

CEREAL RUST BULLETIN

Report No : 1
Date: May 10, 1977

CEREAL RUST LABORATORY
AGRICULTURAL RESEARCH SERVICE (ARS)
DEPARTMENT OF AGRICULTURE
UNIVERSITY OF MINNESOTA, ST. PAUL 55108

Formerly

Issued By:
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
U. S. DEPARTMENT OF AGRICULTURE
(In cooperation with ARS and the
Minnesota Agricultural Experiment Station)

The Cereal Rust Bulletin is now issued by the Agricultural Research Service, U.S. Department of Agriculture. ARS has assumed the primary responsibility for the determination of physiologic races of Puccinia graminis, the maintenance of representative cultures of P. graminis from annual surveys; and the research on survey methods and techniques used in the epidemiology of cereal rusts. Dr. Alan Roelfs and Messrs. David Long and David Casper, formerly supported in these activities by the Animal and Plant Health Inspection Service, U.S. Department of Agriculture, have transferred to ARS. The New Pest Detection and Survey, Plant Protection and Quarantine Programs, APHIS, will conduct an annual nationwide survey of the prevalence, severity, and the resultant losses for stem and leaf rusts of small grains. We will continue, with the cooperation of APHIS and the Minnesota Agricultural Experiment Station, to distribute the Cereal Rust Bulletin as a current summary of available information on the status of the cereal rusts.

The winter was colder than normal in most cereal-growing areas with near average precipitation. Small grain maturity throughout the South is a week later than last year, while in the central Great Plains it's approximately the same as last year. Spring planting of small grains in the upper Midwest was a week later than last year but still a week ahead of average. Soil moisture is adequate in the South except for southern Georgia and the Florida panhandle. Precipitation for February through April was normal in most of the Midwest, although moisture is now short through most of the spring wheat area. Weeds, inadequate nitrogen, and thin stands will affect Texas wheat production in 1977.

Wheat stem rust.--The first stem rust in 1977 was found March 29 in the Beeville, Texas nursery (Gilmore). In the southeastern states stem rust was present in trace to heavy amounts and generally confined to nurseries and trap plots. Severities at the end of April (milk-soft dough) in trap plots of the stem rust susceptible cultivar McNair 701 were: Uvalde, Texas (40%); Quincy, Florida (40%); Tifton, Georgia (80%); St. Joseph (40%), Winnsboro (40%); Bossier City (20%), and Alexandria (40%), Louisiana. At some of these locations McNair 701 will be killed before maturity. Trace amounts of wheat stem rust were found on other cultivars at the Marion Junction, Alabama; Raymond, Mississippi; Baton Rouge and Crowley, Louisiana; and Temple and Beeville, Texas nurseries. Trace amounts of stem rust were present in several commercial fields south of Dallas, Texas and near Baker, Florida. At Quincy, Florida stem rust was severe throughout the early-planted forage screening nursery. In Louisiana stem rust infection centers were observed in all McNair 701 plots; trace-5% severities were observed on other susceptible wheat lines, with heavier infection on lines in close proximity to McNair 701. Signs of stem rust overwintering were found in the plot of McNair 701 at Tifton, Georgia; and in small centers at Beeville and Temple, Texas; Quincy, Florida; Alexandria, Crowley, St. Joseph, and Winnsboro, Louisiana.

Stem rust is more severe in the southeastern states than in 1976, when none was observed. If a large acreage of a susceptible variety (such as McNair 701) had been grown in the southeastern U.S. this year, losses would be severe. Early collections from the Obregon, Mexico nursery were identified as race 15-TLM.

Wheat leaf rust.--Leaf rust is widespread and light to moderate throughout the southern states where moisture has been adequate. Rust severities range from trace-60% in the southern wheat variety nurseries. A few commercial fields were observed with 20% severities. In north-central Texas severe leaf rust (60% severity) was found in two fields, while none was found in others. Little leaf

rust existed in Oklahoma in early May. At Temple, Texas leaf rust was severe on McNair 701, which has Transfer (LR9) as a source of resistance. The rains in late April and early May in the south-central states will create conditions more favorable for leaf rust development on susceptible varieties; however, the crop is advanced enough in maturity so losses will be minimal.

Wheat stripe rust.--Stripe rust was more prevalent than in recent years in Texas, which probably reflects the cold winter. In a few fields it will increase, but warm temperatures will stop development with only a trace loss. The variety Coker 68-15 was especially susceptible to stripe rust, and some fields of this variety will suffer a 5% loss.

Oat stem rust.--The first report of oat stem rust in 1977 was from a forage nursery in Beeville, Texas on February 15 (McDaniel). In early April collections were made from a commercial field in Frio Co., Texas. Stem rust infection centers were also found in the small grain plots at Giddings, Texas (McDaniel). Oat stem rust is very light in Texas, probably due to cold weather and removal of the lower leaves by grazing. An overwintering center of stem rust was found on wild oats in Archer Co., Texas. Stem rust at Fairhope, Alabama overwintered and severities ranged from trace-40% in the oat plots. In plots at Brewton, Alabama numerous 7-10-day-old pustules were observed. The absence of older infections indicated that these infections resulted from rain deposited spores. Elsewhere, a 10% severity was observed in a nursery at Baton Rouge and traces at Alexandria and Crowley, Louisiana and Quincy, Florida. A commercial field with a 10% severity was reported in Walton Co., Florida (Barnett).

Oat crown rust.--Crown rust is light in the southern states and much less this year than in recent years. Freezes in January killed much of the top growth and eliminated or reduced the amount of rust. Traces of crown rust were observed at Beeville, Texas; Quincy, Florida; and Baton Rouge, Louisiana nurseries. Wild oats in Texas were free of crown rust.

Barley stem and leaf rusts.--Traces of stem rust were observed in Quincy, Florida; Tifton, Georgia; and Baton Rouge, Louisiana nurseries. Leaf rust severities were light to moderate on susceptible lines in plots in the southeastern states. Traces of leaf rust were observed in a commercial field in central Texas.

Rye stem and leaf rusts.--The only stem rust observed was a few pustules at Brewton, Alabama. Traces of leaf rust were present in the southeastern states but none was observed in Texas.

Other diseases.--

Wheat: Septoria tritici (speckled leaf blotch) is severe in north-central Texas where severities range from a trace to 80% and average 30%. In the southeastern states Septoria nodorum (glume blotch) and Erysiphe graminis (powdery mildew) were observed in some commercial fields, but little loss should result due to advanced plant maturity. Powdery mildew was also reported to be severe in some Kansas and Oklahoma fields (Shank). Pyrenophora trichostoma (Tan spot) was the most widespread disease in Kansas in late April (Sim), and is also widespread in southeastern Nebraska (Shank, Boosalis). Loose smut was generally light in Texas, but a few fields were observed with 10% smutted heads.

Oats: Septoria foliage blight and oat red leaf were observed in a few fields in the southern states. Loose smut was generally light in commercial oats in Texas; however, several fields were observed with 5-10% smutted heads.

CEREAL RUST BULLETIN

Report No.: 2
Date: June 1, 1977

Formerly

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UNIVERSITY OF MINNESOTA, ST. PAUL 55108

Issued By:
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
U. S. DEPARTMENT OF AGRICULTURE
(In cooperation with ARS and the
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Small grain cereal crops range from near normal maturity in Texas and Oklahoma to 2 weeks earlier than normal in the Dakotas and Minnesota. Wheat is ripe in Texas and southern Oklahoma awaiting several days of dry weather to be harvested. Crops across the northern Great Plains benefitted greatly from precipitation in the past 2 weeks, where in most areas topsoil moisture is adequate but subsoil moisture is short; thus timely rains will be needed to insure adequate plant development. In Minnesota many winter wheat and rye fields are heading, primarily as a result of the early spring and above normal temperatures. Heavy rains (up to 8 inches) have caused some lodging and could result in more damage if the soils do not dry in much of Oklahoma and the eastern two-thirds of Kansas. Western Kansas has suffered a light loss (trace to 1%) due to hail, but a few fields have been destroyed. Weeds have become a major problem. They are principally wild mustard and bindweed in Kansas, and cheat and goatgrass in Oklahoma.

Wheat stem rust.--Traces of stem rust were reported as far north as Stillwater, Oklahoma by May 11 (Gough). By the end of last week stem rust was present on susceptible trap varieties as far north as north-central Kansas. The oldest infections on McNair 701 at Belleville and Manhattan, Kansas occurred at least 20 days ago. In trap plots of McNair 701 in Oklahoma, most of the oldest pustules were just above the first node and the infection centers averaged a few feet in diameter. Only a trace of stem rust was found on commercial cultivars in Oklahoma and southeast Kansas. Races identified from collections received prior to April 29 were as follows:

Location	No. of collections	Wheat stem rust CRL races (no. of isolates) identified
Obregon, Mexico	3	151-QCB (3), 15-TLM (2), 113-RTQ (1)
Beeville, Texas	2	15-TNM (3), 113-RKQ (2), 113-RTQ (1)
Tifton, Georgia	1	15-TNM (3)
Quincy, Florida	3	15-TNM (8), 15-TLM (1)

A number of stem rust uredospores were trapped in rainwater during the week April 17-24 in south-central Minnesota.

Wheat leaf rust.--Leaf rust is widespread as far north as Missouri and Nebraska. In a Stillwater, Oklahoma nursery 100% severities were observed on susceptible varieties. In over 90% of the commercial fields in Oklahoma visited last week, however, leaf rust severities varied from a trace to 10%. In Kansas severities in commercial fields were generally a trace to 5%. In the Quincy, Florida nursery Arthur 71 and progeny carrying the Arthur 71 genes were 80% rusted (Luke). All entries in the Eastern Soft Wheat Nursery were rusted and heavily mildewed. Leaf rust was found in trace amounts in the Pacific Northwest (Line). Traces of leaf rust were found on the susceptible cultivar Ramona in east-central Minnesota (Romig).

Wheat stripe rust.--Traces have been reported in the Stillwater, Oklahoma nursery (Gough). Stripe rust is present in eastern Washington and Oregon in trace amounts. Losses will be minimal in this area compared to last year because of resistant varieties and hot, dry conditions. In western Washington stripe rust is severe in the Skagit Valley where it survived and increased during the winter. In western Oregon the stripe rust race that attacks Yamhill was identified as the same one that attacks Yamhill in western Washington. Stripe rust will be more severe than normal in western Oregon and Washington (Line).

Oat stem rust.--Stem rust is widespread in trace amounts across central Texas, and many collections from susceptible cultivars were made in nurseries at College Station, Temple, and Uvalde (McDaniel). Races identified from collections received prior to May 29 were as follows:

Location	No. of collections	Oat stem rust races (number of isolates)
Beeville, TX	11	31 (29), 77 (1), 87 (1)
Pawnee, TX	1	31 (3)
Dilley, TX	2	31 (3), 61 (3)
Giddings, TX	4	31 (4), 61 (7), 77 (1)
Baldwin, AL	2	31 (6)
Brewton, AL	1	31 (3)
Quincy, FL	1	31 (3)
Baton Rouge, LA	1	31 (3)

Traces of stem rust are present in southern Oklahoma where the oats are in the dough stage. No stem rust was observed in eastern Kansas where most of the oats are in the milk stage.

Oat crown rust.--In mid-May crown rust existed in trace amounts throughout many central Texas and southern Oklahoma commercial fields and nurseries. In southern Wisconsin heavy aecial infection appeared on buckthorn during the second week of May. This could result in greater rust loss for oats if the environment is favorable for crown rust development. At St. Paul, Minnesota uredia have developed on susceptible oat cultivars growing near an infected buckthorn hedge. This disease development is 2 weeks earlier than normal. On May 25 traces of crown rust were reported on oats in Washington Co., Minnesota (Laudon).

Barley stem and leaf rusts.--Barley stem rust was found at the College Station, Texas nursery. An earlier collection from Tifton, Georgia was identified as race 151-QFB, and a Quincy, Florida collection was identified as 113-RTQ and 151-QCB. No leaf rust was observed in the only Kansas field checked last week.

Rye stem and leaf rusts.--To date no rust has been observed on rye.

Barberry rust.--The first aecial collections in 1977 were made on May 9 in Tazewell, Russell, Wythe Counties, Virginia (Saunders, Callahan). Additional collections were received from Smyth, Carroll, Grayson, Pulaski, Bland Counties, Virginia (Callahan, Saunders); Monroe Co., West Virginia (Bostic); Wabasha (Ring, Krentz), Houston (Schulz), Fillmore (Schlick) Counties, Minnesota; Keokuk (Wallerich), Allamakee (Troendle) Counties, Iowa; and Dane (Line, Baumgartner), Grant (Keeler, Bennett, Jakubek) Counties, Wisconsin.

Other diseases.--In north-central Kansas Pyrenophora trichostoma (Tan spot) was the most common disease with severities of 5-30%. Speckled leaf blotch (pathogen Septoria tritici) was the most common disease in commercial wheat fields in southern Kansas and northern Oklahoma with severities of 10-40%. Scattered thin and weedy fields were an indication of the previous locally severe occurrences of soil-borne mosaic in the central third of Kansas. Thin stands in Oklahoma and western Kansas are principally due to poor emergence and survival last fall. Traces of wheat streak mosaic and barley yellow dwarf were observed in Kansas in scattered individual fields. Cephusporium stripe (Cephusporium gramineum) is present in only traces. A few fields were observed where take-all (Gaumannomyces graminis) had killed a significant number of plants. In contrast to Texas, very little loose smut was observed in Kansas and Oklahoma. Two fields were observed just north of Concordia, Kansas in which worms had cut off over 90% of the awns and leaves.

During the late winter a leaf rust epidemic occurred along Mexico's west coast where large amounts of irrigated wheat are grown. Jupateco was grown on a large acreage in 1975-76 and light to moderate leaf rust developed. During the summer of 1976 considerable land was fallowed due to lack of irrigation water. The 1976 fall planting was extended for several months due to disputed land ownership and a rare late fall hurricane. As temperatures warmed in late January, leaf rust increased rapidly. Thousands of hectares were destroyed and thousands were sprayed with fungicide. It is unlikely for similar conditions to exist again; however, leaf rust will continue to result in some losses until a resistant variety replaces Jupa-

CEREAL RUST BULLETIN

Report No.: 3
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UNIVERSITY OF MINNESOTA, ST. PAUL 55108

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The winter wheat harvest is in full swing in southern Kansas and commencing in central Kansas this week. The harvest is approximately one week ahead of normal there, while in Oklahoma and Texas the harvest is 3-4 days behind normal. The upper midwest small grains are continuing to develop two weeks ahead of normal. In most of the upper midwest surface moisture conditions are better than last year, but the subsoil moisture is minimal. Weeds continue to be the other major production problem. The condition of the spring small grains is average.

Wheat Stem Rust.--Traces of stem rust were reported as far north as Fargo, North Dakota by June 7 (Miller). Secondary spreads from earlier infections were found at Rosemount and Waseca, Minnesota on June 13. In Kansas, traces of stem rust observed in plots two weeks ago have not developed any further. Traces of stem rust were also present in commercial fields in Grant, Alfalfa, Woods Counties, Oklahoma (Goodfellow) and Barber, Butler, Meade, Osage and Elk Counties, Kansas (Porterfield). A stem rust center with 90% severity was observed in a plot of TAM W-101 in Hale County, Texas (Gilmore). Light stem rust was reported in Darlington, County, South Carolina (Harrison). A heavily rusted plant was found in a nursery at Urbana, Illinois (Jedlinski). A few infections were observed on wheat near barberry bushes in Dane County, Wisconsin.

Location	Number of								
	Collections	Isolates	QCB	QFB	TNM	TLM	QSH	HNL	RKQ
Alabama	1	3	3						
Florida	1	3	3						
Georgia	4	12		2	8	2			
Louisiana	7	21	16	2			3		
Mississippi	1	3	3						
No. Texas	2	6	3				3		
Central Texas	5	15	6	3			3	3	
So. Texas	9	15	1	2	1		9		2

(See Report No. 2 for earlier identifications)

A number of stem rust uredospores were trapped in rainwater during the week May 17-24 in south-central Minnesota, not in April as incorrectly reported in the last bulletin.

Wheat Leaf Rust.--Leaf rust severities of 30-40% were reported on some winter wheats in Kansas, but the rust appeared too late to cause significant losses (Eversmeyer). Severities in Missouri were somewhat less. Traces of leaf rust were first found on Baart, June 1 at the University of Minnesota Experiment Stations at Waseca, Lamberton, and Rosemount. On June 7 trace to 5% severities were observed in the winter wheat plots at Rosemount and 1% severities on Baart, at Waseca and Lamberton, Minnesota. Traces of leaf rust was found on winter wheat at Fargo on June 6 (Statler and Miller).

Oat Stem Rust.--During the previous two weeks many stem rust collections of light severities were submitted from nurseries in Dallas (Gilmore); McLennon, Bee, and Potter (McDaniel) Counties in Texas. This was the first report of oat stem rust in the Texas panhandle in recent years. Traces of stem rust were found in fields in Sumner (Goodfellow) and Elk (Porterfield) Counties, Kansas and Adams (Baker) County, Nebraska. Collections were made in Darlington,

County, South Carolina (Harrison); Yolo County, California (Prato) and Story County, Iowa (Behizadeh) nurseries. The first infection on oats was found in early June near the barberries at Pennsylvania State. Races identified since the last issue of the Cereal Rust Bulletin are as follows:

<u>Location</u>	<u>Number of</u>		<u>31</u>	<u>61</u>
	<u>Collections</u>	<u>Isolates</u>		
Louisiana	3	9	6	3
N.C. Texas	1	3	3	

Oat Crown Rust.--Traces of crown rust have been reported in Kansas, Iowa, Pennsylvania, and Minnesota. A 1-2% yield loss due to crown rust is predicted in a Glenn County, California commercial field (Prato).

Barley Stem and Leaf Rust.--Traces of barley leaf rust were found on winter barleys in the Rosemount, Minnesota, experimental plots. An earlier stem rust collection from Tifton, Georgia was identified as 151-QCB and a Baton Rouge, Louisiana collection was identified as 113-RPQ.

Rye Stem and Leaf Rusts.--A little stem rust on rye was observed near barberries in Dane County, Wisconsin. Traces of leaf rust were observed in Minnesota rye fields.

Barberry Rust.--In the past two weeks additional aecial collections were made in Goodhue, Wabasha, and Washington Counties, Minnesota (Landon, Schulz, and Ludwitzke). Two collections were made in Monroe and Greenbrier Counties, West Virginia (Bostic). A pycnial infection was reported in Jefferson County, Pennsylvania (Shiver). Most of the 1977 barberry collections received at the Cereal Rust Laboratory have not infected any of our susceptible hosts because the aecia were immature.

CEREAL RUST BULLETIN

Report No.: 4
Date: June 28, 1977

WHEAT RUST LABORATORY
CULTURAL RESEARCH SERVICE (ARS)
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The wheat harvest in Oklahoma, Texas, and Kansas is ahead of 1976 and normal. In southern Nebraska the wheat harvest started 10 days ahead of normal, yields in Kansas and Nebraska are generally good. Throughout the Dakotas, Montana and Minnesota the small grains are reported in good condition and ripening in some areas. In most of the upper midwest the topsoil moisture is adequate and subsoil moisture is improving.

Wheat Stem Rust.--During mid-June less stem rust was observed in commercial fields in Kansas and Nebraska than last year. Severities of 20% were observed on susceptible varieties in plots at Belleville, Kansas and York, Nebraska. In varietal demonstration plots throughout northern Kansas, trace - 1% severities were observed on Parker, Trison, Turkey, and TAM W-101.

Traces of stem rust are present in commercial fields in Colorado, Minnesota, the Dakotas, and Wisconsin. In nurseries at Rosemount, Minnesota severities on McNair 701 winter wheat reached 20% and on Baart spring wheat trace to 1%.

Preliminary results of the wheat stem rust physiological race survey (6-22-77)

Area	No. of Collections	Number of isolates of standard and CRL races									
		15			151			113			17
		TNM	TLM	TDM	QCB	QFB	QSH	RKQ	RTQ	RCR	HNL
Mexico	3		2		3			1			
S. Texas	12	7			1	2	9	4	1		
C. Texas	7				12	3	3				3
N. Texas	2				3		3				
Oklahoma	11	12	1	2		5	9	2			
Alabama	1				3						
Florida	5	8	1		6						
Georgia	6	11	2		3	2					
Louisiana	13				24	2	3			7	3
Mississippi	1				3						

Wheat Leaf Rust.--Light amounts of leaf rust are present in commercial fields of Minnesota, the Dakotas, Virginia, Washington, and Wisconsin. In Nebraska leaf rust developed on the remaining green leaves of winter wheat, however, due to the earliness of the wheat, crop damage is minimal. In nurseries, leaf rust severities as great as 60% occurred in southern Nebraska while severities of 40% occurred in southern Minnesota.

Wheat Stripe Rust.--In western Washington and Oregon stripe rust is severe where the moisture is adequate and rust is lighter than last year in eastern Washington. The 1977 stripe rust cultures from Texas are different than those normally occurring in the Pacific Northwest (Line).

Oat Stem Rust.--Oat stem rust is present in trace amounts in northern Kansas, southern, and eastern Nebraska, Iowa, southern Minnesota and eastern South Dakota. With only traces of rust and most of the oat crop past heading, no threat from stem rust exists.

Preliminary results of the oat stem rust physiological race survey (6-22-77)

Area	No. of Collections	Number of isolates of race				
		<u>2</u>	<u>31</u>	<u>61</u>	<u>77</u>	<u>87</u>
S. Texas	25		55	15	2	1
C. Texas	16	4	36	7	1	
Oklahoma	1		2	1		
Alabama	3		9			
Florida	2	2	3			
Louisiana	4		9	3		

Oat Crown Rust.--Light severities of crown rust were reported in Iowa, Kansas, Minnesota, South Carolina, Virginia, and Wisconsin fields. Losses will be minimal because of the earliness of the crop.

Barley Stem and Leaf Rusts.--Traces of stem rust were found at Lamberton, Minnesota on the susceptible trap variety Hypana. Traces of stem rust are common in commercial fields in northeastern Colorado. Traces of leaf rust are common on commercial barleys as far north as northern Minnesota and light severities are present in Virginia.

Rye Stem and Leaf Rusts.--The only rye stem rust reported in the northern states was in Dane County, Wisconsin. Traces of rye leaf rust were observed in Minnesota, Virginia, and Wisconsin rye fields.

Barberry Rust.--Aecial collections were made in Dane County, Wisconsin (Arny, Baumgartner, Kramer, Line), and the barberry nursery at State College, Pennsylvania (Albright). A collection made in May in Virginia was identified as race RKQ.

Other Diseases.--In Minnesota loose smut of oats is severe with some fields in southwestern Minnesota suffering a 20% loss. Trace to 1% of barley and wheat loose smut occur throughout Minnesota and South Dakota.

CEREAL RUST BULLETIN

Report No.: 5
Date: July 12, 1977

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Adequate topsoil moisture and high temperatures have created favorable conditions for small grain development in the Upper Great Plains. Harvesting of spring planted small grains has commenced in the Dakota's and Minnesota, which is two-three weeks ahead of normal.

Wheat Stem Rust.--Stem rust in the spring wheat area is present in trace amounts and will cause no losses because of the advanced crop growth stage. Initial collections for 1977 from Iowa (Larson), Ohio (Prentice), and West Virginia (Bostic) were received during the past two weeks. In winter wheat fields throughout eastern Colorado stem rust severities varied from trace to 10% in commercial fields in the late dough stage (Sexton, Scholten). A rust collection was made in Laramie County, Wyoming (Scholten), which was the first collection made in this state in many years. In nurseries at Rosemount, Minnesota, the final stem rust severity reading was 80% on McNair (susceptible winter wheat), and Baart (susceptible spring wheat) reached 20% at the soft dough stage.

Preliminary results of the wheat stem rust physiological race survey (7-11-77)

Area	No. of Collections	Number of isolates of standard and CRL races												
		15			151			113			17			
		TNM	TLM	TDM	QCB	QFB	QSH	RKQ	RTQ	RCR	HNL	HDL		
Alabama	1				3									
Arkansas	1							3						
Florida	5	8	1		6									
Georgia	6	11	2		3	2								
Illinois	1	3												
Kansas	17	29		2		1	9	1	1					
Louisiana	13				24	2	3			7		3		
Mississippi	1				3									
Nebraska	4	4					7		1					
Oklahoma	31	54	1	4		8	14	5	1			4		
So. Carolina	1				1									2
So. Texas	12	7			1	2	9	4	1					
Gen. Texas	7				12	3	3						3	
No. Texas	3	2			3		3							
Mexico	3		2		3			1						

Wheat Leaf Rust.--Leaf rust remains light to moderate in the northern hard red spring wheat fields and the rust that is present will cause minimal losses because of the advanced crop maturity. On many of the older susceptible spring wheat varieties (i.e., Thatcher) 60% terminal severities were recorded at the Rosemount, Minnesota experiment station. In Virginia (Saunders) and Colorado (Scholten) wheat fields, 30% severities were reported on winter wheat in the soft dough stage.

Wheat Stripe Rust.--No change from Report No. 4.

Oat Stem Rust.--Oat stem rust spread during the past two weeks and is now present as far north as central Minnesota and southeastern North Dakota. The heaviest severity/prevalence reports were in the following counties: 10/90 in Johnson, Iowa (Wallerich), and 15/100 in Carver, Minnesota (Goodfellow). Due to the early crop maturation little rust loss is expected in the oat growing areas. At Rosemount, Minnesota trace to 5% terminal severities were observed in the commercial cultivars.

Preliminary results of the oat stem rust physiological race survey (7-11-77)

Area	No. of Collections	Number of isolates of race				
		<u>2</u>	<u>31</u>	<u>61</u>	<u>77</u>	<u>87</u>
Alabama	3		9			
Florida	2	2	3			
Iowa	2		4			
Kansas	3		9			
Louisiana	4		9	3		
Nebraska	4		8			
Oklahoma	2		3	3		
So. Carolina	3	7	2			
So. Texas	73	4	193	15	2	1
Gen. Texas	42	9	96	14	1	
No. Texas	9	2	24		1	

Oat Crown Rust.--The recent wet weather in the Dakota's, Minnesota, and Wisconsin created better conditions for rust development; however, because of crop maturity losses will be minimal. Severity readings on commercial cultivars at Rosemount, Minnesota ranged from trace to 40%. Crown rust is very heavy this year in the St. Paul Campus buckthorn nursery and spreads very rapidly to the adjacent field plots.

Barley Stem and Leaf Rust.--Traces of stem rust are common in commercial fields in eastern Colorado (Scholten). A 5% severity was reported on barley in Greenbriar County, West Virginia (Bostic) at late milk. Trace to 1% severities were observed on susceptible barley cultivars at Rosemount, Minnesota. Races TNM and RTQ were identified from collections made May 15 in Brazos County, Texas. Twenty percent leaf rust severity readings were observed in Virginia fields (Callahan) and Minnesota nurseries.

Rye Stem and Leaf Rusts.--Stem rust collections (trace severity) were made in southeastern Minnesota fields (Laudon; Schlick, Schulz). In commercial fields 10% rye leaf rust severities were recorded in Virginia (Saunders), Michigan (Berrier), and Minnesota.

Barberry Rust.--An aecial collection was made June 29 on barberries growing in Dane County, Wisconsin (Baumgartner). Stem rust races identified from aecial collections made the last week in May were: Virginia-QSH, QCB, HDM; Iowa-TNM, RTQ, QFB; and Minnesota-TNM, RTQ. The aecial collections from Minnesota and Wisconsin generally were rye stem rust types and the West Virginia collections were not virulent on wheat, oats, or rye.

CEREAL RUST BULLETIN

Report No. : 6
Date: July 26, 1977

CEREAL RUST LABORATORY
CULTURAL RESEARCH SERVICE (ARS)
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The maturity of small grain cereals remains 2 to 3 weeks earlier than normal, although scattered fields and others in a few local areas that required replanting are near normal. Temperatures and relative humidity continue to be higher than normal. Precipitation is generally adequate but has occurred in thunderstorms. Early hot weather has resulted in small heads of wheat in central North Dakota but favorable conditions at flowering resulted in a high percentage of seed set that compensated for the small heads.

Wheat Stem Rust.--Scattered pustules exist through the upper mid-west as far west as eastern Montana. The principle varieties Waldron, Era, and Olaf are highly resistant, but occasional off-type plants are rusted. In heavily inoculated nurseries the high temperatures are resulting in moderately susceptible host responses by the commercial cultivars Butte, Era, Kitt, and Waldron. No major shift has occurred thus far in races identified in the physiological race survey.

Preliminary results of the wheat stem rust physiological race survey (7-25-77)

Number of isolates of standard and CRL races

Area	No. of Collections	15			151			113				17	
		TNM	TLM	TDM	QCB	QFB	QSH	RKQ	RTQ	RGR	RHM	HNL	HDL
Alabama	1				3								
Arkansas	2						3				3		
Colorado	2	6											
Florida	5	8	1		6								
Georgia	6	11	2		3	2							
Illinois	3	6							3				
Iowa	1	3											
Kansas	34	60		2		1	25	1	2	2			
Louisiana	13				24	2	3			7		3	
Minnesota	6	9				5	3						
Mississippi	1				3								
Nebraska	19	30	1	1			21		2	2			
Ohio	1	3											
Oklahoma	31	54	1	4		8	14	5	1			4	
So. Carolina	1				1								2
So. Dakota	1						3						
So. Texas	12	7			1	2	9	4	1				
Cen. Texas	7				12	3	3					3	
No. Texas	3	2			3		3						
Wisconsin	2	6											
Mexico	3		2		3			1					

Wheat Leaf Rust.--Leaf rust is light throughout the upper mid-west on commercial cultivars. Rust was moderate on susceptible checks in nurseries. In addition to resistant varieties, high temperatures have been unfavorable for this disease.

Oat Stem Rust.--Oat stem rust arrived in the upper mid-west in early June. By mid-July a seriously diseased area occurred in northeastern and east central South Dakota and the adjoining Minnesota counties with a few scattered fields in central Minnesota. Severities at maturity in this area were 20 to 30%, and probably resulted in a 5% loss. A few scattered fields (approximately 10%) were still in the milk stage at this time. Terminal severities in these fields will be from 40 to 100% with losses greater than 20%. By July 22, the rust area had expanded northward through the 5 southeastern counties of North Dakota (Jons) and the adjacent counties of Minnesota. Approximately, 10% of the oats in this area were mature and relatively unaffected, and 65% were moderately rusted at 10-30% severity with a trace to 5% losses. The remaining late fields will be, and are, severely rusted. In northeastern North Dakota severities increased from a trace to nearly 10% during the past week and perhaps 50 to 60% of these oat fields will lose a trace to 5% of the crop. On July 26 severities east of North Dakota highway No. 1 ranged from 10 to 40% all the way to the Canadian border. The rate of increase of oat stem rust throughout this epidemic area is near the maximum rate of development for the disease. The physiological race involved in this epidemic is probably race 31 based on preliminary data from the race survey. Most commercial cultivars have negligible resistance to this race.

Preliminary results of the oat stem rust physiological race survey (7-25-77)

Area	No. of Collections	Number of isolates of race					
		<u>2</u>	<u>8</u>	<u>31</u>	<u>61</u>	<u>77</u>	<u>87</u>
Alabama	3			9			
California	1		3				
Florida	2	2		3			
Iowa	12			33			
Kansas	7			20			
Louisiana	4			9	3		
Minnesota	4			10			
Nebraska	9			22	1		
Oklahoma	3			6			
So. Carolina	3	7		2			
So. Texas	76	4		200	15	2	1
Gen. Texas	44	9		101	14	1	
No. Texas	15	4		37	2	1	

Elsewhere in the North Central States oat stem rust severities vary from a trace to 5%.

Oat Crown Rust.--Crown rust is very light this year occurring in trace amounts on highly susceptible cultivars and wild oats. Only a single field in Isanti County, Minnesota was observed as damaged by crown rust during a survey in the eastern Dakotas and western Minnesota in mid-July. No further increase in crown rust is expected due to the advanced stage of crop maturity in most fields. Scattered late fields in northern Minnesota and North Dakota have rust severities of trace to 5%. In northern Douglas County of Wisconsin oats are in the milk stage and have crown rust severities of trace to 25%. These late fields could suffer light losses.

Barley Stem Rust.--Barley is generally mature with little stem rust. Larker remains rust free but, Beacon frequently has a few moderate to large sized pustules. Wild barley, Hordeum jubatum, had less rust than in recent years.

Rye Stem Rusts.--Rye is mature to harvested and little rust developed.

CEREAL RUST BULLETIN

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CEREAL RUST LABORATORY
AGRICULTURAL RESEARCH SERVICE (ARS)
U. S. DEPARTMENT OF AGRICULTURE
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The small grain harvest in the northern United States is in the final stages. Temperature and precipitation during the past two weeks have been near normal in most areas and crop harvest is progressing 1 to 2 weeks ahead of normal.

Wheat Stem Rust.--Stem rust was more severe in the southeastern states than in 1976 but losses in commercial fields were only traces. Stem rust overwintered throughout the south in plots of McNair 701 in spite of an unusually cold winter. If a large acreage of a highly susceptible variety had been grown in the southeastern U.S. this year, losses would have been severe. Scattered light rains and warm temperatures favored stem rust occurrence in northern Texas, Oklahoma, and Kansas. Traces of stem rust were reported on susceptible varieties in commercial fields in Kansas and 40% severities were observed in Kansas and Nebraska plots. In the spring wheat area, stem rust severities were very light because of early crop maturity, and resistant cultivars.

Preliminary results of the wheat stem rust race survey are shown in Table 1. Race 15-TNM has been the most commonly identified race (50%) this year, compared to 72% in 1976 and 68% in 1975. Race 151-QSH is the second most commonly identified race at 20%. Race QSH comprised 3% of the isolates in 1976 and 8% in 1975. The 1977 percentages for each race in the population will probably change as more collections from spring wheat are identified. No new races with adequate virulence to be hazardous to small grains production has been detected to date in 1977. High temperatures, and high inoculum density in some nurseries has caused some temperature sensitive resistances to become less effective.

Oat Stem Rust.--Oat rust was generally light in the southern states. However, most plants were free of crown rust and as temperatures increased stem rust increased rapidly becoming widespread but light throughout Texas, Oklahoma, Kansas, and Nebraska. During early June infection occurred in east central South Dakota and rapidly increased to epidemic levels in the counties adjacent to the South Dakota and North Dakota border with Minnesota. Early maturity of the majority of the crop prevented a disaster, however, some late fields had losses of 30 to 50 percent.

Race 31 is the most prevalent race identified in 1977, Table 2. As far as is known, the 1977 cultures are identical in virulence to those of race 31 that predominated in the U.S. rust population since 1965. Currently, it is unknown whether the 1977 race 31 differs in aggressiveness from those observed in the past or if unusual environmental circumstances favored the severe disease development. No major shift in cultivars grown, acreage planted, initial time of infection, initial infection level or rust severity in the south was noted in 1977. This is the most serious outbreak of oat stem rust in the United States since the 1950's when epidemics occurred in the same area in 1953, 1954, and 1955.

Table 1.--Preliminary data of the 1977 wheat stem rust race survey (8/8/77).

State	No. of Collections	% of isolates of the most common races												
		15			151			11-32-113			56		17	
		TME	TEM	TDM	QCB	QFB	QSH	RKQ	RTQ	RHM	RCR	MBC	HNL	HDL
AL-FL-GA-SC	13	49	8		33	5								5
AR-LA-MS	16				56	4	13		15	6			6	
Colorado	23	72		6		5	17							
Illinois	3	66							33					
Iowa	3	66					33							
Kansas	35	62		2		1	29	1	2		2			
Minnesota	11	50		11		18	18	3						
Nebraska	23	49	1	3		4	32		3		7			
Ohio	2	100												
Oklahoma	31	59	1	4		9	15	6	1					4
So. Dakota	1						100							
So. Texas	12	29			4	8	38	17	4					
No. Texas	10	7			52	10	21							10
W. Virginia	2			50							50			
Wisconsin	2	100												
Wyoming	1	100												
To date--1977	188	50	1	3	11	5	20	2	3	*	1	1	2	*
Total--1976	671	72	3	10	3	3	3	1	1	*	*	*	*	*
Total--1975	882	68	3	5	7	1	8	1	1	*	*	*	*	*

*Less than 0.6%.

Table 2.--Preliminary data of the 1977 oat stem rust race survey (8/8/77).

State	No. of Collections	% of isolates of each race					
		2	8	31	61	77	87
Alabama	3						100
California	1			100			
Florida	2	40					60
Iowa	13						100
Kansas	8						100
Louisiana	4					25	75
Minnesota	16						100
Nebraska	18					2	98
Oklahoma	3						100
So. Carolina	3	78					22
So. Dakota	3						100
Texas--South	76	2				7	90
Texas--North	59	8				9	82
Wisconsin	1						100
To date--1977	210	4	*		88	6	1
Total--1976	386	2	*		66	28	1
Total--1975	649	*	*		67	28	1

*Less than 0.6%.