CEREAL RUST BULLETIN

REPORT NO. 1

APRIL 4, 1990

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)

Adequate moisture during late winter and early spring has resulted in good cereal growth throughout most of the area from southern Georgia to Texas. In south Texas, however, some of the winter wheats failed to vernalize. Crop maturity is generally a week late in south Texas and a week early in the soft red winter wheat growing area adjacent to the Gulf Coast. In Kansas and Oklahoma most of the wheat crop is in good condition with minimal winter injury.

Wheat stem rust--In south Texas, an overwintering center of stem rust was found in an early November planted trap plot of McNair 701 near Victoria, Texas in late March. Elsewhere, in later seeded susceptible check plots no rust was observed. Late planting, with a December freeze, combined with a dry summer which limited oversummering infections probably resulted in the low initial level of fall infection. In mid-February traces of stem rust were found in a plot in southern Georgia.

Wheat leaf rust--In south Texas leaf rust is lighter than normal. Severities are generally low in most fields, however, severities on the most susceptible lines in nurseries are generally high (60% at late berry stage) along the Texas Gulf Coast. Fields of wheat in north central Texas are lightly infected with rust. Recent rainfall increases the likelihood of rapid disease progress.

In 1990, leaf rust overwintered in south central Kansas and southern Illinois. In the past two weeks in these areas the disease has increased and spread to the upper leaves. Races TBB-10, MFB-10, MDB-10 and MBG-10, common in 1989, were identified from six rust collections from Kansas made in November.

Leaf rust is severe in fields within 75 miles of the Gulf Coast from Louisiana to Georgia. In southern Georgia 90% rust severities were observed in fields of Fla 302 and CK 9766 at the early jointing stage. Rust developed rapidly in late January, slowed in February and then increased in late March. The most severe rust is in December planted fields of CK 9766. Leaf rust losses will be significant in many fields. Fla 302 has Lr10,+ resistance and CK 9766 has Lr2a,9,+ resistance.

Wheat stripe rust--The first observation of stripe rust this year was in the central Sacramento Valley in California in late March.

Stripe rust urediniospores are very vulnerable to heat and time, therefore, viability is poor if shipment of collections 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--During the last week of March traces of oat stem rust were found in south Texas fields. These amounts were near normal. Many fields are late, thus large amounts of inoculum could be generated in 30 days if the weather remains favorable for disease increase.

Oat crown rust--Little crown rust was observed during a recent survey of south Texas. Crown rust overwintered in south Georgia plots, where many plants were dead by mid March. Severities ranged from trace to 60% on cultivars and lines in the plots.

Barley rusts--As of April 2, no rust has been reported on cultivated barley in the U.S. Traces of leaf rust were found on wild barley (Hordeum jubatum) in south Texas the last week in March.

Rye rusts--During mid March 20% leaf rust severities were reported in rye plots at Tifton, Georgia. No stem rust on rye has been reported.

CEREAL RUST BULLETIN

Report No. 2
April 18, 1990

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-sown small grain cereal crops are generally in good condition from the central Great Plains to Ohio in the United States. Seeding of spring-sown small grains in the northern plains began last week but cool temperatures are expected to slow field work this week.

Wheat stem rust--No new reports of stem rust have been received since the last bulletin. From a collection made in early February in southwest Georgia race Pgt-RKR was identified.

Wheat leaf rust--Throughout the southern soft red winter wheat growing area leaf rust is severe on susceptible cultivars growing in fields and nurseries. Leaf rust severities of 95% were observed on flag leaves in plots of Massey and 90% severities were common in fields of Fla 302 in southern Alabama. In Arkansas rust is increasing in the southern counties. Leaf rust severities of 50% were observed on flag leaves of Fla 302 in southeastern Arkansas. In this area conditions were ideal for rust increase last fall and much of this rust overwintered. These southern areas could provide abundant inoculum for the northern soft red winter wheat area.

Leaf rust is light (traces) in early planted fields in the eastern 2/3 of Kansas, where again inoculum was from overwintering uredinia.

Wheat stripe rust--Stripe rust is increasing in the Walla-Walla (southeastern) and Mount Vernon (northwestern) areas of Washington. If the good moisture and low temperatures (50-60 degrees) continue, stripe rust is expected to develop statewide.

Oat stem rust--An overwintering center of stem rust was found in a plot of Simpson oats in southern Alabama.

Oat crown rust--Severities ranged from trace to 60% on cultivars and lines growing in southern Alabama nurseries.

Barley rusts--As of April 16, no rust has been reported on cultivated barley in the U.S.

Rye rusts--No rye rust has been reported since the last bulletin.

CEREAL RUST BULLETIN

Report No. 3
May 1, 1990

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 majority of the winter cereal crop is in good condition, but cool weather is delaying maturity. Wheat and oats in central Texas are currently one week behind normal maturity. Due to plentiful rain the small grain condition shows a marked improvement over last year's crop throughout the Great Plains region. The seeding of spring cereals is generally ahead of normal throughout the northern small grain region.

Wheat stem rust--During the past two weeks traces of wheat stem rust were found in southern Louisiana fields and in southwestern Georgia nursery plots. No stem rust was found in trap plots of McNair 701 in northern Texas during the last week in April. Little wheat stem rust is expected in the Great Plains this year.

Wheat leaf rust--During the last week in April throughout north central Texas leaf rust severities ranged from trace to 80% in fields and plots. In many fields where the rust overwintered, 60% severities were reported, while in adjacent fields only traces were found. This area could provide abundant inoculum for the the wheat growing farther north in the Great Plains. In southern Oklahoma rust was light but flecking was common indicating that new pustules may develop with the advent of warmer weather. In Kansas leaf rust is not yet increasing because of the cooler than normal weather. However, the moisture that was received last week plus warmer temperatures should result in more rust development.

Throughout the southern soft red winter wheat area from central Georgia to southern Arkansas leaf rust is severe on susceptible cultivars growing in fields and nurseries. As stated previously, these southern areas could provide abundant inoculum for the northern soft red winter wheat area. Preliminary data of the 1990 wheat leaf rust survey are shown in Table 1.

Wheat stripe rust--Since the last report stripe rust has been reported in eastern Oregon on early seeded wheat.

Oat stem rust--An overwintering center of stem rust was found in oats in a central Louisiana plot, and extensive spread from this center was noted. Traces of stem rust were found on wild oats (*Avena fatua*) growing in a north central Texas wheat field.

Oat crown rust--A crown rust overwintering center was found in an oat plot in central Texas, and 10% severities were recorded in fields in the same area. Severe crown rust was observed on oats growing in plots in central and northern Louisiana. Trace to 30% rust severities were observed in east central North Carolina commercial seed production fields.

Barley rusts--Severe leaf rust was found in a large plot of barley in an east central North Carolina variety trial. Leaf rust severities ranged from 10 to 90% on individual plants of little barley (Hordeum pusillum) growing in a border area around wheat in variety trial plots in southwest Georgia.

Rye rusts--During the last week of April, 40% leaf rust severities were recorded on rye growing in plots in central Texas.

Table 1. Preliminary data of the 1990 wheat leaf rust virulence survey.

Prt code[1]	Virulence formula[2]	Number of isolates per state[3]					
		AL	FL	GA	TX	KS	CO
CBB	3					1	
CBG-10	3,10,11			2			
KBG-10	2a,2c,3,10,11					1	
MBG	1,3,11	2	1		1		
MBG-10	1,3,10,11	1	1			1	
MDB-10	1,3,10,24					2	
MFB-10	1,3,10,24,26					7	
PLM-10,18	1,2c,3,3ka,9,10,18,30	1	1				
TBB-10	1,2a,2c,3,10					5	1
TBG-10	1,2a,2c,3,10,11					6	
Number of isolates		4	3	2	1	23	1
Number of collections		2	2	2	1	17	1

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

[2] Differentially resistant single-gene lines tested: Lr1,2a,2c,3,3ka,9,10,11,16,17,18,24,26,30.

[3] All of these isolates were identified from collections made between October 1, 1989 and February 2, 1990.

CEREAL RUST BULLETIN

Report No. 4
May 15, 1990

From:
CEREAL RUST LABORATORY
U. S. DEPARTMENT OF AGRICULTURE
UNIVERSITY OF MINNESOTA, ST. PAUL 55108
612-625-6299

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

The majority of the winter cereal crop is in good condition throughout the United States. Flooding has damaged some of the wheat in northeastern Texas, southern Oklahoma and southern Arkansas. Throughout the central Plains and eastern soft red winter wheat area the crop has showed good growth during the past week. Harvest has started in south central Texas and in areas within 50 miles of the Gulf Coast. Spring cereal seeding is almost completed throughout the northern small grain area.

Wheat stem rust--In the past two weeks the only report of wheat stem rust was in a nursery in northwestern Florida on the cultivar Coker 9766 (20% severity).

Wheat leaf rust--By the first week in May leaf rust was severe in fields and plots in north central Texas, southern Oklahoma and southern Arkansas (Fig. 1). However, heavy rains reduced the potential for long range dispersal of wheat leaf rust spores from this area. Late maturing wheat may still provide inoculum for areas farther north. In Kansas leaf rust is increasing in the eastern and central parts of the state but at a slower pace than normal because of the cool weather.

Currently in the southern soft red winter wheat area leaf rust is increasing at a rapid rate and is providing exogenous inoculum for areas farther north.

In the past two weeks traces of leaf rust were located in the northern soft red winter wheat area from south central Pennsylvania, southern Indiana to southeastern Missouri. Current conditions are favorable for the increase of rust in much of this area. Leaf rust is starting to appear in the Pacific Northwest.

Preliminary data of the 1990 wheat leaf rust survey are shown in Table 1. The initial identified leaf rust races are diverse and include many of the virulence combinations found last year.

Wheat stripe rust--In the Pacific Northwest stripe rust is increasing at a fast rate with high severities on susceptible cultivars growing in fields.

Oat stem rust--During the first week in May traces of stem rust were found in oat varietal plots in northwestern Florida.

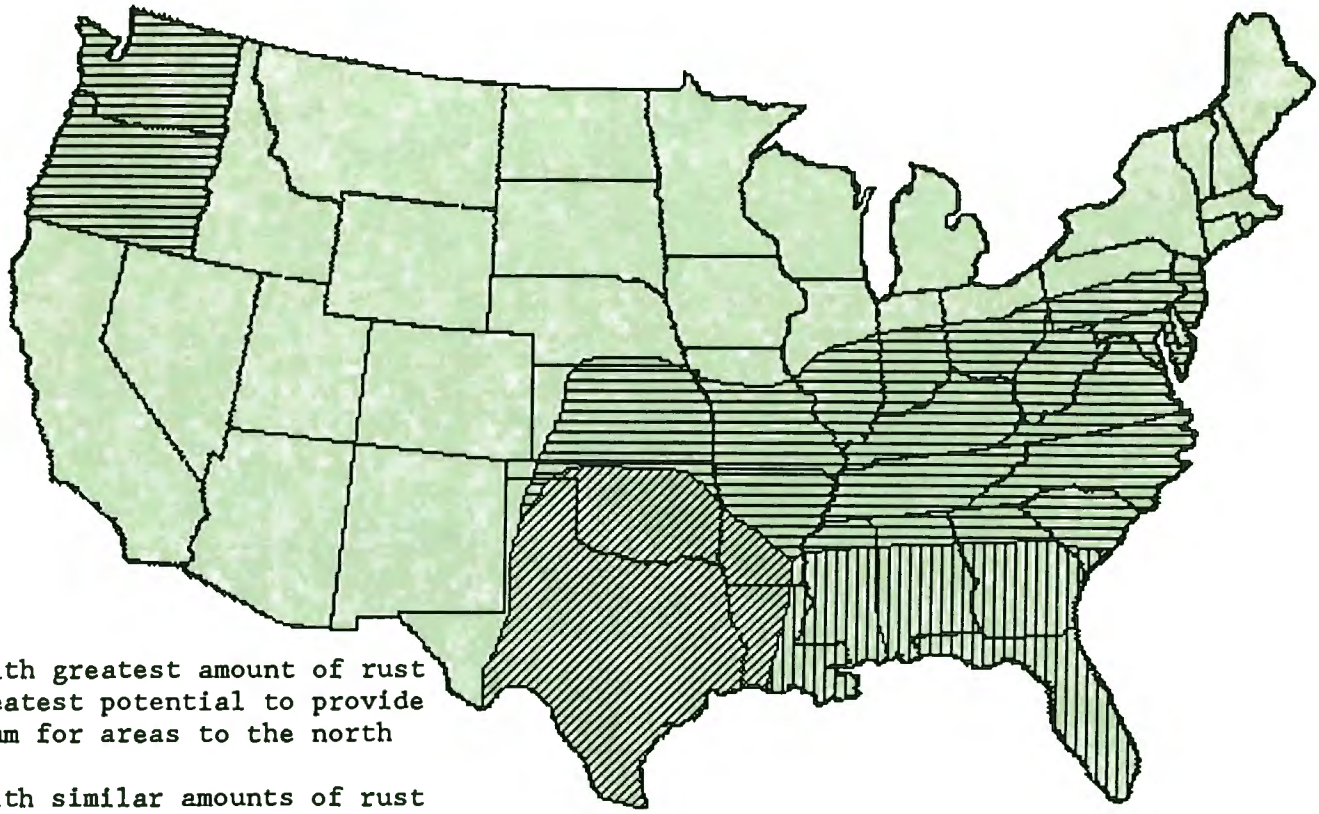
Oat crown rust--In southeastern Arkansas oat fields, crown rust severities ranged from trace to 35% in early May. During the last part of April, 60% crown rust severities were found on ryegrass growing along the roadside in southern Georgia. The first pycnial infections of the season were observed in the St. Paul, Minnesota, buckthorn (alternate host) nursery on May 8.

Barley rusts--No barley rust has been reported since the last bulletin.

Rye rusts--During early May trace-5% severities were recorded on cultivars growing in increase fields in northeast Texas.

Barberry rust--During the second week in May the aecial stage of stem rust was observed on *Berberis vulgaris* bushes in Dane Co., Wisconsin.

Fig. 1 Wheat leaf rust potential (5/11/90).



Area with greatest amount of rust and greatest potential to provide inoculum for areas to the north

Area with similar amounts of rust with lesser potential to provide inoculum for areas to the north

Area where rust does or may exist

Table 1. Preliminary data of the 1990 wheat leaf rust virulence survey.

Prt code[1]	Virulence formula[2]	Number of isolates per state					
		AL	FL	GA	TX	KS[3]	CO[3]
CBB	3					1	
CCB-10	3,10,26			1	1		
CBG-10	3,10,11			2			
FBM-10,18	2c,3,3ka,10,18,30			2			
KBG-10	2a,2c,3,10,11				1	1	
MBG	1,3,11	2	1		1		
MBG-10	1,3,10,11	1	1		1	1	
MDB-10	1,3,10,24				6	2	
MFB-10	1,3,10,24,26				11	7	
PLM-10,18	1,2c,3,3ka,9,10,18,30	1	1				
TBB-10	1,2a,2c,3,10				2	5	1
TBG-10	1,2a,2c,3,10,11			2	3	6	
TCB-18	1,2a,2c,3,18,26				2		
Number of isolates		4	3	7	28	23	1
Number of collections		2	2	5	15	17	1

[1] Prt code: See Phytopathology 79:525-529.
[2] Differentially resistant single-gene lines tested: Lr1,2a,2c,3,3ka,9,10,11,16,17,18,24,26,30.
[3] Collections made in the fall of 1989.

CEREAL RUST BULLETIN

Report No. 5
May 30, 1990

From:
CEREAL RUST LABORATORY
U. S. DEPARTMENT OF AGRICULTURE
UNIVERSITY OF MINNESOTA, ST. PAUL 55108
612-625-6299

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

The small grain harvest is underway throughout much of the southern U.S. from central Texas to central Georgia. Wheat yields are generally much higher than in the previous two years. The Kansas and northern Oklahoma crop is one week behind normal development due to the cool wet spring. Most of the small grains in the northern Great Plains have been planted. The continued warm weather and adequate moisture have contributed to marked increases in crop growth throughout the northern plains in the past week.

Wheat stem rust--During the past two weeks traces of stem rust were found in plots as far north as north central Texas, west and east central Arkansas and west central Indiana. Incidence of stem rust is much less than was found last year on the same date. The reduced incidence of overwintering stem rust along the Gulf Coast and heavy rains throughout Texas and Oklahoma limited stem rust inoculum. Heavy rains scrub urediniospores from the air, wash them from the uredinia, and result in long periods of high humidity within the canopy. These factors all limit the number of spores in the air over the affected fields that are available for long-distance dispersal. Moisture has been more than adequate resulting in frequent dew periods but the temperature during the dew periods has often been too low for infection to occur in the central plains. Race Pgt-RCR was identified from a rust collection made in late March in south Texas.

Wheat leaf rust--In the Great Plains in mid-May leaf rust severities ranged from traces in northern Kansas to severe in southern Oklahoma. Leaf rust losses occurred only in fields where leaf rust overwintered, e.g. southern Oklahoma. In the eastern third of Kansas and much of Missouri, powdery mildew has killed most of the rust infected lower leaves, thereby nearly eliminating the rust. In the central third of Kansas unusually abundant moisture has resulted in plants more typical of irrigated areas where nearly all of the leaves remain on the plant at flowering to berry stage. Leaf rust survived the winter on the lower leaves (10-60% severity), but due to heavy rains and cool dew periods had not spread to the upper three leaves by mid-May.

During the past two weeks traces of leaf rust were found on winter wheat as far north as southeastern South Dakota, south central Wisconsin and northern Ohio (Fig. 1). Leaf rust probably did not overwinter in these northern locations. A single uredinium was found on a susceptible spring wheat cultivar at Brookings, South Dakota.

In the eastern soft red winter wheat area from southern South Carolina to east central Virginia leaf rust is severe in fields and nursery plots of susceptible cultivars. This area is providing exogenous inoculum for the areas farther north.

Leaf rust severities in late May ranged from 20-50% on susceptible cultivars in varietal trials in the Imperial Valley of California. Leaf rust has not increased very much in the Pacific Northwest due to cool weather.

Leaf rust severities on goatgrass (Aegilops cylindrica) growing alongside wheat fields and in roadside ditches throughout southern Oklahoma ranged from trace to 1% on flag leaves.

Preliminary data of the 1990 wheat leaf rust virulence survey are shown in Table 1.

Wheat stripe rust--The cool weather in the Pacific Northwest has been favorable for stripe rust increase on susceptible cultivars. Wheat growers in eastern Oregon and southeastern Washington are spraying with fungicides to control this rust.

Oat stem rust--Traces of stem rust were found in oat varietal plots in south central Georgia on May 15. Oat stem rust remains light and limited to the southern states. Cool weather and excessive rain has limited disease spread. From collections made on oats in south Texas in late March stem rust race NA-27 was identified.

Oat crown rust--During mid-May, 10% crown rust severities were reported in oat varietal trials in central Alabama and eastern Virginia. Traces of oat crown rust were found on wild oats (Avena fatua) in mid-May in southwestern Oklahoma. In general crown rust is lighter and more scattered than normal.

During the fourth week of May, heavy aecial development was observed on buckthorns (alternate host) growing in southern Wisconsin and southeastern Minnesota. Aecial spores from buckthorn can infect oats, however, the infections on buckthorns remote from fields with oats last year are probably infected with the crown rust forms that attack Poa pratensis (bluegrass) and Agropyron repens (Quackgrass) and not oats.

Barley rusts--During the first week in May severe barley leaf rust was observed on cultivars growing in regional test plots in Kings Co., California. Traces of barley leaf rust were found in eastern Virginia during mid-May in state varietal trials. These are the first reports this year of barley leaf rust on cultivated barley. No stem rust has been found on barley this year.

Rye rusts--Severe leaf rust infection was observed on rye that was planted as winter cover crop in a nursery in eastern Virginia. Traces of leaf rust were found in central and southern Oklahoma in mid-May. No leaf rust was observed in Kansas in mid-May. No stem rust has been found on rye in the United States this year.

Barberry rust--The leaves of barberry bushes were heavily infected with stem rust aecia in southern Wisconsin in late May. Generally rye stem rust (Puccinia graminis f. sp. secalis) is identified from aecial collections made in southern Wisconsin.

Special Notice: Due to a change in federal regulations the postage-paid envelopes that were supplied in the past for mailing rust samples are no longer valid. Samples sent in these envelopes without added postage are delayed by several weeks or do not arrive at the Cereal Rust Lab at all. Therefore, we request that cooperators put the necessary postage on the envelopes when they are mailed. New envelopes will be printed and mailed to cooperators as soon as possible.

Fig. 1 Wheat leaf rust severities (5/30/90).

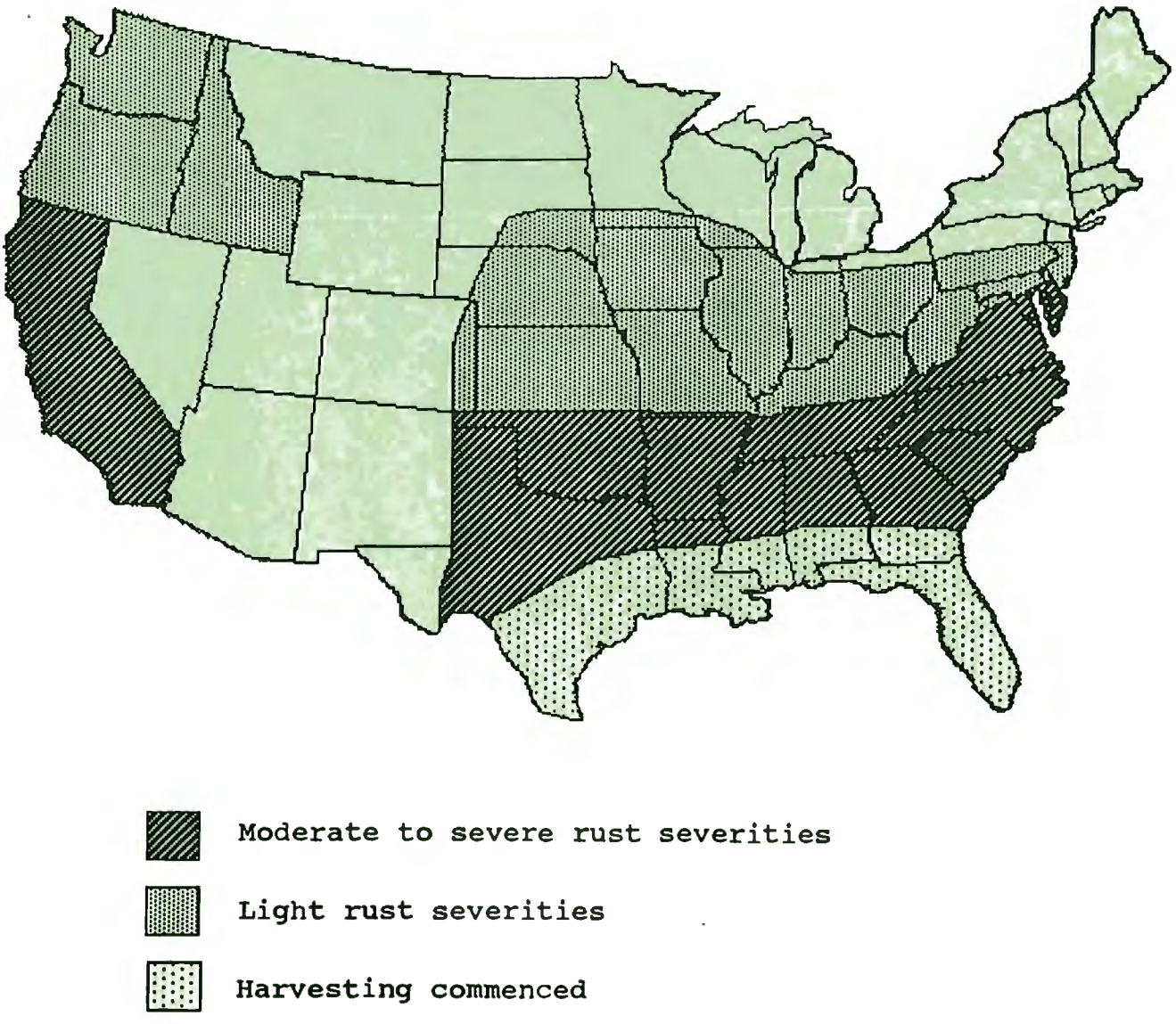


Table 1. Preliminary data of the 1990 wheat leaf rust virulence survey.

Prt code[1]	Virulence formula[2]	Number of isolates per state						
		AL	FL	GA	LA	TX	KS[3]	CO[3]
CBB	3						1	
CBG	3,11			2				
CCB-10	3,10,26			1		1		
CBG-10	3,10,11	1		2				
FBM-10,18	2c,3,3ka,10,18,30			6				
KBG-10	2a,2c,3,10,11		2	2		1	1	
MBG	1,3,11	2	1			1		
MBG-10	1,3,10,11	4	5	14	2	1	1	
MDB-10	1,3,10,24					6	2	
MFB-10	1,3,10,24,26					12	7	
PLM-10,18	1,2c,3,3ka,9,10,18,30	1	1					
TBB-10	1,2a,2c,3,10	1				3	5	1
TBG-18	1,2a,2c,3,11,18	5	2	9				
TBG-10	1,2a,2c,3,10,11			3	2	3	6	
TCB-18	1,2a,2c,3,18,26					2		
Number of isolates		14	11	39	4	30	23	1
Number of collections		8	6	24	2	16	17	1

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

[2] Differentially resistant single-gene lines tested: Lr1,2a,2c,3,3ka,9,10,11,16,17,18,24,26,30.

[3] Collections made in the fall of 1989.

CEREAL RUST BULLETIN

Report No. 6
June 12, 1990

From:
CEREAL RUST LABORATORY
U. S. DEPARTMENT OF AGRICULTURE
UNIVERSITY OF MINNESOTA, ST. PAUL 55108
612-625-6299

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

Winter wheat is in good to excellent condition throughout most of the United States, except in local areas where fields were damaged by storms and floods. Wheat harvest has begun in southern Oklahoma, across to northern Georgia and in early fields along the Atlantic coast. Spring grain seeding is complete and many fields are at the jointing stage. In most areas the crop is in good condition.

Wheat stem rust--Stem rust was first found in central Kansas this season on June 4 in several fields in Barton, Reno and Rice counties. Rust was found in 4 of 6 fields in Reno County leading us to believe it may be of general occurrence. Incidences ranged from trace to 8%, adequate to generate a light severity in the fields and some inoculum for regions to the north. The plants were in the milk stage and the pustules where located on stems six inches above the ground, the source of inoculum for these infections is uncertain. Two of the cultivars grown in this area, TAM 107 and Pioneer 2157, are susceptible.

Races identified from collections received prior to May 3 are as follows:

Location	Number of collections	Wheat stem rust race (No. of isolates)
Georgia	2	RCR (1) RKQ (1)
Louisiana	1	RCR (1) TPM (1)
South Texas	2	RCR (6)

Wheat leaf rust--In the Great Plains, during the first week of June, leaf rust severities ranged from traces in southeast North Dakota to severe (60 to 80% severity) in central Kansas. Severities in eastern Kansas and Missouri have been limited by a severe powdery mildew infection that has killed many leaves. During the past week temperatures have increased along with good dew periods making conditions ideal for rust increase on winter wheats in the central and northern plains. The advanced stage of Kansas wheat should limit leaf rust development in the southern counties.

In the soft red winter wheat region, from southern Illinois to eastern Virginia, leaf rust has increased in susceptible cultivars from 10% on May 25 to 80% severity last week. Losses in this area will occur not only because of leaf rust but also because of Septoria nodorum and scab. When several diseases are present in a field it is hard to ascertain the losses due to each disease.

Most commercial hard red spring durum wheats have been resistant to leaf rust. Leaf rust should appear on susceptible cultivars this week or next. Leaf rust was found in South Dakota two weeks ago and now is present in southwestern Minnesota (Fig 1.).

Preliminary data from the 1990 wheat leaf rust virulence survey are shown in Table 1.

Wheat stripe rust--In the past two weeks there has been no new information reported about stripe rust development in the U.S.

Oat stem rust--Ten percent severities were reported on oat cultivars growing in a varietal nursery in Yolo Co., California. Traces of rust were found in Arkansas. Currently it appears that oat stem rust should not cause a problem in the northern oat growing area. From oat stem rust collections made in Louisiana and Alabama in late April race NA-27 was identified and from a wild oat collection made in north central Texas NA-16 was identified.

Oat crown rust--In eastern Tennessee plots 60% crown rust severities were observed on oats. Crown rust pustules were observed on oats in Arkansas, Nebraska and Wisconsin. The Wisconsin field was adjacent to several buckthorn bushes. The spread of aeciospores from the buckthorn to the grass hosts is becoming apparent.

Barley rusts--Trace to light amounts of leaf rust were found on winter barley in fields in Lancaster, Lebanon and York counties in Pennsylvania. No leaf rust has been observed in central U.S. No stem rust has been found on barley this year.

Rye rusts--In the past two weeks no new reports of rye rusts were reported in the U.S.

Barberry rust--Aecia have appeared on barberry bushes in southeastern Minnesota.

Fig. 1. Wheat leaf rust severities (6/12/90).

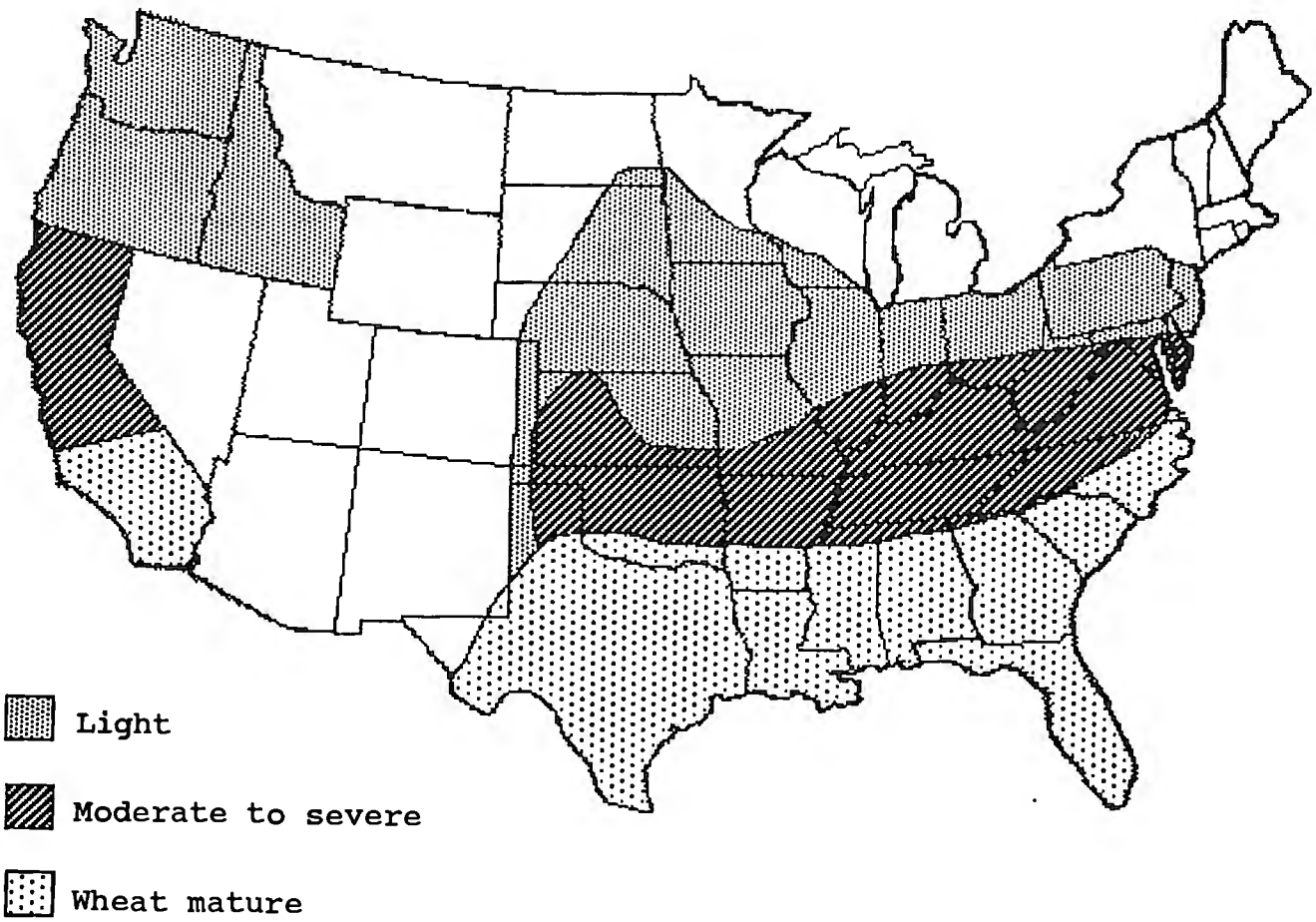


Table 1. Preliminary data of the 1990 wheat leaf rust virulence survey.

Prt code[1]	Virulence formula[2]	Number of isolates per state							
		AL	FL	GA	SC	LA	TX	KS[3]	CO[3]
CBB	3							1	
CBB-10	3,10	1							
CBG	3,11			4					
CBG-10	3,10,11	1		2					
CCB-10	3,10,26			1			1		
FBM-10,18	2c,3,3ka,10,18,30			6					
KBG-10	2a,2c,3,10,11	1	2	2			1	1	
LBB-10,18	1,10,18				2				
MBB	1,3,	2							
MBG	1,3,11		1				1		
MBG-10	1,3,10,11	7	5	14		11	1	2	
MDB-10	1,3,10,24						6	2	
MFB-10	1,3,10,24,26						12	7	
PLM-10,18	1,2c,3,3ka,9,10,18,30	1	1						
SBJ	1,2a.2c.11,17	1							
TBB-10	1,2a,2c,3,10	1				2	3	4	1
TBG-10	1,2a,2c,3,10,11	2		1		2	2	8	
TBG-18	1,2a,2c,3,11,18	1							
TBG-10,18	1,2a,2c,3,10,11,18			2		2			
TBJ-10,17,18	1,2a,2c,3,10,11,17,18	2							
TCB-18	1,2a,2c,3,18,26	2				1	3		
TFB-10	1,2a,2c,3,10,24,26	1				1			
TLG-18	1,2a,2c,3,9,11,18	8	2	9		2			
TLJ-18	1,2a,2c,3,9,11,17,18								
Number of isolates		31	11	41	2	21	30	25	1
Number of collections		17	7	25	1	13	16	18	1

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

[2] Differentially resistant single-gene lines tested: Lr1,2a,2c,3,3ka,9,10,11,16,17,18,24,26,30.

[3] Fall of 1989 collections, 1 isolate MGB, spring 1990.

CEREAL RUST BULLETIN

Report No. 7
June 26, 1990

From:
CEREAL RUST LABORATORY
U. S. DEPARTMENT OF AGRICULTURE
UNIVERSITY OF MINNESOTA, ST. PAUL 55108
612-625-6299

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

The winter wheat harvest has started in central Kansas and hot and dry weather is accelerating maturity across Kansas. In southern Indiana and southern Illinois the crop is turning color and harvesting should began this week. In the northern Great Plains, most of the winter wheats and spring grains are in good condition and varying from near normal maturity to about one week later than normal.

Wheat stem rust--During mid-June stem rust was found in fields and plots of susceptible cultivars in northern Kansas and southcentral Nebraska (Fig, 1). At these locations the severities ranged from traces on most of the plants to 10% on a few plants which were initially infected with exogenous inoculum. This inoculum probably started from scattered stem rust overwintering sites in southern Kansas where a few fields will suffer severe losses. Three of the rusted cultivars were TAM 107, Pioneer 2157 and Karl.

By June 21, traces of stem rust were found in winter and spring wheat plots in eastcentral North Dakota and in eastcentral Minnesota.

Races identified from collections received prior to May 15 are as follows:

Location	Number of collections	Wheat stem rust race (No. of isolates)
Florida	1	RCR (1)
Georgia	2	RCR (1) RKQ (1)
Louisiana	1	RCR (1) TPM (1)
South Texas	4	QFC (2) RCR (9) TPM(1)

Wheat leaf rust--In the Great Plains in mid-June leaf rust severities ranged from 80% in northcentral Kansas to traces in eastcentral North Dakota fields (Fig. 2). In some fields of susceptible cultivars in Kansas losses will occur. Conditions during the past three weeks have been ideal for rust development in the northern Great Plains. These conditions include frequent rains for deposition of inoculum with mild temperatures and frequent heavy dews. Since leaf rust did not overwinter in the winter wheats in this area, the rust was observed on the susceptible spring and winter wheats on approximately the same date with similar severities. For example, last week ten percent leaf rust severities were observed on susceptible spring wheat and winter wheat cultivars in east central Minnesota. Since most commercial spring wheat cultivars are resistant, rust is expected to be light in commerical fields.

Fig. 1. Wheat stem rust incidences (6/26/90).

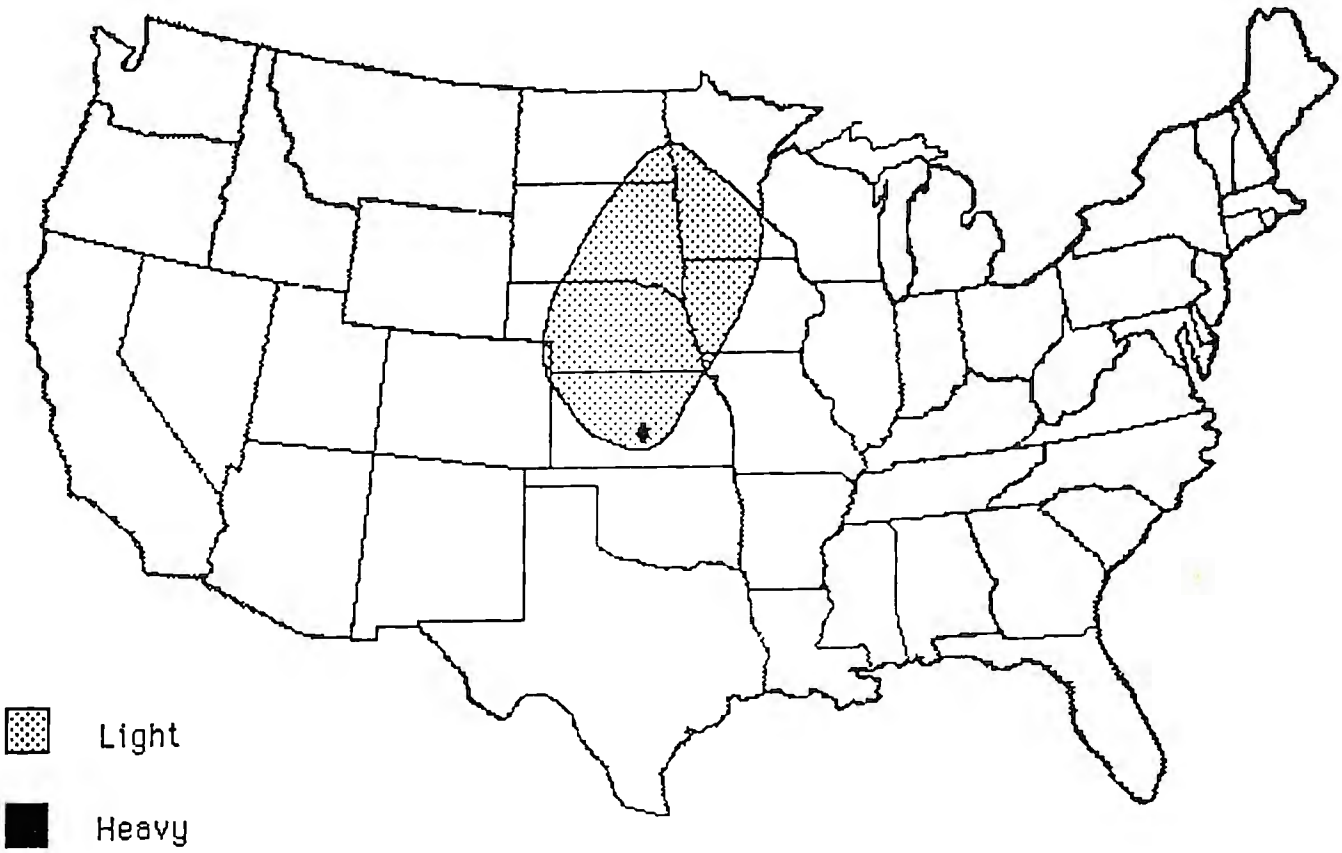
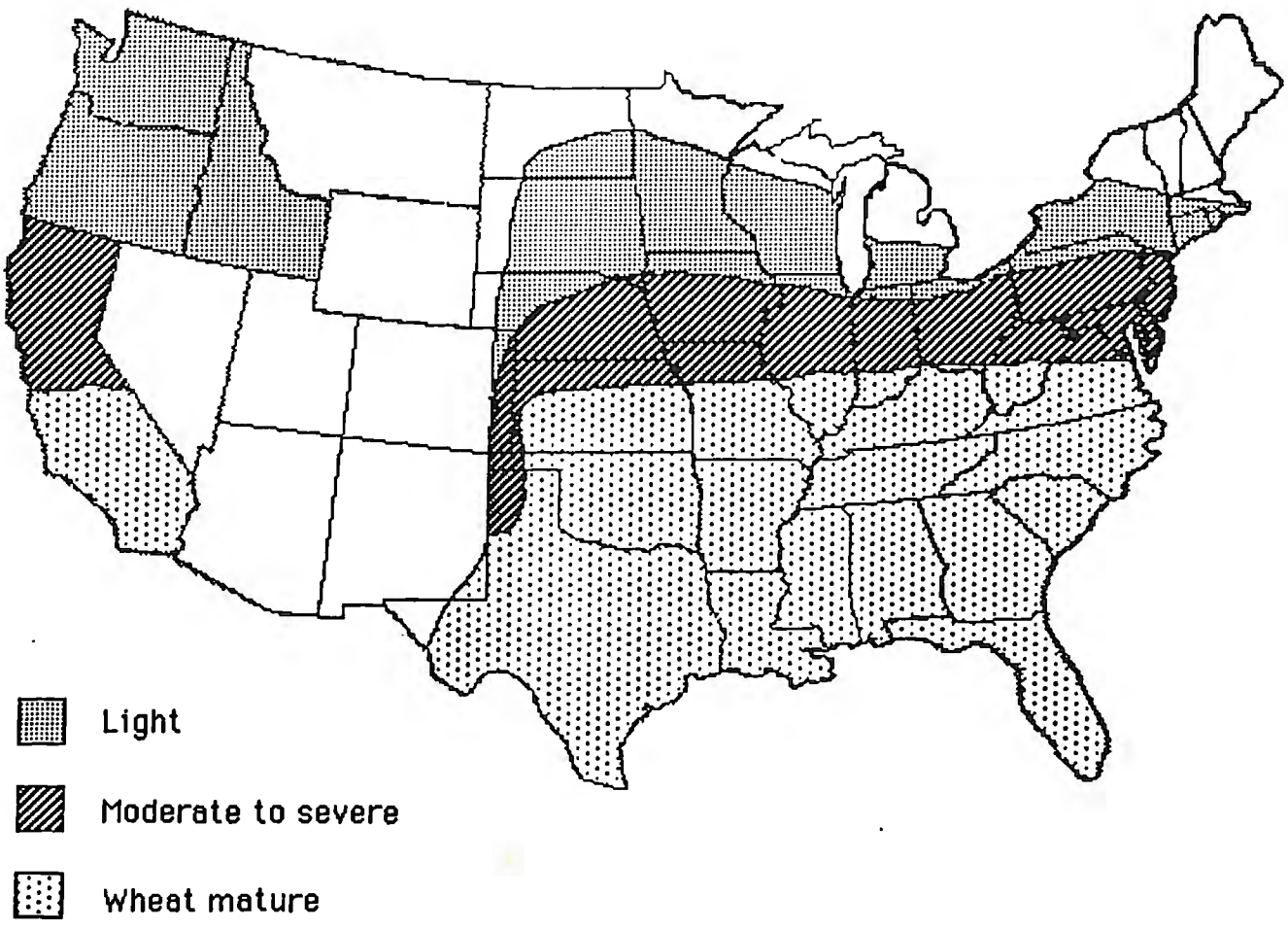


Fig. 2. Wheat leaf rust severities (6/26/90).



CEREAL RUST BULLETIN

Report No. 8
July 11, 1990

From:
CEREAL RUST LABORATORY
U. S. DEPARTMENT OF AGRICULTURE
UNIVERSITY OF MINNESOTA, ST. PAUL 55108
612-625-6299

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

The winter wheat harvest has begun in fields from southeastern South Dakota to central Ohio. Most of the spring small grains in the upper midwest are in good condition, with near normal maturity. Some stress due to hot high tempertures is expected, particularily for heavily rusted plants.

Wheat stem rust--By the first week in July, trace-30% wheat stem rust severities were found in plots of susceptible spring and winter wheat cultivars in southeastern North Dakota, southern Manitoba to eastcentral Minnesota. This is the greatest spread of stem rust into the northern plains since 1986. The inoculum for these infections probably originated from the southern Kansas overwintering sites.

Traces of stem rust were found in east central Washington winter wheat plots in the last week of June. Races identified from collections received prior to June 1 are as follows:

Location	Number of collections	Wheat stem rust race (No. of isolates)
Florida	1	RCR (1)
Georgia	5	RCR (1) RKQ (1) TPM (8)
Virginia	1	TPM (3)
Louisiana	1	RCR (1) TPM (1)
South Texas	4	QFC (2) RCR (9) TPM(1)
Kansas	1	QBC (3)

Wheat leaf rust--In the northern Great Plains in the last two weeks in June, conditions were ideal for rust development. Leaf rust reached eighty percent severity in susceptible spring wheat and winter wheat cultivars growing in an east central Minnesota nursery during the first week of July (Fig. 1). Seventy percent severities were observed in winter wheat fields and plots in southeastern North Dakota the first week of July. Traces of leaf rust were found in spring wheat commercial fields in southeastern North Dakota and southern Manitoba, but leaf rust is not expected to be a problem there because most commercial spring cultivars are resistant.

Leaf rust severities ranged from trace to 20% in western New York soft red winter wheat fields during the last week of June. In the Pacific Northwest leaf rust has increased significantly in the last two weeks on susceptible winter wheats. Eighty percent severities were reported on cultivars in a nursery in Pullman, Washington.

Preliminary data from the 1990 wheat leaf rust virulence survey are shown in Table 1.

Wheat stripe rust--With continued cool weather, stripe rust development in the Pacific Northwest has increased. Losses to stripe rust are expected in eastern Washington fields.

Oat stem rust--During the past two weeks traces of oat stem rust were found in southern Minnesota fields. Stem rust appeared three days earlier then the 50 year mean in southern Minnesota, however, this is still 4 days later than the mean for epidemic years. Losses in the northern oat growing area to stem rust are only expected in late planted fields. From an oat collection made in California in early April race NA-5 was identified.

Oat crown rust--Oat crown rust increased very significantly in southern Minnesota and southern Wisconsin during the first week in July. For example, sixty percent severity readings were common on flag leaves of commercial cultivars growing in fields and plots in southern Minnesota. Premature loss of leaves due to a combination of crown rust and hot temperatures is likely. Losses in heavy rusted and late planted fields could be significant.

Barley stem rust--During the last week in June traces of barley stem rust were found in every commercial field surveyed in the southeastern North Dakota and west central Minnesota area. In one field of Robust a 7% severity was observed. Race Pgt-QBC that was commonly found on barley in 1989 was found in Kansas. This race is very avirulent on wheat and probably originated in the Pacific Northwest. Traces of stem rust were found on Hordeum jubatum (wild barley) growing along the road in southern Minnesota during the last week in June. In the northern barley growing area stem rust could be a problem on late planted cultivars.

Barley leaf rust--Traces of barley leaf rust were found on plots in southcentral New York during the last week in June. This rust probably is a part of the eastern population. The first report of barley leaf rust (trace severities) in the northern Great Plains was July 5th in a east central Minnesota varietal plots. Barley leaf rust is severe in the western region of Washington and Oregon but none has been found in the eastern region of these two states.

Rye rusts--Ten percent leaf rust severities were recorded on spring ryes in east central Minnesota plots. No stem rust has been found on rye this year.

Other rusts--A collection of rust was made from Leymus racemosus at the Land Institute in Salina, Kansas. This grass also rusted in 1986, thus we assume this is wheat stem rust.

Table 1. Preliminary data of the 1990 wheat leaf rust virulence survey.

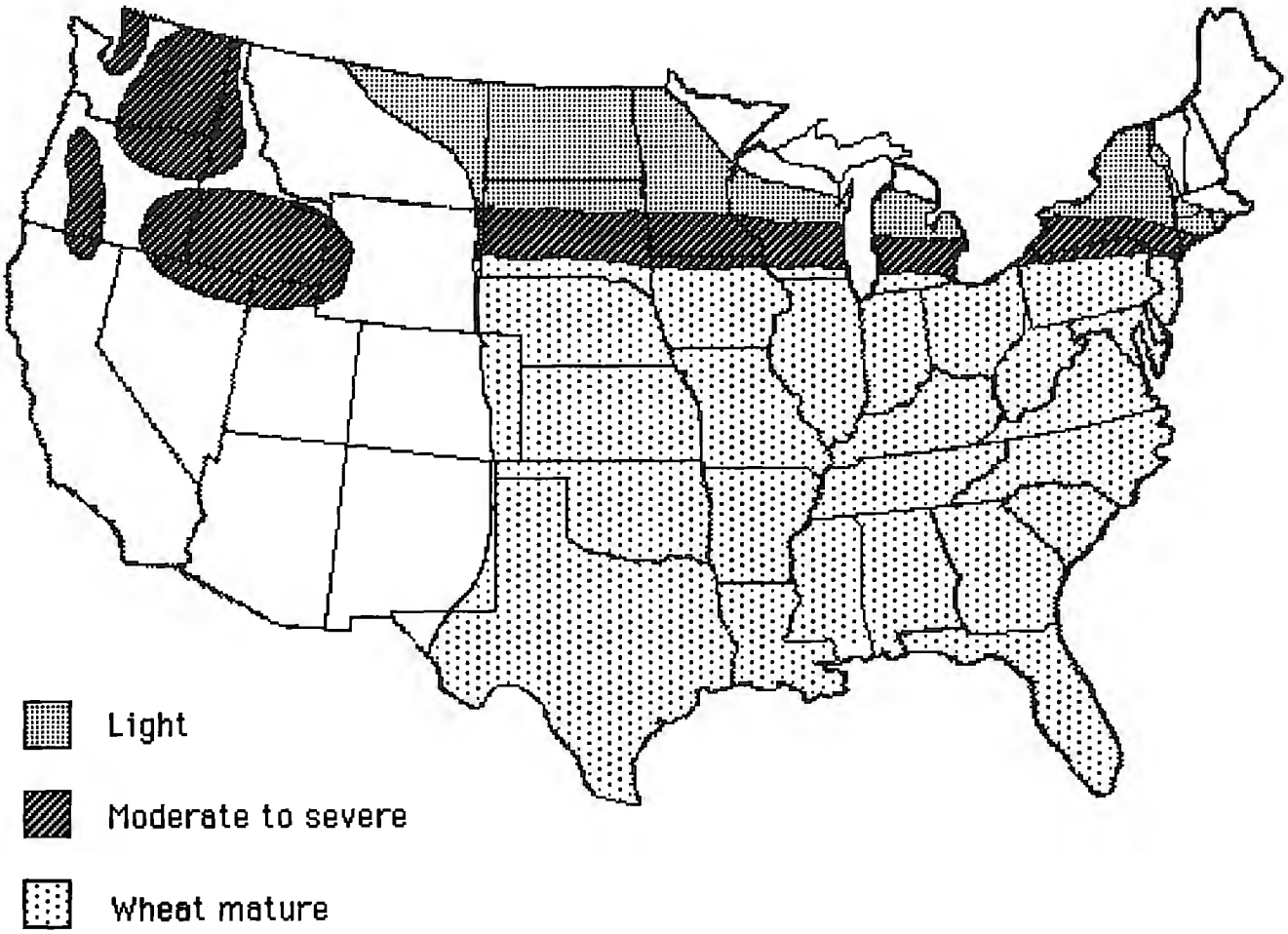
Prt code[1]	Virulence formula[2]	Number of isolates per state[3]							
		AL	FL	GA	SC	NC	MS	LA	TX
CBB-10	3,10	1							
CBG	3,11			5					
CBG-10,18	3,10,11,18	1		3					
CCB-10	3,10,26								1
FBM-10,18	2c,3,3ka,10,18,30	2		7					
KBB-10	2a,2c,3,10	1							1
KBG-10	2a,2c,3,10,11	1	2	3					3
KFG-10	2a,2c,3,10,11,24,26								1
LBB-10,18	1,10,18				2				
LLG-18	1,9,11,18							2	
MBB	1,3	2							
MBB-10	1,3,10								4
MBG	1,3,11		1						1
MBG-10	1,3,10,11	9	5	14		2	4	21	3
MDB-10	1,3,10,24								8
MFB-10	1,3,10,24,26								17
PBM-10,18	1,2c,3,3ka,10,18,30					4			
PLM-10,18	1,2c,3,3ka,9,10,18,30	1	1						
TBB-10	1,2a,2c,3,10	1						2	8
TBG-10	1,2a,2c,3,10,11	2		1				2	2
TBG-18	1,2a,2c,3,11,18	1							
TBG-10,18	1,2a,2c,3,10,11,18			2				4	
TBJ-10,18	1,2a,2c,3,10,11,17,18	2		2					
TCB-18	1,2a,2c,3,18,26	3						1	3
TFB-10	1,2a,2c,3,10,24,26	1						1	
TLG-18	1,2a,2c,3,9,11,18	8	2	9				2	
TLG-10,18	1,2a,2c,3,9,10,11,18							2	
Number of isolates		36	11	46	2	6	4	37	52
Number of collections		20	7	30	1	3	3	20	27

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

[2] Differentially resistant single-gene lines tested:
Lr1,2a,2c,3,3ka,9,10,11,16,17,18,24,26,30.

[3] Fall of 1989 collection information is provided in Cereal Rust Bulletin #6.

Fig. 1. Leaf rust severities on winter wheats (7/10/90).



CEREAL RUST BULLETIN

Report No. 9

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, barley and oat harvests have begun from southern North Dakota to southern Wisconsin. The yield and quality of the crops are above average throughout most of this area.

Wheat stem rust--By mid-July, wheat stem rust severities in plots of susceptible spring wheat cultivars ranged from 30% in west central Minnesota to traces in northwestern North Dakota. In the same area no stem rust was found in spring wheat fields. Most of the commonly grown spring and durum wheats are resistant to stem rust, so no significant loss is expected.

Stem rust severities of 20% were found on winter wheats in southern Michigan, southeastern North Dakota and east central Washington fields during the past two weeks. Since most of the wheat in these areas is near maturity losses will be light.

Races identified from collections received prior to June 1 are as follows:

Location	Number of collections	Pgt- race (No. of isolates)
Florida	1	RCR (3)
Georgia	6	TPM (10) RKR (3) RCR (2)
Kansas	23	QCC (42) TPM (11) QFC (12)
Louisiana	1	TPM (10) RCR (1)
Nebraska	4	TPM (7) QFC (3)
Texas	4	RCR (9) QFC (2) TPM (1)
Virginia	2	TPM (6)

Wheat leaf rust--During the past two weeks 40% leaf rust severities were recorded in susceptible spring wheat plots in northwestern Minnesota and traces in fields throughout the northern spring wheat growing area. Losses will be insignificant, due to the resistance of the commonly grown spring and durum wheats.

Wheat stripe rust--Stripe rust in the Pacific Northwest has increased significantly on susceptible spring wheat cultivars and losses will occur in fields that were not sprayed for rust.

Oat stem rust--By mid-July only traces of oat stem rust were found in northeastern South Dakota, central Minnesota and southern Wisconsin fields. This is less rust than is normally found in these areas by this date. Losses to stem rust in the northern oat growing area are only expected in late planted fields.

Oat crown rust--Oat crown rust development was severe throughout southern Wisconsin and southeastern Minnesota during mid-July. Significant losses of yield to crown rust will occur in heavily rusted, late planted fields in these areas. Only traces of crown rust were observed in oat fields in the Dakotas. The concentration of crown rust in areas known to be heavily infested with buckthorn, the alternate host, suggests that aecial infections were an important source of primary inoculum for the north central states in 1990. Weather conditions throughout the northern Great Plains were favorable for development of other cereal rusts, so weather does not appear to be the cause of the observed pattern of oat crown rust development.

Only a few isolates of oat crown rust have been tested for virulence, but field observations indicated that virulence to cultivars with both Pc38 and Pc39 is common in the north central states. Five isolates of crown rust collected in the Southeast in 1990 have been tested for virulence, and were virulent on differentials with either Pc38 or Pc39.

Barley stem rust--Stem rust on barley was found in every field examined throughout the northern spring barley area during the past two weeks and severities ranged from traces to 60%. This is the most severe and widely scattered barley stem rust in the past thirty-six years. Most of this rust is due to race Pgt-QCC that was found on wheat in southern Kansas in May. The resistance provided by the 'T' gene seems to be ineffective to this race.

Barley leaf rust--Traces of leaf rust were found in barley fields in the Red River Valley of the North during the second week of July. Due to the low severities and advanced maturity of the barleys little loss will occur.

Rye rusts--Traces of rye leaf rust were observed in plots in northwestern North Dakota during the second week of July. No stem rust has been observed on rye this year.

CEREAL RUST BULLETIN

Report No. 10 (1990 Final Issue)
August 15, 1990

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)

Small grain harvest is underway throughout the northern United States. Much of the spring oats and barley acreage has been harvested and the wheat harvest is underway.

Wheat stem rust--During 1990, stem rust overwintering sites were found on susceptible cultivars in southern Texas and southern Louisiana. Late planting, plus a December freeze, combined with a dry summer in 1989 which limited oversummering infections probably resulted in the low initial level of fall infection. By early May rust in trace amounts was found in a nursery in northwestern Florida. During the last two weeks of May only traces of stem rust were found in plots as far north as north central Texas, west and east central Arkansas and west central Indiana. The reduced incidence of overwintering stem rust along the Gulf Coast limited stem rust inoculum development. Heavy rains throughout Texas and Oklahoma scrubbed urediniospores from the air, washed them from the uredinia, and resulted in long periods of high humidity within the canopy limiting spore release. These factors all limited the number of spores in the air over the affected fields that were available for long-distance dispersal.

During the first week in June stem rust was found in several wheat fields in central Kansas. The general occurrence and severity of rust suggested that the inoculum source probably originated from infected plots in south central Kansas. Several overwintering centers were found in McNair 701 plots across Kansas indicating that conditions may have been generally favorable for winter rust survival. The inoculum in Kansas was adequate to result in a light severity in the fields of Karl, TAM 107 and Pioneer 2157 and to provide inoculum for regions to the north. By mid-June stem rust was found in fields and plots of susceptible cultivars in northern Kansas and south central Nebraska. In late June, traces of stem rust were found in winter and spring wheat plots in east central North Dakota, in east central Minnesota, and east central Washington. Then by the third week in July stem rust severities of 20% were found on winter wheats in southern Michigan, southeastern North Dakota and east central Washington fields. Since most of the wheat in these areas was near maturity losses were light.

As shown in Table 1, five Pgt races have been identified from 55 collections made from wheat in the U.S.A. this year. Race Pgt-TPM (15-TNM) comprised 32% of the isolates which was the predominant race (72%) identified in 1989, while Pgt-QCC and QFC (151-QBC, -QFC) comprised 54% of the isolates and 2% of the total number in 1989.

Wheat leaf rust--In 1990 leaf rust was lighter than normal in south Texas because of dry conditions during the winter which restricted increases. However, early spring rains created conditions favorable for rust increase throughout Texas and Oklahoma. During the last week in April 60% severities were reported in many fields where the rust overwintered, while in adjacent fields only traces were present. By early May leaf rust was severe in fields and plots in north central Texas, southern Oklahoma and southern Arkansas. However, heavy rains reduced the potential for long range dispersal of wheat leaf rust spores from this area. Leaf rust overwintered in south central

Kansas but cooler than normal weather in late April and early May and severe levels of powdery mildew in eastern Kansas and Missouri slowed rust development. By mid-May leaf rust severities ranged from traces in northern Kansas to severe in southern Oklahoma fields where leaf rust overwintered. In mid-June leaf rust severities ranged from 80% in north central Kansas where losses occurred to traces in east central North Dakota fields. In the northern Great Plains leaf rust did not overwinter in the winter wheats, therefore, rust was observed on susceptible spring and winter wheats in early July on approximately the same date with similar severities. During mid-July 40% leaf rust severities were recorded in susceptible spring wheat plots in northeastern North Dakota and western Minnesota and traces in fields throughout the northern spring wheat growing area. Losses were insignificant, due to the resistance of the commonly grown spring and durum wheat cultivars.

In the soft red winter wheat area during early April 90% leaf rust severities were common in wheat fields within 75 miles of the Gulf Coast from Louisiana to Georgia. Rust developed rapidly in late January, slowed in February and then increased in late March. The most severe rust was in late planted fields of CK 9766 and Fla 302 where losses occurred. The southern soft red winter wheat area provided an inoculum source for the northern soft red and white wheat areas as no leaf rust overwintered in the northern area in 1990. From southern Illinois to eastern Virginia leaf rust severities increased in susceptible cultivars from 10 to 80% during the first week of June. Losses in this area were from leaf rust, Septoria nodorum and scab. The amount of loss due to each individual disease will be difficult to access.

In California, wheat leaf rust was severe on susceptible cultivars in plots and light in fields throughout the grain growing area. In the Pacific Northwest rust developed slowly, and losses were light.

The leaf rust races (Prt code) identified (Table 2) include many of those found in 1989 in the same areas of the U.S.A. Significant differences when compared to the survey last year are an increase in virulence to Lr11 and 24 in the southern Great Plains and an increase in the Lr2a + 9 virulence combination in the southeastern U.S.A.

Wheat stripe rust--By early April stripe rust was found in the Sacramento Valley of California, southeastern and northwestern areas of Washington. The cool weather in May was favorable for stripe rust increase on susceptible cultivars in the Pacific Northwest. Some wheat growers in eastern Oregon and southeastern Washington sprayed with fungicides to control the rust on the susceptible hard red winter wheats Victory and Weston and the club wheat Tres. No stripe rust was found in the Great Plains in 1990.

Oat stem rust--Overwintering centers of oat stem rust were found in southern Alabama and central Louisiana plots in 1990. In early April traces of oat stem rust were found in south Texas fields. By mid-May rust was light and still limited to the southern states. Traces of stem rust were found in eastern Kansas fields in mid-June. Traces of oat stem rust were found in northeastern South Dakota, central Minnesota and southern Wisconsin fields by mid-July. This is less rust than normal and is about a week later than normal. Severe rust severities were noted on late planted oat fields and wild oats (Avena fatua) in northwestern Minnesota and northeastern North Dakota in late July. Losses will occur in these late planted fields. Race NA-27, virulent on Pg-1, -2, -3, -4 and -8, remains the predominant race of the population (Table 3).

Oat crown rust--Crown rust overwintered in southern Georgia plots, where many plants were dead by mid-March. In south Texas where crown rust normally overwinters, only traces of crown rust were found in late March and in May an overwintering center was found in a central Texas oat plot. Severe crown rust was observed on oats growing in plots in central Louisiana and east central North Carolina and in southeastern Arkansas oat fields by early May. During mid-May, 10% crown rust severities were observed in oat varietal trials in central Alabama and eastern Virginia. In general crown rust was lighter and more scattered than normal throughout this area. By mid-June traces of rust were present in fields in central Pennsylvania and northern Kansas.

During the fourth week of May, heavy aecial development was observed on buckthorns (alternate host) growing in southern Wisconsin and southeastern Minnesota. Aecial spores from buckthorn can infect oats, however, the infections on buckthorns remote from fields with oats last year were probably infected with the crown rust forms that attack Poa pratensis (bluegrass) and Agropyron repens (quackgrass) and not oats. By early June crown rust pustules were observed on oats in Minnesota and Wisconsin. The spread of aeciospores from the buckthorn to the grass hosts also was apparent. Oat crown rust development was severe throughout southern Wisconsin and southeastern Minnesota during mid-July. Significant losses of yield to crown rust occurred in heavily rusted, late planted fields in these areas. The concentration of crown rust in areas known to be heavily infested with buckthorn suggests that aecial infections were an important source of primary inoculum for the north central states in 1990. Weather conditions throughout the northern Great Plains were favorable for development of other cereal rusts, so weather does not appear to be the cause of the observed pattern of oat crown rust development.

Only a few isolates of oat crown rust have been evaluated for virulence, but field observations indicated that virulence to cultivars with both Pc38 and Pc39 is common in the north central states. Five isolates of crown rust collected in the southeastern states in 1990 were virulent on either Pc38 or Pc39.

Barley stem rust--The first report of barley stem rust this year was in winter barley plots in western Kansas during the second week in June. By the third week in June traces of stem rust were found in plots and fields in east central Minnesota and in a field in northwest Minnesota. The initial stem rust lesions found in barley fields were on the leaves. For nearly 50 years the T-gene has protected barleys from stem rust in the Upper Midwest with only a few pustules developing at barley maturity. During the last week in June traces of barley stem rust were found in every commercial field surveyed in southeastern North Dakota and west central Minnesota and by mid-July severities ranged from traces to 60%. This is the most severe and widespread stem rust on barley in the past thirty-six years. Race Pgt-QCC which was found last year on barley has been identified from every collection made on barley in 1990 in Kansas, South Dakota, North Dakota and Minnesota. Pgt-QCC has a virulence pattern similar to races found in the Pacific Northwest and is thought to have originated there in 1989. Race Pgt-QCC was commonly found in collections made on the wheat cultivars Quantum 561 and Pioneer 2157 in Kansas in late May and June. The resistance provided by the T-gene in barley is ineffective against Pgt-QCC. Other wheat stem rust races identified from barley were Pgt-TPM (15-TNM) in Kansas and TPM and Pgt-RCR (11-RCR) in Minnesota.

Barley leaf rust--In 1990, barley leaf rust overwintered in east central North Carolina, eastern Virginia, central California, and western Washington and Oregon. In the eastern areas losses were light. The first report of barley leaf rust in the Great Plains this year was in northeastern Kansas in mid-June, where it probably overwintered. Traces of barley leaf rust occurred by early July in east central Minnesota plots. By the second week of July traces of leaf rust occurred in barley fields in the Red River Valley of the North. Due to the low severities and advanced maturity of the barley losses were light. Barley leaf rust was severe in the western region of Washington and Oregon but none was found in the eastern region of these states.

Rye stem rust--The only report of stem rust on rye this year was during the last week in July in west central North Dakota plots.

Rye leaf rust--By mid-April, 40% rust severities were found in fields throughout the southern U.S.A., where this rust survives throughout the year. By late May severe leaf rust infection was observed on rye that was planted as a winter cover crop in a nursery in eastern Virginia. In late June rye leaf rust was found in fields and plots in southeastern Minnesota. Traces of rye leaf rust were observed in plots in northwestern North Dakota by mid-July. The losses to rye leaf rust were light in the U.S.A. in 1990.

Barberry rust--In 1990, aecial collections were made from barberry in southeastern Minnesota, south central Wisconsin, southern West Virginia, and southeastern Ontario, Canada. Rye stem rust (*Puccinia graminis* f. sp. *secalis*) was identified from aecial collections made in southeastern Minnesota and south central Wisconsin.

Other rust hosts--Traces of leaf rust were found on goatgrass (*Aegilops cylindrica*) growing alongside wheat fields and in roadside ditches throughout southern Oklahoma. Race Prt-SBD and isolates avirulent on Thatcher were identified from these collections. Stem rust was found on *Agropyron repens* (quackgrass) growing within 50 yards of *Berberis vulgaris* bushes in southeastern Minnesota, this was identified as *Puccinia graminis* f. sp. *secalis*.

Table 1. Preliminary results of the 1990 wheat stem rust race survey for collections made from wheat.

	Number of		Percent of Pgt- race[1]				
State	collections	isolates	QCC	QFC	RCR	RKR	TPM
Florida	1	3			100		
Georgia	6	15			13	20	67
Kansas	31	63	25	60			14
Louisiana	1	11			9		91
Minnesota	4	6	33	67			
Nebraska	4	10		30			70
North Dakota	2	6		100			
Texas	4	12		17	75		8
Virginia	2	6					100
Total	55	132	14	40	11	2	32

[1] Pgt code: see Phytopathology 78:525-529

Table 2. Preliminary data of the 1990 wheat leaf rust virulence survey.

Prt code[1]	Virulence formula[2]	Number of isolates per state[3]							
		AL	AR	FL	GA	IN	KS	LA	TX
CBB	3					1	1		
CBB-10	3,10	2				1			1
CBG	3,11	2			5			2	
CBG-10	3,10,11	1						2	
CBG-18	3,11,18	1			1				
CBG-10,18	3,10,11,18				2				
CCB-10	3,10,26						1		1
FBM-10,18	2c,3,3ka,10,18,30	2			2				
FBR-10	2c,3,3ka,10,11,30								2
FBR-10,18	2c,3,3ka,10,11,18,30	2			5				
KBB-10	2a,2c,3,10	1				2			1
KBG-10	2a,2c,3,10,11	4		2	4		3	1	3
KBG-10,18	2a,2c,3,10,11,18							1	2
LBB-10,18	1,10,18						1		
LLG-18	1,9,11,18							2	
MBB	1,3	2							
MBB-10	1,3,10	2				3		3	6
MBG	1,3,11	5		1	4	3			1
MBG-10	1,3,10,11	18	8	5	14	1	4	51	16
MBG-10,18	1,3,10,11,18		4						
MDB-10	1,3,10,24	1	2				1		14
MDG-10	1,3,10,11,24		2						
MFB-10	1,3,10,24,26						8		26
PBM-10,18	1,2c,3,3ka,10,18,30	1							
PLM-10,18	1,2c,3,3ka,9,10,18,30	1		1		3			
TBB-10	1,2a,2c,3,10	2					4	2	16
TBG-10	1,2a,2c,3,10,11	8	1				17	6	20
TBG-10,18	1,2a,2c,3,10,11,18				2			4	
TBJ	1,2a,2c,3,11,17	2							
TBJ-10,18	1,2a,2c,3,10,11,17,18	2			2				
TCB	1,2a,2c,3,26	2							
TCB-18	1,2a,2c,3,18,26	3						1	3
TDB	1,2a,2c,3,24								3
TFB-10	1,2a,2c,3,10,24,26	1					1	1	
TLG-18	1,2a,2c,3,9,11,18	13			9			2	
TLG-10,18	1,2a,2c,3,9,10,11,18	1						2	
Number of isolates		79	17	9	50	14	41	80	115
Number of collections		44	11	5	29	9	22	43	59

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

[2] Differentially resistant single-gene lines tested:
Lr1,2a,2c,3,3ka,9,10,11,16,17,18,24,26,30.

[3] Isolates not included in the table.
MS:MBG-10(8); OK:KBG-10,18(1),MBG-10(1),MFB-10(1),TBG-10(3);
TN:CBG(1),MBG-10(1); SC:LBB-10,18(2); NC:MBG-10(2),PBM-10,18(4);
IL:MBB-10(2),MBG(1); VA:KBB-10(2),MBB(1),MBG-10(1).

Table 3. Preliminary results of the 1990 oat stem rust race survey.

State	Number of collections	Number of isolates	Percent of NA race[1] 5	16	27
Alabama	1	1			100
Arkansas	2	6		17	83
California	2	6	100		
Georgia	2	5			100
Kansas	5	12			100
Louisiana	5	9			100
Minnesota	3	7			100
Texas	17	47		32	68
Total	37	93	6	17	76

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

Special Notice: We would like to thank everyone for mailing rust collections to us this year. We can no longer provide postage-paid envelopes and we do appreciate cooperators using the necessary postage. If you no longer wish to receive the Cereal Rust Bulletin or have an address change please call or write us.

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