CEREAL RUST BULLETIN

Report No: 1
April 12, 1988

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

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

A dry summer and fall has resulted in poor cereal crops in south Texas. Cereal crops were generally planted later than normal which often reduces the probability of fall infection by rust. A generally mild winter was followed by a mid-March freeze which resulted in crop damage throughout most of south Texas and into central Texas.

Wheat stem rust--Little stem rust has been reported yet this year. An overwintering center was found in a trap plot near Victoria, Texas. A few scattered pustules were found in a trap plot at Beeville, Texas. Unless stem rust has overwintered in additional areas it is unlikely that it will be important in 1988.

Wheat leaf rust--Due to the drought there is less leaf rust in south Texas than normal. Severities are generally low in most fields; however, severities on the most susceptible lines in nurseries are generally high (80 to 100 % at heading to late berry stage). In central Texas severities are moderate (60 % at flowering in the most susceptible fields) and should become severe in the next few weeks in many fields, resulting in some losses. Many cultivars have adequate resistance to prevent loss. Virulence based on field observations would indicate Lr9 and Lr16 are more effective resistances than in recent years. Coker 68-15 is also resistant this spring. Lr24 and Lr26 alone or in combination were ineffective.

Leaf rust has been reported in the Mississippi delta area of Arkansas and in southern Kansas. Rust overwintered in these areas and adequate time exists for leaf rust to become important there on susceptible cultivars if weather conditions are favorable.

Table 1, shows the virulences of leaf rust identified from collections made last fall and early this year.

Wheat stripe rust--No stripe rust was observed or reported in south Texas. In many years, some fields in this area are lightly infected.

Oat stem rust--A single overwintering focus was found at Beeville, Texas. No stem rust was observed in commercial fields which is unusual. Three factors may have had a role in this event. First, a dry summer limited the possibility of oversummering of the rust. Second, a dry fall and winter resulted in fewer dew periods for infection of the seeded crop. Third, the late planting and emergence of the crop further reduces the probability of infection due to lower temperatures in the winter and less inoculum.

Oat crown rust--No crown rust was observed during a recent survey of south Texas. This is highly unusual and may be related to the same factors discussed for oat stem rust. Trace amounts of crown rust had been observed in early March, so we can expect some probably survived the freeze. If little crown rust survived the winter along the gulf coast, then aeciospores from buckthorns could provide a greater proportion of the inoculum for the upper midwest than ususal. This could mean a considerable shift in virulence in areas normally remote from buckthorn inoculum sources.

Barley stem rust--No stem rust on barley has been observed, this is normal as most stem rust on barley in the northern Great Plains is from inoculum produced on wheat (Puccinia graminis f. sp. tritici) or on rye (P. graminis f. sp. secalis).

Barley leaf rust--Leaf rust was observed only in the Beeville and Giddings nurseries in Texas. At Beeville severities on the most susceptible cultivars reached 60 percent. Barley is seldom grown commercially in this area. Leaf rust of barley can overwinter into southern Kansas during favorable winters. No leaf rust has been reported in Kansas or Oklahoma nor from the mid-Atlantic states where it also overwinters.

Rye stem rust--No stem rust was observed in south Texas. Stem rust is not common on the limited rye grown in central Texas. The small amount of rye stem rust in the northern Great Plains is probably from uredia or mycelium overwintering on winter rye in this area.

Rye leaf rust--Leaf rust is normally common in nurseries in the wetter areas of central Texas. Severities of 60 percent were observed on some plants at a nursery at Giddings, Texas.

Table 1. Leaf rust virulence identified from collections made in November, December and January of 1987-1988.

State	Virulent on	No. of Isolates
CO	1,3,10	3
	1,3,10,16	1
	2a,2c,3,10	1
	1,2a,2c,3,10	2
IN	1,3,10,17	2
LA	1,3,10	3
	1,3,10,24	1
	1,2a,2c,3,10	3
MN	1,2a,2c,3,10	2

CEREAL RUST BULLETIN

Report No: 2
May 3, 1988

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)

April was cold and dry for most of the southern wheat areas of the United States, delaying maturity. Dew periods were infrequent and too cold for normal rust development. Wheat in central Texas has suffered from the lack of rain since planting. Erratic crop emergence has resulted in a variable growth stage even within a field. Only the earliest fields were affect by frost in north central Texas while in central Texas many fields suffered some damage. In the northern Great Plains the dry weather during April permitted an earlier than normal seeding of spring cereals.

Wheat stem rust--The cold April has restricted stem rust development. A small focus was found in early April at Plains, Georgia and as normal several overwintering sites were found at Crowley, Louisiana. No stem rust was found last week in north central Texas or southwestern Oklahoma. Little stem rust is expected to be observed for several weeks after dew period temperatures start to approach 65° F.

Wheat leaf rust--Disease development has been slow during the past month on the southern winter wheats. In Louisiana and southern Georgia severities of up to 80% have been reported in nurseries. A few fields in central Texas have flag leaf severities of more than 50 percent at flowering to berry and will suffer moderate losses. In most fields leaf rust is light, (trace to 5 percent), and confined to the lower leaves and should cause little loss. In much of the rolling plains there was an effective dew period 7 to 14 days ago so severities will be somewhat greater this week. Little leaf rust was present in the area north of Dallas. Development of leaf rust in Arkansas, Colorado and Kansas has been limited. A trace of leaf rust was found in Pennsylvania on April 19 (Bingaman). Early race survey results are shown in Table 1.

Wheat stripe rust--A single uredium was observed in a field in Foard county Texas, however, stripe rust is common in the area north and east of McKinney, Texas. Severities are generally light, but a severely infected field was observed south of Paris. Stripe rust is serious in southwestern Arkansas where about 3,000 acres of wheat are grown with some growers spraying for control (Milus).

Oat stem rust--No stem rust was observed on cultivated oats or wild oats in central or north central Texas. We have had no reports of oat stem rust.

Oat crown rust --No crown rust was observed or reported in April surveys generally through out Texas and the Gulf coast area. In Texas, due to the the generally mild winter wild oats are more frequent in wheat fields than in many years.

Barley stem rust--No stem rust has been reported on barley.

Barley leaf rust--Leaf rust infections observed in central Texas 3 weeks ago have disappeared as the lower leaves died and no new uredia have yet appeared. Traces of leaf rust was observed in southcentral Pennsylvania (Bingaman).

Rye stem rust--No stem rust has been observed on rye in 1988.

Rye leaf rust--Leaf rust overwintered in the rye plots at Rosemount, Minnesota with uredia observed on April 20. No leaf rust was observed on the limited rye in north central Texas. Leaf rust was reported to be severe in Plains, Georgia nurseries (Bruckner).

Other rusts--Leaf rust was found on Aegilops (Triticum) cylindrica in only Clay and Jack counties in north central Texas, although the grass is common throughout the area and into southern Oklahoma. Traces of leaf rust have been reported on triticale in a nursery at Plains, Georgia (Bruckner).

Other diseases--In Texas, Barley Yellow Dwarf is common in cereals. Spot blotch, tan spot and powdery mildew are present but with a few exceptions they will have a minor effect on yield.

Table 1. Leaf rust virulence identified from collections made in March of 1988.

Area	Virulent on	No. of isolates
N.E. Mexico	1,3,10,24	1
	1,2a,2c,3,10	5
Arkansas	1,2a,2c,3,10	2
	1,3,10,24,26,	1
Colorado	1,3,10	1
	1,2a,2c,3	1
Louisiana	2a,2c,3,10	1
	1,3,10	1
	1,2a,2c,10,16	1
	1,3,10,16	2
	1,2a,2c,3,10,26	2
Texas	1,3,10	9
	1,3,10,24	2
	1,2a,2c,3,10	5

CEREAL RUST BULLETIN

Report No. 3
May 24, 1988

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)

Throughout much of the grain growing area of the United States the growth and development of the small grains has been limited by the shortage of moisture. Small grain harvest is continuing in southern Louisiana, southern and central Texas fields. Wheat across Kansas and Oklahoma is generally in good condition with a narrow band of excellent wheat along the central Kansas and Oklahoma border. Wheat throughout these two states is currently under moisture stress and without rain, conditions will deteriorate daily. Rains last weekend may have at last temporarily relieved the condition. Maturity varies from mid-dough in southern Oklahoma to 1/4 berry in much of Kansas. In the Northern Plains strong winds blowing dry soil have created near dust bowl conditions in some areas.

Wheat steam rust--During the first week in May, wheat stem rust severities readings ranged from 1-10% on a few lines in nurseries at Alexandria, Louisiana and Plains, Georgia. These are the only reports of wheat stem rust in the past three weeks. The light stem rust is primarily due to a lack of inoculum in the south and the dry spring.

Wheat leaf rust--Dry conditions have limited leaf rust development throughout the Great Plains. A few fields in northcentral Oklahoma will suffer light losses. In Arkansas and southern Kansas leaf rust was severe on susceptible cultivars in plots; however, the rust was light in commercial fields . Dry weather has caused all but the flag leaf to dry throughout much of central and western Kansas. Little increase in leaf rust severity is expected in this area. In the eastern soft red winter wheat area from Alabama to North Carolina leaf rust was severe in plots of susceptible cultivars but only light in fields. During the first week in May traces of leaf rust were found on winter wheat in western New York plots. This is the earliest detection of rust in New York (Bergstrom). Wheat leaf rust was severe on cultivars in fields and plots throughout the grain growing areas in California (Jackson). Early race survey results are shown in Table 1.

Alongside wheat fields and in roadside ditches throughout southern Kansas and northern Oklahoma on goatgrass (Aegliops cylindrica) leaf rust severities ranged from 1% to 80% on flag leaves.

During the third week in May traces of leaf rust were found in Cheyenne winter wheat plots at Rosemount, Minnesota. The pustules developed from spores which were deposited on the leaves from May 7-8 rains.

Wheat stripe rust--During the first two weeks in May, stripe rust was severe in southern and eastern Arkansas. A single stripe rust lesion was found in Grady Co., Oklahoma, but there has been no further reported increase in stripe rust because of the hot dry weather.

In the Pacific Northwest stripe rust developed late due to dry weather. In the Mount Vernon and Corvallis areas more severe pockets of stripe rust have developed where moisture has been present. At Davis, California, 10% severities were recorded on some lines in observation nurseries.

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

Oat stem rust--In the past two weeks stem rust severity readings ranged from 5-20% on oats in nursery plots in Baton Rouge and Alexandria, Louisiana. Stem rust was found on wild oats in Solano Co., California. No stem rust was observed on oats in either Oklahoma and Kansas.

Oat crown rust--The aecial stage of this rust was found on buckthorns (alternate host) growing in southern Wisconsin and southeastern Minnesota. The pycnial stage of this rust can infect oats. Traces of crown rust were found in a Hartsville, South Carolina nursery (Harrison). This has been the only report of crown rust in the southern oat growing area of the U.S. Crown rust also has been found on wild oats in California.

Barley stem rust--No stem rust has been reported on barley.

Barley leaf rust--Light amounts of leaf rust were found on barley in eastern Virginia, central Pennsylvania fields and western New York plots. In the California nursery plots in Sutter and Davis counties, 50% severities on flag leaves were reported on a few barley cultivars.

Rye rusts--No reports of rye rusts since the last bulletin.

Barberry rust--In Dane and Iowa Counties in Wisconsin, the aecial stage of stem rust was found on the Common European barberry during the second week in May. The bushes are lightly infected now, but could eventually provide inoculum to infect small grains or other grasses. During the third week in May, aecial collections were made from Berberis canadensis in Monroe Co., West Virginia (Bostic).

Other rusts--Heavy stem rust was observed on orchardgrass leaves in Pike Co., Georgia. This rust could either be Puccinia graminis f. sp. avenae or P. g. lolli; tests are underway.

Other diseases--The major disease of wheat in Oklahoma and Kansas was wheat streak mosaic. Severe losses have occurred in central Kansas which is unusually far east for this disease. No factor other than dry weather has affected much of this area. Aphids and spider mites are common in scattered areas but generally are severe only in fields stressed by dry weather or wheat streak mosaic.

Table 1. Leaf rust virulence identified from collections made in March and April of 1988.

Area	Virulent on	No. of isolates
N.E. Mexico	1,3,10,24	1
	1,2a,2c,3,10	5
Arkansas	1,2a,2c,3,10	2
	1,3,10,24,26	2
	1,3,10	3
Colorado	1,3,10	1
	1,2a,2c,3,10,16	1
Kansas	1,3,10	1
	1,2a,2c,3,10	1
Louisiana	2a,2c,3,10	1
	1,3,10	1
	1,2a,2c,3,10	2
	1,3,10,24	4
	1,2a,2c,3,10,26	2
	1,2a,2c,3,10,11	2
Mississippi	1,3,10,11	2
Texas	1,3,10	9
	1,3,10,24	2
	1,2a,2c,3,10	6

CEREAL RUST BULLETIN

Report No. 4
June 7, 1988

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

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

Small grains are showing moisture stress throughout the central and northern Great Plains. Harvest is underway from southern Oklahoma into the coastal plains of Georgia and fields are ripe into the Ohio Valley. Recent rains in eastern Washington will improve wheat yield prospects.

Wheat stem rust--Stem rust severity readings made on Plains, Georgia, nursery cultivars near the location where rust overwintered, increased significantly during the last week in May. This is the most stem rust found in this nursery in the past five years. In southwestern Arkansas plots, 25% severities were reported on the cultivars Caldwell and Compton. On other cultivars in the same plot severities ranged from 1-5%. Stem rust was first found this season on June 1 in a Kansas field in the central part of the state. The dry late spring and lack of inoculum buildup in overwintering sites has resulted in light stem rust this year. From collections made in April in southern Georgia and southern Louisiana, the common race 15-TNM was identified.

Wheat leaf rust--Throughout the eastern soft red winter wheat and Great Plains areas dry weather has limited leaf rust development. In Kansas the recent rains and dews allowed for good rust development in susceptible cultivars in plots and for light development in fields. The disease severities are less than in recent years in most Kansas commercial fields.

Traces of leaf rust were found scattered on winter wheat throughout the state of North Dakota. Trace-5% severities were reported on susceptible spring wheat cultivars in plots in southern Minnesota and southeastern North Dakota.

No significant amount of leaf rust was found on winter wheats in southwestern Indiana and the Pacific Northwest. During the last part of May, 30% severities were reported in commercial fields of susceptible cultivars in the Sacramento Valley of California.

In the western New York winter wheat growing area along Lake Ontario, overwintering populations of leaf rust have been found. Early in the season it was noted that the leaf rust pustules first were found on the lowest leaves. In this area moisture has been adequate which has allowed for more rust infections to develop higher on the plant.

Wheat stripe rust--In the Pacific Northwest stripe rust was severe in the Mount Vernon and Corvallis areas where moisture has been readily available. In the southeastern Washington area rust is developing where there have been recent rains and temperatures have been cool (50°) at nights. Traces-10% of stripe rust were recorded on a few cultivars in a southwestern Indiana nursery.

Oat stem rust--Oat stem rust collections were made in a central Texas nursery. The rust developed later than normal in these plots. The small amount of oat stem rust inoculum source in the southern states and the dry conditions in the northern oat growing area suggest a light oat stem rust year. During the past two weeks 50% stem rust severity readings were made on oats in nurseries and fields in Yolo Co., California. From collections made on oats in southern Louisiana in late April, the oat stem rust race NA 16 was identified.

Oat crown rust--The buckthorn bush foliage throughout southern Wisconsin and southern Minnesota is lightly infected with crown rust. Last year at this time the buckthorn bushes were heavily infected and losses occurred in these two states. In Bulletin No. 3 dated May 24, the second sentence should have read spores from the aecial stage of this rust can infect oats. Spores from the pycnial stage do not infect oats.

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

Barley leaf rust--In southern California and eastern Virginia nurseries, barley leaf rust severities ranged from 30-80% on many of the cultivars during the fourth week in May.

Rye stem rust--Rust was found on plants growing in the nursery in Tift Co., Georgia.

Rye leaf rust--No new reports of rye leaf rust since the last bulletin.

Barberry rust--In the past two weeks aecial collections of stem rust were made from Berberis canadensis bushes growing in southeastern West Virginia.

Table 1. Preliminary data of the 1988 wheat leaf rust virulence survey.

Area	Virulent on	No. of Isolates
N.E. Mexico	1,3,10,24	1
	1,2a,2c,3,10	5
Arkansas	1,2a,2c,3,10	2
	1,3,10,24,26	2
	1,3,10	3
Colorado	1,3,10	1
	1,2a,2c,3,10,16	1
Georgia	1,2c,3,10,11	5
	1,2c,3,3ka,10,18,30	1
	2a,3,3ka,10,18,30	2
Kansas	1,3,10	1
	1,2a,2c,3,10	2
Louisiana	2a,2c,3,10	1
	1,3,10	1
	1,2a,2c,3,10	2
	1,3,10,24	4
	1,2a,2c,3,10,11	2
	1,2a,2c,3,10,26	2
Mississippi	1,3,10,11	2
Oklahoma	1,2a,2c,3,10,11	1
	1,2a,2c,3,10	4
	1,3,10	1
	1,3,10,24	4
	1,3,10,24,26	2
Pennsylvania	1,2,3,3ka,11,18,30	2
Texas	1,3,10	17
	1,3,10,24	8
	1,2a,2c,3,10	17
	2a,2c,3,10	4

CEREAL RUST BULLETIN

Report No. 5
June 21, 1988

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 progressed rapidly throughout the Southern Great Plains wheat area due to hot dry weather. In the Great Plains the harvest has moved northward into northcentral Kansas. The wheat crop in the Nebraska Panhandle is in good condition where rainfall was above normal. The hot dry weather in western Minnesota, North Dakota and Montana has resulted in areas where it will not be economical to harvest some of the small grain crop.

Wheat stem rust--During mid-June traces of stem rust were found in fields and plots of wheat in northcentral Kansas and southcentral Nebraska. The stem rust spores in this area were deposited from rains that fell during late May. Few dew periods have been conducive for rust infection and limited rust development has occurred. A stem rust uredium was found in a commerical spring wheat at heading in Steele County, North Dakota. Little stem rust development is expected in the Northern Great Plains this summer. The common race 15-TNM has been the only race identified from collections made in the U.S. this year.

Wheat leaf rust--Leaf rust is widespread throughout southern Nebraska and southeast South Dakota winter wheat fields and plots. In wheat plots of susceptible cultivars in this area 60% rust severities were observed, while in commercial fields trace-10% severities occurred. Hot dry weather has prematurely dried the flag leaves in much of this area except for the Nebraska Panhandle. In Kansas losses due to leaf rust are expected to be less than 1%. On winter wheat plots and fields in southern Minnesota and eastern North Dakota rust is limited because of the hot dry weather.

In the spring wheat area leaf rust is increasing on susceptible cultivars in the limited area of eastcentral South Dakota where moisture is adequate. Losses will be minimal. Leaf rust is starting to increase in eastern Washington but the rust development is later and less than normal.

Wheat stripe rust--In the Pacific Northwest stripe rust increased in eastern Washington where it rained in late May. Some farmers have sprayed to control further disease development in this area. In western Washington rust is severe but late so losses will be light.

Oat stem rust--During mid-June traces of oat stem rust were found in plots and fields in northcentral Kansas and southcentral Nebraska. Because of the hot dry weather oat stem rust should be light in the spring oat growing area. From collections made on oats in southern Louisiana in early May, the oat stem rust races NA 16 and 27 were identified.

Oat crown rust--In the past two weeks only traces of oat crown rust were found in plots and fields in southern Minnesota, northeastern Iowa, South Dakota, and Wisconsin. On buckthorn bushes in the nursery at St. Paul, Minnesota, aecia have developed on the leaves but few infections have developed on oats.

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

Barley leaf rust--Traces of barley leaf rust were observed on spring barley growing in plots in northwest Kansas on June 15.

Rye stem rust--No new reports of rye stem rust since the last bulletin.

Rye leaf rust--Traces of leaf rust were found in rye fields in southern Minnesota where flag leaves still were green.

Barberry rust--In the past two weeks heavily infected stem rust aecial collections were made from Berberis vulgaris (common barberry) bushes growing in southeast Minnesota (Laudon).

CEREAL RUST BULLETIN

Report No. 6
July 12, 1988

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)

Hot dry weather dramatically decreased yields of small grains throughout the upper Midwest and Northern Great Plains. Many spring seeded small grain fields have been plowed under or harvested for hay. Harvest of winter wheat is underway in North Dakota and Minnesota. In the Pacific Northwest the crops are in good condition and in many locations yields are expected to be above normal.

Wheat stem rust--In the past three weeks traces of wheat stem rust were found in eastern North and South Dakota plots and southeastern West Virginia and south central Wisconsin fields. In the Dakotas stem rust was found in small areas which have received limited amounts of rainfall. Generally rust spores were deposited with rain and if a susceptible host was present infection occurred. Throughout southern Maintoba stem rust was found in fields with infections apparently occuring during the same time period as in the Dakotas. An overwintering infection site was identified near St. Thomas, ND. From a collection made in early June in a southeastern Nebraska race 15-TNM was identified. Traces of stem rust were found in southeastern Washington plots.

Wheat leaf rust--The hot dry weather has limited rust development throughout the northern plains. Rust developed on susceptible cultivars in a few areas in eastern North Dakota where rain fell. In the northeastern United States rust was light in fields but more severe on susceptible wheat lines in nursery plots. In eastern Washington rust was severe on susceptible cultivars in plots but light in field. Preliminary data of the 1988 wheat leaf rust virulence survey are shown in Table 1.

Wheat stripe rust--No new reports of wheat stripe rust since the last bulletin. Losses will be minor in most of the Pacific Northwest.

Oat stem rust--During the last week in June traces of oat stem rust were found in plots in northwestern South Dakota and fields in southeastern Minnesota. Oat stem rust races NA 5 and NA 10 which do not occur in the Great Plains, were identified in collections from California which has a separate pathogen population.

Oat crown rust--Traces of crown rust were observed on oats in central Wisconsin and eastern North Dakota fields, and in a nursery at Corvallis Oregon.

Barley stem rust--Stem rust has not been reported in 1988.

Barley leaf rust--Traces of barley leaf rust were found in central Pennsylvania fields.

Rye stem rust--No new reports of rye stem rust since the last bulletin.

Rye leaf rust--Traces of leaf rust were reported on rye in southeastern West Virginia fields and east central Minnesota plots.

Barberry rust--During the first week in July many aecial collections were made in eastern Ontario (Galway). Oat stem rust race NA 5 and rye stem rust (P. graminis f. sp. secalis) were identified in aecial collections from Berberis canadenis in West Virginia.

Table 1. Preliminary data of the 1988 wheat leaf rust virulence survey.

Area	Virulent on	No. of Isolates
N. E. Mexico	1,3,10,24	1
	1,2a,2c,3,10	5
Alabama	1,3,10	2
	1,3,10,24	2
	2,2a,2c,3,26	6
Arkansas	1,3,10	13
	1,3,10,11	3
	1,3,10,24,26	4
	1,2a,2c,3,10	5
	1,2a,2c,3,10,16	3
California	3,10	2
	3,10,26	9
	1,3,10	13
	1,3,10,11	3
Colorado	1,3,10	7
	1,3,10,16	1
	1,2a,2c,3,10	1
	1,2a,2c,3,10,16	1
Georgia	1,2c,3,10,11	5
	1,2c,3,3ka,10,18,30	1
	2a,3,3ka,10,18,30	2
Indiana	1,3,10,11	2
Kansas	1,3,10	2
	1,2a,2c,3,10	6

Louisiana	2a,2c,3,10	1
	1,3,10	4
	1,3,10,24	5
	1,2c,3,10,11	1
	1,2a,2c,3,10	6
	1,2a,2c,3,10,11	5
	1,2a,2c,3,10,26	2
Missouri	1,2a,2c,3,10	2
Mississippi	1,3,10	2
	1,3,10,11	2
North Carolina	1,3,10,11	2
Oklahoma	1,3,10	4
	1,3,10,16	1
	1,3,10,24	6
	1,3,10,24,26	2
	1,2a,2c,3,10	31
	1,2a,2c,3,10,11	11
Pennsylvania	1,2c,3,3ka,11,18,30	2
Texas	1,3,10	19
	1,3,10,11	2
	1,3,10,16	1
	1,3,10,24	8
	1,2a,2c,3,10	18
	1,2a,2c,3,26	2
	1,2a,2c,3,10,24	1
	1,2a,2c,3,10,24,26	2
	Total	241

CEREAL RUST BULLETIN

Report No. 7
July 28, 1988

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

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

Hot dry weather accelerated small grain maturity and harvest throughout the Northern Great Plains. Low yields and light test weights have been reported.

Wheat stem rust--The hot dry weather and lack of inoculum buildup in the southern United States overwintering sites resulted in light stem rust this year. Overwintering stem rust centers were found in southern Texas, southern Louisiana, southcentral Georgia, and northeastern North Dakota. These centers provided inoculum that resulted in scattered infections on susceptible cultivars growing in plots throughout the central and northern Great Plains. However, the hot dry weather was not conducive for rust infection and it limited further rust development.

The stem rust overwintering site in northeastern North Dakota was unusual as, with the exception of 1986, stem rust rarely survives in the northern Great Plains. Stem rust inoculum produced in these northern winter wheat plots did not spread to spring wheat cultivars due to their resistance.

During late July stem rust was found in eastern Washington and eastern Oregon. The disease developed later than normal and the recent hot dry weather will limit further rust development.

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

Table 1. Preliminary 1988 wheat stem rust race survey (7/28/88).

	Number of		Percent of Isolates	
State	Collections	Isolates	TNM*	TDM
AR	4	9	100	0
FL	1	3	100	0
GA	6	18	83	19
KS	2	6	100	0
LA	11	30	100	0
MN	2	1	100	0
NE	3	6	100	0
TX	3	6	100	0
Total	32	79	96	4

* Isolates virulent to Sr17.

Wheat leaf rust--In summary for 1988, dry conditions throughout much of the southern United States limited rust development in late winter. As the weather warmed, leaf rust was severe in plots of susceptible cultivars while rust was light in commercial fields in the southern and central plains. A few exceptions were fields in central Texas and northcentral Oklahoma where rust was severe and losses were reported. In late spring, hot dry weather prematurely dried leaves from Kansas to South Dakota before the rust had a chance to develop in much of this area. As the season progressed the hot dry conditions continued and rust development was limited in the Northern Great Plains. Losses were light throughout this area.

In the southern soft red winter wheat area leaf rust was severe on susceptible cultivars in plots but light in fields. Only light rust losses were reported throughout this area. In a few sites in the northeastern soft red winter wheat area leaf rust overwintered. The rust that developed in these areas caused only light losses.

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

The leaf rust races (virulence combinations) identified (Table 2) include many of those found in 1987. Some differences from last year survey on the same date are an increase in virulence to Lr 24 and 26 and a decrease in virulence to Lr 9, and 16.

Wheat stripe rust--During late April severe stripe rust was reported in some northeast Louisiana, southeast Arkansas, and a few northcentral Texas fields. Some growers in Louisiana and Arkansas used fungicides to minimize their losses. Stripe rust was severe in western Washington and caused significant losses where fields were not sprayed while in eastern Washington and Oregon rust developed late and only light losses are expected.

Oat stem rust--No oat stem rust was found in south and central Texas fields and plots in April which is unusual. In late May rust was found in central Texas. Then by early July stem rust was found in the northern oat growing area (Minnesota, Wisconsin, and Dakotas), but not in every field as has often occurred in previous years. The uneven oat stem rust distribution was due to few spores arriving from the south and hot dry weather which is unfavorable for rust infection.

Oat crown rust--No crown rust was observed or reported in April surveys throughout Texas and Gulf coast area. By mid-May the aecial stage of this rust was found on buckthorn (alternate host) growing in southern Wisconsin and southeastern Minnesota. In

mid-June traces of crown rust were found in plots and fields in the northern oat growing area. By mid-July the hot dry weather retarded further rust development in the northern areas, and the only rust found was in central North Dakota irrigated oat plots. This is probably the least crown rust observed in the past 20 years.

Table 2. Preliminary 1988 wheat leaf rust race survey (7/28/88).

	Number of isolates per state												
Virulence on Lr*	TX	OK	CO KS	NE	LA	MO AR	MS	AL	GA	SC NC	PA	CA	Total
3,10												2	2
3,10,26												10	10
1,3,10	20	4	12	5	4	13	2	2		1		13	76
1,3,10,11	2					3	1			2		3	11
1,3,10,16	1	1	1				1						4
1,3,10,24	9	5	4	3	5			2					28
1,3,10,24,26	1	2	9	10		4							26
1,2c,3,10,11					1			1	5				7
1,2c,3,3ka,18,30											4		4
1,2c,3,3ka,11,18,30											2		2
1,2c,3,3ka,9,11,18,30									1				1
1,2a,2c,3,10	25	29	13	12	6	8		6					99
1,2a,2c,3,10,11	1	10			4								15
1,2a,2c,3,10,16	1		1			2							4
1,2a,2c,3,10,24	1	1											2
1,2a,2c,3,10,26					2								2
1,2a,2c,3,10,24,26	2												2
2c,3,3ka,10,11,18					2								2
2a,2c,3,10	4	1	1	1	1		1					2	11
2a,2c,3,10,24	1												1
Total	70	53	41	31	25	30	5	11	6	3	6	30	311

* Single gene differential lines Lr 1, 2a, 3, 3ka, 9, 10, 11, 16, 17, 18, 19, 21, 24, 26, and 30 were tested.

Table 3. Preliminary 1988 oat stem rust race survey (7/28/88).

	Number of		Percent of NA race			
State	Collections	Isolates	5	16	10	27
AR	1	1				100
CA	5	15	40		60	
GA	1	3				100
KS	3	8		12		88
LA	6	16		75		25
NE	3	7				100
TX	32	92		3		97
Total	51	142	4	11	6	78

Barley stem rust--The only barley stem rust found in 1988 was traces on plants in fields and plots throughout eastern and central North Dakota in mid-July. Most stem rust on barley in the northern Great Plains is from inoculum produced on wheat (Puccinia graminis f. sp. tritici) or on rye (P. graminis f. sp. secalis) and neither pathogen was common in 1988.

Barley leaf rust--In 1988, barley leaf rust overwintered in eastern Virginia, central Pennsylvania, western New York, central California, and central Texas. In central California and eastern Virginia light losses were reported in commercial fields. In mid-July barley leaf rust was observed in an irrigated barley plot (20% severity) in central North Dakota.

Rye stem rust--In 1988 rye stem rust was found in rye plots growing close to rust infected wheat plots in southern Georgia and central Minnesota. There was less rye stem rust than normally found in the U.S.

Rye leaf rust--By late April rust was found throughout the southern U.S. where this rust survives throughout the year. By mid-June traces of rye leaf rust were found in fields in southeastern West Virginia and southern Minnesota. The hot dry weather throughout the rye growing area caused premature senescence of rye leaves reducing the leaf area and time for the rust to develop.

Barberry rust--In 1988, aecial collections were made from barberry in southeastern Minnesota, southcentral Wisconsin, southeastern West Virginia, and southeastern Ontario, Canada. From the West Virginia aecial collections the oat stem rust race NA 5 and rye stem rust (P. graminis f. sp. secalis) were identified.

Other rust hosts--Leaf rust was found on goatgrass (Aegilops cylindrica) growing alongside wheat fields and in roadside ditches throughout northcentral Texas, northern Oklahoma, and southern Kansas. In many cases the rust had overwintered at these sites. Heavy stem rust was observed on orchard grass leaves (Dactylis glomerata) in southern Georgia.

If you wish to remain on the Cereal Rust Bulletin mailing list next season, please return the enclosed card by September 9, 1988. Be sure to make the necessary changes if your address is not correct. Any comments on how we could improve the bulletin would be appreciated. USDA regulations requires us to update our list every year. Thank you for your assistance.