CEREAL RUST BULLETIN

Report No. 1
April 10, 1992

From:
CEREAL RUST LABORATORY
U. S. DEPARTMENT OF AGRICULTURE
UNIVERSITY OF MINNESOTA, ST. PAUL 55108
Tel. 612/625-6299 Fax: 612/649-5054

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

The mild winter and ample moisture in much of the U.S. wheat growing area has created some optimism for a good crop in 1992. Wheat in southern Texas is in fair to good condition and about three weeks later than normal in maturity. In the southeastern soft red winter wheat area the crop is in good shape but one week behind normal maturity. Extensive freeze damage has been reported in northern Oklahoma while the wheat in Kansas has had minimal winter injury.

Wheat stem rust. During the first week in April traces of wheat stem rust were found on susceptible cultivars in nursery plots in Victoria, Bee and Lee counties in southern Texas. The rust overwintered in the plots in Victoria and Lee counties. This amount of stem rust is normal for early April.

Wheat leaf rust. Leaf rust severities are generally light to moderate on susceptible cultivars in plots and fields within 75 miles of the Gulf Coast from the Florida panhandle to southern Texas (Fig. 1). The winter was mild and rainfall in these areas was above normal creating favorable conditions for rust infection. In a ProBrand 812 field in Karnes county, Texas, a 20% severity was observed at the flowering stage, but in general severities are very light in fields. Even though leaf rust is widespread across southern Texas it is less severe than normal. In northern Texas, rust severities are moderate on susceptible lines in nurseries. The rust is light in fields but increasing in severity.

During the 1991-92 winter, leaf rust survived in much of eastern and southern Kansas, thus overwintering was more widespread than normal. Leaf rust is now becoming severe in south central Kansas where lower leaves in one south central Kansas field had a 20% severity in mid-March.

Wheat stripe rust. Wheat stripe rust is developing rapidly in northwestern Washington. Dry weather delayed rust development in the fall but early winter was mild and moist which had allowed establishment of the disease.

At the Uvalde irrigated nursery in southern Texas, stripe rust severities were variable ranging from 0 to 60%. This was the only stripe rust found on wheat in Texas in early April. Stripe rust is found in trace amounts in southern Texas in almost half of the years.

Note: Stripe rust urediniospores are very vulnerable to heat and do not survive long at warm temperatures; therefore, if shipment of collections for race identification is delayed their viability will be poor. Please send wheat stripe collections (10 or more rusted green leaves) as soon as possible after collecting to: Dr. Roland Line, USDA-ARS, 361 Johnson Hall, Washington State University, Pullman, WA 99164-6430. BARLEY STRIPE RUST COLLECTIONS SHOULD BE SENT TO THE CEREAL RUST LAB, ST. PAUL, MN.

Oat stem rust. Traces of oat stem rust were found the first week of April in two fields in Zavalla county in southern Texas and in a nursery in Lee county. This is light occurrence but within the normal range for stem rust on oats in Texas.

Oat crown rust. During the first week in April, crown rust was severe in plots and fields throughout southern Texas. In many fields and plots, oats did not develop beyond the heading stage because of severe crown rust infection. Most fields will suffer yield losses or greatly reduced grazing value because crown rust killed the foliage or even plants. This is the most severe and widespread crown rust observed in southern Texas for over 25 years.

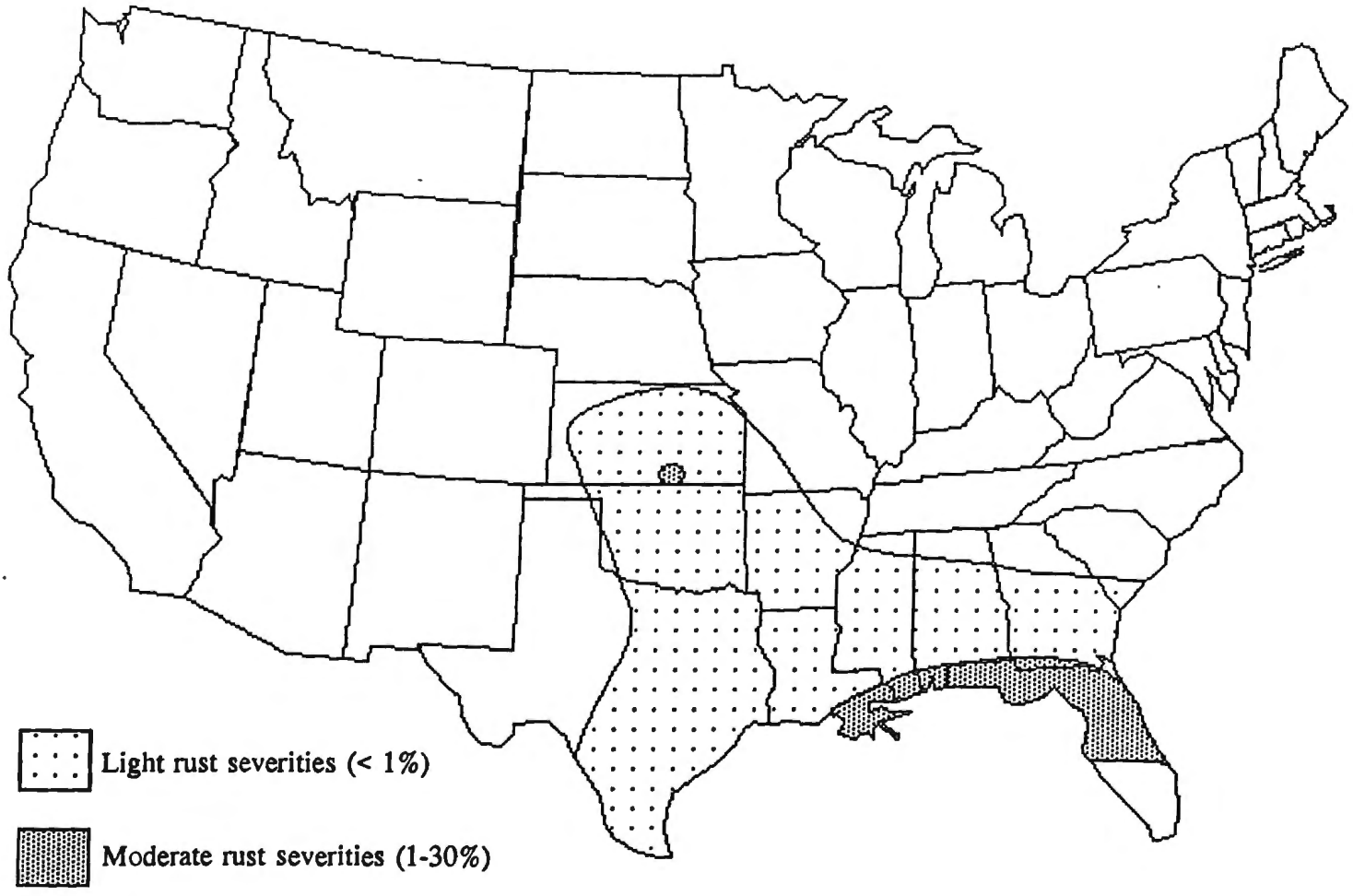
Barley stem rust. As of April 9, no stem rust has been reported on barley in the United States this year. Limited amounts of barley are grown commercially in the southern states. Stem rust on barley often is not found in this area.

Barley leaf rust. By the first week in April, leaf rust caused by Puccinia hordei, was observed only in trace amounts on barley in the Rio Grande Valley. Barley leaf rust can be severe in southern Texas in early April but this is not true every year. Hordeum pusillum growing in roadside ditches throughout southern Texas had 1-10% severities caused by Uromyces hordeinus, this leaf rust does not attack commercial barley cultivars.

Stripe rust on barley. Stripe rust was reported in barley plots in Uvalde, Texas during early March. By the first week in April it was found in barley fields and plots from Uvalde to Dallas, Texas but not along the Texas Gulf Coast. In the same area stripe rust was found on the native Hordeum pusillum. Barley stripe rust was first found in the United States at Uvalde, Texas in March 1991.

Rye leaf rust. During the first week in April, 20 to 60% leaf rust severities were observed in rye plots in southern Texas. No rye stem rust has been reported in the United States as of this date. Rye leaf rust is often found in southern Texas while rye stem rust is rarely found in the southern Great Plains.

Fig. 1. Leaf rust severities in wheat fields on April 10, 1992



CEREAL RUST BULLETIN

Report No. 2

April 27, 1992

From:
CEREAL RUST LABORATORY
U.S. DEPARTMENT OF AGRICULTURE
UNIVERSITY OF MINNESOTA, ST. PAUL 55108
Tel. 612/625-6299 Fax: 612/649-5054

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

The winter-sown small grain crop is generally in good condition. Extensive freeze damage has been reported in Oklahoma and the northern soft red winter wheat area. Hard red winter wheat in northwestern and central Missouri and southern North Dakota is generally in poor condition. Seeding of spring-sown small grains in the northern plains has started but planting has been slowed by cool weather.

Wheat stem rust. Stem rust was light in plots of soft red winter wheat in a nursery at Baton Rouge during mid-April. The only other stem rust report was in southern Texas nurseries (CRB #1). This is less rust than in the past four years.

Wheat leaf rust. Leaf rust is increasing in northern Texas and southern Oklahoma on susceptible cultivars in both nurseries and fields (Fig. 1). Recent dew periods and rain should allow for a rapid increase of leaf rust. Reports in mid-April indicated that leaf rust is increasing from overwintering infection sites in south central and central Kansas. In Louisiana and Arkansas, leaf rust is increasing on susceptible cultivars but rust development is still less than normal. Fungicide spraying has begun in some severely rusted areas of Louisiana and Arkansas. In the southern soft red winter wheat area from Mississippi to Georgia rust is severe on susceptible cultivars in plots but rust in fields is light and increasing at a slow pace except in southern Georgia where heavy amounts of leaf rust overwintered. Overwintering of leaf rust was documented in a Warsaw Virginia nursery. In early planted nursery plots in the Sacramento Valley of California, rust was generally light but was severe on the cultivar Dirkwin.

Wheat stripe rust. Stripe rust was found on a few cultivars in a nursery at Crowley, Louisiana, during mid-April. Stripe rust had been observed earlier at Uvalde, Texas (CRB # 1). Thus stripe rust is widespread in the South but at this late date should not increase or spread significantly.

Oat stem rust. Rust severities ranged from trace to 60% in nursery plots in southern Texas at Uvalde and Eagle Lake. In a nursery at Baton Rouge, Louisiana, stem rust was severe on most cultivars by the third week in April. Conditions should improve for the spread and development of stem rust in the next two weeks.

Oat crown rust. Crown rust was severe in plots at Baton Rouge, Louisiana, by the third week in April (Fig. 2). From southern Mississippi to southern Georgia, light amounts of crown rust were found in interstate small trial plots. Combined with the severe levels of crown rust in south Texas (CRB #1) inoculum levels should be high for the spring oat crop.

Barley leaf rust. Leaf rust overwintered in the Warsaw Virginia nursery and by the second week in April the lower leaves had been killed and the rust was present on upper leaves. Little barley leaf rust exists elsewhere (CRB #1).

Barley stem rust. No stem rust has been reported on barley yet this year. This is not unusual but last year Pgt-QCC was present in Texas at this time.

Barley stripe rust. Stripe rust of barley has not been found outside of Texas. Winter barley is grown only on a limited area in Oklahoma and Kansas. The spring barley crop is mostly seeded to emerged.

Rye rusts. Rye leaf rust is present in Texas in light amounts. Little commercial acreage is planted in southern states. No stem rust has been found on rye.

ig. 1. Leaf rust severities in wheat fields, April 24, 1992

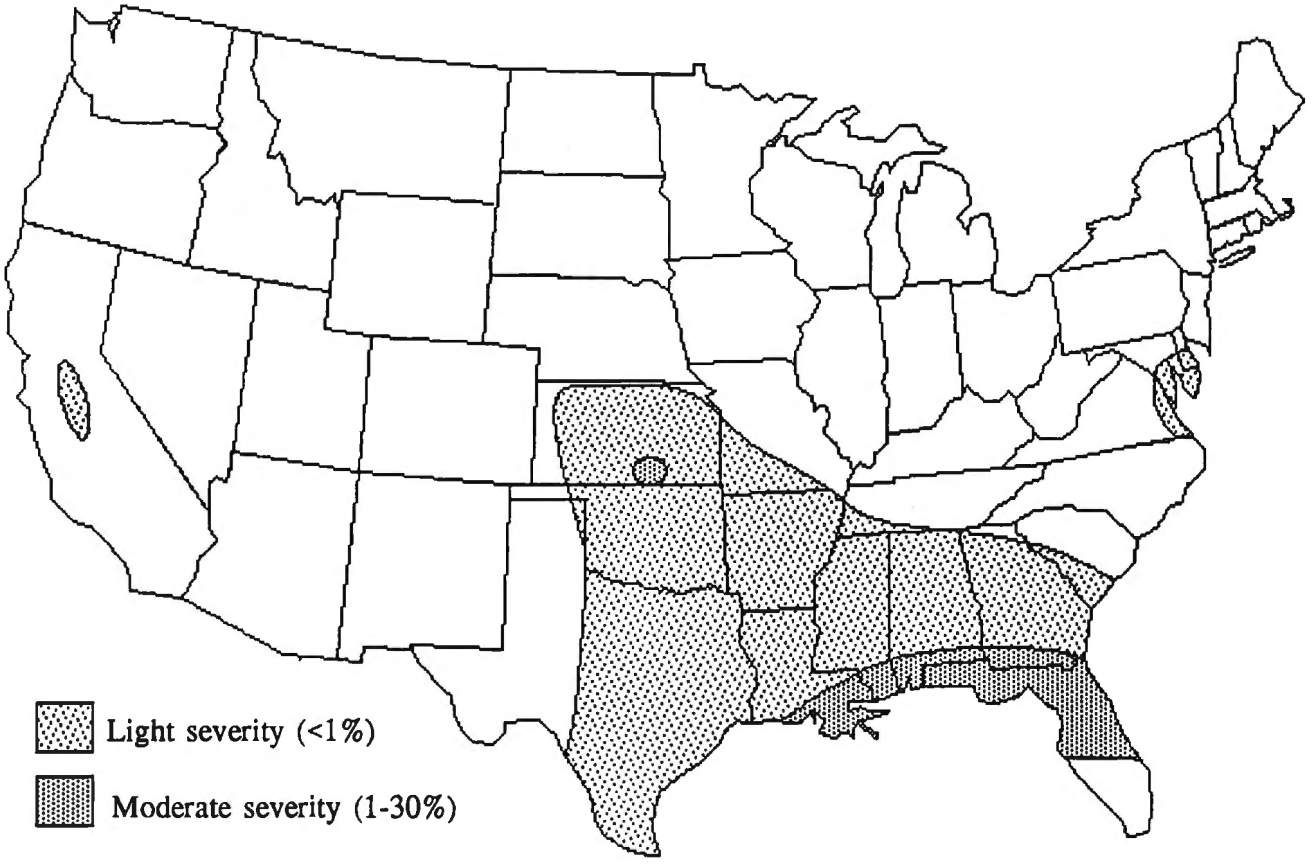
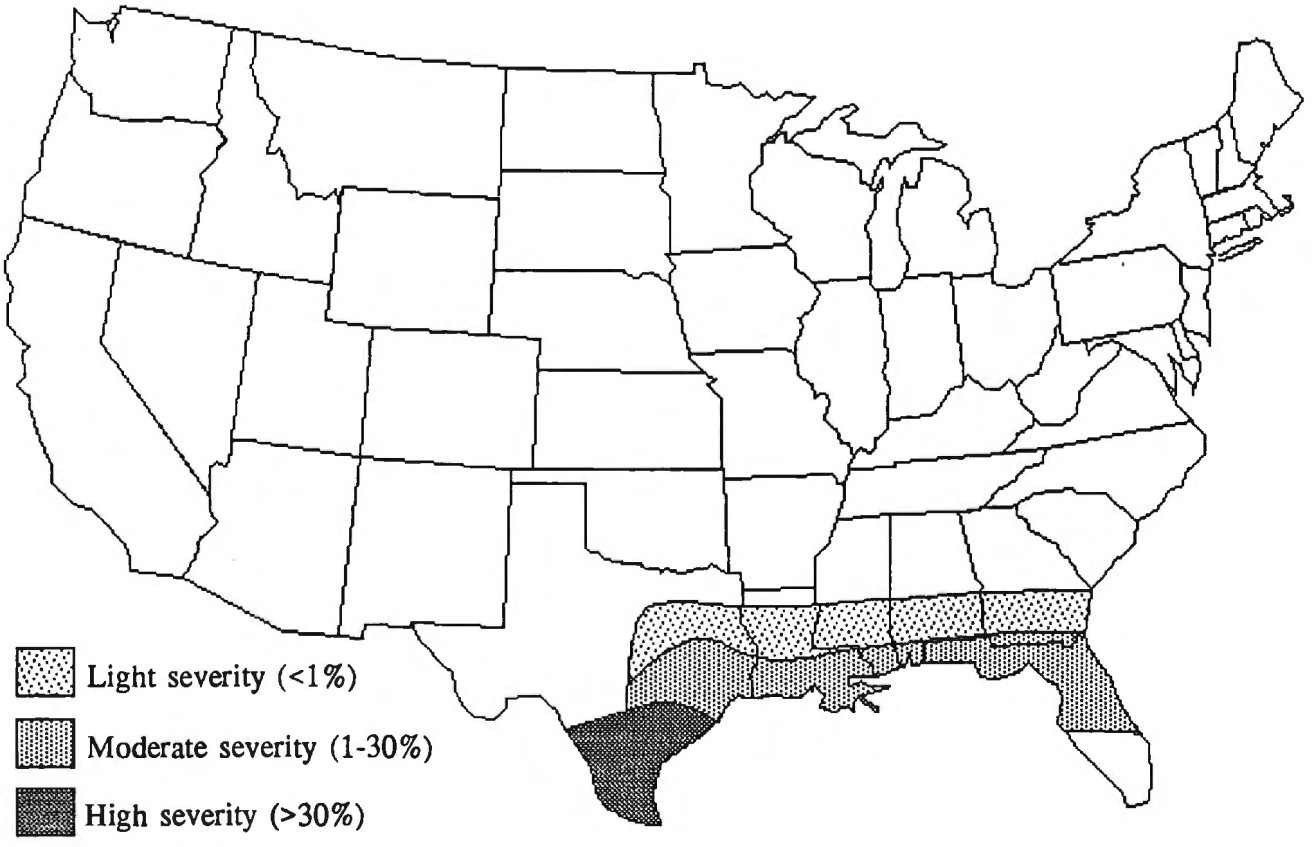


Fig. 2. Crown rust severities in oat fields, April 24, 1992



CEREAL RUST BULLETIN

Report No. 3

May 11, 1992

From:
CEREAL RUST LABORATORY
U.S. DEPARTMENT OF AGRICULTURE
UNIVERSITY OF MINNESOTA, ST. PAUL 55108
Tel. 612/625-6299 Fax: 612/649-5054

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

The majority of the winter small grain crop is in good condition. In the high plains of Texas, western Oklahoma and western Kansas moisture is needed. With the return of warm dry weather seeding of the spring-sown small grains in the northern plains is progressing normally.

Wheat stem rust. During late April, a stem rust overwintering center was found in a Lee county, Texas nursery. Eighty percent severities were observed on an awnless cultivar at full berry, while 30 feet away only traces were found. Traces of stem rust were found in two different fields of an awnless cultivar 100 miles northwest of this nursery. At Temple and McGregor, Texas foci were found on May 1. In north central Texas at Mundy, a foci of stem rust was found in a trap plot of McNair 701 where the severities ranged from 60% at the center to traces 10 feet away. Stem rust did not overwinter as no uredinia were found near ground level. During late April, stem rust was observed in a plot of Coker 9766 in Henry county in southeastern Alabama.

Wheat leaf rust. Leaf rust severities on susceptible cultivars in north central Texas and southwestern Oklahoma averaged 80% during late April (Fig. 1). Rainfall has been limited but dews have occurred allowing for rust infection. The most severe outbreak of leaf rust since 1985 has been reported in Oklahoma and the panhandle of Texas. Ten percent severities were found on Aegilops cylindrica in southwestern Oklahoma.

In the southern soft red winter wheat area from South Carolina to Arkansas rust is severe on susceptible cultivars in plots but rust in fields is light except in Arkansas. However, with continued favorable conditions an increase in rust severities should occur. Traces of leaf rust are now present in Pennsylvania.

Wheat stripe rust. Light amounts of stripe rust were found in late April in soft red winter wheat fields and plots in northeastern Texas. Wheat stripe rust was widespread but light this year in Louisiana, Texas, and southwest Arkansas. With warmer temperatures further development is not expected. Early seeded fields on fallow are being sprayed where yields may justify it.

Oat stem rust. In oat plots in Lee county, Texas, stem rust severities ranged from trace to 80%, while in fields, severities ranged from 0 to 5% in late April. Traces of stem rust were found in fields in north central Texas and southwestern Oklahoma where oats were at 3/4 berry in late April.

Oat crown rust. Crown rust was severe in plots and moderate in fields in north central Texas by late April (Fig. 2). Much of the rust development was on the flag leaves, indicating that most of the spores were from an exogenous source. Crown rust was moderate (15%) in oat plots in California's Sacramento Valley in late April.

Barley leaf rust. By late April, leaf rust was present in trace amounts in barley plots in north central Texas. Severities were high (50%) in plots in the Sacramento Valley in late April. A leaf rust foci was found in a Keowee barley plot at Clemson, South Carolina. While in Lancaster county Pennsylvania traces of leaf rust were found. The foci at Clemson was 50 feet in diameter and probably originated from an overwintering foci, but the Lancaster county infection probably started with exogenous inoculum.

Barley stem rust. No stem rust has yet been reported on barley this year.

Barley stripe rust. Light amounts of stripe rust of barley were found in fields and plots in north central Texas in late April. With warmer temperatures further development is not expected.

Rye rusts. In rye plots in north central Texas, 60% leaf rust severities existed in late April. No stem rust has been found on rye this year.

Fig 1. Leaf rust severities in wheat fields, May 11, 1992

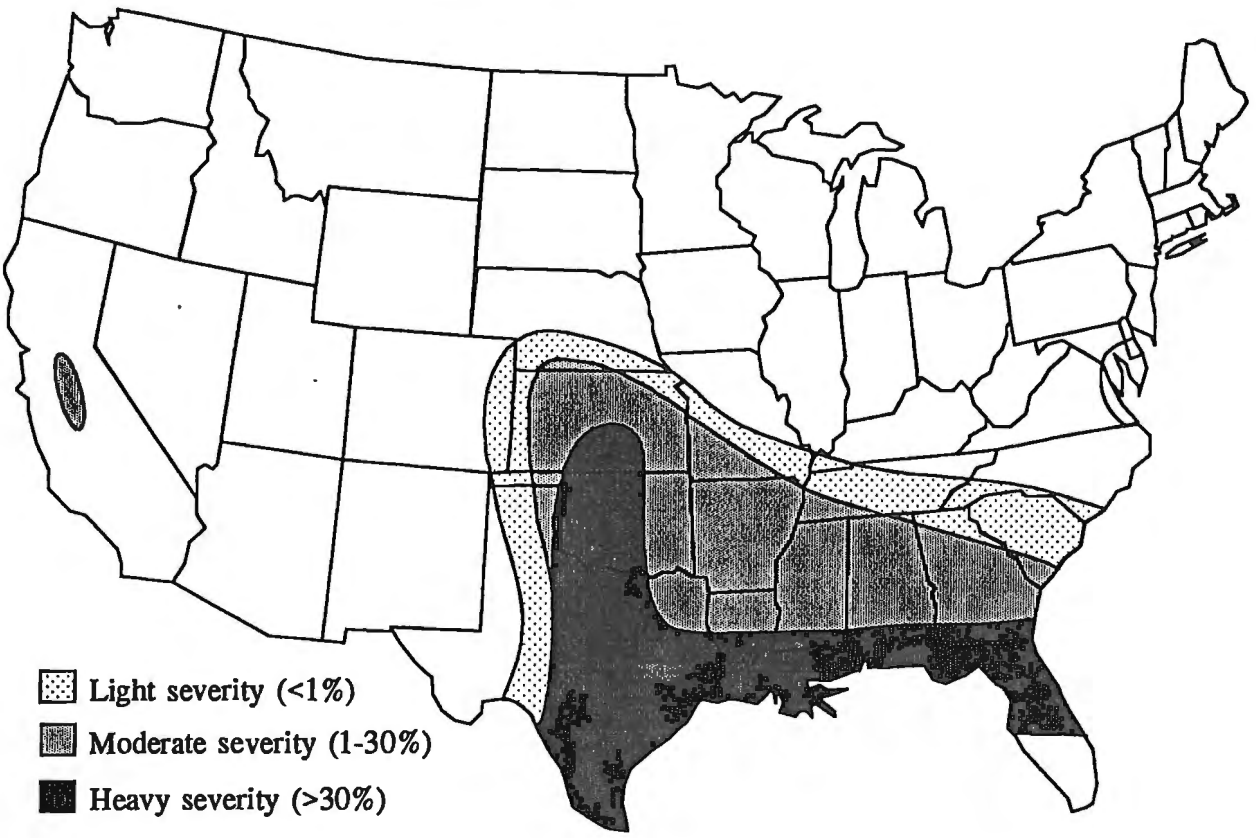
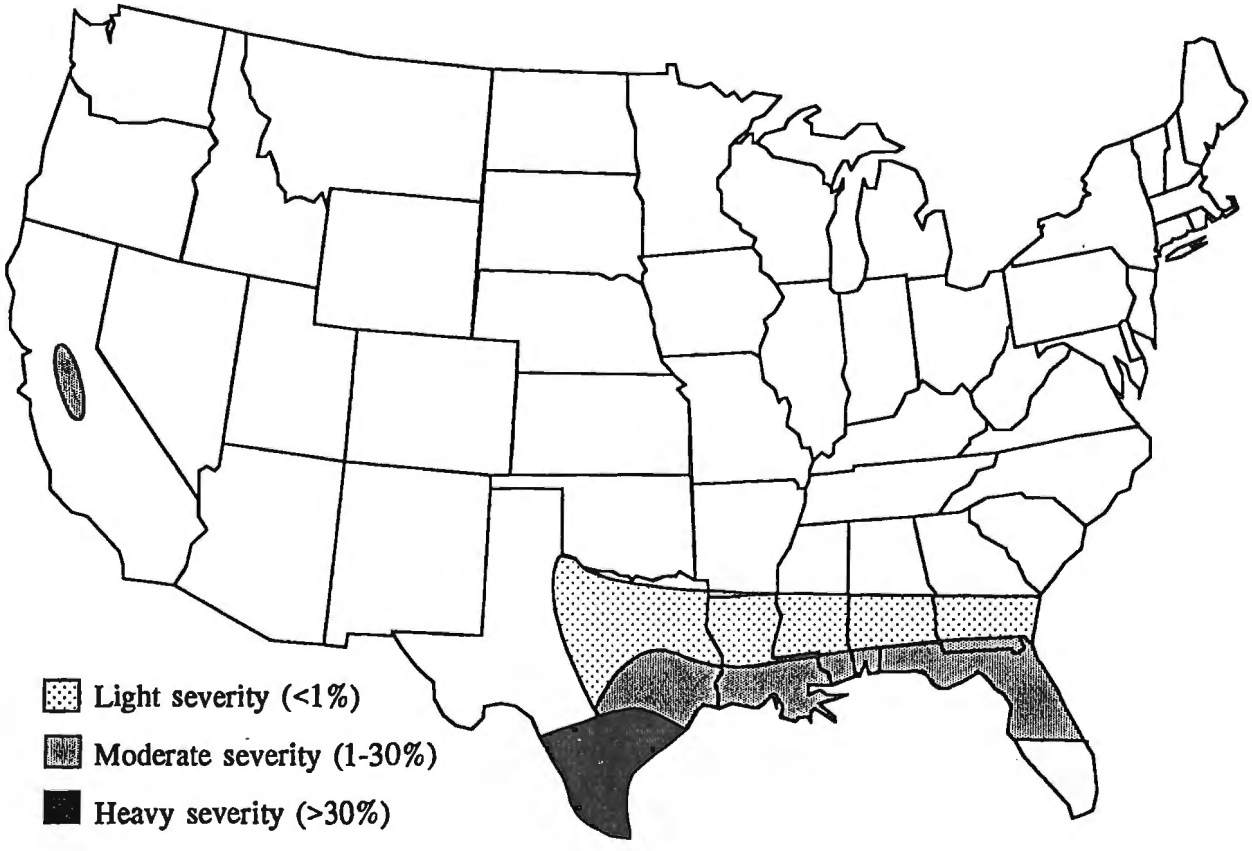


Fig. 2. Crown rust severities in oat fields, May 11, 1992



CEREAL RUST BULLETIN

Report No. 4
May 26, 1992

From:
CEREAL RUST LABORATORY
U.S. DEPARTMENT OF AGRICULTURE
UNIVERSITY OF MINNESOTA, ST. PAUL 55108
Tel. 612/625-6299 Fax: 612/649-5054

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

The small grain harvest is underway from central Texas to southern Georgia. In many areas of southern Oklahoma and southwestern Kansas wheat has suffered from lack of moisture. In northern areas field work is ahead of the normal pace and most spring sown small grains are planted.

Wheat stem rust. During the past two weeks traces of stem rust were found in plots from north central Texas to south central Kansas. The rust pustules on the cultivar 2157 in these plots were 7-10 days old by the second week in May. This cultivar is a host for race QCC which infects barley. In Harvey county in central Kansas traces of stem rust were found during the third week in May on the susceptible cultivar McNair 701, which is susceptible to all common races except QCC. Traces of wheat stem rust were found in a field of soft red winter wheat 30 miles north of Dallas, Texas and in a field in southwestern Oklahoma at the soft dough stage during the second week in May. The second report of wheat stem rust in the southeastern United States this year was in a plot of Citation in southwestern Mississippi with 10% severity. The lower than normal overwintering of stem rust along the Gulf Coast and dry weather throughout northern Texas, Oklahoma and Kansas has limited stem rust development.

Wheat leaf rust. Leaf rust severities on susceptible cultivars in northern Oklahoma and southern Kansas averaged 60% during the second week in May (Fig. 1). In this area dry windy weather temporarily halted rust development. Dews have allowed for rust infection on the flag leaf in less mature fields. We expect 10% losses to leaf rust in many areas of Kansas and Oklahoma where the rust is severe.

In the winter wheat area from southern North Carolina to southern Missouri leaf rust is moderately severe on susceptible cultivars. In much of this area rust development has been slow because of drier than normal conditions. On May 21, one percent severities were observed in a winter wheat field of Roughrider in southeastern North Dakota and traces were observed on spring wheats in the same area. During the last week of May light amounts of leaf rust (less than 1% severity) were found in the spring and winter wheat plots at Brookings, South Dakota. In the Pacific Northwest, leaf rust has increased on susceptible cultivars in the past two weeks but now with conditions becoming drier, rust development has slowed.

Leaf rust severities on goatgrass (Aegilops cylindrica) growing along wheat fields and roadsides in central and southern Oklahoma ranged from trace to 20% on flag leaves during the second week in May.

Preliminary data of the 1992 wheat leaf rust virulence survey are shown in Table 1.

Wheat stripe rust. In the central basin area of Washington and the Willamette Valley of Oregon, stripe rust is severe while elsewhere in the Pacific Northwest stripe rust is present but needs moisture to increase to levels that would cause yield losses.

Oat stem rust. Traces of stem rust were found in oat plots in southwestern Mississippi and a field in east central Louisiana during the second week in May. Ten percent severities were observed on wild oats (Avena fatua) in north central Texas and central California in mid-May.

Oat crown rust. Much of the oat crown rust development in north central Texas was slowed by dry weather in May. During the third week in May moderate aecial development was observed on buckthorns (alternate host) growing in southern Wisconsin and in the buckthorn nursery at St. Paul, Minnesota.

Barley leaf rust. As in recent years severe barley leaf rust was found on susceptible cultivars in plots in eastern North Carolina.

Barley stem rust. The first report of barley stem rust this year was of traces on varietal plots in north central Texas the second week in May.

Barley stripe rust. There have been no reports of barley stripe rust outside of Texas. High temperatures have limited stripe rust development in Texas.

Rye rust. In a rye field in southwestern Oklahoma, 40% leaf rust severities were found the second week in May. No stem rust has been found on rye this year.

Barberry. The aecial stage of stem rust was found on barberry bushes in Dane Co., Wisconsin during the second week in May.

TABLE 1. Preliminary data of the 1992 wheat leaf rust virulence survey

Prt code[1]	Virulence formula[2]	AL	FL	MS	LA	TX	KS
KBB-10	2a,2c,3,10						1
KBG-10	2a,2c,3,10,11		2			1	
MBG	1,3,11	4					
MBB-10	1,3,10					2	
MBG-10	1,3,10,11	9			2		
MBJ-10	1,3,10,11,17			1			
MFB-10	1,3,10,24,26				1	2	1
TBB-10	1,2a,2c,3,10					2	1
TBG-10	1,2a,2c,3,10,11			1	4	3	
TFG-10	1,2a,2c,3,10,11,24,26	3				1	
TLG-18	1,2a,2c,3,9,11,18	1					
Number of isolates		17	2	2	7	11	3
Number of collections		11	2	1	6	8	2

[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

Fig 1. Leaf rust severities in wheat fields, May 26, 1992

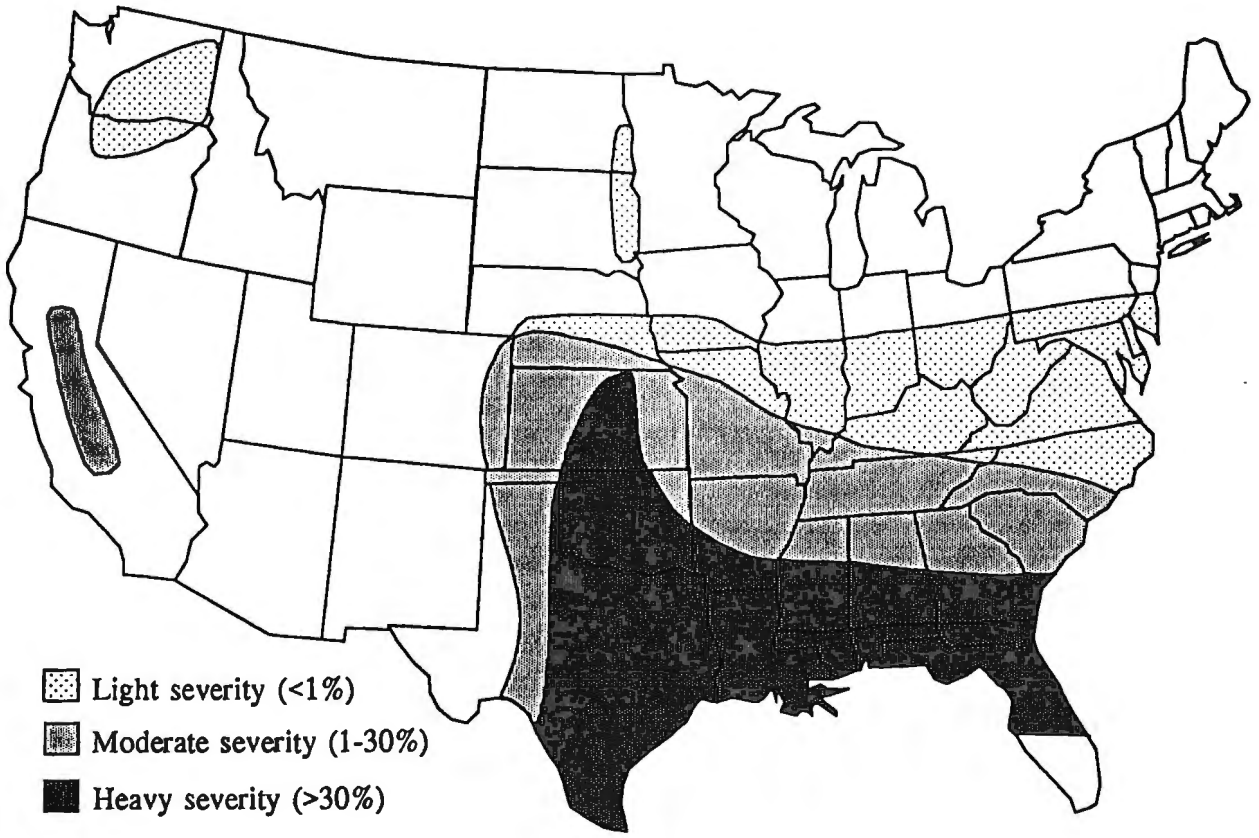
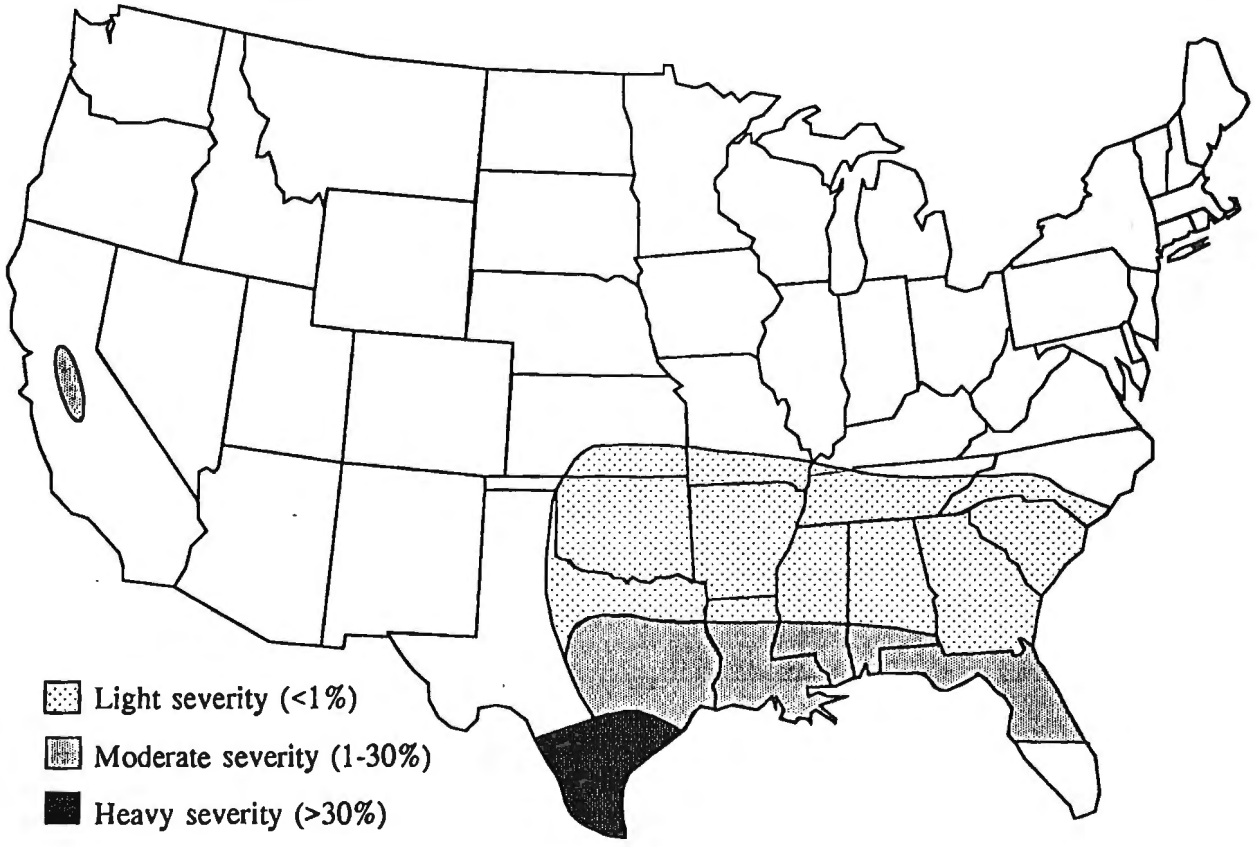


Fig. 2. Crown rust severities in oat fields, May 26, 1992



CEREAL RUST BULLETIN

Report No. 5
June 9, 1992

From:
CEREAL RUST LABORATORY
U.S. DEPARTMENT OF AGRICULTURE
UNIVERSITY OF MINNESOTA, ST. PAUL 55108
Tel. 612/625-6299 Fax: 612/649-5054

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

Wheat harvest has begun in northern Oklahoma, across to northern Georgia and in early fields along the Atlantic Coast. Drought and freezing temperatures in late May damaged the wheat crop significantly in western Kansas. Small grains in Montana and the Pacific Northwest are also showing effects of drought stress. Because of freeze damage and Rhizoctonia this will be the smallest wheat crop in Indiana since 1951. Spring grain seeding is complete and many plants are at the jointing stage. In most areas the spring crop is in good condition.

Wheat stem rust. Race Pgt-QCC, the race that is usually associated with stem rust on barley, was identified from collections made from wheat in early April in southern Texas. Traces of stem rust were found on the cultivar Voyager in south central and central Kansas during the last week in May. On June 2 a pustule of stem rust was found in a plot of 2157 in north central Kansas. This is the least amount of stem rust found by June 2 in Kansas in the past three years, since the appearance of Pgt-QCC. The early maturity of wheat, recent cool temperatures, and late freezes have all inhibited the spread of stem rust. Wheat stem rust was reported in trace amounts in a southeastern Indiana field during the first week in June. This is the only stem rust reported in the soft red winter wheat area. Traces of stem rust were found during the first week in June in a plot of spring-planted winter wheat in a Fargo, North Dakota nursery. This is three weeks earlier than normal for the first report of stem rust at Fargo.

Wheat leaf rust. Leaf rust severities as high as 90% were observed during the last week in May in susceptible wheat plots throughout central Kansas, while severities in fields varied from less than 5% to 90%. In western Kansas severities generally were less than in central Kansas because of the drought. Leaf rust overwintered in Kansas and has increased to damaging levels through most of the state. Losses will be significant where drought (west 1/3) and late May freeze (NW 1/9) have not seriously affected wheat growth. Losses will vary with local conditions but many fields will suffer 10 to 20% reductions in yield. In the northern soft red winter wheat area from southern New York to northwestern Indiana traces of leaf rust were observed during the first week in June (Fig. 1).

During the first week in June traces of leaf rust were observed in northern Great Plains winter wheat fields from east central to south central North Dakota. In the Rosemount, Minnesota nursery on June 4, five percent severities were observed on 10% of the plants in the susceptible spring wheat cultivars Baart and Thatcher. On winter wheat cultivars leaf rust severities ranged from trace to 20% on the susceptible cultivars. Dry weather has slowed rust development on the upper leaves of winter wheat, while on the spring wheats the pustules developed more readily because free moisture was present on the leaves that were close to the ground where dews occurred.

Preliminary data of the 1992 wheat leaf rust virulence survey are shown in Table 1.

Wheat stripe rust. Severe stripe rust was observed on susceptible cultivars in San Luis Obispo County and Sacramento Valley nurseries in California.

Oat stem rust. There have been no new reports of oat stem rust since the last bulletin. From 20 collections made in Texas in early April races NA-9, -16 and -27 were identified. As in recent years race NA-27 comprised almost 90% of the isolates.

Oat crown rust. There have been no new reports of crown rust spread since the last bulletin. Aecial infections on buckthorn in Minnesota are light this year.

Barley leaf rust. Traces of barley leaf rust were found the last week in May throughout central Pennsylvania fields and plots. In eastern Virginia barley plots, 50% severities were observed on the most susceptible cultivars the last week in May. Little leaf rust occurs in the central plains on barley.

Barley stem rust. The only report of barley stem rust this year, was the trace found in barley plots in north central Texas in mid-May. However, race Pgt-QCC has been identified from wheat in Texas. Severities and incidence are much reduced from 1990 and 1991.

Barley stripe rust. Stripe rust has not been reported outside of Texas. Periods of cool moist weather have been separated by hot dry weather in the central plains which would be unfavorable for stripe rust spread.

Rye leaf rust. Traces of rye leaf rust were found on lower leaves in west central Wisconsin fields during the last week in May.

Rye stem rust. During the last week in May traces of stem rust were found on rye in a central Wisconsin field.

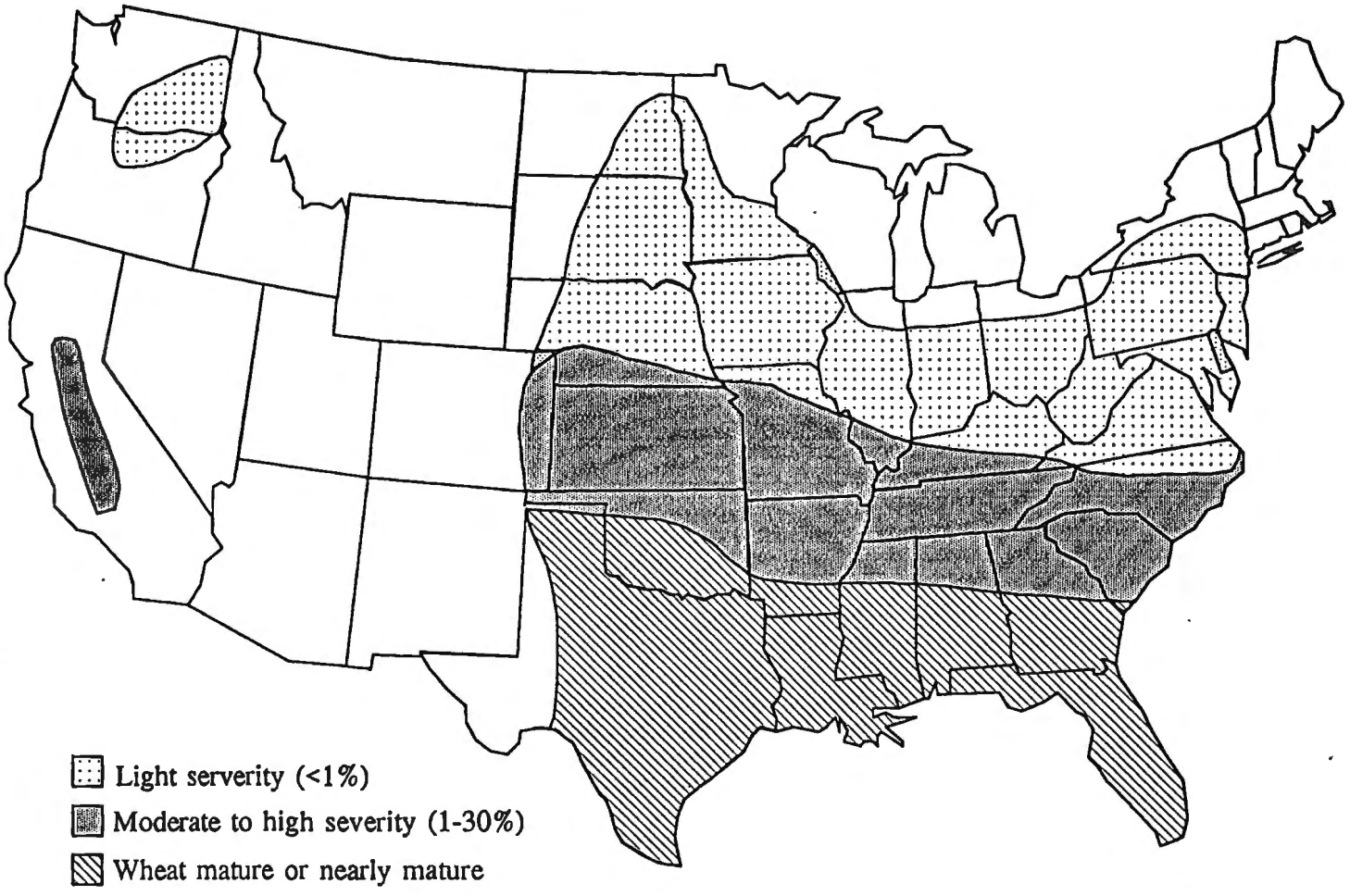
Barberry. During the last week in May, moderate aecial development was observed on Berberis vulgaris bushes in southeastern Minnesota.

TABLE 1. Preliminary data of the 1992 wheat leaf rust virulence survey

Prt code[1]	Virulence formula[2]	AL	FL	MS	LA	TX	KS	CA
KBB-10	2a,2c,3,10						1	
KBG-10	2a,2c,3,10,11	1	2			1		
KCG-10	2a,2c,3,10,11,26						1	
LLJ-10	1,9,10,11,17	1						
MBG	1,3,11	4						
MBB-10	1,3,10					2		
MBG-10	1,3,10,11	14			2			
MBJ-10	1,3,10,11,17	1		1			1	
MCB-10	1,3,10,26							2
MFB-10	1,3,10,24,26				1	2	1	
TBB-10	1,2a,2c,3,10					2	1	
TBG-10	1,2a,2c,3,10,11	2		1	4	3		
TBJ-10	1,2a,2c,3,10,11,17	1						
TDB-10	1,2a,2c,3,10,24					2		
TFG-10	1,2a,2c,3,10,11,24,26	3				1		
TLG-18	1,2a,2c,3,9,11,18	1						
Number of isolates		28	2	2	7	13	5	2
Number of collections		18	2	1	6	9	3	2

[1] Prt code (See Phytopathology 79:525-529).
[2] Single gene resistances evaluated:
Lr1,2a,2c,3,3ka,9,10,11,16,17,18,24,26,30

Fig. 1. Leaf rust severities in wheat fields, June 9, 1992



CEREAL RUST BULLETIN

Report No. 6

June 25, 1992

From:
CEREAL RUST LABORATORY
U.S. DEPARTMENT OF AGRICULTURE
UNIVERSITY OF MINNESOTA, ST. PAUL 55108
Tel. 612/625-6299 Fax: 612/649-5054

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

In mid-June winter wheat was being harvested from southern Kansas to North Carolina. Spring-sown small grains are in good shape and moisture is adequate in most of the northern Great Plains area.

Wheat stem rust. By the first week in June, stem rust severities ranged from 1 to 10% in east central Kansas fields. By the third week in June, traces of stem rust were found in plots of the cultivar Karl from north central Kansas to central and east central South Dakota. Stem rust infection foci of 20% severities were observed on the susceptible trap cultivar McNair 701 in north central Kansas. Traces of stem rust were found in the soft red winter wheats Cardinal and Clark in Belleville, Kansas plots. In the South Dakota plot of Karl stem rust foci had 10% severities while 30 cm away only traces were found. Continued cool weather has slowed the spread of stem rust but with the latest rains the rust should increase. Since only traces of stem rust were found in the central and northern Great Plains stem rust is not expected to be a problem on winter wheats in this area. In south central Illinois soft red winter wheat plots, traces of stem rust were found in mid-June. Only scattered traces of stem rust have been reported in the northern soft red winter wheat area this year. In eastern Washington, stem rust was reported in a field south of Pullman in mid-June, this is earlier than normal for this area. Pgt- races QCCS and TPMK continue to comprise most of the population (Table 1).

Wheat leaf rust. As reported in the previous bulletin, considerable loss to leaf rust will occur in Kansas. During mid-June, 60% leaf rust severities were observed in winter wheat fields and plots in south central Nebraska and trace-60% severities in winter wheat plots in a central South Dakota nursery at Highmore (Fig. 1). Losses will vary with local conditions but many southern Nebraska fields will suffer 10 to 20% reduction in yield. In the central South Dakota nursery, 60% severities were recorded on TAM107 (Lr10+ resistance), 20% severities on Siouxland (Lr24+26) and a trace on Brule (Lr16). Thus, at least 3 leaf rust races are present in this area. In a field in west central Iowa, 20% severities were observed at the 1/2 berry stage the second week in June. Up to 40% severities were observed on winter triticales in east central Nebraska plots. In winter wheat fields in southeast North Dakota, 30% severities were observed the second week in June. In spring wheat plots and fields up to 10% severities were found on wheat cultivars in east central South Dakota and west central and northwestern Minnesota during the second week in June. Rain and dew periods the past two weeks have exceeded the 6 hours necessary for leaf rust infection to occur. In southeastern Washington, leaf rust is severe while in western Washington moderate amounts were present but the severities have not increased in the past week. Preliminary data of the 1992 wheat leaf rust virulence survey are shown in Table 2.

Wheat stripe rust. This year stripe rust was reported for the first time since 1987 on soft wheats in east central Kansas. In the Pacific Northwest, stripe rust is moderate in southwestern Washington, severe in the Skagit Valley and increasing in the Pullman area.

Oat stem rust. During mid-June traces of oat stem rust were found in south central Nebraska fields and in north central Kansas plots. This is later than normal for the first report of oat stem rust in this area. Race NA-27 continues to dominate the oat stem rust population (Table 3).

Oat crown rust. During mid-June crown rust was found at 10% severities on 100% of the plants in south central Nebraska and north central Kansas. In Minnesota and Wisconsin the aecial development is light on buckthorn (alternate host). Spread from buckthorn to oats was delayed by dry weather in May and cooler than normal temperatures in June.

Barley stem rust. Barley plots in south central Nebraska had trace to 10% severities on 20% of the plants during mid-June. During the second week in June traces of barley stem rust were found in plots and fields in southeastern North Dakota.

Barley leaf rust. During mid-June leaf rust severities ranged from trace to 10% severities on barley in a nursery in south central Nebraska. Light amounts of barley leaf rust were found in the Red River Valley in Minnesota in late June.

Rye stem rust. The only report of rye stem rust was in a central Wisconsin field the last week in May.

Rye leaf rust. Up to 10% leaf rust severities were found on lower leaves in a west central Minnesota winter rye nursery the second week in June.

Barberry. During the first week in June, light aecial development was observed on Berberis vulgaris bushes in south central Wisconsin.

Fig. 1. Leaf rust severities in wheat fields, June 25, 1992

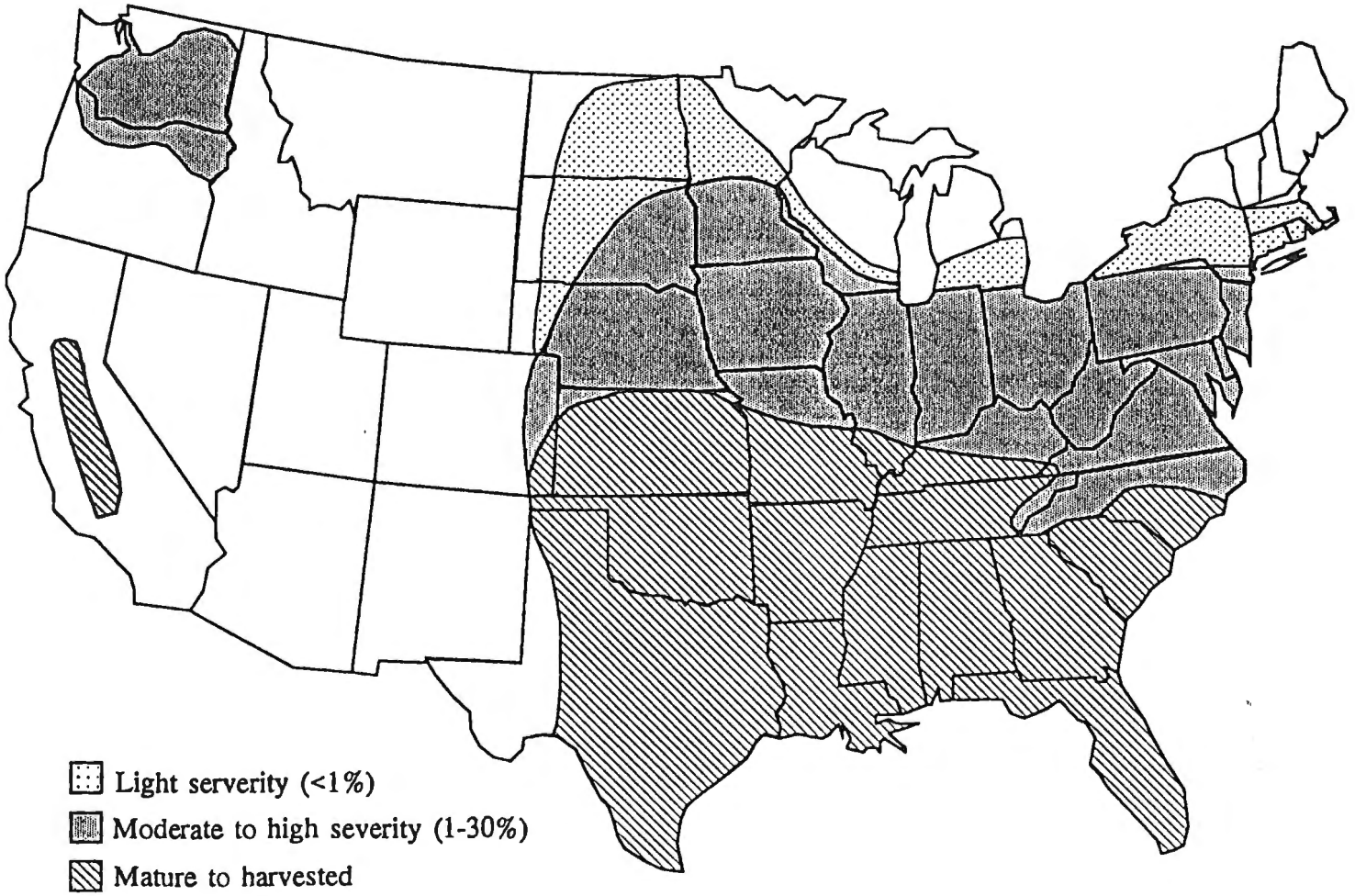


TABLE 1. Wheat stem rust races identified through June 25, 1992

State	Number of		Percent of Pgt- race		
	collections	isolates	TPMK	QCCJ	QCCS
Texas	13	33	21	33	45
Alabama	1	3	100		

TABLE 2. Wheat leaf rust races identified through June 25, 1992

Prt code	Virulence formula[1]	Percent of isolates by state											
		AL	TX	GA	NC	SC	KS	AR	OK	FL	MS	LA	CA
KBB-10	2a,2c,3,10		2				9						
KBG-10	2a,2c,3,10,11	2	2							100			
KCG-10	2a,2c,3,10,11,26						9						
LBD-10,18	1,10,17,18			50									
LLJ-10	1,9,10,11,17	2											
MBG	1,3,11	10											
MBB-10	1,3,10		6										
MBD-10	1,3,10,17		8										
MBG-10	1,3,10,11	45	2				9	50				29	
MBJ-10	1,3,10,11,17	10		50			18				50		
MCB-10	1,3,10,26												100
MDB-10	1,3,10,24		12				9		100				
MDG-10	1,3,10,11,24		6										
MFB-10	1,3,10,24,26		24				9					14	
MLG-10	1,3,9,10,11					100							
PLB-10	1,2c,3,9,10		2										
TBB-10	1,2a,2c,3,10		4				9						
TBG-10	1,2a,2c,3,10,11	4	20				18	50			50	57	
TBJ-10	1,2a,2c,3,10,11,17	4											
TCJ-10	1,2a,2c,3,10,11,17,18,26	2											
TDB-10	1,2a,2c,3,10,24		6										
TDG-10	1,2a,2c,3,10,11,24		2										
TFB-10	1,2a,2c,3,10,24,26		2				9						
TFG-10	1,2a,2c,3,10,11,24,26	8	2										
TLG-18	1,2a,2c,3,9,11,18	8											
TLJ-18	1,2a,2c,3,9,11,17,18	2			100								
Number of isolates		40	49	4	2	1	11	2	1	2	2	7	2
Number of collections		27	26	3	1	1	8	2	1	2	1	6	2

[1] Single gene resistances evaluated: Lr1,2a,2c,3,3ka,9,10,11,16,17,18,24,26,30

TABLE 3. Oat stem rust races identified through June 25, 1992

State	Number of		Percent of NA race		
	collections	isolates	27	16	23
Texas	27	75	79	17	4
Oklahoma	1	3	100		

CEREAL RUST BULLETIN

Report No. 7
July 14, 1992

From:
CEREAL RUST LABORATORY
U.S. DEPARTMENT OF AGRICULTURE
UNIVERSITY OF MINNESOTA, ST. PAUL 55108
Tel. 612/625-6299 Fax: 612/649-5054

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

The winter wheat harvest has begun from northeastern Nebraska to central Indiana. In the northern Great Plains, most of the spring-sown grains are in good condition and one week behind normal crop development because of cool weather. Some cereals along the Canadian border have just reached the jointing stage. These late fields remain very vulnerable to rust infection.

Wheat stem rust. By the second week in July, 20% wheat stem rust severities were found in plots of susceptible winter wheat in east and west central Minnesota and traces in southeastern North Dakota plots. Traces of stem rust were found on the susceptible spring wheat Baart in southeastern Minnesota at the Rosemount nursery on July 9. Commercial spring wheats have a high level of stem rust resistance. This is the least amount of stem rust in the northern plains in the last five years. In Washington there has been no reported stem rust increase since mid-June. Pgt- races QCCS, QFCS and TPMK continue to comprise most of the population (Table 1).

TABLE 1. Wheat stem rust races identified through July 14, 1992

	Number of		Percent of Pgt- race				
State	collections	isolates	QCCJ	QCCQ	QCCS	QFCS	TPMK
Alabama	1	3					100
Kansas	6	18	17	6		22	56
Oklahoma	6	14	36			43	21
Texas	23	50	16	14	26	6	38

Wheat leaf rust. By early July, leaf rust severities in winter wheat fields ranged from 80% in north central South Dakota to traces in northwestern North Dakota. The commonly grown winter wheat cultivars are susceptible to leaf rust and losses are expected in the northern plains. Only traces of leaf rust were found in spring wheat fields over most of the area from north central South Dakota to west central Minnesota. In most of the spring wheat fields in the northern plains no rust was found, while in a few fields 10% severities were reported. At a few Minnesota locations some rust has developed on flag leaves of Marshall. Since most of the spring wheat cultivars in the northern plains are resistant to leaf rust, only trace losses are expected.

During the last week of June leaf rust severities ranged from trace-5% in soft red winter wheat (soft dough stage) fields from central Pennsylvania to central Indiana. During early July traces of leaf rust were observed on winter wheat cultivars in south central New York, which is less than normal. Preliminary data of the 1992 wheat leaf rust virulence survey are shown in Table 2.

Wheat stripe rust. In the Gallatin Valley near Bozeman, Montana severe stripe rust was found in June. However, in general stripe rust remains light.

TABLE 2. Wheat leaf rust races identifed through July 14, 1992

Prt code	Virulence formula[1]	Percent of isolates by state														
		AL	AR	CA	FL	GA	IN	KS	LA	MO	MS	OK	NC	TN	TX	VA
BBB-10	10			6												
CCB-10	3,10,26			19												
DBB-10	2c,10			6												
FBL	2c,3,10	5														
KBB-10	2a,2c,3,10							5							1	
KBG-10	2a,2c,3,10,11	2	6		67			5				17			1	
KCG-10	2a,2c,3,10,11,26							5								
KFB-10	2a,2c,3,10,24,26														1	
LBB-10	1,10															50
LBD-10,18	1,10,17,18												100			
LLJ-10	1,9,10,11,17	2														
MBB-10	1,3,10						14					17			3	
MBD-10	1,3,7,10,17														5	
MBG	1,3,11	10												100		
MBG-10	1,3,10,11	41	59				43	10	20	100	60	17			3	
MBJ	1,3,11,17	2	12			9										
MBJ-10	1,3,10,11,17	7				9		10								
MCB	1,3,26			25											1	
MCB-10	1,3,10,26			38											3	
MDB-10	1,3,10,24						29	10							5	
MDD-10	1,3,10,17,24														3	
MDG	1,3,11,24														1	
MDG-10	1,3,10,11,24						14		5							
MFB-10	1,3,10,24,26							16	15						34	
PBD-10	1,2c,3,10,17			6												
PBG-10	1,2c,3,10,11	2														
PLB-10	1,2c,3,9,10														1	
SBD	1,2a,2c,17							10								
TBB-10	1,2a,2c,3,10							5							3	
TBD	1,2a,2c,3,17		12													
TBG-10	1,2a,2c,3,10,11	12	12		33	9		16	35		40				19	50
TBJ-10	1,2a,2c,3,10,11,17	5														
TCJ-10	1,2a,2c,3,10,11,17,26	2														
TDB-10	1,2a,2c,3,10,24								5						5	
TDG-10	1,2a,2c,3,10,11,24											17			3	
TFB-10	1,2a,2c,3,10,24,26							10	5			33			5	
TFG-10	1,2a,2c,3,10,11,24,26														1	
TGL-10	1,2a,2c,3,10,11,16					9										
TLG-18	1,2a,2c,3,9,11,18	5				36			15							
TLJ-18	1,2a,2c,3,9,11,17,18	2				27										
Number of isolates		41	17	16	3	11	7	20	20	1	5	6	2	2	74	2
Number of collections		27	11	12	3	8	3	12	16	1	3	6	2	1	57	1

[1] Single gene resistances evaluated: Lr1,2a,2c,3,3ka,9,10,11,16,17,18,24,26,30

Oat stem rust. Traces of oat stem rust were found in the past two weeks in southeastern Minnesota. Race NA-27 continues to dominate the southern oat stem rust population (Table 3).

TABLE 3. Oat stem rust races identified through July 14, 1992

State	Number of collections	Number of isolates	Percent of NA race 5	16	23	27
California	2	6	100			
Louisiana	1	3				100
Mississippi	1	1				100
Oklahoma	1	3				100
Texas	27	85		18	4	79

Oat crown rust. During the past two weeks trace to 10% severity of crown rust was found from northeastern South Dakota to south central Wisconsin to southwestern New York. This is the least amount of crown rust that has been seen in the northern oat growing area in the past four years on this date. In oat plots at Rosemount, Minnesota 20% severities were observed on lower leaves. Time remains for significant disease, with more normal temperatures. Moisture is adequate in most areas.

Barley stem rust. During the first full week in July, traces of barley stem rust were found in fields in northeastern South Dakota to east central North Dakota and in plots in west central Minnesota. This is much less stem rust than has been reported on barley since 1988, which probably can be related to lower levels of initial inoculum, cool temperatures and delayed maturity of barley. No stem rust has been reported on Hordeum jubatum which is susceptible to race Pgt-QCCJ, the race that attacks barley.

Barley leaf rust. Last week 10% severities were observed in southeastern North Dakota and west central Minnesota plots. Generally most fields have little leaf rust in this area.

Rye leaf rust. In winter rye plots from east to west central Minnesota 80% leaf rust severities were reported the first week in July. In spring rye fields in the same area 10% severities were reported. Leaf rust is more severe and widespread than normal.

Other rusts. Stem rust was found on Agropyron repens plants growing within 25 feet of Berberis vulgaris bushes in southeastern Minnesota the last week in June. In southeastern North Dakota crown rust was severe on A. repens and H. jubatum the first week in July near buckthorns. Crown rust also was found on barley in plots near these buckthorns. Occurrence of crown rust on barley is a new development for U.S. small grain production, first seen in Nebraska in 1991. The potential destructiveness of crown rust is not known, so this new disease is being closely monitored.

CEREAL RUST BULLETIN

Report No. 8

August 5, 1992

From:
CEREAL RUST LABORATORY
U.S. DEPARTMENT OF AGRICULTURE
UNIVERSITY OF MINNESOTA, ST. PAUL 55108
Tel. 612/625-6299 Fax: 612/649-5054

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

Small grains in the northern Great Plains are mostly in good condition despite being well behind normal development due to the one of the coolest June and July's on record. Barley and winter wheat harvest has begun in southeastern North Dakota and northeastern Montana.

Wheat stem rust. During 1992, stem rust overwintering sites were found on susceptible cultivars in southern Texas, southern Louisiana and southeastern Alabama. By late April, stem rust was severe in these plots while in northern Texas stem rust did increase from the initial foci. By the second week in May traces of stem rust were found in plots and fields from north central Texas to south central Kansas. In late May, traces of stem rust were found on the cultivar Voyager in south central and central Kansas as well as on 2157 (susceptible to both Pgt-TPM and QCC) in a plot in northern Kansas. By the first week in June, stem rust severities ranged from 1 to 10% in east central Kansas fields. This was the least amount of stem rust found in Kansas on this date in the past three years, since the appearance of Pgt-QCC. By the third week in June, traces of stem rust were found in plots of the cultivar Karl from north central Kansas to central and east central South Dakota. Fewer overwintering sites along the Gulf Coast, cool temperatures and late freezes all inhibited the spread of stem rust into the Central Plains. The only reports of stem rust in the northern soft red winter wheat area were in a southeastern Indiana field and south central Illinois plots the first week in June.

In early June, traces of stem rust were found in spring-planted winter wheat in a southeastern North Dakota nursery. This was three weeks earlier than normal for the first report of stem rust in this area. By mid-July, 20% wheat stem rust severities were found in plots of susceptible winter wheat in east and west central Minnesota and traces in southeastern North Dakota plots. Due to cool weather rust increased slowly in northeastern and northwestern North Dakota resulting in light losses.

Traces of stem rust were found on the susceptible spring wheat Baart in southeastern Minnesota in early July. By the last week in July, stem rust was as high as 60% severity on susceptible spring wheat cultivars in west central Minnesota plots. The commonly grown spring and durum wheats are resistant to stem rust, so no losses are expected.

Pgt- races TPMK, QCCJ, and QFCS were the most common races identified in 1992 (Table 1). These races were also common in 1991.

TABLE 1. Races of stem rust identified from wheat through August 4, 1992

	Number of		Percent of Pgt- race					
State	collections	isolates	QCCJ	QCCQ	QCCS	QFCS	TPLK	TPMK
Alabama	1	3						100
Georgia	2	6					17	83
Illinois	2	6						100
Kansas	17	49	6		6	24		63
Nebraska	3	9						100
Oklahoma	6	14	36			43		21
South Dakota	2	6				67		33
Texas	21	47	15	13	28	6		38

Wheat leaf rust. In 1992 by early April leaf rust was light to moderate on susceptible cultivars in plots and fields within 75 miles of the Gulf Coast from the Florida panhandle to southern Texas. The winter was mild and rainfall in these areas was above normal creating favorable conditions for rust infection. In late April in the southern soft red winter wheat area leaf rust was severe on susceptible cultivars in plots but rust in fields was light. By mid-May leaf rust was moderately severe on susceptible cultivars in fields from southern North Carolina to southern Missouri. In some of the severely rusted fields 5% losses occurred. During the last week of June leaf rust severities ranged from trace-5% in soft red winter wheat fields from central Pennsylvania to central Indiana. During early July traces of leaf rust were observed on winter wheat cultivars in south central New York, this was less than normal. Throughout the northern soft red winter wheat area rust severities were less than normal and losses were light.

By late April 80% severities were observed on susceptible cultivars in north central Texas and southwestern Oklahoma. Rainfall was limited in this area but there were dews in April allowing for rust infection. Leaf rust severities on goatgrass (Aegilops cylindrica) growing along wheat fields and roadsides in central and southern Oklahoma ranged from trace to 20% on flag leaves during mid-May. Race SBD (Table 2) was the only race identified from Ae. cylindrica collections. Oklahoma and the panhandle of Texas had the most severe leaf rust since 1985, causing losses.

During the 1991-92 winter, leaf rust survived in much of eastern and southern Kansas. By the second week in May leaf rust severities on flag leaves in northern Oklahoma and southern Kansas averaged 60%. During the last week in May on susceptible wheat 90% severities were observed in plots throughout central Kansas, while severities in fields varied from less than 5% to 90%. In western Kansas, severities generally were less than in central Kansas because of drier conditions. A severe freeze in northwestern Kansas killed most of the wheat in that area. Leaf rust losses in Kansas varied with local conditions but many fields suffered 10 to 20% reductions in yield and the state averaged a 11% loss. During mid-June, 60% severities were observed in southeastern Nebraska winter wheat fields and in winter wheat plots in central South Dakota nurseries. Losses varied with local conditions, but some southeastern Nebraska fields suffered 10 to 20% yield reductions.

During late May light amounts of leaf rust (less than 1% severity) were found in winter wheat plots in the northern Great Plains. By the second week in June, 20% severities were found on winter wheat and 5% severities on spring wheat cultivars at the Rosemount, Minnesota. Dry weather during early June slowed rust development on the upper leaves of winter wheat, while on the spring wheats the rust developed more readily because of dew formation on the leaves near to the ground. By early July, leaf rust severities in winter wheat fields ranged from 80% in north central South Dakota to traces in northwestern North Dakota. All of the major winter wheat cultivars grown in this area are susceptible to leaf rust. In the severely rust-infected fields, 5-20% losses occurred. During late July only traces of leaf rust were found on spring wheat cultivars with the exception of Marshall (10% severity) No losses occurred on spring wheat except for, perhaps, a 1-5% loss in a few fields of Marshall.

In the Pacific Northwest, leaf rust was increasing in mid-May. By late June, leaf rust was severe in southeastern Washington, while in western Washington moderate amounts were present but drought conditions limited rust development resulting in 5 to 10% losses.

Preliminary data (Table 2) on frequency of leaf rust races indicate that MFB-10 and TBG-10 were most common in Texas. The increase in virulence to Lr2a, 2c and 11 (race TBG-10) is the biggest change from 1991. As in 1991, race MBG-10 was the predominate race identified from southern soft red winter wheat area.

Wheat stripe rust. By early April, stripe rust had appeared in an irrigated nursery in southern Texas. Light amounts of stripe rust were found in late April in soft red winter wheat fields and plots in northeastern Texas. Wheat stripe rust was widespread but light this year in Louisiana and southwest

Arkansas. Traces of stripe rust were reported for the first time since 1987 on soft wheats in east central Kansas.

In the Pacific Northwest dry weather delayed rust development in the fall but early winter was mild and moist, which allowed for the disease establishment. By mid-May rust was severe in the central basin area of Washington, Willamette Valley of Oregon and Sacramento Valley nursery in California. Elsewhere in the Pacific Northwest, rust was present but moisture was limited. In mid-June stripe rust was severe in the Gallatin Valley of Montana, and Skagit Valley of Washington and near Pullman, Washington. Losses to stripe rust were variable, ranging from traces to 10% in the Pacific Northwest this year.

Oat stem rust. In early April, traces of oat stem rust were found in southern Texas fields. By mid-April oat stem rust was severe on nurseries in southern Texas and southern Louisiana. In early May, stem rust severities ranged from 0 to 5% in central Texas fields, while traces were found in southwestern Oklahoma fields. By mid-May 10% severities were observed on wild oats (Avena fatua) in north central Texas and central California. By late May oat stem rust was light but widely scattered throughout the southern Great Plains and providing inoculum for the northern oat growing areas. During mid-June traces of oat stem rust were found in south central Nebraska fields and north central Kansas plots. By early July traces of oat stem rust were found in southeastern Minnesota and west central Minnesota. In late July in nearly mature fields in southeastern Minnesota 20% severities were observed. In general in the Northern Plains oat stem rust appeared late in the season and developed slowly because of cool weather. Terminal severities were light and little loss occurred. Race NA-27, virulent to Pg-1,-2,-3,-4 and -8, remains the predominant race of the population (Table 3).

Oat crown rust. During the first week in April, crown rust was severe in plots and fields throughout southern Texas. Most fields suffered yield losses of 20 to 50% or greatly reduced grazing value because crown rust killed the foliage and, in some cases, entire plants. This was the most severe and widespread crown rust infection observed in southern Texas for over 25 years. By late April crown rust was severe in north central Texas and southern Louisiana plots. By mid-May rust development in north central Texas was slowed by dry weather. During mid-June crown rust was found at 10% severities in south central Nebraska and north central Kansas but late onset and low severities limited losses.

During the third week in May moderate aecial development was observed on buckthorns (alternate host) growing in southern Wisconsin and the buckthorn nursery at St. Paul, Minnesota. Spread of aeciospores from buckthorn to oats was delayed by dry weather in May and cooler than normal temperatures in June. During early July trace to 10% crown rust severities were found from northeastern South Dakota to south central Wisconsin to southwestern New York. By late July light amounts of rust (less then 1%) were observed in northwestern Minnesota and eastern north Dakota fields and in plots severities ranged from 10-40% This is the least amount of crown rust seen in the northern oat growing area in the past four years. Losses will be light and limited to a few late maturing fields.

Barley stem rust. The first report of barley stem rust this year was traces in plots in north central Texas the second week in May. Race Pgt-QCCJ was identified from these collections (Table 4). No barley stem rust was found in southern Texas. In mid-June barley plots in south central Nebraska had trace to 10% severities on 20% of the plants. During the second week in June traces of barley stem rust were found in plots and fields in southeastern North Dakota. During the first full week in July, traces of barley stem rust were found in fields in northeastern South Dakota to east central North Dakota and in plots in west central Minnesota. In late July traces of barley stem rust were found in fields and plots in northeastern North Dakota and northwestern Minnesota. This is much less stem

rust than has been reported on barley since 1988, which can be related to lower levels of initial inoculum and cool June and July temperatures.

Race Pgt-QCCJ comprised 71% of the isolates identified so far from barley collections from Texas, Nebraska, Minnesota, South Dakota and North Dakota. Many of the collections from barley made in Minnesota and North Dakota are still being processed.

Barley leaf rust. By the first week in April, leaf rust caused by Puccinia hordei, was observed only in trace amounts on barley in the Rio Grande Valley, this was less than normal. Leaf rust overwintered in plots at Clemson, South Carolina, Warsaw, Virginia and in the Sacramento Valley of California. In early April at these sites the lower leaves had been killed and the rust was present on upper leaves. By late April, leaf rust was present in trace amounts in barley plots in north central Texas and central Pennsylvania. In eastern Virginia, 50% severities were observed on the most susceptible cultivars the last week in May. During mid-June leaf rust severities ranged from trace to 10% severities on barley in south central Nebraska. Light amounts of barley leaf rust were found in the Red River Valley in Minnesota in late June. By late July 20% severities were observed in fields in northeastern North Dakota. There was more leaf rust than usual this year due to cool weather and a dry May which restricted development of spot blotch which allowed the barley plant to keep its green leaves longer.

Barley stripe rust. For the second consecutive year barley stripe rust was reported in barley plots in Uvalde, Texas during early March. By the first week in April it was found in barley fields and plots from Uvalde to Dallas, Texas but not along the Texas Gulf Coast. In the same area stripe rust was found on the native Hordeum pusillum. In late April light amounts of barley stripe rust were found in fields and plots in north central Texas. May was hot and dry and no further spread of stripe rust occurred. Conditions in the northern Great Plains during June and July were ideal for stripe rust development if inoculum had been present.

Rye stem rust. The first report of rye stem rust in 1992 was in a central Wisconsin field during the last week of May. Traces of stem rust were found in a winter rye field in southeastern North Dakota and in a plot in northwestern North Dakota during late July.

Rye leaf rust. During the first week in April, 20 to 60% leaf rust severities were observed in rye plots in southern Texas. In north central Texas, 60% leaf rust severities existed in late April in plots. A rye field in southwestern Oklahoma, had 40% severities in mid-May. Traces of rye leaf rust were found on lower leaves in west central Wisconsin fields and in a west central Minnesota nursery during the last week in May. In central Minnesota winter rye plots, 80% rust severities were reported in early July while in spring rye plots 10% severities were reported. Rye leaf rust in 1992 was more severe and widespread than normal and losses will range from traces to 1%.

Barberry rust. In 1992, aecial collections were made from barberry in south central Wisconsin and southeastern Minnesota during the third week in May.

Other hosts. Stem rust was found on Agropyron repens growing within 25 feet of Berberis vulgaris bushes in southeastern Minnesota the last week in June. In southeastern North Dakota crown rust was severe on A. repens and Hordeum jubatum the first week in July near buckthorns. Crown rust also was found on barley in plots near these buckthorns. Occurrence of crown rust on barley is a new development for U.S. small grain production, first seen in Nebraska in 1991. The potential destructiveness of the disease is not known, so it is being monitored.

TABLE 2. Wheat leaf rust races identifed through August 4, 1992

		Percent of isolates by state															
Prt code	Virulence formula[1]	AL	AR	CA	FL	GA	IL	IN	KS	LA	MO	MS	OK	NC	TN	TX	VA
BBB-10	10			5													
CCB-10	3,10,26			14													
DBB-10	2c,10			5													
FBB-10	2c,3,10	5															
KBB-10	2a,2c,3,10								4							1	
KBG-10	2a,2c,3,10,11	5			67				4			13	8			4	
KCG-10	2a,2c,3,10,11,26								4								
KFB-10	2a,2c,3,10,24,26															1	
LBB-10	1,10																33
LBD-10,18	1,10,17,18													100			
LLJ-10	1,9,10,11,17	2															
MBB-10	1,3,10			14				14					8			2	
MBD-10	1,3,10,17															5	
MBG	1,3,11	4													50		
MBG-10	1,3,10,11	44	64	5				43	8	20	100	50	8		50	3	
MBJ	1,3,11,17	2	5			9											
MBJ-10	1,3,10,11,17	7				9			8								
MCB	1,3,26			23												1	
MCB-10	1,3,10,26			27												2	33
MDB-10	1,3,10,24							29	8							5	
MDD-10	1,3,10,17,24															2	
MDG	1,3,11,24															1	
MDG-10	1,3,10,11,24							14		5							
MFB-10	1,3,10,24,26		3				50		17	15			15			31	
PBD-10	1,2c,3,10,17			5													
PBG-10	1,2c,3,10,11	2															11
PLB-10	1,2c,3,9,10		3													1	
SBD	1,2a,2c,17			5					8				15				
TBB-10	1,2a,2c,3,10								8							2	
TBD	1,2a,2c,3,17		5														
TBG-10	1,2a,2c,3,10,11	12	8		33	9			21	35		38	15			24	11
TBQ-10	1,2a,2c,3,3ka,10,11					9											
TBQ-10,18	1,2a.2c,3,3ka,10,11,18																11
TBJ-10	1,2a,2c,3,10,11,17	5															
TCJ-10	1,2a,2c,3,10,11,17,26	2															
TDB-10	1,2a,2c,3,10,24		3						4	5						5	
TDG-10	1,2a,2c,3,10,11,24						50						8			2	
TFB-10	1,2a,2c,3,10,24,26		3						8	5			23			5	
TFG-10	1,2a,2c,3,10,11,24,26															1	
TLD-10	1,2a,2c,3,9,10,17		3														
TLG-18	1,2a,2c,3,9,11,18	5				36				15							
TLJ-18	1,2a,2c,3,9,11,17,18	2	3			27											
Number of isolates		43	39	16	3	11	2	7	24	20	1	8	13	2	4	84	9
Number of collections		28	28	12	3	8	1	3	16	16	1	5	13	2	2	63	6

[1] Single gene resistances evaluated: Lr1,2a,2c,3,3ka,9,10,11,16,17,18,24,26,30

TABLE 3. Races of stem rust identified from oats through August 4, 1992

State	Number of		Percent of NA race			
	collections	isolates	5	16	23	27
California	3	6	100			
Kansas	1	3				100
Louisiana	1	3				100
Minnesota	3	6		50		50
Mississippi	1	1				100
Nebraska	2	6				100
Oklahoma	1	3				100
Texas	30	85		17	4	78

TABLE 4. Races of stem rust identified from barley through August 4, 1992

State	Number of		Percent of Pgt- race			
	collections	isolates	QCCJ	QCCQ	QFCS	TPMK
Minnesota	1	3	100			
North Dakota	1	1	100			
Nebraska	2	6	83		17	
South Dakota	1	1	100			
Texas	1	3		67		33