CEREAL RUST BULLETIN

Final 2005 Report
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- Stem rust was light throughout the northern Great Plains on susceptible cultivars of wheat.
- Wheat leaf rust was widespread and severe throughout the Great Plains.
- Wheat stripe rust was widespread in the southern U.S.
- Oat crown rust severities were severe this year in Texas and the upper Midwest.
- Rye leaf rust was severe throughout the U.S.

Wheat stem rust. The first reports of wheat stem rust were in late April, when trace levels of infection were found in plots of susceptible wheat at Giddings in central Texas. The next report of wheat stem rust was in late May, when severe rust was found in plots of susceptible wheat at Castroville in south Texas.

In early July, susceptible winter wheat plots had trace to 10% severities at the soft dough stage in east central Minnesota. In mid-July, trace levels of stem rust were found on the susceptible spring wheat cultivar Baart in south central Minnesota and in an east central South Dakota plot of the susceptible cultivar Morocco. All current spring wheat cultivars grown in the northern Great Plains are resistant to the current stem rust race population.

In late July, wheat stem rust was found in plots of the susceptible spring wheat Baart at Crookston in northwestern Minnesota. Stem rust was not found on any of the commonly grown cultivars at the same location.

From April to June, the only reports of wheat stem rust were in the southern Great Plains wheat area. In July, stem rust was present on susceptible cultivars in locations from eastern Minnesota to east central North Dakota. Therefore, the stem rust that developed throughout the north must have originated from the few inoculum sources in the southern plains.
Race QFCS was the predominant stem rust race identified in the 2005 survey. It was found in the majority of collections made from wheat in Texas and Nebraska, and from barley and wheat in the spring wheat region. One collection from Texas was race TTTT.

Wheat Leaf Rust. **Southern Plains -** In late January, leaf rust infections were found in central Texas plots. The most severe rust was reported on the cultivars TAM 110 and Cutter. Warm temperatures and wet weather in February allowed for good leaf rust development. In mid-February, cultivars like Jagger in southern and central Texas varietal plots had 80% severities. By late February, leaf rust was widespread across central Texas in fields of cultivars Coronado, Cutter and Jagalene. Some of the fields in central Texas were sprayed for rust control (Fig 1). In early March, leaf rust was increasing rapidly in south Texas plots at Castroville, and cultivars like Cutter, Jagalene, and TAM 107 had 40-60% severity ratings. Thunderbolt, Overley, both with Lr41, and Ogallala had little rust. In early March, leaf rust was severe in a nursery at McGregor in central Texas, plots of Cutter that were planted in early September had completely brown leaves due to leaf rust. In mid-March leaf rust was the major disease of wheat in central Texas. Temperatures and rain were ideal for leaf rust development throughout Texas in March.

In mid-January, leaf rust was found in southern Oklahoma and conditions were conducive for sporulation, spread and development of leaf rust. In mid-February, healthy leaf rust pustules were observed on lower leaves of susceptible varieties, which indicated that leaf rust had survived the winter in much of Oklahoma. By the first week in March, sporulating pustules of leaf rust were observed in the wheat varietal plot at Stillwater, Oklahoma.

In late March in southern, central, and northern Texas, low to moderate levels of leaf rust infections were found in most commercial wheat fields. High severities (80%) of leaf rust were observed on susceptible cultivars in nursery plots and trace-20% severity levels were found in wheat fields. In late March, in southern Oklahoma, fields had high severity levels of leaf rust, but rust levels were much lower in north central Oklahoma.

In mid-April, leaf rust was found in the Great Plains from Texas to Nebraska (Fig. 1). During the first week in April, leaf rust was found on the mid and upper canopy leaves of susceptible cultivars in central and southern Oklahoma. In early April, high levels of leaf rust were found in variety trails and fields in the panhandle of Oklahoma, which is unusual since low moisture conditions in this area usually are not conducive for rust to develop.

In late April, plots of susceptible wheat cultivars had leaf rust severities up to 80% in the area from central Texas to the Florida panhandle. In late April in central Texas, susceptible cultivars had moderate to severe rust infections, while in northern Texas wheat at milk stage had light to moderate leaf rust infection (Fig. 1). By the last week in April, 100% leaf rust readings were observed on flag leaves of *Triticum cylindricum* (common goat grass) growing in roadside ditches in north central Texas. In central Texas and east central Louisiana, fields that had been sprayed with fungicides had 40% severities. By late April, leaf rust was increasing throughout

Oklahoma. Cultivars like 2174, Jagger (Lr17) and Jagalene (Lr24) were heavily rusted and there was some yield reduction.

In April, at various locations in the southern U.S., there were reports that indicated leaf rust was the most common rust, while at other locations 100 miles away stripe rust was the most common rust. These reports came from southwestern Georgia to southern Oklahoma. This year the cooler than normal temperatures the last two weeks of April were more conducive for stripe rust development than for leaf rust. Usually when temperatures are above 60 F in a 24 hr period stripe rust development slows down, but leaf rust will increase significantly.

During the second week in May, moderate levels of leaf rust were reported in central Texas and low levels in the Panhandle area (Fig. 1). In north central Texas stripe rust was more common at the boot and heading growth stages, but leaf rust was more prevalent at the dough stage.

In early May, plots and fields of susceptible wheat in Oklahoma had 60-90% severities. In mid-May flag leaves of *Triticum cylindricum* (common goatgrass) growing in roadside ditches in north central Oklahoma had 60% leaf rust severities.

In mid-May, leaf rust in the southern Great Plains was not as severe as last year, because the cooler temperatures in late April and early May slowed leaf rust development. However, the southern plains still provided inoculum for the wheat growing areas further north.

Central Plains - In late March, over wintering leaf rust infections were observed on lower leaves in southern Nebraska. Leaf rust over wintered in Colorado throughout the eastern half of the state, but dry conditions in the spring slowed leaf rust development.

In mid-April, trace levels of leaf rust were found across south central to southwest Kansas. In mid-May, plots and fields of susceptible wheat in south central Kansas had 40% severities while in central Kansas fields 5% severities were observed. In south central Kansas wheat plots, 40% rust severities were observed on Jagger, Jagalene, Cutter and Karl 92 cultivars. No leaf rust was observed on Overley, Deliver and Santa Fe. In some plots in south central Kansas, it was observed that leaf rust and stripe rust were competing for the same leaf tissue. In late May, leaf rust was found on susceptible cultivars in fields in northern Kansas. Hot dry weather slowed the rust development in Kansas and Oklahoma in late May. A two percent loss due to wheat leaf rust was estimated for Kansas in 2005.

In early June, traces of leaf rust were found in wheat fields in southern Nebraska. In mid-June wheat leaf rust was found in winter wheat fields from southern Nebraska to North Dakota (Fig.

1). Rust severities on flag leaves in fields ranged from 20% in Nebraska to trace levels in North Dakota fields. In late June, susceptible winter cultivars such as Jagalene in western Nebraska had 60% rust severities.

Northern Plains - On May 11, leaf rust infections that had over wintered were found on the lowest leaves of winter wheat plants of the susceptible cultivar Cheyenne at the Rosemount Experiment Station in east central Minnesota. In early June, leaf rust was increasing in winter wheat in southern Minnesota; susceptible cultivars had severities of 20-60% on lower leaves and 5-10% on flag leaves. The spring wheat crop had trace to 10% levels of leaf rust infections on lower leaves. In early June, rain and warm temperatures were ideal for the increase and spread of leaf rust in the north central region.

Trace amounts of leaf rust were found on winter wheat lines in plots at Brookings in east central South Dakota in early June. Trace levels of leaf rust infections were also found in spring wheat in the Red River Valley of Minnesota in early June.

In late June in susceptible winter cultivars such as Jagalene, in east central Minnesota and central South Dakota had 60% rust severities, but the resistant cultivars had only trace levels of infections on the flag leaves (Fig. 1). In late June, susceptible spring wheat cultivars in southern Minnesota plots had 60% rust severities with most infections on the lower leaves.

In early July, flag leaves of winter wheat in southeastern North Dakota fields had leaf rust severities up to 90%. In mid-July, flag leaves of spring wheat cultivars in fields from north central South Dakota to west central Minnesota had trace-60% leaf rust severities. Many wheat fields were sprayed with fungicide to prevent losses due to rust and scab.

In mid July wheat leaf rust was widespread throughout North Dakota and northwest Minnesota. Susceptible spring wheat cultivars such as Oxen, Ingot, Hanna, and Reeder, had leaf rust severities of 60% or greater in southeast and central North Dakota. The heavy leaf rust infections combined with high temperatures killed the flag leaves of these cultivars. Alsen, the most commonly grown cultivar in North Dakota, had good to moderate resistance to leaf rust, and the cultivars Knudson, Steele, and Glenn were highly resistant. Leaf rust was at lower levels in northeast North Dakota and northwest Minnesota, being mostly found on the lower leaves of susceptible cultivars. By the end of July susceptible wheat cultivars in northwest Minnesota had leaf rust severities of 80-100%.

This year leaf rust was widespread in the upper Midwest in spring and winter wheat. Rust inoculum arrived from the south in mid-May through mid-June with rain showers. Many of the

wheat fields in the spring wheat region were treated with fungicide, which prevented losses due to leaf and stripe rust. However, in unsprayed fields of susceptible cultivars leaf rust losses were significant.

Southeast - In late January, heavy leaf rust (>5%) was observed in varietal plots in a nursery at Baton Rouge. By mid-February, leaf rust was severe on susceptible cultivars throughout the state in plots and fields. Temperature and moisture conditions in February and March were ideal for rust development throughout the southern red winter wheat region.

In late February, leaf rust was severe in fields of susceptible varieties in southwest Arkansas and some fields were sprayed for rust control. By mid-March, leaf rust infections were more severe and widespread than usual in southwestern Arkansas. In late March, susceptible cultivars in Baton Rouge, Louisiana plots had 50% leaf rust severities. Some of the fields infected with rust were sprayed for rust control in the southern U.S.

In early April from central Louisiana through Alabama to Georgia, moderate levels of leaf rust infections were observed in research plots and fields. Susceptible cultivars in south central Louisiana and southern Alabama nurseries had up to 60% severities. In late April, southeastern Alabama varietal plots had 80% leaf rust severities, while 100 miles to the north only trace amounts of leaf rust were observed on the same varieties. In late April in east-central Arkansas plots of susceptible cultivars, trace levels of leaf rust were on lower leaves while upper leaves did not have any leaf rust. By late May, 100% rust severities were reported in plots of susceptible cultivars in central and southwestern Georgia.

East - In late April, traces of leaf rust were found in nursery plots in eastern Virginia at Warsaw and in fields in northeastern North Carolina. During the second week in May, traces of leaf rust were found in fields in north central Tennessee. In late May 15% leaf rust severities were observed on flag leaves of Saluda and McCormick cultivars in northeastern North Carolina research plots. Soft red winter wheat cultivars in eastern Virginia in late May had trace to 90% severities.

In early June, leaf rust severities were low across the state of Virginia. However, a severe leaf rust epidemic occurred in a nursery at Warsaw, Virginia with multiple races that had virulence to Lr24 and Lr26. Cultivars with Lr26, e.g. USG 3209 and Sisson had considerable leaf rust.

In mid-June, trace levels of leaf rust were found in south central New York plots. In early July, light levels of wheat leaf rust were found in western New York.

Mideast - In early June**,** leaf rust was found in fields from southern Illinois at 20% severity to trace levels on flag leaves in northwestern Ohio, northwestern Indiana and south central Wisconsin. In much of the Ohio Valley and Wisconsin, dry conditions in May and June slowed rust development.

California - In late April, traces of leaf rust were detected in yield trials in the Central Valley of California. In mid-May, susceptible cultivars in the San Joaquin Valley nurseries in California had 60 to 100% severities. In late May 70% leaf rust severities were observed in a field of the cultivar Blanca Grande in Kern County, California.

Pacific Northwest – In early June, light leaf rust was found in winter wheat in south central Washington. In mid- June, wheat leaf rust was severe in nurseries near Mt. Vernon in northwestern Washington and was increasing in central Washington, mainly in seed production fields under irrigation. In early July, light levels of wheat leaf rust were found in southwestern Idaho and east central Washington.

Mexico – In the second week in March, leaf rust was present in light amounts on durum wheat and bread wheat throughout the Yaqui Valley. Plots of Morocco had light (5%) levels of leaf rust. Isolated areas of high leaf rust infection were found on durum wheat.

From rust collections made in late January in Louisiana the following leaf rust races were identified: KDBG (Lr24 virulence), MBRK (Lr18 virulence), MCRK (Lr18 and Lr26 virulence) and TBBJ (Lr2a virulence). From collections made in early February the following races were identified from collections made in south Texas: KDBG (Lr24 virulence, identified from Jagalene), MCDS (Lr17 and Lr26 virulence, identified from Jagger, TCBJ (Lr2a and Lr26 virulence), TDBJ (Lr2a and Lr24 virulence) and TNRJ (Lr2a, Lr9, and Lr41 virulence, identified from Thunderbolt). These leaf rust races were also identified from rust collections made during the 2004 survey (http:://www.cdl.umn.edu).

From leaf rust collections made in mid-March in Arkansas the following races were identified: MFGJ (Lr11, Lr24, and Lr26 virulence, identified from McCormick), TBBJ (Lr2a virulence) and TNRJ (Lr9, Lr24, and Lr41 virulence). In mid-March the following races were identified from collections made in central Texas: KDBG (Lr24 virulence, identified from Jagalene and Cutter), KFDS (Lr17, Lr24 and Lr26 identified from Jagalene), MCDS (Lr17 and Lr26 virulence, identified from Jagger), and TNRJ (Lr9. Lr24, and Lr41 virulence, identified from Lockett, TAM 107 and Thunderbolt).

Wheat stripe rust. Southern Plains – During the second week in February, low levels of stripe

rust were found scattered throughout the varietal plot in central Texas at College Station. A spore shower probably occurred during the last week in January. Weather conditions were ideal for stripe rust development. In mid-February in south Texas at Castroville, stripe rust was severe on susceptible varieties while in most varieties rust was at low levels. In early March, stripe rust was increasing rapidly and was widespread throughout the nursery at Castroville (Fig 2). Most infections sites were on lower leaves, with a few on the upper leaves. In south Texas fields were sprayed for rust control.

In late March, wheat stripe rust infections were at light to moderate severities in wheat fields in southern and central Texas. Stripe rust severities ranged from trace levels to 80% severity in plots. This year, stripe rust was found at more locations and the weather conditions were more favorable for rust development than last year in Texas. However, in late March, higher day and night temperatures had slowed stripe rust development in southern and central Texas plots and fields.

During the third week in March, moderate stripe rust was found throughout southern Oklahoma. In early April, stripe rust was reported from central Texas, Louisiana, and Arkansas to southern Alabama (Fig. 2). In the first week of April, susceptible entries had severity levels of 100% in stripe rust monitoring and breeding nurseries throughout Louisiana and central Texas. In early April, in southern Oklahoma, fields of 2174 and OK 102 had severe stripe rust and were sprayed for rust.

In mid-April, stripe rust was increasing throughout the Texas Panhandle (Fig. 2) and by late April most plots of susceptible cultivars had rust severities over 80% on flag leaves. In north central and central Texas, stripe rust was most common in April but by mid-May the warmer temperatures had caused stripe rust development to cease.

In late April, stripe rust was moderate to severe in north central Texas and Oklahoma plots and fields. On April 30, in a wheat-breeding nursery at Lahoma, in north central Oklahoma, the cultivars Custer, Ok101 and 2137 had 80% stripe rust severities. In the same nursery Jagger and Jagalene had trace to 5% stripe rust severities. In late April, Jagger and Jagalene in north central Texas had 30-40% stripe rust severities.

In Oklahoma by mid-May, dry and warm weather had slowed stripe rust development throughout the state. Stripe rust did cause yield reductions in much of the wheat producing areas of Oklahoma.

This year stripe rust infections in the southern U.S. were more severe and extensive than last year

due to more initial inoculum sources of infection and lower than normal temperatures in early spring.

Central Plains - In mid-April in Kansas, trace levels of stripe rust were found in south central and southwestern regions. In early May, a field of Jagger at heading stage in south central Kansas had 30-40% stripe rust severity. These observations were significant because they are some of the first reports of fully susceptible reactions to stripe rust on Jagger, Jagalene, and Cutter. It is possible that these infections were caused by a new race in the stripe rust population in the southern and central Great Plains. This new race could have a serious impact on wheat production throughout the region, and especially in Kansas and Oklahoma where Jagger and Jagalene are planted on more than 65% and 50% of the total wheat area, respectively. In mid-May, wheat stripe rust was prevalent in much of Kansas at varying degrees of severity. Stripe rust was most severe in the southern and western areas of the state. Resistant cultivars such as Overley, Cutter and TAM 111 were still resistant. In some areas of Kansas, the more susceptible cultivars such as 2137, OK102 and Trego were hit very hard with stripe rust. Some estimates were for a 20-40% yield loss for the highly susceptible cultivars. In 2005, the estimated overall loss to wheat stripe rust in Kansas was 8.0%, which relates to a 34 million bushel loss.

In mid-May, wheat stripe rust was severe in central Nebraska plots and light in east central Nebraska plots. In early June, stripe rust was widespread from northern Kansas and across Nebraska and many farmers were spraying to control the disease. In mid-June, susceptible cultivars in winter wheat plots and fields in the panhandle of Nebraska had 60% rust severities, but hot temperatures at the end of June stopped further rust development.

Northern Plains - In late May, traces of wheat stripe rust were found in winter wheat plots in east central Minnesota and south central South Dakota. Infections were mostly on the lower leaves. In early June, stripe rust infections were found in east central Minnesota winter wheat plots on flag leaves. In early June, trace amounts of stripe rust were found in spring wheat fields throughout North Dakota and in spring wheat plots in south central Minnesota. Soft red winter cultivars with Yr9 stripe rust resistance gene, which is on the 1B-1R wheat-rye translocation that also has Lr26/Sr31, had 80% severities in plots in east central Minnesota in mid-June. By mid-June, stripe rust had passed peak development in southern Minnesota and slowed down due to warmer weather and host resistance in both winter and spring wheat.
In late June, very hot weather slowed or stopped stripe rust development throughout the northern Great Plains. In late June, stripe rust was light with severity levels up to 20% in east central South Dakota susceptible spring wheat plots (Fig. 2). The cultivars Walworth and Briggs were the most susceptible with stripe rust infections up to 20%. Most of the commonly grown spring wheats have good resistance to stripe rust.

In mid-July, hot temperatures stopped development of stripe rust on spring wheat in the far northern Great Plains.

Lower Mississippi Valley –– In early February, heavy stripe rust was observed in some varietal plots at Baton Rouge. During the third week in February, fields were sprayed for stripe rust control in central Louisiana.

In early March, in southwestern Arkansas plots, susceptible wheat cultivars averaged 30% rust severity while other cultivars had 0 to 5% severities. In late March, stripe rust was active in Louisiana and some fields were sprayed for rust control. In wheat plots in south central Louisiana, 80% stripe rust severities were recorded. Higher day and night temperatures during the last week of March slowed stripe rust development. In late March, stripe rust was severe in fields throughout Arkansas and fungicide application was recommended.

In mid-April, wheat stripe rust severity levels of near 100% were observed on susceptible entries in nurseries in southwestern Arkansas. By the third week in April, stripe rust was found throughout Arkansas. In late April, wheat plots with 90% severities were observed at Marianna (east central Arkansas) and cool temperatures were still favorable for infection, but insufficient moisture was limiting spread. Losses to stripe rust were expected in this area. In mid-May, stripe rust development had slowed in Arkansas.

East - In mid-March, stripe rust over wintering foci were observed in plots in south central Georgia. Stripe rust had expanded outward from the foci and many of the cultivars in the nursery were infected. In late April, plots of susceptible cultivars had trace-80% severities in the panhandle of Florida, southwestern Georgia and southern Alabama. By late April, stripe rust was reported as far north as southeastern Virginia.

In early May, wheat stripe rust was found across the Atlantic coastal plain from Georgia to Virginia. North central Tennessee wheat fields had 15% stripe rust severities. In mid-May stripe rust was found on Virginia's Eastern Shore and significant stripe rust was found in border rows in nurseries in Painter, Virginia.

In late May, severe stripe rust was found in a field in Washington county in central coastal North Carolina.

In mid-June traces of stripe rust were found in plots in south central New York.

Mideast - In early June, light wheat stripe rust was found in a plot of Becker (older cultivar) in plots at Wooster Ohio. This was only the fourth time in 25 years that stripe rust was seen in the plots at Wooster.

In early June, fields and plots from northwestern Missouri to east central Indiana had 60% severities (Fig. 2). Traces of wheat stripe rust were found in nurseries in northwestern Ohio and central Michigan in early June.

In early June, stripe rust foci of 10% severity were found in winter wheat plots and fields in northern Indiana and south central Wisconsin. Most of the infections developed from spores deposited with rain in the previous 10-14 days**.** In much of the Ohio Valley and Wisconsin, dry and hot conditions in June slowed rust development.

California – Stripe rust on wheat was first detected on February 25 in the nursery at UC Davis in border rows of the highly susceptible variety D6301. On March 11th, trace levels of stripe rust were detected in the Sacramento Valley and in the Sacramento/San Joaquin Delta nursery. Severity levels and incidence were less than last year on the same date. In early April susceptible entries in nurseries in the Davis area of the Sacramento Valley had 60% stripe rust severities. Cool and wet weather in late April were ideal for stripe rust infection, but rust levels remained low to moderate on most of the wheat acreage (dominated by resistant cultivars Summit and Blanc Grande). In late April in the Central Valley, plots of susceptible cultivars had severe stripe rust and severe rust was found in the screening nursery at UC Davis. In early May, stripe rust was increasing in fields and nurseries in the Sacramento Valley.

Pacific Northwest – In early February, stripe rust was found in experimental plots near Corvallis, Oregon. On March 10, susceptible checks in winter wheat plots at Mount Vernon in northwestern Washington had 20% severities. The winter was warmer than normal in the Pacific Northwest, and therefore, stripe rust started sporulating earlier than normal in western PNW.

In early April, wheat stripe rust continued to increase in western Oregon and northwestern Washington. During the first week of April, wheat stripe rust was found on susceptible winter wheat entries in south central Washington nurseries. In mid-April, traces of stripe rust were found in winter wheat nurseries near Pullman in southeastern Washington. An early appearance of stripe rust in the Palouse region was expected according to the forecast based on the higher than normal temperatures in December and January. The wet weather in April was favorable for stripe rust infection.

During the third week in April wheat stripe rust was developing rapidly in the Pacific Northwest. because of moist weather, which was favorable for rust development. In northwestern Washington, wheat fields with 20% rust severities were reported.

By early May, stripe rust was present throughout the Pacific Northwest and caused yield losses in susceptible winter wheat crops in northwestern Oregon and south central Washington. Fungicides were sprayed to control stripe rust in Washington wheat fields in an area that had the most stripe rust in the last 20 years. In early May, in east central Washington and northern Idaho, susceptible winter wheat experimental fields had 60% stripe rust severities. In both Oregon and Washington nurseries stripe rust severities ranged from 0 to 60% in winter wheat cultivars.

In mid-May, stripe rust was widespread throughout the Pacific Northwest. Susceptible entries in southeast Washington winter wheat nurseries had 100% severities and susceptible entries in the spring wheat nurseries had 40% severities. In eastern Washington winter wheat fields with 5% rust severities were sprayed with fungicides. Stripe rust was common in spring wheat fields with less than 2% severity on the lowest leaves. The wet and cool weather in mid-May, were ideal for stripe rust infection in the Washington.

In early June, fields in northern Utah and southern Idaho had severe rust. In mid-July, significant levels of stripe rust were found on wheat in fields and plots in south central Idaho. Losses to wheat stripe rust were expected in southern Idaho.

In mid-June, wheat stripe rust occurred throughout the wheat areas of the Pacific Northwest. The disease passed peak development on winter wheat and was developing on spring wheat. By late June, stripe rust was severe in virtually every location wheat was grown in the Pacific Northwest, extending as far east as Bozeman (Fig. 2). Most fields of moderately susceptible or susceptible winter and spring wheat cultivars were sprayed with fungicides.

Because the rust started very early in the season, and the weather was extremely favorable to the disease (cool and wet), and the inoculum load was heavy, cultivars with low to moderate levels of high-temperature adult-plant (HTAP) resistance, which is generally adequate in years of normal weather, showed heavy infection. This year wheat stripe rust losses were expected to be higher than average in the Pacific Northwest.

Mexico - Stripe rust was at moderate to high infection levels on a few bread wheat cultivars throughout the Yaqui Valley. Some fields were sprayed to prevent yield loss.

Oat Stem Rust. In early March, traces of stem rust were found in oat varietal plots at Castroville in southern Texas. In late March oat varietal plots had 60% severities in central Texas plots at Luling. By early May, stem rust on oats had increased to severe levels in plots at Castroville. Oat stem rust infections were less than last year in this area.

In mid-April, oat stem rust was at trace levels in oat demonstration plots in southwest Louisiana. In mid-May, 80% stem rust severities were observed in *Avena fatua* (wild oats) in San Luis Obispo County in California. In late May oat plots at Davis, California had 60% severities. In early June, oat stem rust was found on wild oats in Sonoma County in California.

In early July, traces of oat stem rust were found in plots at Lincoln, Nebraska.

During mid-July, oat fields and plots at milk to soft dough growth stage had trace to 10% severities throughout southern Minnesota and eastern South Dakota. Most current oat cultivars are not highly resistant to stem rust.

The predominant oat stem rust race identified in 2005 was NA-29. Other oat stem rust races identified so far include NA-10, -27, -67, and two putative new races, one with virulence similar to NA-29 plus *Pga*, and the other with virulence similar to NA-67 plus *Pga*.

Oat Crown Rust. In early February, traces of crown rust were observed in south central Texas plots. By mid-February, severe crown rust infection was reported in south and central Texas varietal fields and plots. Along highways in south Texas *Avena fatua* (wild oats) and "feral oats" were orange because of oat crown rust. In late February, crown rust was heavy in central Texas in fields of Bob, Big Mac, Horizon 314, and TAMO 397. The level of oat crown rust infection was 4-6 weeks ahead of normal in south central Texas by late February.

By early March, susceptible cultivars at College Station, Texas, had 40-80% severities. In late March, oat crown rust severities ranged from trace to 80% in plots and fields in southern and central Texas. Crown rust was so severe in a field in southern Texas that the plants were killed before heading. By mid-April, severe oat crown rust was found across central and southern Texas. A significant amount of crown rust was observed on ryegrass in central Texas. In the last two years there has been severe crown rust on many of the cultivars grown in Texas. In late April 60-80% severities were observed in central Texas fields while trace severities were reported in northern Texas. In early May, crown rust was heavy in oat plots at Castroville in south Texas.

In mid-May, no crown rust was found in central Kansas oat plots.

In late March, oat plots at Baton Rouge, Louisiana had 100% severities. In mid-April, 100% severities of crown rust were observed in oat plots in southeast Louisiana. In early May, oat plots in southern Alabama and the Florida panhandle had 80% rust severities. In late May 5% crown rust severities were found in winter oat plots in northwestern South Carolina.

In mid-June, oat fields and plots in southern Minnesota had trace to 20% severities. During the last week in June, lower leaves of oat in east central Minnesota plots and fields had trace to 20% severities of crown rust. Crown rust on oat in the buckthorn nursery at St. Paul, Minnesota had severity levels up to 60%. In early July, crown rust was not observed in central and eastern Wisconsin because of very dry conditions throughout the area in the past month.

By the second week in July, fields and plots of oat throughout west central Wisconsin to central South Dakota had trace to 80% rust severities. Much of the primary inoculum originated from buckthorn, the alternate crown rust host, which is common throughout the Upper Midwest. In late July, oat crown rust was common on cultivated and wild oat throughout Minnesota and North Dakota.

In late April, low levels of oat crown rust were found in the crown rust-screening nursery at UC Davis. In mid-May, oat crown rust was observed in *Avena fatua* (wild oats) in San Luis Obispo County in California. In early June, crown rust was found on wild oat (*Avena fatua*) in Sonoma County.

Buckthorn. In mid-April, buds on buckthorn, the alternate host for oat crown rust, were beginning to break in the buckthorn nursery at St. Paul, Minnesota. Light pycnial infections were observed on emerging buckthorn leaves in the nursery at St. Paul, Minnesota on May 2. Cooler than normal temperatures slowed down pycnia development.

By the third week in May, aecial development was moderate on buckthorn. In late May, crown rust aecial infections were less than last year, due to cool temperatures.

In mid-June, substanial crown rust infection was observed on upper leaves of oat in spreader rows close to the buckthorn nursery.

Stripe Rust on Barley. California – In late February, barley stripe rust was observed in a nursery at UC Davis, mostly on susceptible check varieties, e.g. Russell. Barley stripe rust developed sooner than wheat stripe rust this year in California, although the incidence was still low. On March 10, California fall-sown barleys in San Luis Obispo County had 40% severities.

In late April, barley stripe rust was found on highly susceptible cultivars in the screening nursery at UC Davis and yield trails in the Central Valley in California.

Pacific Northwest – In early February, stripe rust was found in a fall-planted barley nursery near Corvallis, Oregon.

In mid-May, 1-2% severities were reported in barley fields and plots in eastern Washington. This was the earliest detection of barley stripe rust in eastern Washington in the last five years. In mid-June, barley stripe rust had developed up to 40% severities on susceptible varieties in nurseries and had been observed in commercial fields at very low levels in eastern Washington. Low levels of stripe rust were found on barley in southern Idaho in early June. In late June, stripe rust was increasing rapidly in eastern Washington and northern Idaho and in susceptible barley fields 60% severities were reported.

Barley Leaf Rust. In late March, traces of barley leaf rust were found in southern Texas plots. In mid-May, barley plots in north central Oklahoma at Lahoma had 60% severities.

In late June, lower leaves of barley in east central Minnesota plots had 10% severities. In mid-July, upper leaves of susceptible spring barley plots in east central South Dakota and east central Minnesota had 40% rust severities. In early July, barley leaf rust was reported in fields and plots in eastern North Dakota.

In late April barley leaf rust was increasing on entries in the barley stripe rust-screening nursery at UC Davis. In early May barley plots in Butte and Glenn counties in California had 40-80% leaf rust severities. In mid-June, barley leaf rust was reported near Mt. Vernon in northwestern Washington.

Barley Stem Rust. In early July, trace amounts of barley stem rust were observed in plots of susceptible two-rowed cultivars in east central Minnesota. This was the only report of stem rust on barley in 2005.

Barley Crown Rust. In late June, susceptible barley cultivars in the buckthorn nursery at St. Paul, Minnesota had trace to 10% crown rust severities.

Rye Leaf Rust. In late March winter rye in central Texas plots had 60% rust severities. During the last week in April, severe rye leaf rust was found in fields in the Florida panhandle and in southern Alabama plots. In mid-May, rye fields in north central Oklahoma had 60% severities. In early June, severe rye leaf rust was found in southwestern Indiana rye plots.

In mid-June, winter rye plots in southern Minnesota had 60% severities. By late June upper leaves of winter rye had 60% severities and lower leaves of spring rye had 40% severities in southern and east central Minnesota plots. In mid-July, upper leaves of spring rye in plots in southern and west central Minnesota had 40% severities. In late July, rye leaf rust was heavy throughout Minnesota and North Dakota.

Rye Stem Rust. In mid-July, the first and only report of rye stem rust this year was in winter rye plots in east central South Dakota at Brookings.

Stem rust on Barberry. In late May, aecial infections on common barberry in southeastern Minnesota were severe, similar to the level of infections in 2003 and 2004. Aecial infections were mostly due to *Puccinia graminis* f. sp. *secalis* (the form attaching rye) as *P. graminis* f. sp. *tritici* (the form attacking wheat) or *P. graminis* f. sp. *avenae* (attacking oats) was not identified from the barberry samples. In mid-June, aecial infections were light on susceptible common barberry bushes in south central New York. In early July, aecial infections were found on barberry in west central New York. These isolates did not infect wheat, rye or oat.

This is the last issue of the Cereal Rust Bulletin for the 2004-2005 small grain-growing season. I would like to thank all of those who helped with the bulletin this year, especially Mark Hughes (markh@umn.edu) who coordinates its distribution through the CDL website (http://www.cdl.umn.edu) and mail list and Jim Kolmer for his editorial comments (jkolmer@umn.edu). All rust situation reports were greatly appreciated. All messages from our cereal rust survey mail list are placed on our web page and used in the preparation of the Cereal Rust Bulletins.

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Fig. 1. Leaf rust severities in wheat fields in 2005.

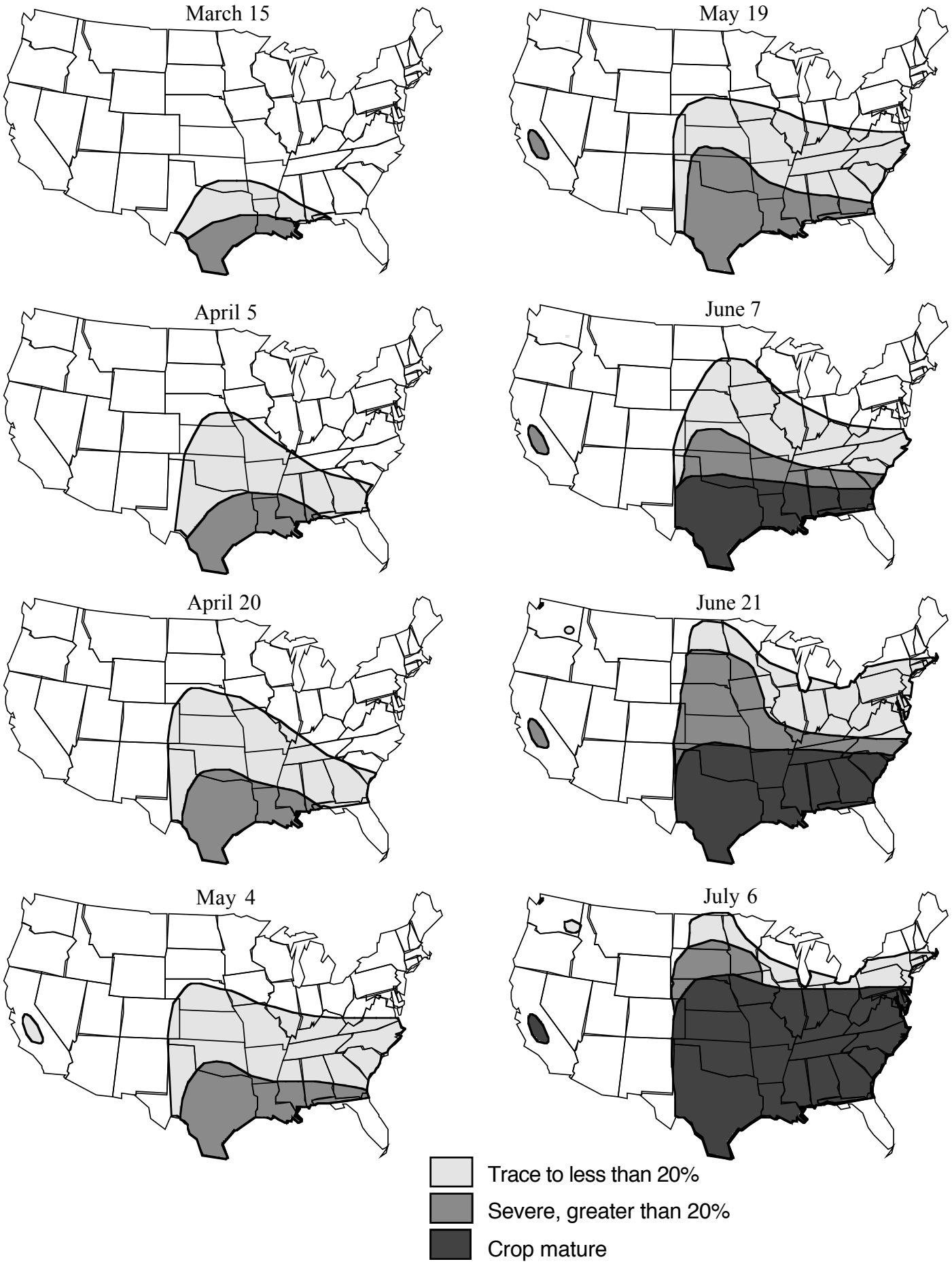

Fig. 2. Stripe rust severities in wheat fields in 2005.