CEREAL RUST BULLETIN

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)

CEREAL RUST BULLETIN

Report No: 1
April 7, 1987

The mild winter and ample moisture in much of the U. S. wheat growing region has created optimism for a good crop in 1987. With the return of warm temperatures, the greening of the crop will be in full swing. Wheat in south Texas is in good to excellent condition but about two weeks later than normal in maturity. Oats in this area are also two weeks later than normal and many fields are still being grazed. This late maturity is at least in part due to late planting. Extensive freeze damage has been recently reported in the Central Blacklands region of Texas.

Wheat stem rust--During a survey trip in late October, 1986, stem rust infections were found scattered in trace amounts throughout wheat fields in southeast Colorado, southwest Kansas and the Texas Panhandle. From these collections race 15-TNM was identified, also the most common race identified from collections made during the 1985-86 crop season throughout the Great Plains. No further stem rust reports have been obtained from this area.

In late March, 1987, wheat stem rust was present in south Louisiana, south Georgia and south Texas in trace amounts. This slow spring development is perhaps due to cool night temperatures delaying rust while warm daytime temperatures have allowed wheat growth.

Wheat leaf rust--In late March wheat leaf rust was severe on susceptible cultivars growing in south Texas nurseries; however, little rust was present in commercial fields and that which was found was confined to the lower part of the plant. In plots in the Beeville and Victoria, Texas, nurseries, susceptible cultivars were severely rusted while cultivars like ProBrand 812 (Lr 16 resistance), Payne (Lr 24 resistance) and Siouxland (24, 26 resistance) had 20-40% severities on the lower leaves. In the Beeville spring wheat nursery only traces of leaf rust were observed on the lower leaves.

In fields in the north Texas and south Oklahoma area leaf rust was severe on lower leaves and intection on the upper leaves was 10-20% on susceptible cultivars. This rust development has slowed with the return of cool temperatures. In Kansas leaf rust was severe in many fields during late winter because of good rust infection periods in the fall. A potential leaf rust epidemic was possible, but within the past two weeks many lower leaves were destroyed due to cold temperatures; therefore, the epidemic possibilities were lessened.

In south Louisiana and south Georgia leaf rust was severe on many susceptible cultivars (i.e., Massey, Hunter). In south Louisiana the potential for losses is as great as last year, and in south Georgia more losses than last year are possible because moisture is not a problem this year.

The first report of triticale leaf rust (5% severity) was in mid-March in plots in south Georgia (Hofmann).

The leaf rust virulence combinations identified from a limited number of collections made during a late October survey trip from north Texas to central Kansas were as follows: Virulence phenotypes (p) = p 2a,2c,3,10 (UN 17); p 1,3,10,16 (UN 5); p 1,3,10,24 (UN 5) and p 1,2a,2c,3,10 (UN 13). The Lr single-gene differentials tested were 1, 2a, 2c, 3, 3ka, 9, 10, 11, 16, 17, 18, 19, 21, 24, 26, 30. These phenotypes and their frequencies were quite similar to those found during the 1985-86 cropping season in the same area. However, they are somewhat different from those which were found in the Northern Great Plains last year where the frequencies of Lr 16 and 24 virulence decreased while the Lr 1 virulence frequency was greater. The differences in frequencies and virulence phenotypes of the commmon races in these two areas may mean that leaf rust oversummers in the southern Plains and is present throughout the year in this area.

Stripe rust—During late March, 1987, stripe rust was found scattered on wheat in Arkansas, Louisiana, Mississippi, and throughout Texas. In fields of soft red winter wheat in south Louisiana the rust was severe and some farmers were spraying to control their losses (Harrison). In south Texas the rust currently is not active while in north Texas, where it overwintered, the rust is still developing (Kenlund). If temperatures continue to stay cool, stripe rust may continue to develop.

Oat stem rust--In south Texas, stem rust was much less prevalent than usual with only traces found on the lowest leaves in grazed oat fields. Many oat fields in this area were in a preheading stage which probably means they are not receptive to stem rust infections.

Oat crown rust--This was the most severe rust in commercial oat fields in south Texas. Losses will range from 1-10% in many of these fields. In the Beeville, Texas, nursery, however, there were many lines which were resistant. In the Tifton, Georgia, nursery crown rust was severe on susceptible cultivars, also.

Barley rust--Leaf rust was common in south Texas nurseries. No stem rust was found. No commercial fields were observed.

Rye rust--No rye stem rust has been reported yet. Rye leaf rust was common in plots in the Giddings, Texas, nursery.

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We can be reached either by mail, by telephone (612-625-6299), or Telemail (user name = RL.CER.RUST or PPQ.ARS.CRUSTLAB.MN).

CEREAL RUST BULLETIN

Report No: 2
May 5, 1987

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 Stetion)

Conditions are dry throughout much of the small grain growing area from central Georgia to the Texas panhandle. The optimistic prediction of an excellent crop a month ago has been downgraded because of the drier than normal conditions. Extensive freeze damage exists in northcentral Texas. Some farmers there are baling or grazing their wheat crop.

Wheat stem rust--Overwintering centers of wheat stem rust were found at McGregor, Texas; Crowley and Jeanerette, Louisiana; and Tifton, Georgia, in susceptible plots of McNair 701. In southern Louisiana 2-5% stem rust severities were reported, while in fields north of Dallas, Texas, traces (less than 0.1%) of stem rust were found. Although much less than in 1986, this is more rust in north Texas than the mean for the 1970-85 period. From collections made in late March in south Texas and south Georgia the common race 15-TNM was identified.

Wheat leaf rust--In north Texas leaf rust is present in light amounts in almost every field. The early March freeze killed most of the rusted leaves, and lack of rain since then has retarded leaf rust development. In plots in central Texas severities ranged from 60-80% on susceptible cultivars (i.e., TAM 105, Chisholm) while resistant cultivars (i.e., ProBrand 812, Siouxland) had 0-10% severity readings.

Throughout the southern soft red winter wheat growing area leaf rust is present in every observed field in trace amounts. In contrast, susceptible cultivars in nurseries had 60-80% severities. Thus, most of the southern soft red winter commercial cultivars currently being grown possess some level of resistance to the pathogen population. Leaf rust is now present also throughout the Pacific Northwest in trace amounts.

From the early collections made in Texas in late winter, virulence was found on the single gene differentials Lr1,2a,2c,3,10,11,24 and 26 in 11 different phenotypic combinations. Currently, no virulence has been identified in 1987 for Lr9 or 16 from Texas.

Wheat Stripe rust--Severe stripe rust was found from western Mississippi to the Missouri bootheel, west to northcentral Texas. In Texas losses will be the highest they have been since the late fifties. In the Raymond, Mississippi, plots 80% severities were reported on many cultivars while in nearby fields 20% severities were common. In southwest Arkansas, wheat fields were killed by stripe rust.

In the Pacific Northwest stripe rust is continuing to develop in central and western Washington and northwest Oregon. A new virulence was found in central Washington that attacks the cultivar Hattan. In western Oregon Yamhill is rusted.

Oat stem rust--In the last week in April oat stem rust was found in trace amounts in Crowley, Louisiana, and McGregor, Texas, plots. From collections made in south Texas in late March race NA-27 was identified. This race has been the dominant one found in the U.S. the past 20 years.

Oat crown rust--During a survey this past week in north Texas no crown rust was found. In south Alabama oat fields, however, 60% severity readings were common.

Barley rust--Leaf rust was found in a southcentral Kansas field in late April. Approximately 10% of the leaf area was affected by the disease which overwintered there (Willis). No stem rust has been reported.

Rye rust--No new reports of rye rust were reported in the past two weeks.

Other diseases--Leaf rust was found on Aegilops cylindrica (goatgrass) in north Texas but in lesser amounts than last year.

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CEREAL RUST BULLETIN

Report No: 3
May 27, 1987

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

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

Wheat harvest has begun in southern Louisiana and Texas. In Oklahoma and Kansas the wheat maturity currently is one week behind normal. Throughout the U. S. southern wheat region drier than normal conditions are becoming more apparent. Small grain seeding is completed in the northern spring grain region with the crop ahead of normal.

Wheat stem rust--In the past two weeks more overwintering centers of wheat stem rust were found in southwest Arkansas and in southeast and northcentral Mississippi nursery plots of Coker 916. In central and south Louisiana nursery plots severe stem rust (20%+) was observed on many of the susceptible soft red winter wheats. Traces of stem rust were found in a McNair 701 (susceptible host) plot in a Hartsville, South Carolina, nursery in mid-May. Lightly rusted commercial fields were observed in southern Tennessee and northcentral Arkansas.

Traces of stem rust were found in nursery plots of susceptible cultivars in southcentral Kansas. These were the only reports of stem rust found in either Kansas or Oklahoma this year. This is much less stem rust than found last year on the same date. The main reasons for less rust may be lack of overwintering in these areas and little inoculum moving from the south. A stem rust overwintering center was found in goatgrass (Aegilops cylindrica) in central Kansas in late May.

Wheat leaf rust--In north Oklahoma and southcentral Kansas nurseries leaf rust was moderate on susceptible cultivars, while in fields only traces were found.

In the past two weeks leaf rust severities were light in wheat fields from central Pennsylvania to eastcentral Missouri. In much of the southern soft red winter wheat region leaf rust is limited by other diseases (viz., stripe rust and Septoria nodorum) and premature senescence because of drought. The drought this year is more scattered in this area than last when much of the southeast U. S. had droughty conditions.

Wheat leaf rust was severe in Sacramento Valley, California, nurseries and fields (Jackson). Leaf rust development in the Pacific Northwest has been limited by less rainfall than normal.

The leaf rust races identified (Table 1) are varied and include many of the virulence combinations found in 1986 (unpublished). Two differences from last year at the same date are an increase in Lr24 and 26 (Siouxland) combined virulence and a decrease in Lr16 (ProBrand 812) virulence.

Table 1. Preliminary data of the 1987 wheat leaf rust virulence survey (5/26/87).

		Number of isolates per state											
Race	Virulence[1]	AL	CO[2]	FL	GA	KS[2]	LA	MS	NM[2]	OK	PA[2]	TX	Total
UN2	Lr3,10							1				3	4
	3,11											2	2
	3,10,11			2				1					3
UN3	Lr2c,3,3ka,10,18				3								3
UN5	Lr1,3,10	2			1	12				1		12	28
	1,3,10,16		2			4				4		10	20
	1,3,10,24					3	1			4		20	28
	1,3,10,24,26						1					5	6
UN6	Lr1,2c,3,3ka,9,18,30											2	2
	1,2c,3,3ka,11,18,30										4		4
UN13	Lr1,2a,2c,3,10		1			4	4			8		20	37
	1,2a,2c,3,10,17,18		1										1
UN17	Lr2a,2c,3,10		1		2	1	1		4			20	29
Total		2	5	2	6	24	7	2	4	17	4	94	167

[1] The single gene differential lines tested in leaf rust race identification were Lr 1, 2a, 2c, 3, 3ka, 9, 10, 11, 16, 17, 18, 19, 21, 24, 26, 30.

[2] Identifications from collections made in fall of 1986.

Wheat stripe rust--Severe stripe rust is still being found in northeast Arkansas and southeast Missouri. In some fields in this area stripe rust losses will occur. In the hard red winter wheats only traces of stripe rust have been reported in Kansas (Sim). From initial stripe rust collections made in the southcentral states the races identified (Races 3 and 8) are not different from the races found in past years, based on the differentials currently used (Line). The initial races identified should not offer virulence to either the hard red winter or spring wheats. Possibilities for the increased amount of stripe rust in the southcentral area compared to previous years are: 1) Large area of disease during the mild winter, 2) Susceptibility of the current soft wheat cultivars, and 3) Expanded minimum tillage practices which can lead to some host plants throughout the year.

In the Pacific Northwest stripe rust is not developing rapidly because of increased temperature. The rust in western Washington is at severe levels mainly because of earlier development with a new virulence combination.

Stripe rust uredospores are very vulnerable to heat, and therefore viability is poor if shipment is delayed. Please send rusted green leaves (5 or more) to Dr. Roland Line, USDA, Cereal Disease Res. Lab., 367 Johnson Hall, Washington State University, Pullman, WA 99163 as soon as possible after collecting.

Oat stem rust--In the past two weeks oat stem rust collections were made in nursery plots in Yolo, California; Beeville, Texas; and Jay, Florida. From collections made in Mexico and south Texas, the common race NA-27 was identified.

Oat crown rust--The aecial stage of crown rust is developing heavily on buckthorns in southern Wisconsin, southern Minnesota and central Iowa. In Iowa this is the heaviest crown rust on buckthorn that has been observed in the past few years. If weather conditions continue to be favorable for disease development, there should be considerable inoculum to infect oats.

Barley rust--Light amounts of barley leaf rust were found in early planted fields in southcentral Kansas in mid-May. Moderate amounts (20% severities) of leaf rust were found in nurseries at Lincoln, Nebraska, and Meridian, California. Leaf rust severities are light in central Pennsylvania fields. No stem rust has been reported on barley.

Rye rust--Rye leaf rust in southcentral Kansas was lighter than normal. In plots most plants were infected but the rust was not severe. No rye stem has been reported.

Barberry rust--In Dane Co., Wisconsin, the aecial stage of stem rust was found on the common European barberry in mid-May. The bushes are lightly infected now, but could eventually provide inoculum to infect small grains or other grasses.

Other diseases--Leaf rust was found on *Aegilops cylindrica* (goatgrass) in northern Oklahoma and southern Kansas. In many cases the rust had overwintered at these sites.

CEREAL RUST BULLETIN

Report No: 4
June 9, 1987

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

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

Wheat harvest is beginning in southern Kansas, northeastern Arkansas, and the coastal plains of Georgia, and many fields are ripe north to the Ohio Valley. Much of the northern soft red winter wheat crop has ripened 7-10 days ahead of normal. In the northern Great Plains most of the spring grains are one week ahead of normal development.

Wheat stem rust--During the first week in June light amounts of stem rust were found in plots in Illinois, Indiana, Kentucky, and Tennessee. The initial rust infections were from rain-deposited rust spores, and disease development was restricted by lack of moisture. Most cultivars in this area (e.g., Caldwell, Compton) were resistant to stem rust. In northeastern Arkansas a plot of Tyler was killed by stem rust that overwintered; moderate damage occurred in McNair 1003; and there was no damage to Fla 302, except where inoculum pressure was severe from the adjacent susceptible Tyler plot. Only a single race (TNM-15) has been identified so far from collections made during the current crop year (Table 1).

Table 1. Preliminary data of the 1987 wheat stem rust race survey.

State	Number of Collections	Number of Isolates	15* TNM
AL	1	3	3
CO	3	6	6
GA	8	24	24
KS	3	2	2
LA	9	21	21
OK	1	3	3
TX	10	20	20
Total	35	79	79

* All isolates virulent to Sr17

Wheat leaf rust--In much of the northern soft red winter wheat area the lack of moisture limited rust development during the month of May. Where moisture was adequate severe leaf rust was found in plots of susceptible cultivars. In fields the infection was light since most of the cultivars in this area have some resistance. East of the Appalachian Mountains from North Carolina to Pennsylvania leaf rust was severe in fields and plots of susceptible cultivars. In many locations in this area there is much more leaf rust this year than in 1986. Rains in the past week have provided conditions for rust increase in northern Kansas and southern Nebraska. In most locations in this area rust will not be a major problem except in late maturing fields.

By June 1 traces of leaf rust were found in winter wheat fields as far north as southeastern North Dakota and in nursery plots in eastcentral Minnesota. At these locations rust also was found in spring wheat plots indicating exogenous inoculum sources. In the Pacific Northwest leaf rust is light but the recent rains may provide conditions for more rust development.

Wheat stripe rust--During the first week in June stripe rust was found in wheat plots at Urbana, Illinois. A 3-ft center of rust was found where the oldest pustules were 21-28 days old. Currently some rust pustules are still developing on green leaf tissue. Moisture stress slowed rust development. In the Pacific Northwest stripe rust is severe in the Mt. Vernon region of western Washington. On the major cultivar Stephens losses are expected. Some of the acreage has been sprayed for stripe rust control. Elsewhere in the northwest stripe rust is generally light.

Oat stem rust--In the past two weeks oat stem rust collections were made in central Texas and northeastern Arkansas. Oat stem rust development has been confined to this area. NA 27 has been the only race identified except in California where only race NA 10 has been found (Table 2).

Table 2. Preliminary data of the 1987 oats stem rust race survey.

State	Number of Collections	Number of Isolates	NA race 27	NA race 10
CA	1	3		3
FL	1	3	3	
GA	1	3	3	
KS	3	9	9	
LA	1	3	3	
TX	6	12	12	
Total	13	33	30	3

Oat crown rust--Crown rust is present in trace amounts throughout Wisconsin, Minnesota and the Carolinas. A recent survey found no crown rust in oat fields in Illinois and Indiana.

Barley rust--Light amounts of barley leaf rust were found in eastern Kentucky and central Pennyslvania nursery plots and northwestern Kansas fields. Stem rust was found on late developing plants in the Lexington, Kentucky, nursery. It is likely that this is wheat stem rust on barley.

Rye rust--Traces of rye leaf rust were found on lower leaves in southcentral Wisconsin fields and eastcentral Minnesota plots. No rye stem rust has been reported.

Barberry rust--During the last week in May, aecial collections were made from bushes in southeast Minnesota. No pyncia have been observed yet in the Pacific Northwest.

CEREAL RUST BULLETIN

Report No: 5
June 23, 1987

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
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The wheat harvest has moved northward to northcentral Kansas. Generally the crop is one week ahead of normal maturity in northcentral Kansas and southeast Nebraska. In the Dakotas, Minnesota, and Montana the early spring and dry weather have contributed to earlier than normal crop development in both the winter and spring sown small grains.

Wheat stem rust--During mid-June traces of stem rust were found in fields and plots in northcentral Kansas and southcentral Nebraska. A stem rust infection center was found in a plot of Redchief at York, Nebraska, on June 16. The initial infection in this plot occurred sometime during early April from spores deposited by rain from the south. Since the initial infection there have been 4-5 generations of pustule development (40% severity), however, the spread has been limited to a small (3 feet diam.) focus. During mid-June single pustules of stem rust were found in nursery plots in Whitethorne, Virginia, and Brookings, South Dakota. Three percent of plants in a winter wheat field in southeast Wisconsin were infected with stem rust. In 1987 the stem rust development throughout the northern Great Plains spring wheat area is much less than in 1986 on the same date.

Wheat leaf rust--Leaf rust is widespread throughout southeast Nebraska and southeast South Dakota winter wheat fields and in some fields light losses will occur. However, the hot weather has prematurely dried the flag leaves so leaf rust never reached epidemic level. In southeast Minnesota and eastern North Dakota winter wheat nursery plots, leaf rust is much less severe than last year on the same date.

In the spring wheat area leaf rust is severe on susceptible cultivars where moisture is adequate (e.g., eastcentral South Dakota). However, most of the spring wheats have adult-plant resistance, and losses should be light. In the Pacific Northwest recent favorable weather has provided good conditions for rust increase at many locations, but the late onset of disease will limit losses.

Virulence identifications since the last bulletin have been similar to those tabulated previously. The main additional information has been the occurrence of Lr11 virulence in three further virulence combinations.

Wheat stripe rust--Throughout western Washington stripe rust is severe, and with a continuation of favorable weather more stripe rust is expected. Losses will be mainly in western Washington. There have been no new reports of wheat stripe rust in the central United States since the last bulletin.

Oat stem rust--During the third week in June traces of oat stem rust were found in plots in northcentral Kansas and fields in southcentral Nebraska. It is anticipated that rust will appear in the spring oat area in the next two weeks which would correspond to long term average date of first detection. For the first time this year the rather avirulent race NA5 was found in Florida and Texas (Table 1).

Table 1. Preliminary data of the 1987 oat stem rust race survey.

	Number		NA Race		
State	Collections	Isolates	5	10	27
AL	1	3			3
CA	1	3		3	
FL	2	6	1		5
GA	1	3			3
KS	3	9			9
LA	1	3			3
TX	42	97	9		88
Total	51	124	10	3	111

Oat crown rust--During the past week severe crown rust was found in central Iowa and southcentral Wisconsin fields. In Iowa, the rust was limited to the more moist areas of the fields. The disease will cause losses in many of these fields. Rust most often was very severe within 1/2 mile of infected buckthorns.

Barley rust--In spring barley plots in northwest Kansas and eastcentral South Dakota barley leaf rust was severe on susceptible cultivars. In late planted fields in North Dakota and Minnesota some light losses may be expected. There have been no new reports of barley stem rust since the last bulletin.

Rye rust--Light amounts of rye leaf rust were found in southeast West Virginia and southcentral Nebraska. There have been no reports of rye stem rust this year.

Quackgrass rust--During the first week in June severe stem rust (65%) was found on quackgrass (*Agropyron repens*) growing within 25 feet of barberry bushes in southeastern Minnesota (Laudon).

CEREAL RUST BULLETIN

Report No: 6
July 14, 1987

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

Issued By:
AGRICULTURAL RESEARCH SERVICE
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Winter wheat harvest progressed into a few fields in southeastern North Dakota, southern Minnesota, and Wisconsin. Scattered recent rain alleviated some of the dryness, but it was too late to be useful for spring planted cereals.

Wheat stem rust--During the first full week in July traces of wheat stem rust were found in wheat plots of susceptible winter and spring cultivars from the eastern Dakotas to eastern Wisconsin. The winter wheats were in the hard dough stage while the spring wheats were in the soft dough stage. In this area there is much less stem rust than in 1986 on the same date. Three apparent reasons for less rust in 1987 are a drier season, a probable lack of overwintering stem rust in the Northern Plains, and probably a smaller initial inoculum source in the Southern Plains. Traces of wheat stem rust have been reported in eastern Washington, Oregon, and northern Idaho. The crop there is ahead of normal maturity so damage will be minimal. All of the isolates identified from collections made from southern and southeastern wheat areas so far in 1987 have been identified as race 15-TNM.

Wheat leaf rust--Leaf rust is severe in fields and plots of winter wheat in western Minnesota and the eastern Dakotas. Losses in a few fields will be moderate. Winter wheat acreage is greatly reduced in North Dakota and Minnesota from those of 1986. Severe rust is also present on some spring wheat cultivars in plots; however, commercial fields are generally planted to cultivars adequately resistant to prevent all but very light losses. Currently, the greatest leaf rust severities are in eastcentral North Dakota. Little leaf rust is present in the western Dakotas, primarly due to dry conditions. Several new durums cultivars appear to be more susceptible to leaf rust than most of the durum cultivars which have been commercially grown in North Dakota. Their resistance may still be adequate to avoid all but light losses. Four virulence/avirulence phenotypes dominate (71%) among the 377 isolates identified from collections made in the southern United States. These phenotypes are all virulent to Lr3 and 10 (Table 1).

Isolates identified from collections made from Aegilops cylindrica in northern Texas and Oklahoma have the virulence pattern (UN9) p1,2a,2c,17. This virulence phenotype has not been identified from wheat in 1987 (Table 1) but is similiar to those identified from Ae. cylindrica in recent years.

Table 1. Preliminary data of the 1987 wheat leaf rust virulence survey (7/14/87)

Race	Virulence[1]	Number of isolates per state											
		AL	AR	CA	FL	GA	KS	LA	MS	OK	SC	TX	Total
UN2	Lr3,10			2					1		1	4	8
	3,11		4		1			2				5	12
	3,17				1								1
	3,10,11		2		5	1			1				9
	3,10,26				4								4
UN3	Lr2c,3,3ka,10,18					6							6
UN5	Lr1,3,10	8	8	1	1	6	15	1		2		18	60
	1,3,10,11					2					1		3
	1,3,10,16						4			4		21	29
	1,3,10,24		10				4	2		5		36	57
	1,3,10,24,26							4				8	12
UN6	Lr1,2c,3,3ka,9,30											2	2
	1,2c,3,3ka,9,10,18,30								2			2	4
	1,2c,3,3ka,11,18,30											1	1
UN13	Lr1,2a,2c,3								2				2
	1,2a,2c,3,10	3	1				8	11		12		41	76
	1,2a,2c,3,9,11,30							2					2
	1,2a,2c,3,10,11,30	2	1										3
UN14	Lr1,2c,10,11	1	2		2						4		9
UN17	Lr2a,2c,3,10	3	7	1		3	2	2		22		37	77
Total		17	35	8	10	18	33	24	6	45	6	175	377

[1] The single gene differential lines tested for leaf rust race identification were Lr 1, 2a, 2c, 3, 3ka, 9, 10, 11, 16, 17, 18, 19, 21, 24, 26, 30.

Wheat stripe rust--In the Pacific Northwest the stripe rust population now includes races that are virulent to Tres and Hatton cultivars (Line).

Oat stem rust--During the past two weeks only traces of oat stem rust were found in oat fields and plots in the eastern Dakotas and Minnesota. This is less oat stem rust than normally found in this area. This probably was due to drier than normal conditions and perhaps less inoculum arriving from the Southern Plains oat growing area. The oat stem rust population is comprised of three races (Table 2), however, race NA-27 makes up 83% of the isolates.

Table 2. Preliminary data of the 1987 oat stem rust race survey (7/14/87).

State	Number of		NA Race		
	Collections	Isolates	5	10	27
AL	1	3			3
CA	4	12	3	9	
FL	3	9	1		8
GA	1	3			3
IL	1	3			3
KS	3	9			9
LA	2	6			6
SC	1	3	3		
TX	68	175	13		162
Total	84	223	20	9	194

Oat crown rust--During the first full week in July severe oat crown rust was found in fields and plots throughout southern Wisconsin. The disease will cause losses in many of these fields. Crown rust also was severe on wild oats intermixed in fields of planted spring grains in Minnesota.

Barley stem rust--Severe stem rust was reported on barley in some plots in southwestern Minnesota with traces in barley fields in eastcentral Minnesota.

Barley leaf rust--In the eastern Dakotas and northwestern Minnesota severe barley leaf rust was observed in susceptible plots of barley with light amounts in fields. Losses will be very light in this area except in the very late maturing fields.

Rye rust--Trace amounts of rye leaf rust were reported in plots in northcentral North Dakota and in a field in northcentral South Dakota. A collection of rye stem rust (trace severity) was made in southeastern Minnesota.

Barberry rust--During the third week in June many aecial collections were made in southeastern Ontario, Canada. From one West Virginia barberry aecial collection wheat stem rust race 113-RTQ and oat stem race NA3 were identified.

Other rusts--Stem rust collections were made from Agrostis alba and Hordeum jubatum (Laudon) in southeastern Minnesota and perennial ryegrass in western Oregon (Azenedo).

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The harvest of spring sown small cereals has progressed into all areas of the Northern Great Plains. Much of the oats and barleys have been harvested, while the early planted spring wheat harvest is in full swing. Most of the northern area grains are in good condition but hot temperatures and infrequent rains resulted in a lower yield potential than in 1986 and now at harvest, rains, wind, and hail have further damaged the crop.

Wheat stem rust--During the 1987 season stem rust overwintering sites were found on susceptible cultivars from southern Texas to southern Georgia and up the Mississippi Valley to the Arkansas-Tennessee border. By late April rust was reported in northern Texas fields but severities were less than 1986. By mid-May traces of stem rust were found in plots from southcentral Kansas to northern South Carolina. During the first week in June traces of stem rust were found scattered in susceptible plots of northern soft red winter wheat in central Illinois and central Indiana. The initial rust infections were from rain-deposited rust spores and subsequent disease development was restricted by lack of moisture.

During the first full week in July traces of wheat stem rust were found in plots of susceptible winter wheat cultivars from the eastern Dakotas to eastern Wisconsin. Rust also was found on susceptible spring cultivars in eastern North Dakota and western Minnesota. However, since the majority of the hard red spring cultivars are resistant to stem rust, losses were insignificant.

During mid-July traces of stem rust were found in fields and plots in eastern Washington, Oregon, and northern Idaho. The crop in this area was ahead of normal maturity so losses will be minimal.

Three apparent factors for less stem rust in 1987 were a drier cereal growing season, a smaller initial inoculum source in the Southern Plains and a lack of overwintering stem rust in the Northern Plains. This year the number of stem rust collections received at the Cereal Rust Lab was one-half the number collected in 1986 when the estimated loss to stem rust in the U.S. was 1.12%.

Table 1. Preliminary data of the 1987 wheat stem rust race survey (8/4/87).

State	Number of Collections	Number of Isolates	Races (% of isolates per state) 15 TNM*	113 RTQ
AL	1	3	100	
AR	12	34	97	3
CO	1	3	100	
GA	10	30	100	
IL	2	5	100	
IN	5	10	100	
KS	8	20	100	
KY	2	6	100	
LA	19	53	100	
MS	3	9	100	
MO	2	6	100	
NE	5	14	100	
SC	3	9	100	
TN	2	6	100	
TX	26	71	100	
VA	1	3	100	
WV	1	3	100	
Total	105	285	100	1

* All isolates virulent to Sr17

Wheat leaf rust--In late March rust was severe on susceptible cultivars growing in southern Texas plots; however, little rust was present in commercial fields. From northern Texas to northern Kansas leaf rust was severe in many fields during late winter because of good rust infection periods in the fall. A potential for a leaf rust epidemic existed, but in late March many lower leaves were killed by a severe freeze destroying both the leaves and the pathogen; thus, the probability of an epidemic was lessened. The lack of rain further retarded leaf rust development so losses were light throughout this area.

In mid-June leaf rust was severe in winter wheat plots and fields from southeastern Nebraska to eastern South Dakota. However, the hot weather prematurely dried the flag leaves so leaf rust never reached an epidemic level.

Throughout the southern soft red winter wheat area, leaf rust was severe on susceptible cultivars in nurseries, while in commercial fields leaf rust was light. Most of the commercial cultivars currently grown possess some level of resistance. Also, in this area leaf rust was limited by the presence of stripe rust and Septoria nodorum on the leaves and premature leaf senescence due to drought. In the soft red winter wheat area east of the Appalachian Mountains from North Carolina to Pennsylvania, where leaf rust overwintered, rust was severe by early June on susceptible cultivars. Leaf rust was more severe than in 1986 in this eastern area. However, in much of the northern soft red winter wheat area the lack of moisture limited rust development during the month of May. This moisture limitation and cultivar resistance accounted for the light severities and losses.

By late June moderate leaf rust was observed on some of the spring wheat cultivars growing in the Northern Plains plots; however, in most commercial fields rust was light because the early planting date, hot weather, and cultivar resistance created conditions allowing for only very light losses. In 1987 two new durum cultivars - Stockholm and Sceptre were more susceptible to leaf rust than most of the

durum cultivars which have been commercially grown in North Dakota. Their resistance may still be adequate to avoid most losses.

In the Pacific Northwest wheat leaf rust developed late, and losses will be light.

The leaf rust races identified (Table 2) include many of the virulence combinations found in 1986 (unpublished). Some differences from last year at the same date are an increase in Lr11 virulence, increase in Lr24 and 26 (Siouxland) combined virulence and decrease in Lr16 (ProBrand 812) virulence.

Table 2. Preliminary data of the 1987 wheat leaf rust virulence survey (8/4/87)

		Number of isolates per state													
Race	Virulence[1]	TX	OK	CO KS	LA	AR	MS	AL	GA	FL	SC	TN KY	PA	CA	Total
UN2	Lr3,10	4					1				1			2	8
	3,11	5			2	4			2	1					14
	3,17									1					1
	3,10,11					2	1		1	5					9
	3,10,26													4	4
UN3	Lr2c,3,3ka,10,18								6						6
UN5	Lr1,3,10	20	2	23	2	8	1	8	6	1				1	72
	1,3,10,11			2					6		1				9
	1,3,10,16	25	4	10											39
	1,3,10,24	38	5	4	3	10									60
	1,3,10,24,26	12			4										16
UN6	Lr1,2c,3,3ka,9,30	2													2
	1,2c,3,3ka,9,10,18,30	2					2								4
	1,2c,3,3ka,11,18,30	1			1							1	6		9
UN13	Lr1,2a,2c,3					2	2								4
	1,2a,2c,3,10	46	12	21	11	1		3							94
	1,2a,2c,3,10,24	3		1											4
	1,2a,2c,3,9,11,30				2										2
	1,2a,2c,3,10,11,30			1		1		2							4
UN14	Lr1,2c,10,11					2		1		2	4				9
UN17	Lr2a,2c,3,10	38	22	7	4	7		3	3			1		1	86
Total		196	45	69	29	37	7	17	24	10	6	2	6	8	456

[1] The single gene differential lines tested for leaf rust race identification were Lr1, 2a, 2c, 3, 3ka, 9, 10, 11, 16, 17, 18, 19, 21, 24, 26, 30.

Wheat stripe rust--During late March, 1987, stripe rust infections were found on wheat in the states bordering the lower Mississippi Delta and in Texas. In fields of soft red winter wheat in southern Louisiana rust was severe enough that some farmers sprayed to reduce disease losses. By early May stripe rust was severe from western Mississippi to the Missouri boot heel and west to northcentral Texas. In southwestern Arkansas some wheat fields were destroyed by stripe rust. In Texas losses to stripe rust were the highest since the late fifties. In early June traces of stripe rust were found in central Kansas and central Illinois. This appears to be the northern limit of stripe rust in this region. Hot weather in June and July retarded further development of this rust.

Races 3 and 8 were identified from stripe rust collections made in the southcentral states. These are similar to the races found in past years, based on the current differentials. These races are avirulent to the common hard red winter and spring wheats. The increased amount of stripe rust in the southcentral area

compared to previous years probably was due to: 1) large area of disease infection during the mild winter, 2) susceptibility of the current soft winter wheat cultivars, and 3) expanded minimum tillage practices which can lead to some host plants growing throughout the year.

In the Pacific Northwest stripe rust was severe in western Washington and some losses occurred on the major cultivars. Elsewhere in the northwest stripe rust was generally light. In this area the stripe rust population now includes races that are virulent to Tres and Hatton cultivars.

Oat stem rust--In early April only traces of overwintering oat stem rust were found in Texas, Louisiana, and Florida fields and plots. This was much less rust than usual in the area. Less stem rust than normal was found throughout the Northern Plains oat-growing area. Only traces of oat stem rust were found on wild oats (Avena fatua) in eastern North Dakota and northwestern Minnesota. This probably was due to drier than normal conditions and less inoculum arriving from the Southern Plains oat-growing area.

Table 3. Preliminary data of the 1987 oat stem rust race survey (8/4/87).

State	Number of Collections	Number of Isolates	NA Race (% of isolates per state) 5	10	27
AL	1	3			100
CA	4	12	25	75	
FL	3	9	11		89
GA	1	3			100
IL	1	3			100
KS	4	11			100
LA	2	6			100
MN	1	1			100
NE	1	3			100
SC	1	3	100		
TX	71	184	7		93
Total	90	238	8	4	88

Oat crown rust--In 1987, severe crown rust was found in oat fields in south Texas, where it overwintered, and in central Iowa and southern Wisconsin. In Iowa there was the heaviest crown rust infection on buckthorn (alternate host) that has been observed in recent years. This was one of the earliest (like 1986) and most severe outbreaks of crown rust in central Iowa and southern Wisconsin in the past 30 years. Much of the rust developed in fields where inoculum arrived early from the south or where infected buckthorn hedges were growing in close proximity to oat fields. The severe rust resulted in losses in many fields from southcentral Wisconsin to eastern South Dakota.

Barley stem rust--Ten percent stem rust severities were observed on barley in susceptible plots in southwestern Minnesota and traces in barley fields in eastcentral Minnesota and eastern North Dakota. The T-gene resistance seems to have been adequate to prevent barley stem rust losses.

Barley leaf rust--In 1987, leaf rust was severe on some cultivars in south Texas, northwestern Kansas, northwestern Minnesota, and the eastern Dakotas. Losses will be light except in late maturing fields. In spite of more inoculum than normal the rust was light because of less favorable environmental conditions and an earlier maturing crop than normal.

Rye stem rust--A collection of rye stem rust (trace severity) was made in

southeastern Minnesota in early July. There was less rye stem rust than normally found in the U. S.

Rye leaf rust--By late April rust was found througout the southern U. S. where this rust survives throughout the year. By early July traces of rye leaf rust were found in plots in northcentral North Dakota and in a field in northcentral South Dakota. The hot weather in the northcentral states caused premature senescence of rye leaves which created less leaf area and time for the rust to develop.

Barberry rust--In 1987, aecial collections were made in southeastern Minnesota, southcentral Wisconsin, southern West Virginia, and southeastern Ontario, Canada. From the West Virginia barberry aecial collection the wheat stem rust race 113-RTQ and oat stem race NA3 were identified. From one of the Minnesota aecial collections race 113-RTQ was identified.

Other rust hosts--Leaf rust was found on Aegilops cylindrica (goatgrass) in northern Oklahoma, southern Kansas, and northern Texas in lesser amounts than last year. In many cases the rust had overwintered at these sites. In late May a stem rust overwintering center was found on goatgrass in central Kansas. Stem rust also was found on quackgrass (Agropyron repens) and redtop (Agrostis alba) in southeastern Minnesota and perennial ryegrass (Lolium perenne) in western Oregon.

If you wish to remain on the Cereal Rust Bulletin mailing list next season, please return the enclosed card by September 8, 1987. Be sure to make the necessary changes if your address is not correct. USDA regulations requires us to update our list every year.

Thank you for your assistance.