CEREAL RUST BULLETIN

Report No: 1
April 17, 1984

From:
CEREAL RUST LABORATORY
U. S. DEPARTMENT OF AGRICULTURE
UNIVERSITY OF MINNESOTA, ST. PAUL 55108

Issued By:
AGRICULTURAL RESEARCH SERVICE
U. S. DEPARTMENT OF AGRICULTURE
(In cooperation with the Minnesota Agricultural Experiment Station)

The cold winter and cool spring weather has slowed development of small grains to 1-2 weeks behind normal across the southern United States. In most of this region, moisture has been adequate but in south Texas the crop is under moisture stress. In the central and northern U.S. wheat growing areas, the winter was cold with spotty snow cover. In southern Nebraska and northern Kansas, winter killing was more severe than normal due to the lack of snow cover. In the central plains, spring seeding of oats and barley is in full swing. In the northern plains, the initial planting of spring grains started but was delayed by rains. Warm drying weather should soon result in the resumption of planting.

Wheat stem rust--In 1984, the first wheat stem rust was observed in McNair 701 disease detection plots at Victoria and Uvalde, Texas, experiment stations on April 7. At the Victoria site, the rust overwintered and with the increase in spring temperatures the rust increased to the point where it killed the plants. In the Uvalde plots, the rust infection was approximately three weeks old. Scattered pustules developed from spores that were deposited with rainfall. These spores probably originated some distance from the plot. These are the only reports of wheat stem rust in the United States at the present time. During the first week in April, traces of stem rust were also observed in the Rio Bravo nursery in the Rio Grande valley of northeastern Mexico.

Wheat leaf rust--During the early part of April leaf rust was found scattered throughout the wheat growing areas of south and central Texas. The cultivars differed greatly in the leaf rust severities that were observed in both nurseries and fields. Leaf rust was severe on some cultivars, i.e., NK Pro 812 and CK 68-15 in nurseries, while rust was light or nonexistent on some of the other cultivars in this area, i.e., Mit and CK 762. In much of the south Texas wheat growing area, moisture is needed before leaf rust will increase to the point where losses will occur. Leaf rust was also prevalent on susceptible checks in the Rio Bravo nursery in Mexico. In contrast, leaf rust was rare or absent in the Mexican irrigated wheat areas near Torreon, Delicias, Zaragoza, and Anahuac.

Wheat stripe rust--Stripe rust was scattered in trace amounts in the Uvalde, Texas, irrigated nursery. This is much less stripe rust than last year on the same date. Light severities of rust were also observed in plots in Yolo County, California (Steffenson).

Oat stem rust--No oat stem rust was found in south Texas during the first week in April. Lack of rust in this area at this date is unusual; however, last year only a trace of rust was found on the same date. A few pustules of stem rust were found in nurseries at Zaragoza and Anahuac, Mexico, and on wild oats in Yolo County, California (Steffenson), the first week in April.

Oat crown rust--Crown rust has been reported in only trace amounts in nurseries in southern U.S. No infected fields were observed in south Texas in early April which is unusual for that area.

Barley leaf rust--Leaf rust was observed in some central California nurseries and fields (Jackson).

Rye leaf rust--Light amounts of leaf rust were found in south Georgia fields (Morey). In the Rosemount, Minnesota, nursery leaf rust was easily found in the winter rye plots.

CEREAL RUST BULLETIN

Report No: 2
May 1, 1984

From:
CEREAL RUST LABORATORY
U. S. DEPARTMENT OF AGRICULTURE
UNIVERSITY OF MINNESOTA, ST. PAUL 55108

Issued By:
AGRICULTURAL RESEARCH SERVICE
U. S. DEPARTMENT OF AGRICULTURE
(In cooperation with the Minnesota Agricultural Experiment Station)

The winter wheat crop throughout much of the United States is in good condition. A few exceptions are north-central and western Kansas and southern Nebraska where 20-30% of the fields may be lost because of winter kill. Some winter damage has also been reported in South Dakota. Drought has stressed the cereal crops in south Texas and in some areas has resulted in premature ripening. During the past week, spring seeding of small grains in the upper midwest was in full swing in Minnesota, while rain and snow slowed seeding of small grains in the Dakotas. This past weekend, snow fell over the rest of the upper midwest delaying further planting. In the Pacific Northwest the crop is 2-3 weeks later than normal, which is due to a long, cold, wet spring after a cold, dry winter.

Wheat stem rust--No new reports of have been received since the last bulletin.

Wheat leaf rust--Leaf rust is light in the southern U.S., with most of the severe rust reported in susceptible wheat cultivar plots. As of May 1, the leaf rust identified from south Texas was UN-5 (virulent to Lr1, 3a, 10, and 17). This was the most common race identified from this area in 1983. Traces of leaf rust were reported in fields in southern Oklahoma (Horinck, Mitchel). There has been no leaf rust observed in Kansas since the cold weather in February. In Virginia, leaf rust overwintered in the eastern and northern areas of the state. With the advent of warm, moist weather, rust development will increase, particularly on the susceptible cultivars, e.g., Tyler, Massey, and Wheeler (Stromberg). Traces of leaf rust were reported on wheat in central Washington. This is less rust than last year on the same date in this area of the country.

During the last week in April, traces of leaf rust were found in winter wheat plots at Rosemount, Minnesota. The uredia were scattered and on many cultivars, e.g., Cheyenne, McNair 701, and Roughrider. Most uredia were on leaves close to the soil. These uredia probably developed from fall infections that survived the winter as non-sporulating mycelia. With continued wet, warm weather, the conditions are conducive for more leaf rust increase. On April 25, the first rust was reported in a winter wheat field in Walworth County, Wisconsin. Again the rust uredia were found on the lower leaves of several plants and are probably due to overwintering mycelia. Thus, in 1984, there seem to be several bands of leaf rust development in the Great Plains. In northern Mexico, it is too dry for leaf rust development, while in southern Texas, leaf rust severities are moderate on susceptible cultivars. In the central Great Plains, the diseases were eliminated by cold temperatures without snow cover sometime during the winter and in the northern Great Plains an early snow provided protection to the diseased plants throughout the winter.

Stripe rust--In eastern Oregon, Washington and Idaho there are moderate levels of stripe rust, which is similar to 1982 on the same date. In Southeast Washington, stripe rust is the heaviest and some damage will occur on the cultivars with adult plant resistance. In the Mount Vernon area, rust is increasing on Stephens, the most common cultivar (Line).

There have been no further reports of oat and barley stem or leaf rust development in the United States.

CEREAL RUST BULLETIN

Report No: 3
May 15, 1984

From:
CEREAL RUST LABORATORY
U. S. DEPARTMENT OF AGRICULTURE
UNIVERSITY OF MINNESOTA, ST. PAUL 55108

Issued By:
AGRICULTURAL RESEARCH SERVICE
U. S. DEPARTMENT OF AGRICULTURE
(In cooperation with the Minnesota Agricultural Experiment Station)

Winter wheat is in mostly fair to good condition throughout the United States except in dryland areas of Texas and Oklahoma where the yield potential is declining daily due to warm, dry, windy weather. The Kansas winter wheat crop is 1-2 weeks behind normal and in fair to good condition except in the north.

In the southern soft red winter wheat area the maturity is advancing rapidly and harvest will begin shortly. Wheat in the Mississippi Delta is in good condition except for a few flooded areas.

Spring wheat growth stage is earlier than normal in Montana, near normal in Minnesota, and later than normal in the Dakotas.

Wheat stem rust--During the first week in May stem rust was found in nurseries in Quincy, Florida (Barnett), Tifton, Georgia (Morey) and Louisiana where it appeared to overwinter in all of these locations. Stem rust was also found in central Texas nurseries (McDaniel, Erickson). The most severe rust was found in the soft red winter wheat plots in southern Louisiana. Last week, significant stem rust was observed on the cultivar Auburn (has Sr17, McVey) in Louisiana plots, and traces were observed on Florida 301 at Quincy, Florida. Rust was found in a commercial field in southern Louisiana and a field in central Texas. The pustules of stem rust in the central Texas commercial field may have developed from rain-deposited spores 4-6 weeks ago. Further moisture was minimal so rust development was slowed, in fact, even stopped. A trace of rust was found in the Renner, Texas plots on May 11, which is the normal date for the first rust found in this area. These southern areas can be a source of inoculum for the northern grain but most of the northern cultivars are resistant, so losses should be insignificant.

Wheat leaf rust--During the first week in May, leaf rust was found easily in commercial fields throughout central and north Texas, but a lack of moisture will limit further rust development in most of this area.

Leaf rust was light in Georgia, Alabama, and Florida fields which is due in part to the widespread use of Florida 301. Rust was heavy in southern Arkansas and west central Mississippi and light in the northern Delta area which is in the early dough stage.

In southeastern U.S. and central Texas nurseries, rust was severe on some cultivars (e.g. McNair 1003, Coker 983, Massey), while other cultivars were rust-free (e.g., Coker 762, Florida 301). Cultivar susceptibility or resistance was very easily observed throughout the plots.

During the past two weeks, UN-5 (virulent to Lr1, 3, 10, and 11), UN-17 (virulent to Lr2a, 2c, 3, and 10), UN-13 (virulent to Lr1, 2a, 2c, 3, and 18) and UN-10 (virulent to Lr2c) were identified from collections made in nurseries in northeast Mexico. Races UN-5 and UN-2 (virulent to Lr3 and 11) were identified from collections made in a south Texas nursery.

Wheat stripe rust--Stripe rust was found in northern Texas in irrigated plots on May 9 (Ward, Jordan). This nursery, plus the Uvalde irrigated nursery, are the only two locations were stripe rust was reported in Texas this year.

Oat stem rust--During the last two weeks, oat stem rust severities ranged from light to moderate on cultivars in nurseries at Beeville, Uvalde and Giddings, Texas. Traces of oat stem rust were found in a forage plot in Fairhope, Alabama. No other stem rust was found in the southeast states or north central Texas.

Oat crown rust--Traces of crown rust were found in the nursery at Tifton, Georgia. In the southeast U.S. and north central Texas, the maximum severity is a trace, while most fields have no crown rust.

Barley stem rust--No stem rust on barley has been found in 1984 in the U.S.

Barley leaf rust--Traces of leaf rust were found the first week in May in Locustville, Virginia (Stromberg) and Ithaca, New York (Bergstrom) nurseries. Leaf rust is severe in barley cultivars in southern California nurseries (Jackson).

Rye stem and leaf rust--Leaf rust was light in central Georgia.

Other diseases--Septoria nodorum is severe in the southeastern U.S. Septoria tritici is severe in southern Arkansas, western Mississippi, Louisiana, and in north central Texas where moisture conditions are favorable for disease development. Powdery mildew is severe in southern Alabama plots and north-central Texas heavily fertilized fields.

News item: John Roberts has been transferred from West Lafayette, Indiana, to Experiment, Georgia, where he will represent the Cereal Rust Laboratory in the Southeast, with the recently greatly increased wheat acreage in that region. Dr. Roberts will be an integral part of the research staff of the Cereal Rust Laboratory as relating to rust research needs in cooperation with other researchers in the Southeast. He is located on the campus of the Georgia Agricultural Experiment Station.

CEREAL RUST BULLETIN

Report No: 4
May 30, 1984

From:
CEREAL RUST LABORATORY
U. S. DEPARTMENT OF AGRICULTURE
UNIVERSITY OF MINNESOTA, ST. PAUL 55108

Issued By:
AGRICULTURAL RESEARCH SERVICE
U. S. DEPARTMENT OF AGRICULTURE
(In cooperation with the Minnesota Agricultural Experiment Station)

The small grain harvest is in full swing throughout the extreme south of the United States, northern Texas and starting in southern Oklahoma. Wheat yields in Texas are less than last year due to drought conditions.

In Kansas and central and northern Oklahoma the crop is 1-2 weeks behind normal development but is in good shape except for the dry area of southwestern Oklahoma and areas affected by winterkilling in northern Kansas. Most of the small grains in the northern Great Plains are seeded. The continued warm weather and adequate moisture have contributed to marked increases in crop growth throughout the area.

Wheat stem rust--During the past two weeks stem rust was found in nurseries in Laurinburg, North Carolina (Newton), Plains, Georgia (Johnson, Cunfer), San Antonio, Texas (McKone), Tom Beam, Texas (Ward), Stillwater, Oklahoma (Cost), and Davis, California (Jackson). In these locations the rust was found scattered throughout the nursery on susceptible cultivars in moderate severities at soft dough or later crop stage. The stem rust race HNL (virulent to Sr genes 7b, 8, 9d, 11, and 36) was identified from the collections made in McNair 701 trap plots at Victoria and Uvalde, Texas, nurseries the first week in April.

Wheat leaf rust--During the past two weeks traces of leaf rust were found as far north as central New York (Bergstrom) and southern North Dakota (McMullen, Ball). Leaf rust also was found in nurseries in northern South Carolina (Harrison), eastern Virginia (Stromberg) and central Pennsylvania (Bingman) in light amounts. Traces of rust were found scattered throughout the state of Oklahoma and southwestern Missouri (Foudin) the last full week of May. Leaf rust is light and scattered in the southern part of Kansas. These pustules most likely developed from fall infections that survived the winter as nonsporulating mycelia on lower leaves. Rust in the Minnesota and Wisconsin overwintering sites now has spread to the middle leaves of the tillers.

In the past two weeks severe leaf rust ratings were made on susceptible cultivars growing in central California (Jackson), central Oklahoma (Cost), northern Texas (McCoy, Gardenhire) nurseries. Throughout the Pacific Northwest leaf rust is present but is not developing at a very fast pace (Line).

In summary, leaf rust is widespread and may cause losses on susceptible cultivars where the maturity has been delayed from normal.

Wheat stripe rust--In the Pacific Northwest the favorable spring weather, and snowcover which permitted rust overwintering, have created conditions for severe rust; e.g., north central Oregon (area near Dalles), southeast Washington (west of Walla Walla), and the northern edge of the central Washington dryland wheat area. In western Washington the rust is developing at a normal rate. In the Palouse area traces of rust have been detected and the crop is late so adult plant resistance may be more effective.

The stripe rust race picture in the Pacific Northwest has changed in that races virulent on cultivars with the PI 178383 and Tyee resistances have become more widespread and common. Therefore, more of the wheat growers are spraying with Bayleton to help control the rust (Line).

In the past two weeks the only observation of stripe rust in the Great Plains was in the Stillwater, Oklahoma, nursery on the cultivar Arkan.

Oat stem rust--During mid-May collections were made in nurseries at San Antonio, Texas (McKone), and Hartsville, South Carolina (Harrison). As of May 30, 1984, oat stem rust remains very light in the United States.

The race NA-5 was identified from a wild oats collection made in California (April 8); NA-5 has been found in previous years in this state. The common NA-27 race was identified from the collections made in Mexico in April.

Oat crown rust--On May 16 oat crown rust pycnia were present on buckthorn bushes growing in the St. Paul, Minnesota, nursery and on wild buckthorn in Dane Co., Wisconsin. Aecia can be expected 7 to 14 days after pycnia are first visible.

Barley stem and leaf rust--No new reports since last bulletin.

Rye stem rust--Stem rust was found in the nursery at Laurinburg, North Carolina. No stem rust has been observed yet in the Great Plains.

Rye leaf rust--In a Rio Grande Valley, Texas nursery, leaf rust was severe on the rye cover crop. Leaf rust of rye is present throughout the year in this area (Jenkins).

Barberry rust--The first barberry aecial collections of 1984 were made May 21 on Canadian Barberry (Berberis canadensis) in Monroe County, West Virginia (Bostic), and in Dane County, Wisconsin, from Common European (Berberis vulgaris) on May 25 (Line).

Other diseases--Throughout Kansas and Oklahoma, tanspot (Pyrenophora trichostoma) and speckled leaf blotch (Septoria tritici) vary from light to severe. Flag leaf severities of 50 percent (singly or in combination) of these diseases were observed at heading to berry growth stage in a number of commercial fields. Cheat grass (Bromus sp.) and mustard (Brassica sp.) are severely infesting a number of wheat fields in Kansas and Oklahoma.

CEREAL RUST BULLETIN

Report No: 5
June 15, 1984

From:
CEREAL RUST LABORATORY
U. S. DEPARTMENT OF AGRICULTURE
UNIVERSITY OF MINNESOTA, ST. PAUL 55108

Issued By:
AGRICULTURAL RESEARCH SERVICE
U. S. DEPARTMENT OF AGRICULTURE
(In cooperation with the Minnesota Agricultural Experiment Station)

Winter wheat is in fair to good condition throughout the United States. Wheat development lagged one week behind normal across the Great Plains and two weeks late in much of the Pacific Northwest. Small grains are being harvested in southern Oklahoma, across to central Georgia and in early fields along the Atlantic coast.

Spring grain seeding is complete. Much of the early planted crop is in the flag-leaf growth stage. In most areas, the crop is in good condition, except for some flooded fields in eastern Minnesota and the Red River Valley north of Fargo. Also there is an area in northeastern Montana where wheat is under moisture stress conditions.

Wheat stem rust--On June 7, stem rust was found for the first time this season in Kansas, in a Harvey County field. During the second week in June, no stem rust was found in southern Kansas, in plots of the super susceptible cultivar, McNair 701, which shows the area of rust occurrence is limited. Other stem rust collections were made in Jackson (Jordan) and Payne (Hunger) counties in Oklahoma.

Races identified from collections received prior to May 2 are as follows:

Location	Number of Collections	Wheat stem rust CRL races (No. of isolates)
South Texas	5	TNM (9) HNL (5)
Central Texas	10	TNM (22) RTQ (1) RKQ (1) RCR (1)

Wheat leaf rust--Leaf rust is moderate in susceptible cultivars in some Kansas field plots, but the rust is too late to cause any extensive losses in commercial fields. Traces of rust were reported on spring wheats in a Rosemount, Minnesota, nursery. With good soil moisture, a rapid increase in rust is likely.

In the Pacific Northwest, the current weather has been favorable for rust increase, and the rust is expected to develop to epidemic levels on many of the susceptible cultivars.

Three leaf rust virulence combinations were identified so far from collections made in Texas. UN-2 (virulent to Lr3 and 10); UN-5 (virulent to Lr1, 3 and 10); and UN-13 (virulent to Lr1, 2a, 2c, 3, and 10). The first Lr24 virulence of 1984 was identified from a collection made in southwestern Oklahoma, UN-5 (virulent to Lr1, 3, 10 and 24). Lr9 virulence was found in collections made in southern Alabama, UN-6 (virulent to Lr1, 2c, 3, 9, 18, 30, and 3ka). Two virulence combinations were identified from the leaf rust collections made in the overwintering nursery site at Rosemount, Minnesota in late April; UN-2 (virulent to Lr3) and UN-3 (virulent to 2c, 3, 9, 18, 30 and 3ka).

Wheat stripe rust--In the Palouse area of eastern Washington, stripe rust is starting to increase. Due to the host growth stage, rust will not be as destructive as in 1983 (Line).

Oat stem rust--During the past two weeks, oat stem rust collections were made in nurseries in College Station, Texas (McDaniel) and Hartsville, South Carolina (Harrison). As of June 14, oat stem rust remains light in the United States. Races identified from collections received prior to May 2 are as follows:

Location	Number of Collections	Oat stem rust NA races (No. of isolates)
South Texas	12	NA-27 (28)
Northeast Mexico	2	NA-27 (4)
California (wild oats)	3	NA-5 (6) NA-10 (3)

Oat crown rust--Buckthorns infected with crown rust pycnia can be found throughout central Iowa (Michel).

Barley leaf rust--During the first week in June, severe barley leaf rust was found in Lancaster County, Pennsylvania fields (Sninsky).

Barley stem rust--No new reports since the last bulletin.

Rye rusts--No new reports of rye stem or leaf rust were received since the last bulletin.

Barberry rust--During the past two weeks, more barberry aecial collections were made in West Virginia and Wisconsin plus collections were made from barberry bushes in Anoka, Chisago and Fillmore Counties, Minnesota (Schlick, Laudon). In Minnesota, the bushes were large fruiting bushes heavily infected with rust. In the Palouse region of eastern Washington and northern Idaho, pycnia are starting to show on bushes.

CEREAL RUST BULLETIN

Report No: 6
June 26, 1984

From:
CEREAL RUST LABORATORY
U. S. DEPARTMENT OF AGRICULTURE
UNIVERSITY OF MINNESOTA, ST. PAUL 55108

Issued By:
AGRICULTURAL RESEARCH SERVICE
U. S. DEPARTMENT OF AGRICULTURE
(In cooperation with the Minnesota Agricultural Experiment Station)

Last week rains and high humidity stalled the wheat harvest in parts of Oklahoma and southern Kansas. With good drying weather, harvest will advance rapidly.

Much of the wheat in the Central Plains remains one week behind normal crop maturity. In the spring-grain area the biggest problem is too much moisture which has resulted in many flooded fields in western Iowa, western Minnesota and the eastern Dakota's. Northeastern Montana, in contrast, remains abnormally dry.

Wheat stem rust--During the week of June 18-22, stem rust was found in susceptible stem rust trap plots from northern Kansas to southern Minnesota. The severities ranged from 20% in McNair 701 plots in Kansas (Browder & Eversmeyer) to traces in a Baart plot in southern Minnesota. Throughout northwest Kansas, TAM 105 in commercial fields and county agent plots had traces of stem rust. The uredia were 2-3 weeks old, probably resulting from spores deposited all on the same date. Most of the pustules on the stems of TAM 105 were 1-2 inches above the nodes and of moderate size, indicating a level of adult-plant resistance.

During the past week stem rust collections were made in varietal plots in the northern soft red winter areas of Ohio (Ellett), Indiana (Vian), and Illinois (Jedlinski). Plots near maturity were heavily infected in the Boot Heel of Missouri and northeast Arkansas (Harrison). Most of the cultivars that are replacing the Arthur wheats are susceptible and do not have Sr36 which has been a major factor in controlling stem rust in this area. Stem rust, historically has not been an important disease each year here but has caused major losses locally. The additional wheat acreage to the south of cultivars with similar genotype could provide adequate inoculum some years to result in significant yield reduction.

A large amount of inoculum should be generated in the southern winter wheat area that will provide inoculum for spring wheats farther north. However, since most spring wheats are resistant, losses should be minor. This could change, of course, if a change in pathogen virulence should occur. Races identified from collections received prior to May 21 are as follows:

Location	Number of Collections	Wheat stem rust CRL races (No. of isolates)
South Texas	8	TNM (17) HNL (5) QFB (1)
Central Texas	11	TNM (13) RTQ (1) RKQ (1) RCR (1)
N. Central Texas	2	TNM (1) QFB (1) RCR (1)
Louisiana	7	QCB (10) RCR (8) QFB (3)
Georgia	4	QCB (12)
Florida	5	QCB (8), RCR (7)
California	3	TNM (1) HNL (1) RTQ (1) QSH (1) unknown (1)

Wheat stripe rust--Traces of stripe rust were found in varietal plots at the Colby, Kansas, experiment station. This is the first report of stripe rust in Kansas this year and is much less stripe rust than last year in the Central Plains.

Wheat leaf rust--Throughout southern Nebraska and northern Kansas leaf rust severities of 10% were found in commercial fields; in varietal plots severities ranged from traces to 20% on the flag leaves. In many parts of this area there is competition for the leaf surface from other leaf diseases, e.g., Septoria leaf blotch, bacterial leaf blight, powdery mildew, and tanspot. The heavy moisture in the Central Plains area will create ideal conditions for some of these diseases to increase and cause the leaves to die before leaf rust becomes severe. In northern Kansas there is less leaf rust on Newton than last year, which may indicate less Lr1 virulence in the leaf rust population.

Leaf rust collections were made in the northern soft red winter wheat area from Pennsylvania (Andres), West Virginia (Williams), Ohio (Havlen) and Indiana (Vian). Severities ranged from 5-40% at the soft dough crop stage at these locations.

In the Waseca, Minnesota winter wheat plots, leaf rust severities ranged from 40% on the lowest leaves to traces on the flag leaves. The infections probably developed from pustules that overwintered on the lowest leaves. Similarly, at Carrington, North Dakota, 30% severity of leaf rust was present on the lower leaves of Agassiz (Miller). Only traces of leaf rust were found on spring wheats in South Dakota and Minnesota.

Leaf rust virulence combinations identified since bulletin #5, from Louisiana are: UN-2 (virulent to Lr3), UN-3 (virulent to Lr2c, 3, 18, 30, and 3ka) and UN-5 (virulent to Lr1, 3, 10, and 24). UN-6 (virulent to Lr1, 2c, 3, 9, 18, 30, and 3ka) was identified from a Georgia collection. From California collections, these virulence combinations were identified: UN-2 (virulent to Lr3 and 10), UN-6 (virulent to Lr1, 2c, 3, 10, 17, and 3ka). From Arizona UN-13 (virulent to Lr1, 2a, 2c, 3, 10, 17, and 18) was identified.

Oat stem rust--During the past two weeks there were two new reports of oat stem rust: traces in south central Kansas and west central Wisconsin. A number of collections were made at College Station, Texas (McDaniel). Races identified from collections received prior to May 9 are as follows:

Location	Number of Collections	Oat stem rust NA races (No. of isolates)
South Texas	32	NA-27 (80), NA-5 (2)
Northeast Mexico	2	NA-27 (4)
California (wild oats)	3	NA-5 (6) NA-10 (3)

Oat crown rust--This disease was found in oat fields in Dane County, Wisconsin, in mid-June. The inoculum that initially infected the oats originated on nearby buckthorn, the alternate host for the rust fungus, which was growing along the edges of the fields. So far this year the only reports of crown rust in the upper midwest came from oats grown in close proximity to buckthorn.

Barley leaf and stem rust--No new reports since the last bulletin.

Rye leaf rust--In a southern Minnesota rye field leaf rust rated 20% severity on the flag leaves.

Rye stem rust--No new reports since the last bulletin.

Barberry rust--A number of aecial collections were made in eastern Ontario (Clark) and an additional collection was made in Wisconsin (Line).

CEREAL RUST BULLETIN

Report No: 7
July 10, 1984

From:
CEREAL RUST LABORATORY
U. S. DEPARTMENT OF AGRICULTURE
UNIVERSITY OF MINNESOTA, ST. PAUL 55108

Issued By:
AGRICULTURAL RESEARCH SERVICE
U. S. DEPARTMENT OF AGRICULTURE
(In cooperation with the Minnesota Agricultural Experiment Station)

The Great Plains winter wheat harvest is now into northern Kansas and southern Nebraska. During the past two weeks above normal temperatures have hastened maturity across much of the area.

In the Dakota's and Minnesota small grain growing areas, the earlier incessant rains have ceased and warm sunny weather has pushed the crop towards normal maturity.

Wheat stem rust--During the past two weeks collections were made in northern soft red winter wheat fields from southern West Virginia (Bostic, Williams), southwestern Ohio (Heinlein), to southeastern Wisconsin (Ellingboe, Grau, Arny). Collections were also made in winter wheat nursery plots in west central Indiana (Hess), east central Illinois (Jedlinski), central Iowa (Simons), and northeastern Wisconsin. In the Central Plains area stem rust collections were made in susceptible winter wheat varietal plots in northwestern Kansas (Willis) and southeastern Nebraska (Divoky). The infections probably originated from the same spore showers that were mentioned in Bulletin #6. Traces of stem rust are currently present in plots and commercial fields in southern Minnesota, and eastern North Dakota (Miller).

The urediospores generated in the winter wheat areas could provide inoculum for the spring wheat area. However, most of the spring wheats are resistant and currently there have been no reports of stem rust being found in the commercially grown spring wheats. Scattered infections are common on susceptible trap cultivars in southern Minnesota and have been found in North Dakota (Miller).

In the Pacific Northwest trace amounts of stem rust were found in nurseries in southeastern Washington and northeastern Oregon.

Races identified from collections received prior to June 7 are as follows:

		Wheat Stem Rust Race (% of isolates)									
	No. of	11	15		17	113		151			
State	isolates	RCR	TBM	TNM	HNL	RKQ	RTQ	QCB	QFB	QCM	QSH
California	6			17	17		17		17	17	17
Florida	12	33						67			
Georgia	15	20						80			
Louisiana	24	46						42	12		
N. Carolina	3	67	33								
Oklahoma	3			100							
Texas	24	4		77	9	2	4		4		

Wheat leaf rust--Leaf rust is severe in susceptible varietal plots from central New York (Bergstrom), where it is the most severe leaf rust in several years, east central Illinois (Jedlinski) to east central North Dakota (Miller). There are also reports of severe rust in some soft red winter wheat commercial fields in southeastern Pennsylvania (Zimmerman) and central Michigan (Iwig). Winter wheat in North Dakota shows 40 percent on flag leaves (Miller). At the same time leaf rust is light in northwestern Indiana, and northeastern Wisconsin. The principal hard red spring wheats remain resistant to leaf rust. Severities of 20% were observed on Butte at the Waseca, Minnesota, nursery.

In eastern Oregon and eastern Washington fields leaf rust is increasing but developing late so damage will not be as severe as last year (Line). In Corvallis, Oregon, (Eaton) nursery plots, leaf rust severities ranged from a trace to severe.

Wheat stripe rust--In the northern spring wheats the first stripe rust was found July 5 in the Rosemount, Minnesota experiment station plots. Only traces were found and with the advent of hot weather the rust development should cease.

In the eastern area of Washington, stripe rust developed late but will cause losses in some susceptible cultivars. The cultivars with adult plant resistance will experience only moderate damage. Rust is starting to develop in southern Idaho and northwestern Montana. The stripe rust races virulent on cultivars with the PI 178383 and Tyee resistances continue to dominate and become more widespread (Line).

Oat stem rust--During the last two weeks oat stem rust was reported at Riley County Kansas (Willis), Ames, Iowa, (Johnson) and Rosemount, Minnesota, nurseries. Oat stem rust remains very light throughout the United States. However, traces are now present across southern Minnesota and eastern South Dakota on oats at the full berry growth stage. With favorable conditions this could result in some losses.

		Oat Stem Rust			
	No. of	NA Race (% of isolates)			
State	Isolates	5	10	16	27
Mexico	4				100
Alabama	2			50	50
California	12	50	50		
S. Carolina	1				100
Texas	115	2			98

Oat crown rust--Moderate amounts of crown rust were observed in spring oat cultivars in the Ames, Iowa, and Rosemount, Minnesota nurseries. In southern Minnesota and eastern South Dakota, crown rust is present in light to moderate severities in nearly every field. At this growth stage losses should be light except for late planted fields.

Barley leaf rust--During the first week of July traces of rust were found in the Ithaca, New York, nursery (Bergstrom). A trace of leaf rust was observed in a trap plot at Waseca, Minnesota and a 10% severity on the cultivar Bumper at Brookings, South Dakota.

Barley stem rust--Stem rust was observed on a trap plot at Waseca, Minnesota. This plot is adjacent to rusted wheat so it is likely the pathogen is Puccinia graminis f. sp. tritici.

Rye leaf rust--Leaf rust was found the first week of July in the Salinas, California, rye and triticale nurseries (Jenkins). Moderate severities of rye leaf rust were found in commercial fields in Minnesota and Wisconsin.

Rye stem rust--Traces of stem rust was observed on a trap plot of rye at Waseca, Minnesota.

Barberry rust--During the past two weeks, more barberry aecial collections were made in West Virginia (Bostic) and Wisconsin (Line). Collections of wheat stem rust were made 900 feet from Berberis canadensis bushes in Monroe Co., West Virginia. The early 1984 Minnesota aecial collections were identified as Puccinia graminis f. sp. secalis.

CEREAL RUST BULLETIN

Report No: 8
July 24, 1984

From:
CEREAL RUST LABORATORY
U. S. DEPARTMENT OF AGRICULTURE
UNIVERSITY OF MINNESOTA, ST. PAUL 55108

Issued By:
AGRICULTURAL RESEARCH SERVICE
U. S. DEPARTMENT OF AGRICULTURE
(In cooperation with the Minnesota Agricultural Experiment Station)

The small grain harvest has begun in some winter wheat and barley fields in southern North Dakota and the Red River Valley of the north. Spring small grains are ahead of normal crop maturity throughout most of the northern crop growing region.

Wheat stem rust--Stem rust infections were easily found in winter wheat from central Michigan (Clayton), southern Wisconsin (Brenner, Kramer) to southern North Dakota. In most cases rust severities were traces in these fields while in plots of susceptible cultivars the rust was severe. At the same time in the commercially grown spring wheat fields no stem rust has been found while in the plots of susceptible cultivars rust is becoming severe. Currently there are high levels of inoculum, but since most of the spring wheats are resistant, losses will be minimal.

In the Walla Walla area of Washington, stem rust is developing in fields that were delayed in maturity (10-14 days) because of herbicide application. This delayed crop development plus good moisture for rust increase could result in losses in herbicide damaged spring wheat fields (Line).

Table 1. Preliminary data from the 1984 wheat stem rust race survey.

		Wheat Stem Rust Race (% of isolates)									
	No. of	11	15		17	113		151			
State	isolates	RCR	TBM	TNM	HNL	RKQ	RTQ	QCB	QFB	QCM	QSH
California	6			17	17		17		17	17	17
Florida	12	33						67			
Georgia	15	20						80			
Indiana	9			100							
Kansas	3			100							
Louisiana	24	46						42	12		
Minnesota	3			100							
Nebraska	3			100							
N. Carolina	3	67	33								
Oklahoma	21			100							
Texas	54	4		77	9	2	4		4		

Wheat leaf rust--During the past two weeks severe leaf rust was observed in winter wheat plots and fields in northeast South Dakota, southeast North Dakota, central Ohio (Johnson), West Virginia (Bostic), Virginia (Roane) and central Michigan (Clayton). In Michigan the leaf rust was the most severe rust in many years and a few cultivars that were considered slow rusters (Augusta, Frankenmuth) were not effective this year.

As mentioned in previous bulletins, leaf rust overwintered on winter wheats in more northern locations than normal. This inoculum, plus the good conditions for early rust development, provided for the severe leaf rust on northern winter wheat. The resistance of the spring wheats prevented the buildup of rust despite the presence of inoculum generated by the winter wheats. Presently in the northern spring wheats, leaf rust is moderate (20% flag leaf at early milk) on the susceptible cultivars.

Table 2. Preliminary data of the 1984 wheat leaf rust virulence survey.

Race and	No. of isolates per state															
virulence*	AL	AK	AZ	CA	DE	FL	GA	KS	LA	MN	NC	OH	OK	SC	TX	Total
UN-1																
Lr10						2										2
UN-2																
Lr3	1			2				2	3			2	1		21	32
3,10				4		1		2		2		1			11	21
3,10,24						1							2			3
UN-3																
Lr2c,3,3ka,18,30	1								3							4
2c,3,3ka,9,18,30	1				1				4	2	1			2		11
UN-5																
Lr1,3,10	2		1					5					12		86	106
1,3,10,30											1		2		2	5
1,3,10,24									2				4		2	8
UN-6																
Lr1,2c,3,3ka,10,17				4												4
1,2c,3,3ka,9,18,30	4						2									6
1,2c,3,9														2		2
UN-13																
Lr1,2a,2c,3,10													2		23	25
1,2a,2c,3,10,17,18			3										2		4	9
UN-14																
Lr1,2c,10											2				1	3
UN-17																
Lr2a,2c,3,10		2			1		4	9					18		19	53
2a,2c,3,10,30				8									2			10
Total	9	2	4	18	2	4	6	18	12	4	4	3	45	4	169	304

* The Lr single gene differentials tested in leaf rust race identification were 1, 2a, 2c, 3, 3ka, 9, 10, 17, 18, 24, and 30.

Wheat stripe rust--In mid-July traces of stripe rust were found in a winter wheat field in the soft dough stage in Stutsman county, North Dakota. Most of the pustule development had ceased because of the hot weather.

Oat stem rust--During the past two weeks oat stem rust infections were found scattered in fields throughout the northern oat growing area from central Illinois to eastern North Dakota. In general, there was one pustule per stem in these fields with a few centers rated at 10% severity. In plots in the same area stem

rust on susceptible cultivars averaged 10% on the flag leaf. Since most of the commonly grown oat cultivars are susceptible to stem rust, losses on late planted fields could result if favorable conditions for rust development continue.

Table 3. Preliminary data of the 1984 oat stem rust race survey.

State	No. of Isolates	Oat Stem Rust NA Race (% of isolates) 5	10	16	27
Mexico	4				100
Alabama	2			50	50
California	12	50	50		
Kansas	2				100
S. Carolina	7				100
Texas	123	2			98

Oat crown rust--Crown rust is present in light to moderate severities in oat fields throughout the northern oat growing area. Crown rust is more severe and widespread than last year. The moderate severities are found in fields where rust occurred early and conditions were conducive for rust development. Buckthorns growing in close proximity to oat fields provided some of the initial inoculum in some areas. However, the majority of the crown rust inoculum originated from sources farther south.

Barley stem rust--Barley stem rust was found in Virginia (Roane), Ohio (Ellett), and Nebraska (Divoky) nurseries. In all three locations this was considered a rare occurrence.

Barley leaf rust--During the past two weeks traces of leaf rust were found in barley fields in western Minnesota and southern Wisconsin.

Rye stem rust--Traces of stem rust were found in nearly ripe rye fields in eastern South Dakota and western Minnesota.

Rye leaf rust--Moderate severities of rye leaf rust were found in commercial fields in eastern North Dakota.

Other stem rust collections--Hordeum jubatum (wild barley) and Avena fatua (wild oats) are stem-rusted throughout northeast South Dakota and west-central Minnesota. A collection was made from Agropyron repens (quack grass) growing in close proximity to barberry bushes in southeast Minnesota (Laudon).

CEREAL RUST BULLETIN

FINAL ISSUE
August 8, 1984

From:
CEREAL RUST LABORATORY
U. S. DEPARTMENT OF AGRICULTURE
UNIVERSITY OF MINNESOTA, ST. PAUL 55108

Issued By:
AGRICULTURAL RESEARCH SERVICE
U. S. DEPARTMENT OF AGRICULTURE
(In cooperation with the Minnesota Agricultural Experiment Station)

The small grain harvest has progressed into all areas of the northern Great Plains. Much of the barley and winter wheat has been harvested and the oats and spring wheat harvest is gaining momentum. Most of the northern area grains are in good condition except for areas of Montana and western North Dakota where some of the crop was severely damaged due to moisture stress, and/or grasshopper damage.

Wheat stem rust--Stem rust is severe in susceptible spring wheat and late maturing winter wheat cultivars from northwestern New York (Luz), eastern Wisconsin (H. E. Line) to northwest Minnesota. At the same time, in commercial spring wheat fields only traces were reported since most of the northern cultivars are resistant to the current stem rust populations.

In eastern Washington, stem rust is severe in late-maturing susceptible fields in valleys, resulting in significant yield and grain weight reductions. At the same time the spring wheats are showing some resistance to stem rust (R. F. Line).

In summary for the season, in 1984 the first stem rust was found April 7 in a McNair 701 disease detection plot in south Texas where it overwintered. By early May, overwintering foci were found in susceptible cultivars along the Gulf Coast from northwest Florida to southeast Texas. The most severe rust was found in the soft red winter wheat plots in southern Louisiana. By mid-May, stem rust was reported in plots throughout central and northern Texas. The rust developed from rain-deposited spores 4-6 weeks earlier. Moisture was minimal in this area so rust development was slow. During the last week in May, stem rust was found in plots in southern North Carolina and southern Oklahoma. By the third week in June, traces of stem rust were found in susceptible stem rust trap plots from northern Kansas to southern Minnesota and also in commercial fields in northern Kansas. The infections developed from rain deposited spores from a storm that moved over the central and northern Great Plains in late May.

Resistant cultivars prevented disease buildup and losses in the northern plains. The high number of resistant lesions present on some hard red spring wheats in 1983 was not observed in 1984. Based on survey observations, it is believed this was due to environmental differences between the years.

As shown in Table 1, race 15-TNM is the most common race identified from collections received prior to 8/6/84. This race is generally found throughout the central region of the U.S. The next two most common races 11-RCR and 151-QCB were the commonly identified races in the southeastern part of the country in 1984. An interesting aspect of the results is the variation in the race population found in two southern states, Texas and California, in contrast to the Plains. The 151-QCM race is an unusual virulence combination. This race differs from QCB at least on virulence on Sr10 and 36.

Table 1. Preliminary data from the 1984 wheat stem rust race survey. (8/6/84)

State	No. of isolates	Race (% of isolates per state) 11 RCR	15 TBM	15 TNM	17 HNL	113 RKQ	113 RTQ	151 QCB	151 QFB	151 QCM	151 QSH
Texas	54	4		77	9	2	4		4		
Oklahoma	21			100							
Kansas	42										
Nebraska	12			100							
Minnesota	3			100							
Louisiana	24	46						42	12		
Florida	12	33						67			
Georgia	15	20						80			
N. Carolina	3	67	33								
Ohio	3			100							
Indiana	26	9		91							
California	6			17	17		17		17	17	17

Wheat leaf rust--In the northern spring wheat growing area, the majority of the commonly grown cultivars are resistant to leaf rust. Exceptions are Butte, Centa, Oslo, and Waldron. This year there also have been several reports of leaf rust more severe than normal on Marshall. Severities as high as 40% (Moderate susceptibility rating) have been reported on the flag leaves in some northwestern Minnesota and northeastern North Dakota commercial fields. This level of rust may be due to one or more of the following reasons: 1) some fields were planted to the original seed lot which was not reselected for leaf rust resistance, 2) environmental response, inhibiting the adult-plant resistance in spots in fields, 3) Marshall does not possess as complete adult-plant resistance as Era, 4) leaf rust inoculum pressure was more severe than the last two years, and/or 5) a new leaf rust virulence combination (race) is present. The rust is more severe in some localities than expected, but much less than on fully susceptible cultivars and losses will be minimal in commercial fields.

In summary, for 1984, wheat leaf rust severities and losses were less than 1983 in most areas of the U.S., but as usual there were exceptions. In the southern soft red winter wheat area less leaf rust than in recent years appeared due to: 1) more cultivars resistant to leaf rust being planted, 2) changes in the virulence of the leaf rust race population (Table 2), and 3) less leaf rust than usual overwintered because of the cold spell in late December which killed rust-infected wheat leaves.

In Texas, leaf rust was severe on some of the commonly grown cultivars but the moisture shortage restricted further rust increase, and losses due to rust were minimal. In Kansas, less rust than normal survived the winter and most of the initial infections were from deposited spores from the southern plains. Although frequent rains and favorable temperatures occurred in the spring, this disease did not develop to the levels observed in 1983. The disease did not become established on flag leaves over most of the state until mid-June, and by that time, the crop was mature so damage from this disease was lighter than normal. For example, in 1984, losses to leaf rust in Kansas averaged 1.5%, whereas in 1983 the loss was 2.5% (Willis).

In the northern wheat growing area leaf rust overwintered on winter wheats in more locations than usual. Rust overwintered from central New York to southeastern North Dakota where rust was present in the fall, and the snow cover provided protection. In the susceptible winter wheats the rust was severe and losses were common. At the same time, losses were light in this area on the resistant spring wheats.

In California and the Pacific Northwest, leaf rust was severe and developed to epidemic levels on many of the susceptible cultivars. However, the disease developed late, and most of the cultivars have some resistance, so final losses will be light.

Table 2. Preliminary data of the 1984 wheat leaf rust virulence survey.

Race and virulence*	No. of isolates per state																			
	TX	OK	KS	NE	IA	MN	ND	LA	AR	AL	FL	GA	SC	NC	DE	OH	IN	AZ	CA	Total
UN-1																				
Lr10											2									2
UN-2																				
Lr3	31	1	3	2		2		3		1						3	8		13	67
3,10	2	1	5	2							1					1			4	16
3,10,24	2	2									1									5
UN-3																				
Lr2c,3,3ka,18,30			1					4		1										6
2c,3,3ka,9,18,30				1		2				3			2	1	1		1			11
UN-5																				
Lr1,3,10	116	14	31			1		3		2								1		168
1,3,10,17	2													1						3
1,3,10,24	2	4						2												8
1,3,10,30		2																		2
UN-6																				
Lr1,2c,3,3ka,10,17			3														2		1	6
1,2c,3,3ka,9,18,30										6		2	2							10
1,2c,3,3ka,10,17,30																			5	5
UN-13																				
Lr1,2a,2c,3			1																	1
1,2a,2c,3,10	23	6													1					30
1,2a,2c,3,10,17,18	5	2																3		10
UN-14																				
Lr1,2c,10	2													2						4
UN-17																				
Lr2a,2c,3,10	19	18	13	5	2	3	2		2			4			1		2		3	74
2a,2c,3,10,30		2																	8	10
Total	204	52	57	10	2	8	2	12	2	13	4	6	4	4	3	4	13	4	34	438

* The Lr single gene differentials tested in leaf rust race identification were 1, 2a, 2c, 3, 3ka, 9, 10, 17, 18, 24, and 30.

The data in Table 2 are largely from the southern states and heavily from Texas. They include less than half of the collections received at the laboratory for race identification in 1984. The most common race is UN-5 (virulent to Lr1, 3, 10). The next three most common races are UN-17 (virulent to Lr2a, 2c, 3, 10), UN-2 (virulent to Lr3, 10) and UN-13 (virulent to Lr1, 2a, 2c, 3, 10). The most significant change from 1983 is an increase in the UN-17 race throughout the Great Plains, back to the occurrence of 1979-82. As in previous years much of the total population is virulent to Lr3 and 10. As in 1983, there has been a significant decrease in Lr9 virulence. The Lr9 virulence is still centered in the southern soft red winter wheat area. Only 13 isolates were virulent to Lr24 (UN-2 and UN-5). As usual, the Lr1 and 2a virulence combination is not common. In the supplemental set of tester lines, again no virulence was found to either Lr16 or 19.

Wheat stripe rust--Traces of stripe rust were found scattered from Texas to North Dakota. In all cases the initial rust development was slow and ceased with the advent of hot weather. There was much less stripe rust than last year in the Plains area.

In the Pacific Northwest, stripe rust was more widespread and severe on cultivars with the PI 178383 and Tyee resistances than in previous years. However, losses are less than 1983 because the rust developed late and some wheat growers sprayed for stripe rust control (R. F. Line).

Oat stem rust--Again this year, like in 1983, oat stem rust was light throughout south Texas and the southeast states. In mid-May the rust was increasing in north Texas and by mid-June it had progressed into south central Kansas but still was light. By early July rust was prevalent in trace amounts across the spring oat growing area. However, because of the light amounts and late arrival of the rust, losses were light except in late-planted fields throughout the major oat growing area of the U.S. The severity of stem rust in eastern North Dakota and Minnesota on wild oats (Avena fatua) was greater than normal.

Table 3. Preliminary data of the 1984 oat stem rust race survey. (8/6/84)

State	No. of Isolates	NA Race (% of isolates) 5	10	16	27
Mexico	4				100
Texas	143	1		1	98
Kansas	2				100
Alabama	2			50	50
S. Carolina	7				100
California	12	50	50		

Oat crown rust--In 1984, there were few reports of crown rust in the southern U.S. In fact, the first reports of significant rust were in mid-July, scattered throughout the northern oat growing area. Much of this rust developed in fields where inoculum arrived early from the south and conditions were conducive for rust development. Also in some cases buckthorns growing in close proximity to oat fields provided some of the initial inoculum, which resulted in light losses.

Barley stem rust--In 1984 barley stem rust was found widely scattered but in trace amounts from western Virginia to eastern Washington. At these locations the barley was growing in close proximity to rusted wheat so the likely pathogen was Puccinia graminis f. sp. tritici. Scattered infections also were observed in the Red River Valley near Grand Forks. Losses to barley stem rust were negligible. Stem rust infections were found throughout the eastern portion of the northern Great Plains on wild barley (Hordeum jubatum).

Barley leaf rust--Leaf rust was severe on some cultivars in the mid-Atlantic states and southern California where it overwintered. Generally in the north-central states only traces of barley leaf rust were found except for an area just south of Grand Forks, ND, where 60% severities were reported at maturity in commercial fields.

Rye stem rust--The first rye stem rust reported in 1984 was in late May in a south central North Carolina nursery. The next reports were from nearly ripe fields in the northern Great Plains in mid-July. Losses to rye stem rust will be minimal in '84.

Rye leaf rust--Rye leaf rust that overwintered was found in winter rye plots in southern Minnesota in mid-April. At the same time rye leaf rust was reported in south Georgia and south Texas. In these locations the rust is present throughout the year. By late June leaf rust was severe on the flag leaves throughout Minnesota and South Dakota. This was the most severe rust in many years in these locations; however, losses were light because the rye flag leaf is small and dries up quickly as the crop matures.

Barberry rust--Aecial collections were made in West Virginia, Wisconsin, Minnesota, and southeastern Ontario, Canada. In Minnesota the bushes were large fruiting bushes heavily infected with rust. The number of barberry aecial collections made in 1984 were the most made in the last five years. As in previous years the majority of the first collected aecial collections were identified as Puccinia graminis f. sp. secalis.

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