CEREAL RUST BULLETIN

Report No: 1
April 9, 1985

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 mild warm weather the past month has hastened small grain development across the southern United States and central Great Plains. In most of these areas the moisture has been adequate. In northern Kansas and southern Nebraska there has been very little winterkill of wheat, and spring seeding of oats and barley is in full swing. In the northern plains there was more winterkill than last year because of cold weather when snow cover was inadequate. In the northern U.S. the small grain farmer is waiting for warm dry weather to start the spring planting season.

Wheat stem rust--In 1985, the first overwintering wheat stem rust sites were observed in McNair 701 disease detection plots at Beeville and Victoria, Texas, experiment stations on April 1. At both sites the rust developed in early December. Then the cold weather slowed disease development, and now, with the temperature increase, rust is developing at a fast pace. Currently the rust pustules are small and scattered throughout the plots. These are the only reports of wheat stem rust in the United States at the present time.

Wheat leaf rust--During the early part of April, leaf rust was severe throughout NK 812 fields and plots in south and central Texas. Ten percent losses are a possibility in many of these fields. In this area, leaf rust ranged from severe in some cultivars down to traces in others, such as Mitt. Leaf rust also has been reported in north Texas, southwest Oklahoma, southeast Arkansas and central and southeast Kansas.

From leaf rust collections made in mid-November, 1984, in north Texas, the following virulence combinations were identified: UN 2 (virulent to Lr3,11), UN 5 (virulent to Lr1,3,10), UN 17 (virulent to Lr2a,2c,3,10) and UN 6 (virulent to Lr1,2c,3,3ka,10,17,30). Except for UN 6, these were the common virulences found in this area in 1984. The UN 6 was identified from collections made from triticales.

Wheat stripe rust--There are no reports of stripe rust in 1985 in the central plains area of the United States.

Oat stem rust--In mid-January oat stem rust was severe in south Texas and then the cold weather arrived and rust development was set back. In early April, rust was found in grazed oat fields throughout south Texas and in the nursery plots at Beeville. This rust may develop at a fast pace if conditions for rust development continue.

The leading race of 1984, NA 27, was identified from the initial 1985 oat stem rust collections.

Oat crown rust--In early April, severe crown rust was found in south Texas oat plots, but was less severe in nearly every commercial field in the same area. This is significantly more crown rust than last year, and these rust sources could provide inoculum for the northern oat growing areas of the United States.

Barley leaf rust--Severe leaf rust was found in central Texas nursery plots in early April. In this area very little winter barley was seen.

CEREAL RUST BULLETIN

Report No: 2
April 23, 1985

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

Issued By:
AGRICULTURAL RESEARCH SERVICE
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The winter-sown small grain cereal crops are in generally good condition in most areas of the United States. Reports of winterkilling throughout the Great Plains are less than last year. Spring small grain seeding was progressing at a normal pace, but now rain has slowed this progress.

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

Wheat leaf rust--Leaf rust is severe in central Texas on some cultivars, i.e., NK 812, and increasing in north central Texas on other cultivars, i.e., Chisholm (Marshall). In many commercial fields of these two cultivars losses will be significant. In Texas nursery plots, the Lr9 single gene line and cultivars with Lr9 in their pedigrees are disease-free. Progressing northward, leaf rust is now readily found on susceptible cultivars in central Oklahoma plots, and traces were found in south central Kansas fields. From collections made in early March in southwestern Oklahoma, the following virulence combinations were identified: UN 2 (virulent to Lr3,10) and UN 5 (virulent to Lr1,3,10,17). Rust is severe in Louisiana plots, and in commercial fields of susceptible cultivars losses will occur (Harrison).

In the southeastern United States, leaf rust was found in nurseries and fields that were planted in October, 1984, and in locations close to the Gulf Coast. In these southerly locations rust is severe on susceptible cultivars but scarce on the commonly grown commercial cultivars. Rust is severe on Lr9, Lr1, and Lr3 lines. In the more northern locations of this area, like central and north Georgia, leaf rust was not yet found. Cold winter temperatures killed leaves and with them most of the overwintering rust.

In a central Pennsylvania nursery leaf rust was found on Tyler in late March (Bingaman). This rust must have overwintered at this location.

Traces of rust were found in the early fall-seeded wheat in the Pullman, Washington, area (Line). Rust is not as severe as last year because of the severe winter which killed much of the overwintering inoculum.

Wheat stripe rust--Traces of stripe rust were found in western Washington (Line) and on triticales in nursery plots in Salinas Valley, California. The first collection of 1985 made in the central US was made in a nursery plot in Chillicothe, Texas, from the soft red winter wheat cultivar CK 68-15 (Mathieson).

Oat stem rust--Oat stem rust was found in nursery plots and commercial fields throughout south Texas. In some oat fields rust is severe and losses will be extensive (McDaniel). If conditions for rust development continue, this area may provide inoculum for the northern oat growing areas.

Oat crown rust--Compared to the previous two years oat crown rust is easily found in south Texas. Two race groups were identified. One which attacks the Coker lines and the other one which attacks cultivars like Florida 501. Crown rust also is severe in the Fairhope, Alabama, plots (Gudauskas).

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

Rye rusts--Rye leaf rust is severe in some Georgia plots (Tifton), where wheat leaf rust is nearly absent. No reports of rye stem rust have been obtained.

Miscellaneous:

Hessian Fly--This spring, hessian fly damage was noted in almost every commercial field in the southeast U.S. There is a differential response in that some cultivars such as CK 916 appear more susceptible than others.

Powdery mildew--Whenever conditions were moist and warm, powdery mildew was severe on susceptible cultivars in the southeast U.S.

CEREAL RUST BULLETIN

Report No: 3
May 14, 1985

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

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

Wheat growth in the eastern half of southeastern U.S. is about one week behind normal. In the western half conditions have been nearer normal for crop development. Heavy fall flooding prevented some lower Mississippi River Valley planting.

Throughout much of the southern and central plains the winter wheat crop is in good condition and 1-2 weeks ahead of normal. The progress of spring small grain development is ahead of normal throughout most of the northern states. In northeastern Montana considerable winter wheat acreage will be reseeded to spring wheat.

Wheat stem rust -- During the first week in May overwintering centers of wheat stem rust were found in nursery plots at Crowley, Louisiana, and Poplarville, Mississippi. Stem rust was also found in nursery plots in southwestern Georgia (Potts, Godwin), western Florida, southern Alabama and eastern Louisiana. Moderate to heavy severities of stem rust were found on the soft red winter wheats: McNair 701, Coker 797, Coker 916, Coker 983, Ar 48-7-4, Nelson, Coker 762, Fla 302, and Saluda. Stem rust overwintering centers were found in a commercial field at Marvell in northeastern Arkansas on May 4. Stem rust was also found in commercial fields in southcentral Louisiana and northwestern Mississippi (Trevathan).

A modest increase in the amount of stem rust in these overwintering centers may provide potential for stem rust inoculum to move north. Several cultivars currently grown in the Southeast are susceptible enough to allow the development of such centers.

In the southern plains stem rust was found during the first week in May in plots at San Antonio (Taff), and Uvalde (McDaniel), Texas, and in a field in southwestern Oklahoma. In the southern Texas locations rust was found in Coker 762, 916, Mit and NK 812 plots.

The first isolates identified in 1985 were race 15-TNM. Those from Beeville were avirulent, while those from Victoria, Texas, were virulent to Sr17.

Wheat leaf rust -- During the first week in May leaf rust was found at every stop of the southeastern U.S. survey. Very dry weather limited the severity of leaf rust in the eastern area while in the western area moisture was adequate. Leaf rust severities in commercial fields ranged from 0-20% in the dry eastern area and trace-80% in the western area. The severities on Coker 762 and Coker 916 were 0 and 5% at Monroeville, Alabama, compared to 20 and 50%, respectively, at Crowley, Louisana. In the boot heel of Missouri 80% severity was recorded on flag leaves in a field of Hart in the anthesis growth stage.

Wheat leaf rust is severe in plots and fields in northcentral Texas and southern Oklahoma. In northcentral Texas plots, 100% flag leaf severities were observed on TAM 107, TAM 108, Chisholm, Vona, NK 812, Scout 66 and Mustang at soft dough stage. Severities less than 10% were observed in plots of Payne, Mit, Coker 68-15 and Siouxland. Leaf rust was found in nearly every field in central Kansas, as far north as the Nebraska border (Sim). The disease is active on flag leaves in southcentral Kansas.

In the northern soft red winter wheat area leaf rust overwintered on Hart and Tyler in Ohio (Heinlein) at a greater frequency than usual. It was present at a trace severity on Augusta in Kalamazoo Co., Michigan, on May 2 (Fulbright, Clayton). In Virginia leaf rust overwintered on several cultivars (e.g., Tyler) at many

locations throughout the state (Roane). The hot dry weather temporarily stopped the rust spread. Rust pustules were found on winter wheat cultivars at the Rosemount, Minnesota, nursery the second week in May.

Since the last bulletin the following leaf rust virulence combinations were identified: North Texas: UN 13 (virulent to Lr 1,2a,2c,3,10) and UN 17 (virulent to Lr 2a,2c,3,10). East central Arkansas: UN 5 (virulent to Lr 1,3,10,11) and UN 17.

Wheat stripe rust -- During the first week in May traces of stripe rust were found at 4 locations in northcentral Texas and southwestern Oklahoma.

Oat stem rust -- Oat stem rust is severe in south Texas nurseries and fields and is light in northcentral Texas. With continued moist conditions the rust will increase rapidly and provide plentiful inoculum for the northern oat growing areas. Race NA 27 was identified from collections made the first week in April in south Texas.

Crown rust -- Crown rust is widespread from eastern Alabama to central Texas. In some central Texas fields 60% severities at milk stage were found the first week in May.

The aecial stage of crown rust was found on buckthorn in Dane and Grant Co., Wisconsin, and Dakota Co., Minnesota, the second week in May.

Barley stem rust -- Barley stem rust was severe in two plots located close to stem rust-infected wheat in southcentral Georgia the first week in May.

Barley leaf rust -- During the last week in April traces of barley leaf rust were found in plots in northcentral Texas and eastern Virginia. In the lower Rio Grande Valley leaf rust severely damaged seed increase plots. On May 8, a 50% severity reading was made in a Yolo Co., California barley nursery (Jackson).

Rye leaf rust -- Incidence of rust was 100% and severities varied from 10-60% throughout southeastern U.S. nursery plots and along the east coast to Virginia during the past month.

Barberry rust -- The first barberry aecial collection of 1985 was made in Monroe Co., West Virginia (Bostic) on May 6.

Miscellaneous:

Septoria nodorum was severe in plots near the Gulf Coast in the states of Florida, Alabama and Mississippi the first week in May.

Septoria tritici was found west of the Mississippi River in Louisiana and Arkansas on lower leaves at severe levels.

Powdery mildew was severe during early spring in the eastern U.S. from Alabama to Pennsylvania. With the advent of dry weather this disease decreased. In the moist areas of northern Texas and southern Oklahoma mildew was severe on the lower leaves in the wheat canopy.

Hessian fly infestations were found in all field and nursery stops east of the Mississippi River during the southeastern U.S. survey. Infestations ranged from 10-100% in nurseries. Georgia extension specialists estimate losses due to Hessian fly at 25% in the state of Georgia.

CEREAL RUST BULLETIN

Report No: 4
May 29, 1985

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 wheat harvest is progressing in north Texas where early yields are less than previously expected. In the central plains wheat continues to develop at a rapid pace and is ahead of schedule. Small grain seeding is complete in the northern plains and in general the emerged fields are in good condition, ahead of normal development. Moisture is generally adequate throughout most of the Great Plains.

Wheat stem rust--During the past week stem rust was found in fields and plots in southwest Oklahoma and in plots at Stillwater, Oklahoma (Hunger). Trace severity was observed on plants that ranged in development from late milk to mid-dough at these locations. This is more rust than has been present in recent years in this area during mid-May. Stem rust probably overwintered in some Oklahoma locations although no such sites were observed. During mid-May more wheat stem rust collections were made in west central Mississippi fields (Sciumbato). No more stem rust isolates have been identified since the last bulletin.

Wheat leaf rust--During the past two weeks leaf rust has increased at a rapid rate throughout much of the winter wheat growing area. Severe leaf rust was found last week from west central Oklahoma to Hays, Kansas, in nurseries and fields. Severities as high as 100% occurred on cultivars Chisholm, TAM 105, and Vona in some locations. In this area leaf rust is more severe than normal because of the amount of rust which overwintered and ideal conditions for disease development. The large inoculum source farther south may have also been a contributing factor. In Oklahoma and Kansas estimated crop yield losses may be 10% and 5%, respectively.

Leaf rust was found in Nebraska and South Dakota in lesser amounts, but 4 to 6 weeks remain for disease development during which disease increase can occur with favorable environmental conditions. Traces of leaf rust were found in west central Minnesota spring wheat plots, southern Minnesota and southeastern North Dakota winter wheat plots. In these plots the rust pustules originated from rain deposited spores which fell two weeks ago. Currently it is anticipated that significant rust will develop on the winter wheats in this area. Many of the spring wheats should be resistant, but inoculum density may be adequate to result in some disease.

In the northern soft red winter wheat area rust is severe in Ohio and Missouri where moisture is not limiting. In Indiana, the northeastern states, and Pacific Northwest, rust is limited because of the dry conditions.

The leaf rust races identified so far (Table 1) are varied and include many of the historical UN race combinations (Plant Disease 69:343-347). However, the one significant difference between 1985 identifications and 1978-84 data is large increase in Lr 16 virulence. The collections made from NK 812 have had a high frequency of virulence to Lr 16.

Wheat stripe rust--Traces of stripe rust were found in southern Kansas in Wilson and Sedgwick counties. In the Pacific Northwest stripe rust is generally light and increasing at a slow rate because of the dry weather (Line). In California, rust was found on susceptible cultivars in the Sacramento Valley and Salinas area.

Oat stem rust--Oat stem rust is present in commercial fields and on wild oats (Avena fatua) in southwest Oklahoma and in west central Kansas as far north as Rush City. An overwintering site was found in Tillman County, Oklahoma, on wild oats. This is much farther north than oat stem is normally observed on this date. Early

arrival of inoculum in the major spring oat grain area should be expected. The early planting of oats in this area will help to reduce the epidemic severity but losses should be expected with normal environmental conditions. The additional oat stem rust collections identified in the race survey during the past two weeks were race NA 27. This race is virulent on most of the spring oat cultivars.

Oat crown rust--Crown rust severities were light in oat fields in Oklahoma and Kansas. We are unsure of why crown rust is less prevalent and severe than stem rust in this area. Inoculum for northern oat growing areas would appear limited currently. Aecia were easily found on buckthorns growing in southern Minnesota.

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

Barley leaf rust--Leaf rust is severe in plots of susceptible cultivars in Yolo Co., California (Jackson). Severities were light in fields in Lancaster Co., Pennsylvania (Smith), and traces are present in south central Kansas.

Rye leaf rust--Rye collections were made in north central Oklahoma and Maryland.

Grass rusts--Leaf rust collections were made from Hordeumjubatum and Aegilops cylindrica in south central Oklahoma. The collections on Aegilops cylindrica were from areas where local wheat fields were defoliated by leaf rust. Isolates will be evaluated for possible virulence on wheat. A stem rust collection was made from fescue in the northwestern Mississippi area (Trevathan).

Barberry rust--In the past two weeks aecial collections from barberry were made in Dane Co., Wisconsin (Line) and Moscow, Idaho. In the Moscow, Idaho area the aecial development is heavier than last year, where some stem rust losses on wheat occurred in nearby Washington (3%) and Oregon (2%) in 1984.

Miscellaneous:

In the area from Abilene, Kansas, to Enid, Oklahoma, Septoria tritici was severe on flag leaves and most lower leaves had been killed by the disease. Aphid infestations in some fields in this area were very high.

An annual brome infestation was severe throughout most of the Oklahoma wheat growing area, and has resulted in some fields or portions of fields being destroyed.

Table 1. Preliminary data of the 1985 wheat leaf rust virulence survey. (5/28/85)

		Number of isolates per state						
Race	Virulence*	AR	LA	OK	So. TX	C. TX	No.TX	Total
UN 2	Lr 3,10			5	2	1		8
	3,11					5		5
UN 3	Lr 2c,3,3ka,18	2						2
UN 5	Lr 1,3,10	6		3	10			19
	1,3,10,16				21	1		22
	1,3,10,24				1			1
	1,3,10,16,18				10			10
UN 6	Lr 1,2c,3,3ka,9,18			1				1
	1,2c,3,3ka,10,16,17				1		4	5
UN 13	Lr 1,2a,2c,3,10				1		1	2
	1,2a,2c,3,18			1	3			4
	1,2a,2c,3,10,17,18				2			2
UN 17	Lr 2a,2c,3,10		2		8	2	10	22
Total		8	2	10	59	9	15	103

* The Lr single gene differentials tested in leaf rust race identification were 1, 2a, 2c, 3, 3ka, 9, 10, 11, 16, 17, 18, and 24.

CEREAL RUST BULLETIN

Report No: 5
June 11, 1985

From:
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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)

Throughout the central plains wheat is rapidly approaching maturity and a few fields in southern Kansas have already been harvested. Harvest is intensifying in Oklahoma where yields are less than expected. Test weights are light, the result of severe leaf rust, and bushel weight measurements were further reduced by the presence of weed seed (cheat). In most of the spring grain growing area the condition of small grains is good and ahead of normal development. Western South Dakota is short of moisture.

Wheat stem rust--During the past two weeks stem rust was found in central and northeastern Kansas trap plots of susceptible McNair 701. This stem rust may have developed from spores that were deposited with the rains of late February, rather than from local overwintering. In the Uvalde, Texas, nursery rust was found on many entries (TAM 105, McNair 701, preliminary yield entries) (McDaniel). Other stem rust collections were made in Fayetteville, Arkansas (Jones); Lahoma, Oklahoma (Cost); and Plains, Georgia. Stem rust has been observed widely in southern Illinois at low incidence, primarily on Caldwell wheat, which comprises about half of the Illinois wheat area (Jacobson). Stem rust is now common on the most susceptible cultivars in nurseries at Lincoln, Nebraska. During the last part of May, stem rust collections were made in western US nurseries in Pinal County, Arizona (Ykema) and Yolo County, California (Zwer).

Table 1. Preliminary data of 1985 wheat stem rust race survey (6/10/85).

State	Number of collections	Number of isolates	Race 15-TNM*	Race 15-TNM**	Race 151-QFB
AL	2	6		5	1
FL	1	3		3	
GA	4	9		9	
LA	1	0			
MS	3	9		9	
OK	1	1		1	
TX	5	12	2	10	

* Avirulent to Sr 17.
** This is identical to the previously most common race 15-TNM except it is virulent to Sr 17.

Wheat leaf rust--Leaf rust is severe in some wheat fields in northern Kansas and developing in Nebraska fields. With 2-3 weeks before harvest in many of these areas, losses are still possible. Traces of rust were found in susceptible spring wheat nursery rows at Fargo, North Dakota, the first week in June.

In the northeastern U.S. area, leaf rust is severe on susceptible wheats (Tyler) but losses will be lighter than earlier expected because of the droughty conditions. In the northern soft red winter wheats, leaf rust has developed rapidly and will be severe in areas where moisture is plentiful. Tyler, Pike, Hart, and Argee are expected to show 10-30% loss in Illinois where they are severely infected. Leaf rust has also been noted on previously resistant Caldwell in small amounts (Jacobson).

The leading races identified so far are UN 5 and 17 in Texas, and UN 5 and 6 in the Southeast. Significant findings include the relatively high proportion of virulence to Lr 16, largely in UN 5 (36 isolates from Texas), and the combined virulence to Lr 2a and 9 in four isolates from Louisiana and Mississippi, a virulence combination not previously identified.

Table 2. Preliminary data of the 1985 wheat leaf rust virulence survey (6/7/85).

		Number of isolates per state											
Race	Virulence*	AL	AR	FL	GA	LA	MS	OK	PA	So. TX	C. TX	No. TX	Total
UN 2	Lr 3,10							5		2	1		8
	3,11	4								3	4		11
UN 3	Lr 2c,3,3ka,18		2										2
	2c,3,3ka,9,18	2											2
UN 5	Lr 1,3,10	10	8	2	12			3		12	5	1	53
	1,3,10,16									23	3		26
	1,3,10,24									1			1
	1,3,10,16,18										10		10
UN 6	Lr 1,2c,3,3ka,18			6	3								9
	1,2c,3,3ka,9,10	8		4	10			1		1			24
	1,2c,3,3ka,10,17									4			4
	1,2c,3,3ka,10,16,17											4	4
UN 13	Lr 1,2a,2c,3	2											2
	1,2a,2c,3,10							2		2	1	1	6
	1,2a,2c,3,18							1		2	1		4
	1,2a,2c,3,11,18				2				2				4
	1,2a,2c,3,9,11,18					2	2						4
	1,2a,2c,3,10,17,18									6	1		7
UN 14	Lr 1,2c,10,11,18			2									2
UN 17	Lr 2a,2c,3,10			2	1	2		2		10	7	10	34
Total		26	10	16	28	4	2	14	2	66	33	16	217

* The Lr single gene differentials tested in leaf rust race identification were 1, 2a, 2c, 3, 3ka, 9, 10, 11, 16, 17, 18, and 24.

Stripe rust--Traces of stripe rust were found in wheat plots in northwestern Kansas and at Davis, California (Steffenson).

Oat stem rust--In the past two weeks oat stem rust collections were made from many entries in the College Station, Texas, nursery (McDaniel) and from wild oats (Avena fatua) in Solano Co., California (Steffenson). Stem rust is present in light amounts in a commercial field in Seward County, Nebraska. As of June 11, 171 isolates have been identified from 131 Texas collections made in early May. Race NA 27 comprised 97% (166) of the isolates. This race is virulent on most of the northern spring oat cultivars but as of yet no rust has been reported from that area. Races NA 16 and NA 23 were represented by three and two isolates, respectively.

Oat crown rust--Traces of crown rust were found in the plots at Rosemount, Minnesota, on June 4. Crown rust was present in commercial fields in Mower, Freeborn and Olmstead Counties in southeastern Minnesota (Laudon), and in northwestern Iowa. Moderate infection was observed in a single field in Nicollet County, Minnesota.

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

Barley leaf rust--As in previous years, barley leaf rust is severe on susceptible cultivars in the barley growing areas of California. A number of collections have been received from Pennsylvania and one each from Maryland and Virginia. Isolates from California received a month ago were virulent to Pa, Pa_2, Pa_4, Pa_6, Pa_8, and Pa_9. The Virginia collection was virulent to Pa, Pa_2, Pa_4, and Pa_8. Neither virulence combination fits the current race key.

Rye leaf rust--Rye leaf rust was found in northeastern Kansas, northwestern Iowa, and central Minnesota fields. Severities are generally low.

Barberry rust--In the past two weeks aecial collections were made from barberries growing in four different locations in southeastern Minnesota (Schlick, Laudon).

Miscellaneous:

Tan spot is reported to be severe on Caldwell wheat throughout Illinois (Jacobson).

Leaf Rust Resistance Observations: Recent obsrvations of leaf rust in Kansas and Oklahoma nurseries showed severity levels listed below:

	Leaf rust	Probable resis.	Also similar
Arkan	0	Lr 24+	
Sage	5S	Lr 24	Payne
Newton	10S	Lr 1 + Scout 66	(See below)
Centurk 78	20S	Lr 10+	Centurk, Parker, Rocky
Scout 66	50S	+	(Different from Centurk 78, etc.)
TAM 105	80S	Lr 10+	(Different from Centurk or Scout)
Vona	100S	+	(Possibly different)
Parker 76	-	Lr 24+	Resis. of Centurk 78, etc.

Research recently published by Modawi, Browder, and Heyne at Kansas State University (Crop Sci. 25:9-13), indicated that each of these cultivars possesses some resistance to leaf rust, which is probably unique from the others. These are all adapted hard red winter wheats; so intercombination of them is suggested to be a quick route to leaf rust resistant germ plasm which is superior to any one of them alone in effectiveness to the current epidemic. Such crosses may already be present in several hard red winter breeding programs, and progenies available for selection.

Note to CRB recipients: The total narratives of the 1985 Cereal Rust Bulletins have been entered into the USDA Fort Collins Computer Center (FCCC) Conference System data bank. The conference name is RUST-85BULL. This makes this information available "on line" for anyone who has access through the Cooperative National Plant Pest Survey and Detection System program into this data bank. If you have this capability, we would encourage you to access the Cereal Rust Bulletin in this manner, when it is first entered. This will make it available to you more quickly than by mail.

We realize that access to this data base is quite limited. However, if this sort of program appears useful, we could also move the CRB to a more broadly accessed data network to increase its distribution and accessability.

We would be pleased to hear from our CRB recipients about any phase of development of such on-line efforts for the CRB.

CEREAL RUST BULLETIN

Report No: 6
June 25, 1985

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 Kansas winter wheat harvest is in full swing after a disruption due to wet and cool conditions. The winter wheat crop is turning color as far north as east central South Dakota. In the northern area of the United States small grain development continues ahead of normal in most locations. Dry conditions still exist in the western Dakota's and eastern Montana.

Wheat stem rust -- During the past two weeks wheat stem rust was detected in plots in northeast Indiana (Cisar), east central Illinois (Jedlinski), northeast Missouri (Schaffer), southwest Nebraska, and southern Wisconsin (Norgren). Generally the rust was light at the north edge of the infected area. This level of rust will provide inoculum for spring wheats farther north. However, since most spring wheats are resistant, losses are not expected.

In Table 1 race 15-TNM was identified from 99% of the collections. This was the most prevalent race also in 1984. The main difference this year is that the virulence to Sr 17 has increased significantly. This race was identified from collections made in the 1985 southern overwintering stem rust sites.

Table 1. Preliminary data of 1985 wheat stem rust race survey (6/21/85).

	Number of		Race			
State	collections	isolates	15 TDM	15* TNM	15** TNM	151 QFB
AL	2	6			5	1
AR	4	10			10	
FL	1	3			3	
GA	4	9			9	
LA	16	45			45	
MS	8	24			24	
OK	1	1			1	
TX	13	36	5	2	29	

* Avirulent to Sr 17.
** This is identical to the previously most common race 15-TNM except it is virulent to Sr 17.

Wheat leaf rust -- Wheat leaf rust is severe in some southern Nebraska, northeast Colorado, and southeast South Dakota winter wheat fields. Losses will occur in some of these fields. Two separate spore showers were identified in winter wheat plots in southeastern South Dakota. On the lower leaves leaf rust severities ranged from 10-20%, no rust was observed on the next two leaves, and then traces were present on the flag leaves. Rust development in the northern Great Plains winter wheat fields has been slowed by the long period of cool weather, particulary at night. Rust collections were made in Pennsylvania (Frank) and New York (Bergstrom) last week. With a return to normal temperature the rust will build fast, and losses are possible.

On the northern spring wheats leaf rust is light in commercial fields and the infections were from exogenous spore showers. Severities of 20% were found in some susceptible cultivars in plots at several southern Minnesota sites.

In the Pacific Northwest leaf rust is starting to increase but losses will be lighter than the previous two years.

Table 2. Preliminary data of the 1985 wheat leaf rust virulence survey (6/21/85).

Race	Virulence*	Number of isolates per state													
		AL	AR	FL	GA	LA	MO	MS	OK	PA	SC	So. TX	C. TX	No. TX	Total
UN 2	Lr3,10								5		1	3	1		10
	3,11	4				1					6	5	4		20
UN 3	Lr2c,3,3ka,18		2									1			3
	2c,3,3ka,9,18	2	2						1		1	1			7
UN 5	Lr1,3,10	12	10	2	12				3			16	8	1	64
	1,3,10,16	3				2						37	7		49
	1,3,10,24											1			1
	1,3,10,16,18						1						10		11
UN 6	Lr1,2c,3,3ka,18	4		6	3										13
	1,2c,3,3ka,9,18	13	2	4	10	4	1		3			1			38
	1,2c,3,3ka,10,17											4			4
	1,2c,3,3ka,10,16,17													4	4
UN 13	Lr1,2a,2c,3	2													2
	1,2a,2c,3,10								2			3	1	1	7
	1,2a,2c,3,18								1			2	1		4
	1,2a,2c,3,10,16												5		5
	1,2a,2c,3,11,18				2					2					4
	1,2a,2c,3,9,11,18					7		2							9
	1,2a,2c,3,10,17,18		1			4						9	1		15
UN 14	Lr1,2c,10,11,18			2		8									10
UN 17	Lr2a,2c,3,10		1	2	1	4	1		7			16	12	20	64
Total		40	18	16	28	30	3	2	22	2	8	99	50	26	344

* The Lr single gene differentials tested in leaf rust race identification were 1, 2a, 2c, 3 ,3ka, 9, 10, 11, 16, 17, 18, and 24.

Stripe rust -- In northeast Colorado, southwest Nebraska and northwest Kansas traces of stripe rust were found the second week in June (Milus). With the recent cool nights it is expected that stripe rust may be found on some spring wheat in the Dakota's and Minnesota.

Stripe rust was found throughout the Pacific Northwest but was severe only in a few areas. One of these was north central Oregon on cultivars with PI 178383 resistance. This was one of the same areas where stripe rust was severe last year.

Oat stem rust -- In the past two weeks oat stem rust was observed in nurseries at Quincy, FL (Barnett), Davis, CA (Zwer), Ames, IA (Michel), and in fields throughout northwest Kansas and southern Nebraska and near Fayetteville, Arkansas. As of June 21, Race NA 27 comprised 96% of the isolates.

Table 3. Preliminary data of the 1985 oat stem rust race survey (6/21/85).

State	Number of collections	Number of isolates	NA Race (% of isolates)							
			1	5	6	15	16	23	24	27
Texas	91	262	2				5	2	1	252
W. Virginia*	3	7		3	1	2				1

* Barberry aecial collections

Oat crown rust -- Oat crown rust is scattered throughout the northern oat growing area from southern Nebraska to northeast South Dakota to central Wisconsin. In some fields in southeast South Dakota rust infection was severe and losses will occur. With a return to warm moist weather the rust will spread in the northern areas and rust will be severe in many locations.

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

Barley leaf rust -- Collections were made the past two weeks in nurseries in western Kansas, southern Minnesota (Laudon), central Pennsylvania (Bingaman and Wolf), and eastern New York (Loria). Severities at all of these locations were 10% or less.

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

Barberry rust -- During the third week in June many aecial collections were made in eastern Ontario (Clark). Aecial collections from West Virginia have been primarily oat stem rust.

CEREAL RUST BULLETIN

Report No: 7
July 9, 1985

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)

After a cool June the upper midwest spring small grains continue in good condition, with development still ahead of normal. Drought and grasshoppers are problems in the western Dakotas and northeastern Montana. Winter wheat harvest is almost complete in Kansas, and some of the early fields in South Dakota have been cut.

Wheat stem rust--During the first week in July wheat stem rust centers were detected on the susceptible spring wheat cultivar Baart growing in southern Minnesota and Fargo, North Dakota (Miller) nursery plots. The rust has been present in the southern Minnesota locations for 30 days but the cool dry conditions slowed development. In the Rosemount, Minnesota, winter wheat nursery plots stem rust centers were found where the oldest pustules developed from spores deposited 30-40 days ago.

During the past two weeks more collections were made in plots in central Ohio (Heinlein) and northeast Indiana (Buechley).

Table 1. Preliminary data of 1985 wheat stem rust race survey (7/8/85).

State	Number of collections	Number of isolates	Race 15 TDM	Race 15* TNM	Race 15** TNM	Race 56 MBC	Race 151 QFB	Race 151 QSH
AL	2	6			5		1	
AR	4	10			10			
AZ	1	3			3			
FL	1	3			3			
GA	4	9			9			
LA	16	45			45			
MS	9	27			26	1		
OK	10	27			25	2		
TX	18	49	9	6	29	4		1

* Avirulent to Sr 17.
** This is identical to the previously most common race 15-TNM except it is virulent to Sr 17.

Wheat leaf rust--During the past two weeks severe leaf rust was reported in winter wheats in northeastern Colorado (Walker), southern Minnesota, northern Ohio (Heinlein), and western New York (Bergstrom). In most of these locations the severe rust will not cause significant losses because the crop is close to harvest.

In the northern spring wheats leaf rust is light in commercial fields. In some susceptible wheat plots in southern Minnesota 80% severities occur, but since most of the commercial spring wheats have some leaf rust resistance losses will be light. In West Virginia spring wheat plots, 10% severities were observed on a few of the cultivars (Bostic).

In the central Great Plains there has been an increase in the UN 17 race (virulence = Lr2a, 2c, 3, and 10) (Table 2) compared to 1984. At the same time there has been a decrease in UN 5 (virulence = Lr1, 3, 10), which probably accounts for less leaf rust being found in fields of Newton which possesses Lr1.

Table 2. Preliminary data of the 1985 wheat leaf rust virulence survey (7/8/85).

Race	Virulence*	Number of isolates per state: So. TX	C. TX	No. TX	OK	KS	LA	AR	MO	AL	FL	GA	SC	PA	VA	Total
UN 2	Lr3,10	3	1		5								1			10
	3,11	5	4				1	1		8			6			25
UN 3	Lr2c,3,3ka,18	1						2								3
	2c,3,3ka,9,18	1			1			2		3	2	14	1			24
UN 5	Lr1,3,10	16	8	5	4	3	2	13		17	4					72
	1,3,10,16	37	7	2		5	2			3						56
	1,3,10,24	1			2			1								4
	1,3,10,16,18		10	2					1							13
UN 6	Lr1,2c,3,3ka,18								3	8	6	5			4	26
	1,2c,3,3ka,9,18	1			4		4	5	1	18	4	10			3	50
	1,2c,3,3ka,10,17	4		4												8
UN 13	Lr1,2a,2c,3									2						2
	1,2a,2c,3,10	3	1	3	4	2		1							1	15
	1,2a,2c,3,18	2	1		1											4
	1,2a,2c,3,10,16		5			2			1							8
	1,2a,2c,3,11,18										1	6		2		9
	1,2a,2c,3,9,11,18						10									10
	1,2a,2c,3,10,17, 18	9	1	1			4	1	2		1					19
UN 14	Lr1,2c,10,17													2		2
	1,2C,10,11,18						8				2					10
UN 17	Lr2a,2c,3,10	16	12	25	25	29	6	2	1		3	1				120
Total		99	50	42	46	41	37	28	9	59	23	36	8	4	8	490

* The Lr single gene differentials tested in leaf rust race identification were 1, 2a, 2c, 3 ,3ka, 9, 10, 11, 16, 17, 18, and 24.

Stripe rust--No reports since the last bulletin.

Oat stem rust--In the past two weeks traces of oat stem rust were found in commercial fields in southern Minnesota (Laudon, Schlick), eastern South Dakota, and central Iowa (Frey, Simons). The cool dry conditions in the Dakotas and Minnesota in June slowed rust development. Now with a return of warm weather there has been a rapid increase in rust. The rust in southern Minnesota fields developed from 2 separate inputs of exogenous inoculum (10 and 30 days ago).

Table 3. Preliminary data of 1985 oat stem rust race survey (7/8/85).

State	Number of collections	Number of isolates	NA Race (No. of isolates): 1	5	6	15	16	23	24	27
Kansas	2	4								4
Oklahoma	5	15								15
Texas	97	280	2				5	2	1	270
W. Virginia*	3	7		3	1	2				1

* Barberry aecial collections

Oat crown rust--Crown rust is found throughout north central U.S. oat fields with flag leaf severities ranging from trace to 80%. This disease has spread much more readily than oat stem rust in the past two weeks and losses will occur in some fields.

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

Barley leaf rust--Collections were made the past two weeks throughout southern Minnesota and West Virginia fields. Severities at all of these locations were 10% or less.

Rye stem rust--Collections of stem rust were made in rye fields growing in close proximity to barberries in Greenbrier Co., West Virginia (Bostic) and Anoka Co., Minnesota (Laudon).

Rye leaf rust--Twenty percent leaf rust severities were reported in rye fields in Monroe Co., West Virginia (Bostic) and Door County, Wisconsin. In southern Minnesota susceptible rye plots, 10% severities were common on lower leaves.

Other stem rust hosts--Stem rust collections were made from Agropyron repens, Agrostis alba and Agrostis palustris grasses in southern Minnesota (Laudon). In all cases the collections were made from hosts growing within 25 feet of a barberry bush. A stem rust collection also was made from orchardgrass in Greenbrier Co., West Virginia (Bostic). From the initial 1985 aecial collections made in southeastern Minnesota, rye stem rust was identified.

CEREAL RUST BULLETIN

Report No: 8
July 23, 1985

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

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

The small grain harvest has begun in the barley and winter wheat fields in southern North Dakota. Spring small grains are one to two weeks ahead of normal crop maturity throughout much of the northern crop growing region. Drought has prematurely ripened the crop in the western Dakotas and southwestern Minnesota. Excellent yields are expected in the Red River Valley where moisture is adequate to surplus.

Wheat stem rust--During the past two weeks stem rust was found in nursery plots in southeast South Dakota (Buchenau), northwest Minnesota, central North Dakota, northcentral Colorado (Milus) and West Virginia (Bostic). In these locations rust was light, and no rust was reported in commercial fields. The pathogen population sampled so far in 1985 is exceedingly uniform in racial makeup with the only major variation found in Texas. Stem rust is now appearing in the Palouse area of Washington and Idaho and in the La Grande area in Oregon. Stem rust could cause damage in late maturing cultivars (Line).

Table 1. Preliminary data of 1985 wheat stem rust race survey (7/19/85).

State	Number of collections	Number of isolates	Race and No. of Isolates: CBC	11 RCR	15 TDM	15* TNM	15** TNM	56 MBC	151 QFB	151 QSH	113 RTQ
AL	2	6					5			1	
AR	5	13					13				
AZ	1	3					3				
CA	4	11		9						2	
FL	1	3					3				
GA	6	15				1	14				
IL	1	3					3				
IN	1	3					3				
KS	5	15					14		1		
LA	16	45					45				
MS	9	27					26	1			
MO	2	6				2	3			1	
NE	6	18				1	14			1	
OK	11	28					26	2			
TX	42	116		2	22	6	81	4		1	
WI	3	0									
WV	3	2					1				1

* Avirulent to Sr 17.
** Virulent to Sr 17.

Wheat leaf rust--The recent warm weather has caused an explosion in leaf rust in susceptible spring wheat cultivars in plots throughout the upper midwest. However, the leaf rust resistance in most of the commercial spring wheat cultivars is adequate and severities are currently light, so rust losses will be minimal in fields. Butte and Centa are severely rusted in plots. In New York, leaf rust was severe on the winter wheats but losses were light because the rust developed later than last year. In a northcentral Colorado plot, leaf rust was severe on TAM 105 but

no rust was found on NK 812 (Milus). This suggests that the leaf rust population found in Colorado is different from that occurring earlier in Texas where rust was severe on NK 812. There are no significant changes in the virulence survey results since the last report.

Table 2. Preliminary data of the 1985 wheat leaf rust virulence survey (7/19/85).

		Number of isolates per state														
Race	Virulence*	TX	OK	KS	LA	AR	MO	AL	FL	GA	SC	VA	PA	CO	CA	Total
UN 2	Lr3,10	4	5												1	10
	3,11	9			1	1		8			6					25
UN 3	Lr2c,3,3ka,18	1				2										3
	2c,3,3ka,9,18	1	1			2		5			1					10
UN 5	Lr1,3,10	41	4	6	4	20		16	4	14		2		1		112
	1,3,10,16	47	4	15		1		4		1						72
	1,3,10,17		2	2												4
	1,3,10,16,18	12					1									13
	1,3,10,24	1	2			2										5
UN 6	Lr1,2c,3,3ka,18						6	8	6	5		6				31
	1,2c,3,3ka,9					2				1						3
	1,2c,3,3ka,9,18	1	2		4	3		18	4	10		5				47
	1,2c,3,3ka,10,17	8											16			24
UN 13	Lr1,2a,2c,3							2								2
	1,2a,2c,3,10	9	7	2		2						1				21
	1,2a,2c,3,18	3	1													4
	1,2a,2c,3,10,16	7		2			1									10
	1,2a,2c,3,11,18								1	6			2			9
	1,2a,2c,3,9,11,18				10			2								12
	1,2a,2c,3,10,17,18	11					2	1	1							15
	1,2a,2c,3,10,11,18				4											4
UN 14	Lr1,2c,10,17												2		1	3
	1,2c,10,11,18				8				2							10
UN 17	Lr2a,2c,3,10	74	31	38	5	1	4	1	3	1				9	2	169
Total		229	59	65	36	36	14	65	21	38	7	14	20	10	4	618

* The Lr single gene differentials tested in leaf rust race identification were 1, 2a, 2c, 3, 3ka, 9, 10, 11, 16, 17, 18, and 24.

Oat stem rust--In the past two weeks stem rust was found in almost every oat field observed in the eastern Dakotas and western Minnesota and southern Wisconsin. In a few cases, 10% severities were noted on stems but most were trace severities. Some fields in southern Wisconsin were reported severely rusted. Oat stem rust was collected in West Virginia in mid-July (Bostic). In the past two weeks, traces of stem rust were observed on wild oats (Avena fatua) in western Minnesota, northeastern South Dakota, and eastern North Dakota.

Table 3. Preliminary data of 1985 oat stem rust survey (7/19/85).

State	Number of collections	Number of isolates	NA Race (No. of isolates)								
			1	5	6	10	15	16	23	24	27
California	1	3				3					
Kansas	6	16									16
Nebraska	2	5		1							4
Oklahoma	5	15									15
Texas	127	363	2	1				5	2	1	352
W. Virginia*	3	7		3	1		2				1

* Barberry aecial collections

Oat crown rust--Crown rust is severe in many commercial fields throughout north central U.S. and western New York. Losses will be significant in some locations in central Minnesota where weather conditions were ideal for significant rust development in the past month.

Barley leaf rust--Leaf rust was found in nursery plots in western New York in the past two weeks (Bergstrom) and in a few commercial fields in westcentral Minnesota. In Minnesota the barley is adequately mature to prevent yield losses.

Barley stem rust is light in trap plots in westcentral Minnesota. Nearby wheat is rusted while the rye is rust-free so the pathogen is probably *P. graminis* f. sp. *tritici*.

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

Rye leaf rust is light and scattered in central Minnesota.

Other stem rust hosts--Stem rust collections were made from *Hordeum jubatum* in western Minnesota and from *Hordeum pusillum* in northern Illinois. From a barberry aecial collection made near Moscow, Idaho, wheat stem race BBC was identified. Additional isolates obtained from aecia from Ontario, Canada were identified as rye stem rust and a previously undescribed race of oat stem rust. Rye stem rust was identified from an *Agropyron repens* collection made in southeast Minnesota. Several collections of leaf rust have been made on *H. jubatum*.

CEREAL RUST BULLETIN

Report No. 9
FINAL ISSUE
August 6, 1985

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

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

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

Wheat stem rust--During the past two weeks severe stem rust was found in late maturing winter wheat fields in westcentral Michigan (Clayton), northern Idaho (Wattenbarger) and susceptible spring wheat plots in northeast North Dakota and northwest Minnesota. In the commercial spring wheat fields no stem rust was reported. The present northern cultivars are resistant to the current stem rust population.

During the 1985 season the first stem rust was found April 1 in south Texas in McNair 701 disease detection plots, where it overwintered. By early May, overwintering foci were found in susceptible cultivars scattered along the Gulf Coast from northwest Florida to southern Louisiana and north along the Mississippi River valley to northeast Arkansas. A special note on the stem rust resistance situation in the soft red winter wheats is included at the end of this report.

By mid-May more stem rust than usual was reported in southern Oklahoma. Stem rust may have overwintered in some Oklahoma locations although no such sites were observed. By early June stem rust was found scattered throughout northern Kansas and southern Nebraska in susceptible wheat plots. By mid-June stem rust was found scattered in the northern soft red winter wheat areas from northeast Indiana to southern Wisconsin. In southern Illinois stem rust was found widely on Caldwell wheat, which comprised about half of the Illinois wheat area.

As shown in Table 1, race 15-TNM is the most common race identified from 1985 collections. As in recent years the Sr 17 virulent form of the race predominates. This race is generally found throughout the central region of the U.S. but this year it also was the most commonly identified race in soft red winter wheat areas. This increase in 15-TNM in the southeast wheats may have accounted for more rust being found in the northern soft red winter wheats. An interesting aspect of the survey is the greater variation in the race population found in Texas, a major overwintering source area, compared to other states. In 1985 there was a slight increase in identifications of 56-MBC and 151-QSH, two races that are found almost every year in minor amounts.

Wheat leaf rust--In summary, for 1985, leaf rust overwintered throughout the southern U.S. and central Great Plains in many locations and in heavy amounts. By early April in south Texas leaf rust was so damaging so as to cause 20% losses in fields of susceptible cultivars. Progressing northward the moisture situation was favorable for rust development in western Oklahoma and Kansas. With wind borne inoculum from farther south and susceptible cultivars, losses were severe in the

Table 1. Preliminary data from the 1985 wheat stem rust race survey (8/5/85).

State	Number of collections	Number of isolates	Race (% of isolates per state) BBC	CBC	11 RCR	15 TDM	15* TNM	15** TNM	56 MBC	151 QFB	151 QSH	113 RTQ
AL	2	6						83			17	
AR	5	13						100				
AZ	1	3						100				
CA	5	14		86							14	
FL	1	3						100				
GA***	6	15						100				
ID	1	3	100									
IL	1	3						100				
IN	1	3						100				
KS	6	18				17		78		6		
LA	16	45						100				
MS	9	27						96	4			
MO	2	6					33	50			17	
NE	7	21					5	95				
OK	11	28						93	7			
TX	42	116			2	19	5	70	3		1	
WI***	4	6						100				
WV	3	2						50				50

* Avirulent to Sr 17.
** Virulent to Sr 17.
*** Barberry aecial collections.

central plains states. For example, in Kansas the estimated loss was 5% in comparison to a five-year average of 1.7%. By mid-May leaf rust was found in the northern Great Plains. This was later than last year when many of the early infections were due to overwintering inoculum. In the northern Great Plains significant leaf rust developed on the winter wheats resulting in some loss, but most of the spring wheats were resistant to the rust, thus avoiding loss.

In the western part of the southern soft red winter wheat area leaf rust was severe on susceptible cultivars. In some states, like Louisiana, 10% losses were common. However, in the eastern part of the southern area drought limited leaf rust development and losses were light. Farther north in the soft red winter wheat area leaf rust was severe wherever moisture was not limiting (i.e., eastern Missouri). However, in much of the eastern U.S., California, and the Pacific Northwest rust was light because of dry conditions.

The majority of the data in Table 2 is from the states in which leaf rust caused the most severe losses in 1985. In Texas the most common race was UN 5 (virulent to Lr1,3,10,16). Collections made from NK812 had a high frequency of virulence to Lr16. Progressing farther north in the Great Plains into Oklahoma and Kansas UN 17 (virulent to Lr2a,2c,3,10) was the most common race. These are the virulences that were identified from collections made from TAM 105, Vona, Chisholm, etc. There was a significant increase in UN 17 over 1984 when UN 5 dominated in this central area. As in previous years much of the total population was virulent to Lr3 and 10. Lr9 virulence was still centered in the southern soft red winter wheat area. Only five isolates were virulent to Lr24 which corresponds to the low numbers of previous years. A new virulence combination of UN 13 (virulent to Lr1,2a,2c,3,9,11,18) was identified this year. Virulence to Lr2a and 9 is a newly identified combination which caused rust on the previously resistant Coker 762.

Table 2. Preliminary data of the 1985 wheat leaf rust virulence survey (8/5/85).

Race	Virulence*	Number of isolates per state														
		TX	OK	CO KS	LA	AR	IA MO	AL	FL	GA	NC SC	IN OH	PA VA	MN SD	CA	Total
UN 2	Lr3,10	4	5					1			1				1	12
	3,11	7		2	1	1		8			6	2			1	28
UN 3	Lr2c,3,3ka,18	1		1		2										4
	2c,3,3ka,9,18	2	1			2		5			1					11
UN 5	Lr1,3,10	38	4	10	4	22	2	16	6	16			2	4		124
	1,3,10,16	47	4	19		1		4		1						76
	1,3,10,17		2	2												4
	1,3,10,17,18												2			2
	1,3,10,16,18	13					1									14
	1,3,10,24	1	2			2										5
UN 6	Lr1,2c,3,3ka,18						6	8	6	5			6			31
	1,2c,3,3ka,9					2				1						3
	1,2c,3,3ka,9,18	1	2		4	3		18	4	10		1	5			48
	1,2c,3,3ka,10,17	4											16			20
	1,2c,3,10,17					1						2				3
UN 13	Lr1,2a,2c,3							2								2
	1,2a,2c,3,10	6	7	2		2						1	1			19
	1,2a,2c,3,18	3	1													4
	1,2a,2c,3,10,16	7		2			1									10
	1,2a,2c,3,11,18								1	6			2			9
	1,2a,2c,3,9,11,18				10			2								12
	1,2a,2c,3,10,17,18	10					2	1	1							14
	1,2a,2c,3,10,11,18				4											4
UN 14	Lr1,2c,10,17												2		1	3
	1,2c,10,11,18				8				2							10
UN 17	Lr2a,2c,3,10	95	34	61	5	1	4	1	3	1	2			17	2	226
Total		239	62	99	36	39	16	66	23	40	10	6	36	21	5	~~668~~ 698

* The Lr single gene differentials tested in leaf rust race identification were 1, 2a, 2c, 3, 3ka, 9, 10, 11, 16, 17, 18, and 24.

Wheat stripe rust--In 1985 traces of stripe rust were found scattered in the Great Plains from north central Texas to eastern North Dakota. In all cases rust development was limited.

The dry weather in the Pacific Northwest retarted stripe rust and it was severe only in a few areas. One such area of severe rust was northcentral Oregon on cultivars with PI 178383 resistance. This was the same area where rust was severe last year.

Oat stem rust--In the northern oat growing area stem rust is severe and will cause losses in late planted fields. In Illinois and Wisconsin this was the most severe oat stem rust in the past ten years.

In summary, in 1985 oat stem rust was severe in south Texas fields and plots. This area provided much of the inoculum for the northern oat growing area. By mid-May rust was found as far north as westcentral Kansas, which was earlier than normal. Rust was found in mid-June in South Dakota in light amounts. The early planting of oats in the northern Great Plains and the extensive dry areas in the Dakotas and southeast Minnesota reduced the potential for losses except for late-planted fields throughout the major oat growing area of the U.S. As in previous

Table 3. Preliminary data of 1985 oat stem rust survey (8/5/85).

State	Number of collections	Number of isolates	NA Race (% of isolates)								
			1	5	6	10	15	16	23	24	27
California	10	24		29		71					
Florida	1	3									100
Iowa	1	3									100
Kansas	7	18									100
Minnesota	2	6									100
Nebraska	2	5		20							80
Oklahoma	5	15									100
Texas	130	371	1	1				1	1	1	96
W. Virginia*	3	7		43	14		29				14

* Barberry aecial collections

years the stem rust was severe on wild oats (Avena fatua) in eastern North Dakota and northwest Minnesota.

Oat crown rust--In 1985, severe crown rust was observed in south Texas fields and plots in early April. By mid-May crown rust was prevalent throughout oat fields in Kansas and Oklahoma. The first crown rust was noted in the northern oat growing area in early June. Much of this rust developed in fields where inoculum arrived early from the south and conditions were conducive for rust development. Buckthorns growing in close proximity to oat fields also provided some of the initial inoculum. All of these conditions led to the development of severe rust with resultant losses in many fields from central Wisconsin to eastern South Dakota.

Barley stem rust--In 1985, barley stem rust was found in plots growing close to stem rust infected wheat in southcentral Georgia and westcentral Minnesota. Wheat stem rust race 15-TNM was identified from these collections. Barley plants mixed in an oat field in the Red River Valley near Stephens, Minnesota, were infected with rust which was identified as Puccinia graminis f. sp. secalis. Losses from barley stem rust were negligible. Stem rust infections were found throughout the eastern portion of the northern Great Plains on wild barley (Hordeum jubatum).

Barley leaf rust--This year barley leaf rust was scattered throughout the U.S. in light amounts except for areas like southern Texas and southern California where it overwintered. In these two areas the rust severely damaged susceptible cultivars growing in plots but losses were light in nearby fields.

Rye stem rust--In 1985, collections of stem rust were made in rye fields growing in close proximity to barberries in southeast West Virginia and eastcentral Minnesota. Scattered stem rust pustules were found in ripe fields in central Minnesota in late July. Losses to rye stem rust will be minimal in 1985.

Rye leaf rust--As in previous years traces of leaf rust that overwintered were found in winter rye plots in southern Minnesota in early April. By early May 1985 rye leaf rust was reported from northcentral Texas, along the Gulf Coast and up the east coast to Virginia. In late June leaf rust was severe on flag leaves throughout Minnesota and South Dakota. This rust has a wide geographic range, however, overall losses were light.

Barberry rust--In 1985, aecial collections were made in Idaho, Minnesota, West Virginia, Wisconsin and southeastern Ontario, Canada. In Idaho the aecial development was heavier than last year in the same area where stem rust losses occurred in 1984. The aecial collections identified from Ontario, Minnesota and Wisconsin were Puccinia graminis f. sp. secalis. Those from Idaho and West Virginia were P. graminis f. sp. tritici and avenae as shown in Tables 1 and 3.

Special Note

Stem Rust Susceptibility of Southern and Eastern Wheat Cultivars

Stem rust of wheat has been controlled in the United States for many years, primarily through the use of resistance. However, stem rust occurs in varying quantities every year on susceptible cultivars in nurseries. In disease-favoring years, they are severely damaged.

Stem rust overwinters annually in the uredinial stage in the southern states. Because of the sensitivity of the uredinial stage to cold, the area of overwintering is much more restricted than that of leaf rust. However, this southern area is the annual source for almost all of the stem rust in the rest of the country, except in the Pacific Northwest, following the major elimination of barberry, its alternate host, some years ago.

In recent years there has been a 5-fold increase of wheat production in the southeast United States. In our tests we also note a great amount of susceptibility to stem rust of recent cultivars and breeding lines adapted to the southern soft winter wheat areas. This combination of greatly increased wheat production and apparent move toward more susceptibility gives us concern in respect to potential increase in stem rust in this region. This could lead to greater loss as well as an increase in overwintering rust that would result in a major inoculum source.

Because of this potential problem, we are contemplating a field day or short workshop during the 1986 crop season, probably the second week of July. As plans develop we propose to contact relevant wheat breeders and pathologists who may wish to participate. This note is to alert researchers and others who may be interested.

If you wish to remain on the Cereal Rust Bulletin mailing list next season, please return the enclosed card by September 1, 1985. Be sure to make the necessary changes if your address or number of copies requested is not correct. USDA regulations require us to update our list every year.

Thank you for your assistance.