

DISCUSSION

I. M. Atkins- Mentioned the possibility of growing some material in Texas where it could be harvested in April and seed sent north in time for planting.

SUMMARY OF SOURCES OF STEM RUST RESISTANCE FOUND IN

ROCKEFELLER FOUNDATION WHEAT BREEDING PROGRAM IN MEXICO

N. E. Borlaug

During the past year an attempt has been made to determine whether any of the material found in the Rockefeller Foundation wheat improvement program carries resistance to race 15B. Since this race has not been found in Mexico up to the present time, none of the work herein reported has been conducted there. We are indebted to Dr. E. C. Stakman and his co-workers at the University of Minnesota, and to Drs. B. B. Bayles and H. A. Rodenhiser of the U. S. D. A. for making it possible to obtain the data which are summarized in this project.

The 20 lines listed in Table 1 were found to be resistant to races 11, 15B, 17, 38, and 56 in the seedling stage. These tests were conducted in the greenhouse at the University of Minnesota under moderate temperature conditions. The same 20 lines which were found to be resistant to all 5 races in the seedling stage, were re-inoculated with race 15B in the adult plant stage and these results are also shown in Table 1. From these results it is apparent that there is considerable resistance at moderate temperatures in the crosses of Kenya X Montana, Kenya X Montana X Montana, and Supremo X Kenya. It remains to be determined whether this degree of resistance will be adequate under high temperature conditions in the field.

During the summer of 1950 approximately 110 lines were grown in the rust nursery at University Farm, St. Paul, Minnesota. The reaction of the most promising lines which were found in this group is summarized in Table 2. These lines have as yet not been tested in the greenhouse for resistance to 15B.

During the summer of 1950 a considerable number of lines from our program were evaluated by Ruben Heerman in the U. S. D. A. rust nursery at Langdon, North Dakota. Stem rust conditions were severe at this station and 15B was one of the important races which caused this epidemic. Under these severe field conditions, a considerable number of lines were found to be highly resistant to stem rust. These results are summarized in Table 3.

*Report of the Wheat Stem Rust Conference at University Farm St Paul, Minnesota
November 17-18, 1950 p31-34*

Table 1. Reaction of the most promising lines from Mexico to *Puccinia graminis tritici* Race 11, 15B, 17, 38, and 56 in seedling plant stage at 65°F and to race 15B in the adult plant stage in the greenhouse at University Farm, St. Paul, Minnesota by Ing. Alfredo Campos.

Line no. (Campos)	Cross	Selection no.	Row no. summer 1949	Reaction in seedling stage to race:				Reaction 2/ in adult stage on:			
				11	15B	17	38	56	Heads,	Glumes,	Calms awns, necks, leaves
55	Egypt X Kenya	IL-702-3y-2y-5c	1127c	0	0:1	0:1,2	0:1	0:1	S	S	MR
82	Supremo X Newthatch	IL-445-2C-2C-IL-14C	30135	2	2	0:1	0:1	0:1	S	S	MS
92	Mentana X Kenya	IL-35-6C-6C-2C-6C	50728	2++	2	0:1	0:1	0:1	S	S	MR
201	Mentana X Kenya	IL-35-6C-2C-(1-6)C-(5)	52137	2	2	0:1	0:1	0:1	S	S	MR
202	"	IL-35-6C-6C-2C-5C	50727	2	2	0:1	0:1	0:1	S	S	MS
95	Kenya X Mentana	IL-56-8C-11C-2C-1C	50393	2++	2	0:1	0:1	2	-	-	MR
96	"	IL-56-8C-11C-2C-2C	50394	2++	2	0:1	0:1	2	-	-	MR
203	"	IL-56-8C-17C-1C-1C	50063	2	2	0:1	0:1	0:1	-	-	MR
204	"	IL-56-8C-17C-(3-5C)2C	52524	2s	0:1	0:1 ⁿ	0:1	0:1	MS	MS	MR
122	Mentana ² X Kenya	CR ₁ IL-459-3C-2C-IL-2C	50664	2	2	0:1	0:1	0:1	-	-	MR
134	Mentana X Kenya ²	CR ₁ IL-459-9C-2C-2C-1C-16	52388	2	2	0:1	0:1	0:1	-	-	MR
123	Mentana ² X Kenya	CR ₁ IL-460-1C-1C-1C-1C-2C	51234	2	2	0:1	0:1	0:1	-	-	MR
124	"	CR ₁ IL-460-1C-1C-1C-1C-3C	51235	2	2	0:1	0:1	0:1	-	-	MR
125	"	CR ₁ IL-460-1C-1C-1C-1C-4C	51236	2	2	0:1	0:1	0:1	-	-	MR
126	"	CR ₁ IL-460-1C-1C-1C-1C-5C	51237	2	2	0:1	0:1	0:1	-	-	MR
132	CR ₁ IL-463-6Y-3C-3C-26C	51198	2++	2	2	0:1 ⁿ⁺⁺	0:1	0:1	-	-	MR
167	Montana X Kenya ²	IL-746-8C-3C-2C-4C	52436	2	2+	0:1 ⁿ⁺⁺	0:1	0:1	S	S	MS
168	Supremo X Kenya	IL-746-2y-1C-1C-2C	51054	2	0:1	0:1	0:1	0:1	S	S	MS
169	"	IL-746-8C-3C-3C-1C	50093	2	0:1	0:1	0:1	0:1	S	S	MS
170	Kenya C9906	IL-746-2Y-1C-1C-4C	51056	2	2+	0:1 ⁿ⁺	0:1	0:1	S	S	MS
		RF 324									

1/ Seed produced summer 1949...Exp. XXXV

2/ Inoculations were made by Alfredo Campos approximately August 24, 1950, and notes were taken by Loggoring. Sept. 21. Temperatures in the greenhouse at St. Paul during this period were generally lower than normal. No record was kept, but it is estimated that the average was around 70-75°F.

The same varieties were inoculated at the same time with Race 11, and, although the Little Club check was heavily infected, no visible infections were observed on the twenty-one varieties listed.

Table 2. Promising lines based on reaction in rust nursery at University of Minnesota (University Farm). During summer of 1950 (These results not been checked by greenhouse inoculations with 15B).

Cross	Sel no.	Stem rust	Leaf rust
Kentana "48"		R 3/trace	MS 20/100
Kentana 48 (Resel)	II 56-8c-17c-1c-115c	R-SR 10/10	R 10/100
Kentana 48 (Resel)	II 56-8c-17c(3-5c)-72c	R 5/10	R Trace/Trace
Mentana X Kenya	II 35-6c-6c-2c-36R	R 5/10	MS 25/100
Mentana ³ X Kenya Bc ₂	II 461-6L-IL-IL-IL	R-SR 15/30	R 5/100
Peru X Supremo	II 329-1y-17y-3c-2c	R 5/10	R Trace/Trace
Peru X Supremo	II 329-1y-17y-3c-3c	R 5/10	R Trace/Trace
Marroqui-Supremo X Regent-Marroqui	II 819-9y-2y-2c	R-SR 5/10	R 5/30
Pelon Colorado-Renown X Renown-Supremo	II 938-12y-4c-2c	R Tr/Tr	R 10/10
Newthatch-Marroqui X Kenya-Mentana	II 908-7c-3c-1c-2y	R 5/10	R 10/30
Candel X Kenya	II 428-8c-1c-8c	R 5/Tr	R-MS 10/100
Newthatch		MS-R 20/50	S - 70
Mentana		S 65/100	MS-R 50/100

Table 3. Lines which showed high degree of resistance to stem rust under severe epidemic conditions with race 15B at Langdon, North Dakota (by Ruben Heerman, U. S. D. A.) during summer of 1950 (These lines have not yet been checked by Greenhouse inoculations with 15B).

Cross	Sel no.	Stem $\frac{\%}{2}$ rust	Leaf $\frac{\%}{2}$ rust	P. I. no.
Kenya-Mentana	II 56-8c-11c-2c-1c	0	80	185861
"	II 56-8c-11c-2c-26c	0	90	185862
Kentana "48" (Resel)	II 56-8c-17c-1c-2c	0	80	185884
Mentana ² -Kenya Bc ₁	II 461-6L-4L-3c	0	80	185895
Mentana-Kenya ² Bc ₁	II 463-5y-1c-1c-1c	0	90	185897
Aquilera-Kenya X Marroqui-Supremo	II 1088-(4 selections)	0	50-70	186009-12
Kenya-Marroqui X Marroqui -Peru	II 1442-(20 selections)	0	Trace-3	186013-34
Kenya-Marroqui X Marroqui-Peru	II 1443 (8 lines)	0	3-10	186035-43
Kentana 48		0	10	186093

Discussion

E. C. Stakman- Did Capelli rust in Mexico last year?

N. E. Borlaug- Yes, it had about 35 percent stem rust in Sonora.

STEM RUST IN WASHINGTON

G. W. Fischer

Before the barberry bushes were eradicated in Eastern Washington, heavy local losses from stem rust occurred in the vicinity of bushes in wet years.

Probably 95 percent of the barberry bushes in Eastern Washington have been eradicated, but the bushes in Northern Idaho afford a breeding ground for the development of new races of stem rust.

There appear to be two new races of rust which attack and overwinter on wheat grasses and rye grasses but which do not attack wheat.

Discussion

L. R. Waldron- Is the Oregon grape an alternate host for the organism causing stem rust?

G. W. Fischer- No.

REACTION OF WHEATS TO STEM RUST IN COOPERATIVE NURSERIES

H. A. Rodenhiser

Uniform Rust Nursery

The most significant data in the Spring Wheat Uniform Rust Nurseries, so far as race 15B is concerned, was obtained at Langdon, North Dakota. As shown in the summary of results which follows, McMurachy was the only wheat in this nursery at Langdon that was free from rust. All other hard spring wheats which carry the Hope, H-44, or T hatcher genes were susceptible with infections ranging from 30 to 60 percent and all had either a susceptible or completely susceptible response. In this same test Rio Negro had 30 percent rust with a susceptible reaction. The soft red spring variety Frontana developed 10 percent rust but with a resistant type response. All the durum wheats tested were completely susceptible to 15B. The emmers, Timopheevi and Vernal, developed 30 and 50 percent, respectively.

It is apparent that McMurachy is not as highly resistant to some races or under certain environmental conditions as it was at Langdon in 1950. At Lincoln, Nebraska, the severity on this variety was 20 percent with an intermediate response and at Waseca, 10 percent with a susceptible type of infection.