ND
Jason Kelley	AR	Dewey Lienemann	NE
Michael Emerson	AR	Jennifer Rees	NE
Rick Cartwright	AR	Stephen Baenziger	NE
Scott Monfort	AR	Stephen Wegulo	NE
Shawn Lancaster	AR	Gary Bergstrom	NY
Lee Jackson	CA	Pierce Paul	OH
Scott Haley	CO	Art Klatt	OK
Ron Barnett	FL	Bob Hunger	OK
Dan Bland	GA	Brett Carver	OK
Jerry Johnson	GA	Joe McCray	OK
John Roberts	GA	Stephanie Rogers	OK
Forrest Nutter	IA	Earl Flack	PA
Juliet Windes	ID	Ben Edge	SC
Charlie Thompson	IL	Jeff Stein	SD
Barton Fogleman	IN	Larry Osborne	SD
Herb Ohm	IN	Lon Hall	SD
Bob Bowden	KS	Vivek Gupta	SD
Erick De Wolf	KS	Amir Ibrahim	TX
Jon Appel	KS	Dave Worrall	TX
Clint Hardy	KY	Jackie Rudd	TX
Dave Van Sanford	KY	Jacob Price	TX
Don Hershman	KY	Jason Baker	TX
Don Groth	LA	Jim Stewart	TX
Stephen Harrison	LA	Ravindra Devkota	TX
Arv Grybauskas	MD	Rex Herrington	TX
Bruce Potter	MN	Ronald French-Monar	TX
Char Hollingsworth	MN	Russell Sutton	TX
Cindy Sparrow	MN	Todd Baughman	TX
Deon Stuthman	MN	Carl Griffey	VA
Jim Anderson	MN	Anmin Wan	WA
Jochum Wiersma	MN	Craig Cook	WA
Robert Laudon	MN	Dale Clark	WA
Roy Mayeda	MN	Xianming Chen	WA
Ruth Dill-Macky	MN	Adrian Barta	WI
David Tague	MO	Alan Roelfs	WI
David Ingram	MS	John Mochon	WI
Tom Allen	MS	Paul Esker	WI
Bill Grey	MT		
Mary Burrows	MT	Jason Voogt	Manitoba, CA
Christina Cowger	NC	Albert Tenuta	Ontario, CA
Paul Murphy	NC		

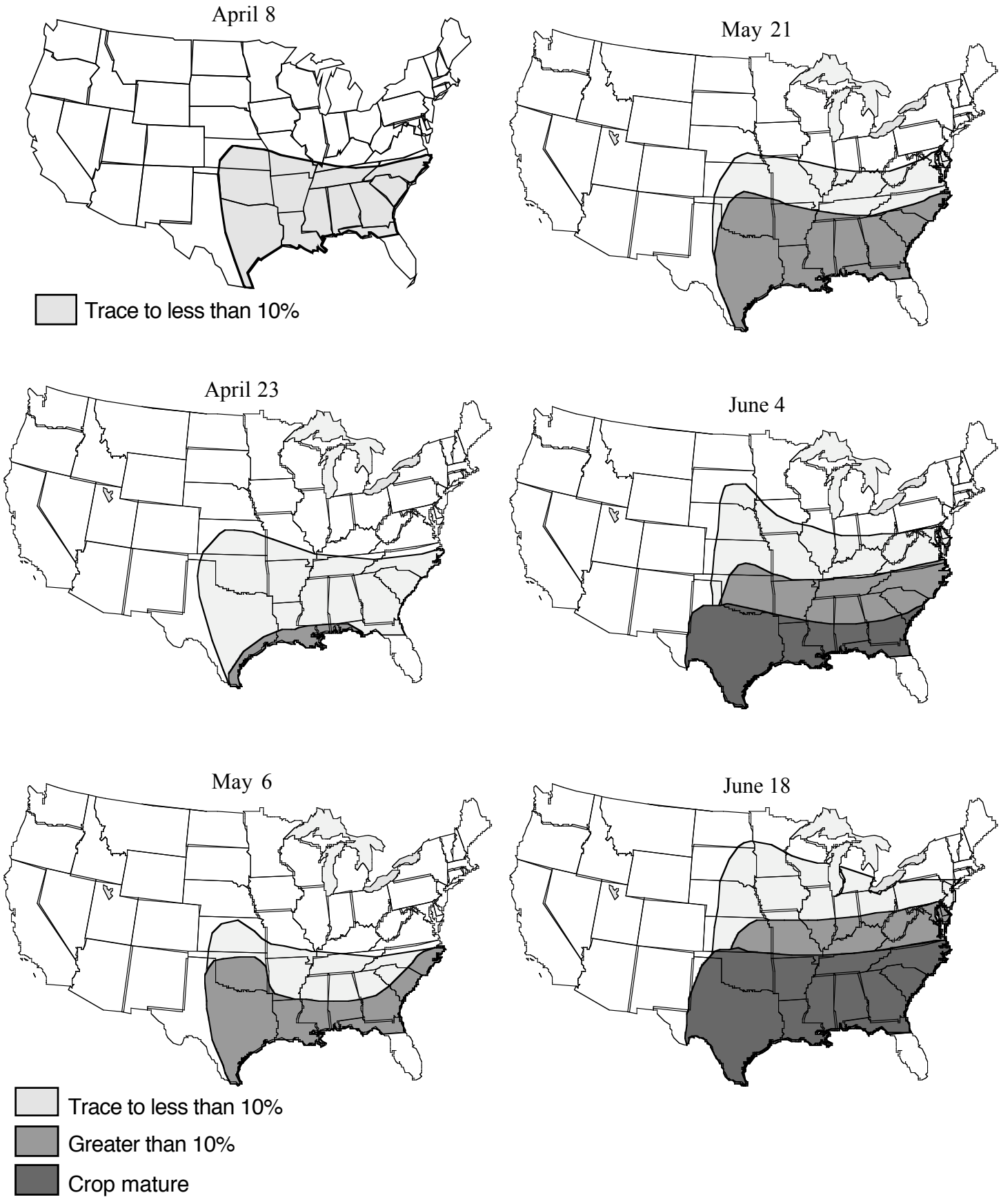
Our sincere apologies if by oversight we have omitted anyone from this list.

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.

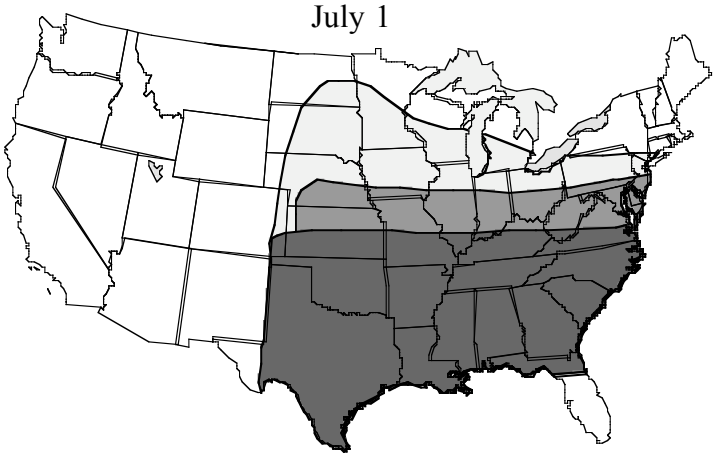
- David Long (david.long@ars.usda.gov)

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.

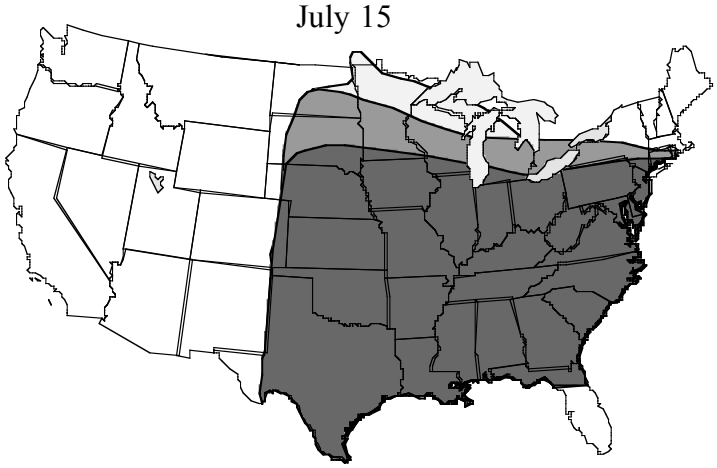
Fig. 1. Leaf rust severities in wheat fields in 2008



July 1



July 15

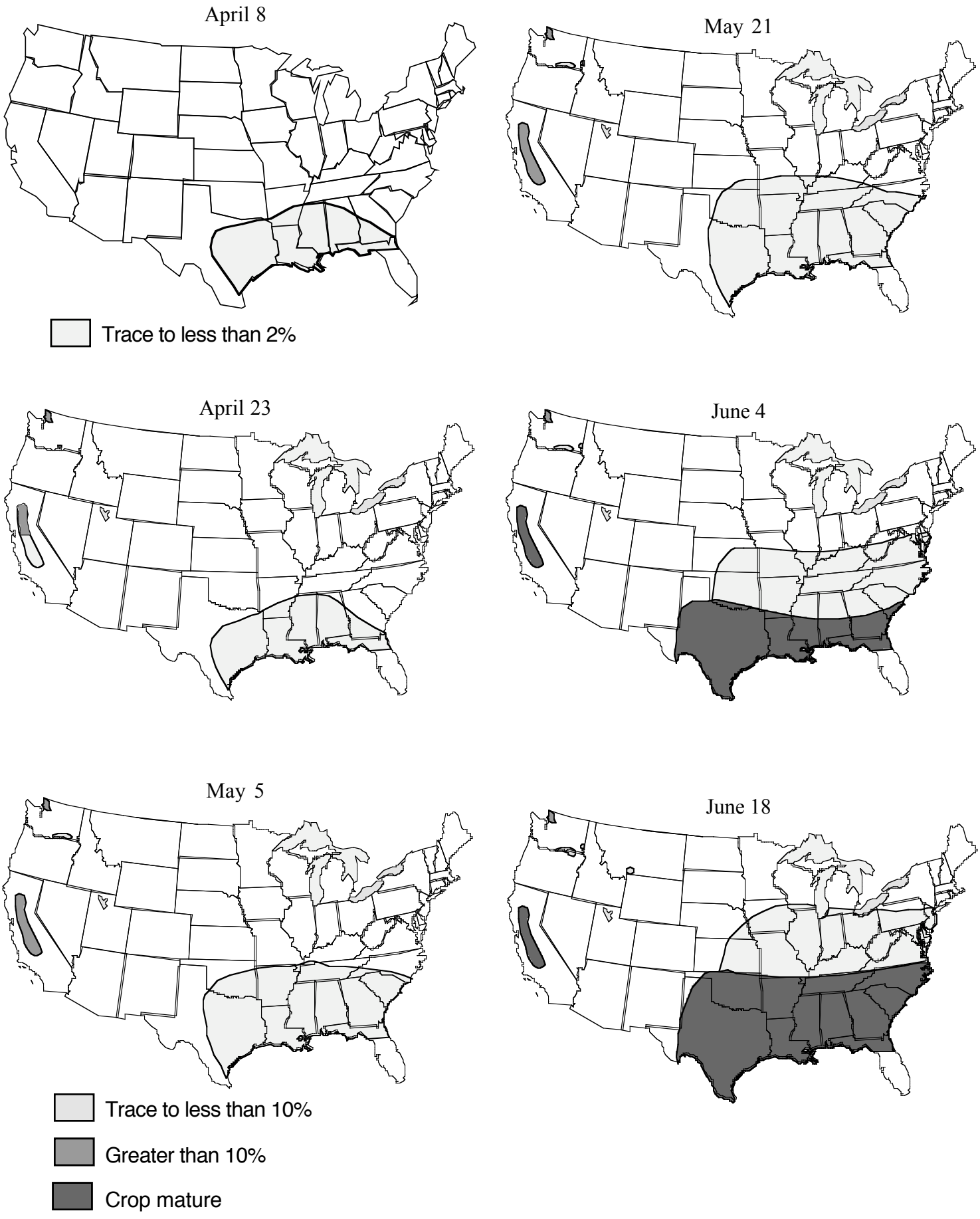


Trace to less than 10%

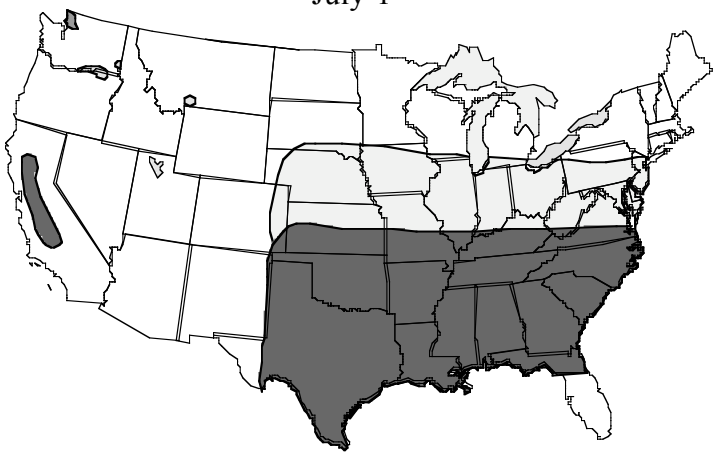
Greater than 10%

Crop mature

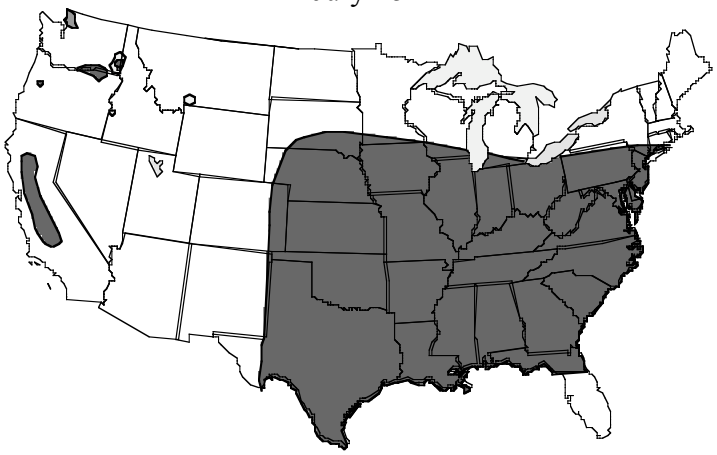
Fig. 2 Stripe rust severities in wheat plots and fields in 2008



July 1



July 15



Trace to less than 10%

Greater than 10%

Crop mature