CEREAL RUST BULLETIN

Report No. 1
April 19, 1989

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)

A dry fall and winter has resulted in a poor cereal crop condition throughout south Texas. Cereal emergence was very erratic and currently some plants have not jointed. Some winter wheats failed to vernalize, while many others were severely damaged by two freezes. Winter killing is extensive in many oat cultivars. Crop maturity is generally a month later than normal in south Texas and two weeks later in central Texas and Kansas. In the central plains the mild winter permitted the overwintering of fall rust infections. However, the early March freeze greatly reduced the inoculum level. The Kansas wheat crop has been severely damaged by dry weather.

Wheat stem rust--In south Texas, a center of stem rust was found in a commercial field in Live Oak County. Elsewhere, even susceptible check plots were rust-free. Late planting and a lack of moisture probably resulted in the low initial level of infection.

Wheat leaf rust--In south Texas, wheat leaf rust is light because of dry conditions and winter killing of host leaves and plants. In north Texas, rust is more severe and with adequate moisture disease progress will be rapid. The late crop maturity and potential for development of late tillers could provide an inoculum source into late May. In much of the area from northern Texas to Kansas, freezes during March destroyed some of the wheat crop which included the rust infected leaves. During mid-April traces of leaf rust were observed in southeastern Arkansas and southern and east-central Kansas, which is less rust than normal for this date.

Leaf rust is severe in fields and nursery plots within 75 miles of the Gulf Coast from Louisana to Georgia. For example, in commercial cultivar plots at Fairhope, Alabama and Tifton, Georgia, 80% rust severities were observed. Many of the cultivars that have shown resistance in previous years, i.e. Florida 302, are severely rusted. In this area a shift in the population of leaf rust virulence combination (MFB-10) is being found this year (Table 1). However, since the inoculum generally moves from the southwest to the northeast, this inoculum source should have a minor effect in the Great Plains but offer a major inoculum source for wheat in the northern soft red winter wheat area.

It is interesting to note that in the preliminary 1989 leaf rust data there are a large number of MFB-10 and MBG-10 virulence combinations in the southeast U.S. and a center of PLM-10 in southwestern Indiana.

Wheat stripe rust--Stripe rust was found in southern Louisiana in late March. In mid-April, traces of rust were found in the southeastern corner of Arkansas. Stripe rust is developing at a much slower pace than the last two years in the lower Mississippi River valley. In Texas, the effects of a mild winter which were conducive for stripe rust development were negated by the dry weather.

Oat stem rust--Rust was found in plots at 5% severities from southern Texas to southern Louisana in late March. During the first week of April, traces were found in south Texas commercial fields.

Oat crown rust--In early April in south Texas,crown rust in nursery plots and fields ranged from traces to 30%. In southern Alabama and southern Louisiana plots, crown rust has killed some of the susceptible cultivars. This is the most crown rust observed since 1986.

Barley rusts--As of April 17, no barley rust has been reported in the U.S. No barley stripe rust was found in increase nurseries in the Rio Grande Valley of Texas.

Rye rusts--In south Texas experiment station nursery plots, rye leaf rust was rated at 30-50% severities in early April. Traces of rye leaf rust were found in plots at Tifton, Georgia at the end of February. In early April, 75% severities were reported in the same plots.

Table 1. Preliminary data of the 1989 wheat leaf rust virulence survey.

Prt code[1]	Virulence formula[2]	Number of isolates per state								
		AL	GA	FL	LA	MO[3]	IN[3]	TX	CO[3]	WS[3]
CBG	3,11	1	2							
CBG-10	3,10,11	1								
MBG	1,3,11	1								
MBB-10	1,3,10						1			
MBG-10	1,3,10,11				7					
MGB-10	1,3,10,16	1								
MDB-10	1,3,10,24							3		
MFB-10	1,3,10,24,26	1	4	2	2			3		2
KBB-10	2a,2c,3,10						2			
PLM-10,18	1,2c,3,9,10,18,30,3ka	1					6			
TBB-10	1,2a,2c,3,10	7	2		6		1	8	3	
TBG-10	1,2a,2c,3,10,11	1				1	1			
TBG-10,18	1,2a,2c,3,10,11,18	2								
Number of isolates		16	8	2	15	1	11	14	3	2
Number of collections		10	6	1	9	1	6	8	2	1

1 Prt code - Phytopathology 79: (In press).
2 The Lr single-gene differentials tested=1,2a,2c,3,3ka,9,10,11,16,17,18,21,24,26,30.
3 Rust collections made in the fall of 1988.

CEREAL RUST BULLETIN

Report No. 2
May 3,1989

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)

Most of the wheat growing area from south Texas to North Dakota needs rain. Drought stress has existed for so much of the season that moisture at this late date may not produce any significant impact. Crop maturity is 1-2 weeks later than normal throughout northcentral Texas due to the late winter freezes in February and March and cold weather in early April. The maturity of the small grain crop in the southeast U.S. is ahead of normal, because of the warm weather. Varying amounts of winter injury can be found in many winter wheat fields in the northern Great Plains. In the spring sown small grain area field work and seeding remain well behind last year's early start and considerably behind average.

Wheat stem rust--The dry weather in the southern Plains has restricted stem rust development. In north Texas, traces of stem rust were found on the flag leaves of the susceptible cultivar McNair 701 in disease detection plots. Little stem rust is expected in the Great Plains this year. Stem rust was found in plots and fields in southern and central Louisana parishes in light amounts during late April. Overwintering centers of stem rust were detected in disease detection plots at Crowley and Baton Rouge, Louisana, where some lines were severely rusted or dead due to stem rust.

Wheat leaf rust--Disease development has been slow during the last half of April in the southern Great Plains area because of light or no rainfall and infrequent dews. In north central Texas 10% severities were observed in a few fields at flowering to early berry growth stage. In nursery plots in this area 40-60% severities were observed on the most susceptible cultivars. Leaf rust occurred only where lower leaves were still green and plants were not under extreme moisture stress. Some inoculum is present in this area but dryness in the central plains will limit any infection. In the soft red winter wheat area in northeast Texas and northeast Arkansas the crop is in good condition with only light amounts of leaf rust

Leaf rust from Georgia to Louisana is extremely heavy on susceptible cultivars in fields and nurseries. Severities of 90% occur on Fla 302 in nurseries and fields. In the past two weeks leaf rust has increased on previously resistant cultivars. Losses to wheat leaf rust will be significant in much of the southeastern U.S. if conditions remain favorable for rust development. This area could provide a source of inoculum for the northern soft red winter area. Additionally, severe losses will occur in Georgia due to a severe Hessian fly infestation.

Wheat stripe rust--Stripe rust now occurs from southcentral Mississipi, northern Louisiana to southern Arkansas. Hot dry weather has limited the spread of rust infection in this area.

Wheat stripe rust--Stripe rust now occurs from southcentral Mississipi, northern Louisiana to southern Arkansas. Hot dry weather has limited the spread of rust infection in this area. Stripe rust is less prevalent in this area than in the previous three years. Stripe rust did not overwinter in Arkansas because the stripe rust infected leaves were damaged by the freezes in February and March.

Stripe rust uredospores are very vulnerable to heat and time, therefore, viability is poor if shipment is delayed. Please send rusted green leaves (10 or more) to: Dr. Roland Line, USDA Cereal Disease Research Lab., 367 Johnson Hall, Washington State University, Pullman, WA 99163, as soon as possible after collecting.

Oat stem rust--Traces of oat stem rust were found on susceptible cultivars throughout commercial fields in the southeast U.S. during the last week in April. No stem rust was observed on cultivated oats or wild oats in central or north central Texas. The winter freezes which caused severe damage to the host probably are the primary cause for the lack of rust in Texas.

Oat crown rust--In oat plots from Georgia to Louisana crown rust is severe and in fields of suceptible cultivars severities range from 10-30%. During the last week in April no crown rust was observed on cultivated oats or wild oats in central or north central Texas.

Barley rusts--In California nursery plots in Merced and Tulare counties, 40% severities of leaf rust were observed at the soft dough stage on a few barley cultivars.

Rye rusts--There have been no new reports of rye rusts in the U.S. since the last bulletin.

Other rusts--Leaf rust was found on Aegilops (Triticum) cylindrica only in Denton county in north central Texas, although the grass is common throughout this area and into southern Oklahoma. There is a great variability in leaf rust severity of Aegilops found. Some clumps were observed to have 40% severities while, 1 foot away no rust was found on plants of the same maturity. Rust collections have been made in this area in the past three years and the races identified from these collections(no Lr 3 virulence) have been different than those found on wheat grown in this area (Phytopathology 78:1614).

CEREAL RUST BULLETIN

Report No. 3
May 23, 1989

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)

During the past week rain fell throughout much of the U.S. wheat growing area. The effects will be minimal in the southern and central Great Plains due to advanced crop maturity and the severe drought damage. Small grain harvest is continuing in southern Louisiana and southern Texas fields. Harvest in southern Oklahoma will be delayed a week or more by wet fields. Most of the spring-sown small grains in the Northern Plains have been planted and with timely rainfall the crop should develop normally although subsoil moisture is limited throughout much of the area.

Wheat stem rust--During the first two weeks in May wheat stem rust has been observed in plots in southern Georgia, southern Alabama, southern Texas and southwestern Oklahoma. In these plots the rust has been light except for a 50% severity recorded on an experimental line in Oklahoma. The scattered wheat stem rust infections in the U.S. could be the source of inoculum for susceptible cultivars but probably is inadequate to generate an epidemic. The first stem rust collection made this year in south Texas was identified as the common race 15-TNM (Pgt-TMM).

Wheat leaf rust--Leaf rust severities are low throughout much of the Great Plains area from northern Texas to Nebraska. During the past week rain fell in much of this area but it was to late to result in damaging levels of rust, however, significant amounts of leaf rust may occur by next week. There has been no evidence of leaf rust overwintering in North Dakota, Minnesota, Ohio, Indiana and New York.

In the southern soft red winter wheat area leaf rust favorable conditions have continued for rust development. From central Georgia to central Arkansas leaf rust is extremely severe on susceptible cultivars. In northeastern Arkansas 80% severities were observed in nurseries while in commercial fields trace-2% severities were reported. In the northern soft red winter wheat growing region trace severities were found on wheat in fields in southwestern Ohio and southern Indiana during the second week in May. The lack of leaf rust in this area maybe due in part to the absence of inoculum and to use of leaf rust resistant cultivars. Virulence to some of these cultivars occurs in the southern states.

Leaf rust amounts were light in the Mount Vernon, Washington area and the Sacramento Valley of California.

During mid May leaf rust was scarce on goatgrass (Aegilops cylindrica) growing alongside wheat fields and roadside ditches throughout southern Kansas and northern Oklahoma.

Preliminary data of the 1989 wheat leaf rust survey are shown in Table 1.

Wheat stripe rust--Last week wheat stripe rust was found in Pike Co., Georgia, this is the farthest east stripe rust has been reported this year.

In the Mount Vernon and Skagit Valley areas of the Pacific Northwest stripe rust has developed later than normal but is increasing rapidly in moist areas. In the winter wheat area in central Washington, where the crop was damaged by freezes in early February, much of the acreage has been replanted to spring wheat which means a longer growing season and the potential for more rust infections. Light amounts of stripe rust were found on wheat lines in nurseries in the Sacramento Valley of California.

Oat stem rust--Severe oat stem rust infections have been found in plots bordering the lower Mississippi delta and in plots in south Texas at maturity. Overwintering centers of oat stem rust were found in Raymond, Mississippi and Marianna, Arkansas plots. At Raymond stem rust killed many of the cultivars.

From collections made on oats in southern Louisiana in early April the oat stem rust race NA-27 was identified while in southern Texas races NA-27 and NA-16 were identified.

Oat crown rust--The aecial stage of this rust was found on buckthorns (alternate host) growing in southern Wisconsin and southeastern Minnesota. Spores from the aecial stage of this rust can infect oats. Crown rust is severe in nurseries and fields in southern Mississippi and southeastern Arkansas. No crown rust was observed in Oklahoma and Kansas.

In mid-May crown rust was severe on ryegrass in south central Alabama plots.

Barley and rye rusts--There are no new reports of barley and rye rusts since the last bulletin. No rust was observed on winter rye and barley in Kansas and Oklahoma.

Barberry rust--During the first week in May, pycnial development was observed on Berberis canadensis bushes in Monroe Co., West Virginia. During the second week in May the aecial stage of stem rust was observed on Berberis vulgaris bushes in Dane Co., Wisconsin.

Table 1. Preliminary data of the 1989 wheat leaf rust virulence survey.

Prt code[1]	Virulence formula[2]	Number of isolates per state										
		AL	GA	FL	LA	AR	MO[3]	IN[3]	TX	OK	CO[3]	WS[3]
CBG	3,11	1	2	1		2						
CBG-10	3,10,11	1										
MBG	1,3,11	1		1	4	2						
MBB-10	1,3,10						1	1	4			
MBG-10	1,3,10,11		1		7							
MGB-10	1,3,10,16	1										
MDB-10	1,3,10,24								10			
MFB-10	1,3,10,24,26	1	7	2	6	1			11			2
KBB-10	2a,2c,3,10		2			1		2	5	1		
PLM-10,18	1,2c,3,9,10,18,30,3ka	1	1					6				
TBB-10	1,2a,2c,3,10	7	6	4	13	6		1	17	1	3	
TBG-10	1,2a,2c,3,10,11	1	2		2			1				
TBG-10,18	1,2a,2c,3,10,11,18	2										
TLG-18	1,2a,2c,3,9,11,18								3			
Number of isolates		16	21	8	32	12	1	11	50	2	3	2
Number of collections		10	15	4	18	6	1	6	27	1	2	1

[1] Prt code - Phytopathology 79:525-529

[2] Differentials tested=1,2a,2c,3,3ka,9,10,11,16,17,18,21,24,26,30

[3] Collections made in the fall of 1988

CEREAL RUST BULLETIN

Report No. 4
June 7, 1989

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)

Much of the central and northern Great Plains received beneficial moisture during the past weeks. In Kansas, the moisture will assist in filling the kernels, but for most of the winter wheat crop it is too late for major increases in yield. Conditions in much of the northern soft red winter wheat area have been ideal for plant growth. In north Texas, Louisiana, southern Alabama and southern Georgia small grain harvest is progressing on schedule. Spring sown spring grains have been planted and with average rainfall the crop should develop normally. Subsoil moisture is short in a significant portion of the spring cereal area.

Wheat stem rust--During the past two weeks stem rust has been found from north east Missouri to south central Kansas. In east central Arkansas rust was severe on susceptible cultivars in plots and light in commercial fields. The crop is close to maturity so losses will be light. This is the most stem rust seen in these soft red winter wheat plots in the past five years. Most of the initial inoculum arrived from inoculum that originated in Louisiana. The stem rust observed in plots and fields in central Louisiana was much more severe than normal for this area. In the plots 40-50% severities were reported on susceptible cultivars. From stem rust collections made in southern Louisiana races Pgt-TNM (15-TMM) and Pgt-RCR (11-RCR) were identified. Currently, most of the commonly grown soft red winter wheats are at least moderately susceptible to stem rust.

No stem rust has been observed in Washington, although conditions are becoming favorable. The reseeding with spring wheat, a limited acreage of which is susceptible, and the seeding of spring barley provide ideal hosts.

Wheat leaf rust--Leaf rust is severe in northeastern Arkansas, the bootheel of Missouri and southern Illinois. Some farmers will have losses due to leaf rust where conditions were favorable for disease development. In southern Indiana, southwestern Ohio, and eastern Virginia rust is increasing. In Kansas trace-10% severities were reported on flag leaves throughout the eastern and central part of the state. Trace to 2% severities are common in Pennsylvania. On June 1, traces of leaf rust were found in east central Minnesota and south central Wisconsin. Recent rains have enhanced the chances for leaf rust development in Washington, currently severities are light in south central Washington.

Wheat stripe rust--Stripe rust is severe in the Mount Vernon area of Washington. Stripe rust has increased on the cultivars Tres and Tyee in south central areas. This may be a new race virulent on both cultivars or involve the presence of two known races. Elsewhere in Washington traces of stripe rust are present. Moisture received in the past 2 weeks should favor disease development, however, this may partly be negated by high temperatures.

Oat stem rust--Throughout Louisiana and Arkansas oat stem rust was severe on most oat cultivars. These infected oats are producing large amounts of inoculum. No rust has been observed in northern Missouri or southern Illinois. During mid-May, 30-40% oat stem rust severities were reported on oats growing in plots in the Sacramento Valley of California.

Oat crown rust--During mid-May crown rust was found in the east central area of Oklahoma. No rust was observed in northern Missouri or southern Illinois. During the last part of May oats growing in close proximity to buckthorns in Minnesota and Wisconsin were lightly infected with crown rust. At the St. Paul, Minnesota, buckthorn nursery the bushes were moderately to heavily infected with pycnia, the first aecia and uredia have appeared.

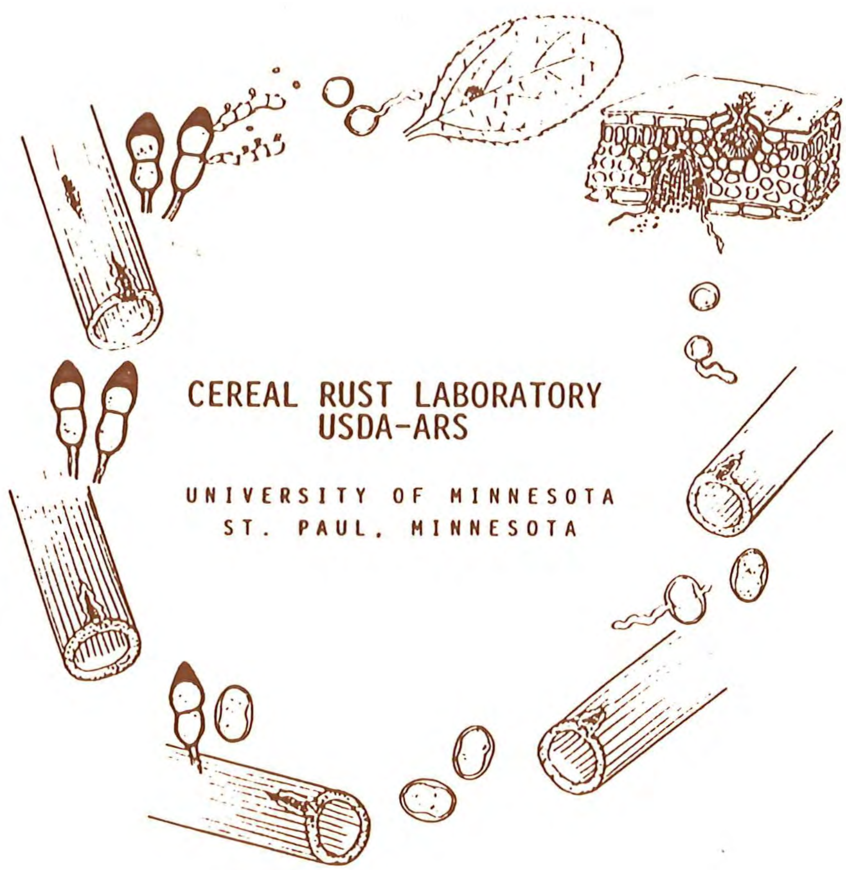
Barley rust--Traces of leaf rust were found on barley in eastern Virginia. No stem rust was observed or reported on barley.

Rye rust--Traces of leaf rust were found on rye growing in eastern Virginia plots. No stem rust was observed or reported on rye.

Barberry rust--During the third week in May, aecial development was observed on Berberis canadensis bushes in Monroe Co., West Virginia.

Other rusts--Overwintering stem rust was found on both perennial ryegrass and tall fescue in early May in Oregon. These diseases are due to separate pathogen forms. This points out the potential overwintering of Puccinia graminis in Oregon area and the resulting early disease onsets. Leaf rust (unknown species) was also observed on fescue in Oregon in early May.

CEREAL RUST LABORATORY
UNIVERSITY OF MINNESOTA
ST. PAUL, MN 55108



CEREAL RUST BULLETIN

Report No. 5
June 22, 1989

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)

Wheat harvest started in southern Kansas in early June but the pace has been slow. It is expected that the harvest will move rapidly northward with dry weather. In southern Oklahoma and northern Texas yields and test weights are low because of the winter drought. In southern Indiana and southern Illinois the crop is turning color and harvesting should began this week. In the northern Great Plains, much of the winter wheats are near normal maturity to a week early while spring grains are behind normal development because of the cool weather in early June.

Wheat stem rust--During the first week in June traces of wheat stem rust were found in commercial fields from southern Illinois to east central Indiana. At these locations the stem rust spores were deposited with rain that fell during the previous 7-10 days. Severe (80% Severity) stem rust was found on a single cultivar in a plot in eastern Virginia on June 14. Since wheat crop maturity ranges from full berry-soft dough stage in this area the losses to stem rust should be light. On June 1, traces of stem rust were found on the susceptible McNair 701 cultivar in a northeastern Kansas plot and at Lincoln, Nebraska on RedChief on June 19, (Trace/20).

Race Pgt-TPN (15-TNM) continues to be the most commonly isolated phenotype (Table 1) Pgt-RCR (11-RCR) is one of the several races commonly identified from the soft wheat area.

Wheat leaf rust--During the first full week in June leaf rust severities ranged from 80% in southern Illinois to traces in southeastern Michigan and central Pennsylvania and southern Wisconsin fields. In nurseries in the same area leaf rust is moderate on susceptible cultivars. Leaf rust will cause small losses in the northern soft red winter wheat area but in general the rust developed to late to cause significant damage. During the past two weeks in the central Great Plains leaf rust severities ranged from 90% in southeastern Kansas to trace-10% in south central Nebraska. In winter wheat fields in eastern South Dakota, southeast North Dakota and west central Minnesota traces of wheat leaf rust were found June 8-12. Losses on winter wheats should be very light. Leaf rust currently is found throughout the state of Washington with the highest severities in the south central part of the state.

Preliminary data of the 1989 wheat leaf rust survey are shown in Table 2. TBB-10 and MFB-10 are the two most commonly identified races from the first 115 collections identified. As of June 16 more collections have been received at the Cereal Rust Lab than the total number received in 1988.

Wheat stripe rust--Stripe rust is increasing throughout the state of Washington and if the weather remains cool more disease will develop. A potential for significant losses exists in fields of susceptible spring wheats that were reseeded into winter wheat fields that were destroyed by cold weather.

Oat stem rust--During the first week in June traces of oat stem rust were found scattered throughout southeastern Kansas fields. In plots in central Texas nursery oat stem was severe on many cultivars. Race NA 27 comprised 94% of the isolates identified to date from the Gulf Coast States. NA 16 comprised 33, 100 and 5%, if the isolates from Alabama, Flordia, and Texas, respectively. All identified isolates from Louisiana and Georgia have been NA 27.

Oat crown rust--Uredia development has been observed on oat plants growing in close proximity to the buckthorn nursery at St. Paul, Minnesota. Oats in Illinois, Iowa, Indiana, Missouri, and Nebraska were rust free last week. Traces of crown rust were reported in Pennsylvania and southern Wisconsin.

Barley rusts--During the last week in May, 5% barley stem rust severities occurred on many different lines in a southcentral Georgia nursery. No leaf rust was oberved in Illinois or Indiana. Light leaf rust severities 10-20% were reported in Pennsylvania and traces in Georgia.

Rye rusts--Leaf rust severities of 40% were observed in rye fields in south central Illinois, southwest Indiana and west central West Virginia. Trace-1% severities were observed in rye fields in southeast Minnesota fields. No stem rust was observed or reported on rye.

Barberry rust--During the first week in June, aecial development was observed on Berberis vulgaris bushes in southeastern Minnesota, southern Ontario and on B. canadensis in West Virginia.

Table 1. Preliminary data of the 1989 wheat stem rust virulence survey.

State	Number of Collections	Number of Isolates	Percent of isolates RCR[1]	Percent of isolates TPN
AL	1	3		100
LA	12	36	42	58
TX	7	21		100
Total	20	60	35	65

[1]Pgt code - Phytopathology 78:526-533

Table 2. Preliminary data of the 1989 wheat leaf rust virulence survey.

Prt code[1]	Virulence formula[2] per state	AL	GA	FL	LA	AR	MO[3]	IN[3]	TX	OK
		Number of isolates								
CBG	3,11	3	2	1		2				
CBG-10	3,10,11	1								
MBG	1,3,11	3		1	4	2				
MBB-10	1,3,10	2			2		1	1	4	
MBG-10	1,3,10,11		1		11					
MGB-10	1,3,10,16	1								
MDB-10	1,3,10,24				1				10	
MFB-10	1,3,10,24,26	2	11	2	9	2			14	3
KBB-10	2a,2c,3,10	2	2			1		2	6	1
FBR-10,18	2c,3,3ka,10,11,18,30	2			3					
PLM-10,18	1,2c,3,9,10,18,30,3ka	1	1		1			6		
TBB-10	1,2a,2c,3,10	8	7	4	14	7		1	17	1
TBG-10	1,2a,2c,3,10,11	1	2		2			1		
TBG-10,18	1,2a,2c,3,10,11,18	2								
TLG-18	1,2a,2c,3,9,11,18								3	
Number of isolates		28	26	8	47	14	1	11	54	5
Number of collections		17	18	4	28	8	1	6	29	3

[1] Prt code - Phytopathology 79:525-529.
[2] Differentials tested=1,2a,2c,3,3ka,9,10,11,16,17,18,21,24,26,30.
[3] Collections made in the fall of 1988.

CEREAL RUST BULLETIN

Report No. 6
July 7, 1989

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)

In the central Great Plains the wheat harvest has moved into southern Nebraska and into a few fields in southeastern South Dakota where crop development is ahead of normal. Most of the northern Great Plains winter wheat is in good condition. In the spring grain area of the northern Great Plains moisture stress is starting to show while crop progress remains behind normal. In much of this area grains are heading out at very short heights and rain is needed soon to avert losses in grain yields and quality. Harvest is starting in central Illinois and Indiana and yields are above normal. In the Pacific Northwest the crops are in good condition.

Wheat stem rust--By the third week in June 10% severities were observed on susceptible cultivars in plots from northwestern Kansas to northwestern Indiana. During the last week in June trace-5% stem rust severities were common in winter wheat fields in southern Wisconsin and southern Virginia. On June 28th, traces of stem rust were found in winter wheat plots in east central North Dakota. During the first week in July in east central Minnesota varietal plots, 20% stem rust severities were recorded on the susceptible winter wheat McNair 701 and traces on the susceptible spring wheat Baart. Stem rust development on winter wheat throughout the northern Great Plains of the U.S.A. is much more this year than 1988, but since most of the currently grown cultivars are resistant, losses should be minimal. No significant stem rust is expected in the resistant spring and durum wheats. Preliminary data of the 1989 wheat stem rust survey are shown in Table 1.

Wheat leaf rust--During the third week in June, 20% severities were reported on winter wheats growing in varietal plots from central South Dakota, and from northwestern Ohio to central Pennsylvania. At these locations the most mature infections were scattered throughout the plots, which indicates initial inoculum arrived from rain deposition during the previous two weeks. During the last week in June in a western Virginia field, a 20% severity was recorded. At the same time 1-5% severities were recorded in winter wheat fields and trace severities were observed in spring wheat fields in northeastern North Dakota and west central Minnesota. In late June in western New York fields wheat leaf rust severities ranged from trace-10% on flag leaves. On July 5th in east central Minnesota plots, 60% severities were recorded on the winter wheat cultivar Roughrider and also on the spring wheat Thatcher. In the state of Washington, leaf rust is increasing mainly on winter wheats and since the rust developed late it will cause only minimal losses. Preliminary data of the 1989 wheat leaf rust survey are shown in Table 2.

Wheat stripe rust--In eastern Washington stripe rust is severe on the club wheats Tres and Tyee. In some areas where farmers have not sprayed for rust control 10-20% losses are expected. Very little stripe rust is found on the spring wheats in this area because the race that attacks the widely grown cultivar Tres, does not attack the spring wheats.

Oat stem rust--In late June in northwestern Indiana plots, traces of stem rust were found. In southeastern Minnesota oat fields 10% severities were found on 5% of the plants during the last week in June, which indicated stem rust spores had arrived from the south two weeks previously. Race NA-10 comprised 100% of the isolates identified from collections made in Davis and Chico, California nurseries. Race NA-5 was identified from a collection made from wild oats near Chico, California.

Oat crown rust--During the last week in June traces of oat crown rust were found in fields in central Pennsylvania and western New York. In oat varietal plots at the east central Minnesota experiment station, trace-5% severities were noted on mid leaves of susceptible cultivars.

Barley rusts--During the last week in June light amounts of barley leaf rust were found in southeast North Dakota. On July 5, traces of barley stem rust were found in the plots in east central Minnesota. During the last week in June, 5-40% stem rust severities were observed on Hordeum jubatum (wild barley) in southeastern Minnesota.

Rye rusts--Leaf rust severities of 20% have been observed in winter wheat fields in western West Virginia and in plots in east central Minnesota. No stem rust has been observed or reported on rye.

Table 1. Preliminary data of the 1989 wheat stem rust virulence survey.

State	Number of		Percent of isolates		
	Collections	Isolates	QFC[1]	RCR	TPM
AL	12	28			100
AR	5	13			100
GA	1	3			100
LA	13	39		54	46
MO	2	3			100
OK	1	3	100		
TX	13	39			100
Total	47	129	2	17	81

[1] Pgt code - Phytopathology 78:526-533

Table 2. Preliminary data of the 1989 wheat leaf rust virulence survey.

Prt code[1]	Virulence formula[2]	Number of isolates per state								
		AL[3]	GA	FL	LA	AR	MO[4]	IN[4]	TX	OK
CBG	3,11	6	2	1		2				
CBG-10	3,10,11	2	1							
MBG	1,3,11	5		1	4	2				
MBB-10	1,3,10	2	1	1	5		1	1	7	
MBG-10	1,3,10,11		2		15	2				
MGB-10	1,3,10,16	1								
MDB-10	1,3,10,24	3	1		1	2			10	
MFB-10	1,3,10,24,26	2	11	2	9	5			20	3
KBB-10	2a,2c,3,10	3	2			1		2	10	1
FBR-10,18	2c,3,3ka,10,11,18,30	2		2	3	2				
PLM-10,18	1,2c,3,9,10,18,30,3ka	3	1		1	2		6		
TBB-10	1,2a,2c,3,10	19	12	4	17	8		1	30	1
TBG-10	1,2a,2c,3,10,11	2	2		2			1		
TBG-10,18	1,2a,2c,3,10,11,18	2								
TLG-18	1,2a,2c,3,9,11,18		2	2					3	
Number of isolates		53	37	13	57	26	1	11	80	5
Number of collections		32	27	7	34	16	1	6	46	3

[1] Prt code - Phytopathology 79:525-529.

[2] Differentials tested=1,2a,2c,3,3ka,9,10,11,16,17,18,21,24,26,30.

[3] The following states had one isolate each: MS MBG-10; PA CBG-10; SC CBG-10.

[4] Collections made in the fall of 1988.

CEREAL RUST BULLETIN

Report No. 7
July 20, 1989

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)

Harvest is starting in the northern soft red winter wheat area from southeastern Wisconsin to southwestern New York. Winter wheat and barley harvest has begun in some fields from southern North Dakota to southern Minnesota. Moisture shortage in the northern Great Plains spring grain areas has resulted in short plants with small heads.

Wheat stem rust--Stem rust infections are common in winter wheat from southern Michigan, southern Wisconsin to southeastern North Dakota. Severities ranged from 90% in central Michigan fields to traces in southeastern North Dakota during the second week in July. The heaviest stem rust development in several years was observed in southeastern West Virginia winter wheat fields. In 1989 more stem rust developed on winter wheat in the northern U.S.A. than normal, but since the crop in most areas is close to maturity losses are minimal. In central Minnesota 40% severities were observed on the susceptible spring wheat cultivar Baart, but no stem rust was found in commercial spring wheat fields. A field of wheat that appeared to be winter wheat overseeded by spring wheat was observed in west central Minnesota. The winter wheat was severely rusted (30% severity).

Wheat leaf rust--During the past two weeks severe leaf rust (greater than 40% severities) was observed in winter wheat plots and fields in southeastern North Dakota, west central Minnesota, northeastern Wisconsin, central Michigan and southeastern West Virginia. Climatic conditions in the northern winter wheat growing area from Wisconsin eastward were ideal for disease development and losses to leaf rust are expected. Trace to 5% severities occurred in southern Minnesota spring wheat fields, while in test plots of susceptible cultivars 40% severities were observed. In plots of triticales in northeastern South Dakota up to 30% severities were observed. In the drier areas of central and western North Dakota leaf rust severities were less than 1% in both winter and spring wheats.

Wheat stripe rust--There have been no new reports of wheat stripe rust since the last bulletin.

Oat stem rust--During the past two weeks severe oat stem rust (40+% severity) was found in fields from southeastern Minnesota, south central Wisconsin, to southwestern Michigan. Losses will occur in many of these fields; heavier losses are expected in the late maturing oat fields. In northeastern South Dakota and west central Minnesota oat fields rust was light except in test plots. No stem rust was observed on cultivated oats in the western 2/3 of the Dakotas and Montana. Traces of oat stem rust were found on wild oats (Avena fatua) in north central South Dakota. In southeastern West Virginia, 10% severities were reported in oat fields.

Oat crown rust--In western New York crown rust is rated the most severe in recent years. Test plots in this area had 80% severities, while 50% severities were common in oat fields in the same area. In southern West Virginia and southwestern New York fields severities ranged from 5 to 40%. In southern Wisconsin fields, 70% severities were observed on oats in the early berry crop stage which will result in a significant loss. In east central Minnesota crown rust is light in fields while in the test plots severities ranged from trace to 60%. Crown rust is light to absent in northern South Dakota, North Dakota and Montana.

Crown rust is more severe and widespread this year than it was in the last three years. The most severe rust is found in fields where rust occurred early and conditions were conducive for rust development. Buckthorn growing in close proximity to oat fields provided some of the initial inoculum in these areas, i.e. southern Wisconsin. However, most of the crown rust inoculum originates from sources farther south.

Barley stem rust--Traces of stem rust were found in fields and plots throughout the eastern Dakota's. Rust severities ranged from trace to 40% in southern Minnesota barley plots and trace-1% severities in fields. Traces of stem rust were found on wild barley (Hordeum jubatum) in fields and roadsides of the eastern Dakota's during the second week in July. Barley stem rust is much more widespread and severe than normal, and an occasional plant had severities of 10 to 30%. No stem rust was found in the western Dakota's or Montana.

Barley leaf rust--During the past two weeks trace to 5% severities were observed on barley plants in fields and nurseries in southwestern Minnesota and northeastern South Dakota. In the western Dakota's and Montana no leaf rust was observed and due to advanced growth stage none is expected to develop.

Rye stem rust--In the past two weeks traces of rye stem rust were found in southeastern Minnesota fields and in southeastern North Dakota plots. In east central Minnesota 20% severities were recorded on rye growing in plots at the Rosemount experiment station.

Rye leaf rust--During the second week in July, 1 to 30% severity ratings were made on the susceptible spring rye cultivar Prolific throughout southern Minnesota and northeastern South Dakota plots. In other areas of Minnesota, the Dakota's and Montana, no rust was observed.

CEREAL RUST BULLETIN

Report No. 8
Final Issue
August 10, 1989

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)

Moisture stress caused grain to ripen rapidly in Montana, Minnesota and the Dakotas. Barley harvest is in full swing throughout the Red River Valley of Minnesota and North Dakota to the Canadian border, and spring wheat harvest will begin in the same area by the end of the week.

Wheat stem rust--During 1989 stem rust overwintering sites were found on susceptible cultivars from southern Texas through southern Louisiana to southern Alabama. The scattered wheat stem rust infections throughout the southern U.S.A. were sources of inoculum for susceptible cultivars in the rest of the U.S.A. but the amount was inadequate to generate a major epidemic. By early May only light amounts of stem rust were found on susceptible cultivars in northern Texas and southwestern Oklahoma test plots. In early June stem rust was found in south central Kansas. Dry weather in the Central Plains was a major factor in restricting disease development. During the first week in June stem rust was found from northeast Missouri, southern Illinois, east central Indiana to eastern Virginia. At these locations stem rust was severe on susceptible cultivars in test plots and light in wheat fields at the soft dough stage. Stem rust inoculum arrived at these locations too late to cause significant losses. In east central Arkansas and eastern Virginia soft red winter wheat fields stem rust was the most severe in the past five years.

During the last week in June trace-5% stem rust severities were common in winter wheat fields in southern Wisconsin and southern Michigan. By mid-July stem rust severities ranged from 80% in central Michigan and southeastern Wisconsin fields to traces in southeastern North Dakota fields.

Stem rust overwintered in a susceptible cultivar plot in east central North Dakota. This overwintering of stem rust is unusual but has occurred in three of the last four years in this area. The increased frequency of overwintering in this area may be due in part to a few very susceptible cultivars, minimal tillage practices which provide some protection in the winter and to the increased winter wheat acreage in eastern North Dakota. Stem rust development on winter wheat throughout the northern Great Plains of the U.S.A. was more severe this year than the previous two years. But since most of the currently grown cultivars are resistant, Bighorn is a notable exception, losses were minimal.

During the last week in July severe rust was found on susceptible spring cultivars in test plots in eastern North Dakota and northwestern Minnesota. However, since the majority of the hard red spring cultivars are resistant to stem rust, losses were insignificant.

In eastern Washington and west central Idaho fields, traces of stem rust were found on winter wheats in mid-July. Moisture was inadequate for the infection process to continue and therefore losses to rust were minimal. Several winter wheat fields in east central Oregon were destroyed by stem rust.

As shown in Table 1, race Pgt-TPN (15-TNM) was again the predominant race identified from collections made in the U.S.A. this year.

Table 1. Preliminary 1989 wheat stem rust race survey (8/9/89).

	Number of		Percent of Pgt race[1]			
State	Collections	Isolates	QFC[1]	RSC	RCR	TPM
AL	12	32	13			87
AR	11	31			3	90
GA	1	3				100
IL	2	6				100
IN	12	29		7		93
KS	8	20	10			90
LA	13	39			54	46
MN	3	7	43			57
MO	1	3			33	67
MS	2	4				100
NE	2	6				100
OK	1	3	67			33
SD	1	3	67			33
TX	14	42				100
VA	1	3				100
WI	2	6	83			17
WV	2	6				100
Total	88	243	7	10	1	81

[1] Pgt code - Phytopathology 78: 526-533

Wheat leaf rust--In 1989 dry conditions and winter killing of host leaves throughout much of the area from southern Texas to northern Kansas limited rust development. Since the source of rust inoculum from the south was less than normal and leaf rust did not overwinter in Nebraska and South Dakota, rust development was light in these two states.

During mid-April leaf rust was severe in fields and nursery plots within 75 miles of the Gulf Coast from Louisiana to Georgia. Favorable conditions continued for rust development and by mid-May rust was severe on susceptible cultivars in fields and plots from central Georgia to central Arkansas. In the southern soft red winter wheat area, losses to leaf rust were significant (i.e. Georgia 4%).

The southern soft red winter wheat area provided a source of inoculum for the northern soft red and white wheat areas. During the first week in June, leaf rust severities ranged from 80% in southern Illinois to traces in southeastern Michigan and southern Wisconsin fields. In late June, 10% severities were reported in fields in central Pennsylvania and western New York. Severe leaf rust (greater than 40% severities) was observed by mid-July in winter wheat plots and fields in southeastern North Dakota, northeastern Wisconsin, central Michigan and southeastern West Virginia. Climatic conditions in the northern winter wheat growing area from Wisconsin eastward were ideal for disease development and losses occurred. In the northern Great Plains hot dry weather in early July caused winter wheat leaves to dry prematurely and therefore minimized losses to leaf rust.

In the eastern Dakotas and western Minnesota 60% leaf rust severities were observed on susceptible spring wheat cultivars in plots while trace to 5% severities were observed in fields at the soft dough stage. Rust severities on the currently grown spring wheats were low as most cultivars have seedling and adult plant resistance. No losses occurred in this area of the U.S.A.

In much of California, wheat leaf rust was severe on susceptible cultivars in plots and light in fields throughout the grain growing area; light losses were reported. In the Pacific Northwest rust developed late, and losses will be light.

The leaf rust races (Prt) identified (Table 2) include many of those found in 1988. Some differences from the survey last year on the same date are an increase in virulence to Lr10 + 11 and Lr24 + 26 combinations.

Wheat stripe rust--In 1989 stripe rust was found in light amounts in the lower Mississippi Valley from southern Louisiana to northeastern Arkansas. Stripe rust was less prevalent in this area than in the previous three years because of a dry winter followed by a hot dry spring which limited the spread of rust infection. Stripe rust was severe in club wheat fields in south central and eastern Washington and caused significant losses where fields were not sprayed.

Oat stem rust--In late March, 5% severities were reported in plots from south Texas to south Louisiana. In early May severe rust was observed in south Texas while only traces were found in north Texas plots on susceptible cultivars. By mid-May severe oat stem rust was found in overwintering centers in test plots bordering the lower Mississippi delta. Many of the cultivars there were killed by oat stem rust. Dry weather restricted oat stem rust development throughout the Central Great Plains. During the first week in June only traces of oat stem rust were found in southeastern Kansas fields. By mid-July stem rust was severe in fields from central Iowa, southeastern Minnesota, south central Wisconsin to southwestern Michigan. Significant rust losses were reported in many of these fields. In the northern spring oat growing area of western Minnesota and

the eastern Dakotas rust was much lighter and losses were only reported in late maturing fields. In the same area only traces of oat stem rust were found on wild oats (Avena fatua). Race NA-27, virulent on Pg-1, -2, -3, -4 and -8, remains the major portion of the population (Table 2). In California, NA-27 was not found while NA-5 and NA-10 were isolated. In the area from Louisiana to Florida NA-16 virulent on Pg-1, -3, -8 was commonly identified.

Table 2. Preliminary data of the 1989 wheat leaf rust virulence survey (8/9/89).

Prt code[1]	Virulence formula[2]	Number of isolates per state[3]												
		TX	OK	CO KS	LA	AR	MS	AL	FL	GA	VA PA	IN[4]	CA	Total
BBG-10	10,11										2			2
CBG	3,11					2	4	9	1	2				18
CBB-10	3,10								1					1
CCB-10	3,10,26												1	1
CBG-10	3,10,11					1		4		5				10
CCG-10,18	3,10,11,18,26												3	3
CBR-10,18	3,3ka,10,11,18,30												4	4
MBB	1,3							2	1					3
MBG	1,3,11				4	2		5	1					12
MBB-10	1,3,10	7		6	5	1	1	3	1	1		1	3	29
MBG-10	1,3,10,11			1	15	15	1	6		2				40
MGB-10	1,3,10,16							1						1
MDB-10	1,3,10,24	10			1	3		5		1				20
MFB-10	1,3,10,24,26	22	3	4	11	10	1	5	2	11				69
PLM-10,18	1,2C,3,3ka,9,10,18,30		1		1	2		1		1		6		12
PLR-18	1,2C,3ka,9,11,18,30						2	2						4
PLR-10,18	1,2C,3,3ka,9,10,18,30							6		1	3			10
TBB-10	1,2a,2c,3,10	32	2	14	19	12	1	29	5	13		1		128
TBG-10	1,2a,2c,3,10,11				2			6		2		1		11
TBD-10	1,2a,2c,3,10,17			1				3		1				5
TBG-10,18	1,2a,2c,3,10,11,18							2						2
TLG-18	1,2a,2c,3,9,18	3						3	2	2				10
FBM-18	2c,3,3ka,18,30					1								1
FBR-10,18	2c,3,3ka,10,11,18,30				3	2		4	2		2			13
KBB-10	2a,2c,3,10	10	2			3		5		2		2		24
Total		84	8	26	61	54	10	101	16	44	7	11	11	433

[1] Prt code - Phytopathology 79: 525-529
[2] Differentials tested = Lr1,2a,2c,3,3ka,9,10,11,16,17,18,21,24,26,30
[3] The following states had one isolate each: MO MBB-10; SC CBG-10; TN MBG-10; WS MFB-10
[4] Collections made in the fall of 1988

Table 3. Preliminary 1989 oat stem rust race survey (8/9/89).

State	Number of		Percent of NA race[1]			
	Collections	Isolates	5	10	16	27
AL	1	3			33	67
AR	1	3				100
CA	3	9	67	33		
FL	1	3			100	
GA	11	29				100
IN	1	3				100
KS	7	19				100
LA	14	51			100	
MN	4	12				100
MS	3	7			29	71
TX	45	132			1	99
Total	91	261	2	1	3	93

[1] NA race - Phytopathology 69:293-294

Oat crown rust--Crown rust was more severe and widespread by early April than it was in the last three years from south Texas to southern Georgia. In southern Louisiana plots, crown rust killed the susceptible cultivars. By mid-May rust was severe in southeastern Arkansas fields while no crown rust was observed in Oklahoma and Kansas.

In Minnesota and Wisconsin the most severe rust was found in fields where rust occurred early and conditions were conducive for rust development. Buckthorn growing in close proximity to oat fields provided some of the initial inoculum. However, most of the crown rust inoculum originated from southern sources. In some fields in southern Wisconsin significant losses to crown rust occurred. Crown rust was light to absent in northern South Dakota, North Dakota and Montana. In western New York and southern West Virginia fields crown rust was the most severe (50% severity) in recent years.

Barley stem rust--The first report of barley stem rust in 1989 was during the last week in May in a south central Georgia nursery. By early July traces of stem rust were found in barley plots in east central Minnesota and 40% severities were reported on Hordeum jubatum (wild barley) in the same area. In mid-July traces of stem rust were found in barley fields and plots and on wild barley growing in fields and along roadsides of the eastern Dakota's. In early August traces of barley stem rust were found throughout northern North Dakota and western Minnesota. Barley stem rust is much more widespread and severe than normal. The hot weather in early July in the northern barley growing area seems to have suppressed some of the effectiveness of the T-gene resistance to stem rust. Most stem rust on barley was probably

from inoculum produced on wheat (Puccinia graminis f. sp. tritici) but stem rust on rye (P. graminis f. sp. secalis) can also attack barley.

Barley leaf rust--In 1989, barley leaf rust overwintered in eastern Virginia, central Pennsylvania and central California. In these areas rust was light and losses were minimal. By early July, trace to 5% severities were observed on barley plants in fields and nurseries in western Minnesota and the eastern Dakota's. Leaf senescence which was primarily due to dry weather limited disease development and losses.

Rye stem rust--In 1989, traces of rye stem rust were found in southeastern Minnesota fields and in rye plots in southeastern North Dakota and east central Minnesota.

Rye leaf rust--By early April, rust severities of 50% were found in fields throughout the southern U.S.A. where this rust survives throughout the year. By mid-June 40% severities were observed in rye fields in south central Illinois and western West Virginia. Losses to rye leaf rust were light in the eastern U.S.A. and no significant rust developed in the Great Plains of the U.S.A.

Barberry rust--In 1989, aecial collections were made from barberry in southeastern Minnesota, south central Wisconsin, southern West Virginia, and southeastern Ontario, Canada. From the Minnesota collections three isolates of a unique race were identified and from Ontario, Canada two different races were identified. The oat stem rust race NA-12 was identified from the Canadian collections. Rye stem rust (P. graminis f. sp. secalis) were identified from both locations.

Other rust hosts--Traces of leaf rust were found on goatgrass (Aegilops cyindrica) growing alongside wheat fields and in roadside ditches in north central Texas and northern Oklahoma. The races identified from the goatgrass rust collections were different (no Lr3 virulence) from those found on wheat grown in this area and this was the same as in the previous three years (Phytopathology 78:1614). Overwintering stem rust was found on both perennial ryegrass and tall fescue in early May in Oregon. These diseases are caused by pathogen forms different from those attacking the cereals, but these observations point out the potential for overwintering of Puccinia graminis in the Oregon area leading to early onset of disease and eventual losses.

Note--Race identification of collections sent to the Cereal Rust Lab are performed as received. Identifications are provided directly to the collector. Summaries are published in the Annual Wheat, Oat and Barley Newsletters and in Plant Disease. However, if you need this information earlier please contact us.

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