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The New Stem Rust Threat

A REAL threat to the food supplies of this country is Race 15-B of stem rust. Last year we lost 10 million bushels of durum wheat alone, which was about one fifth of the crop. Losses would undoubtedly have been much greater except for the fact that last year most of the bread wheat varieties matured before the disease reached epidemic proportions.

What will happen to this year's crop is anyone's guess. Much depends on the build-up of inoculum in southern Texas, the condition of the grain farther north, and the weather. Abundance of inoculum and warm, humid weather are ideal for development of the rust.

Race 15-B is the most virulent race of stem rust of wheat ever found in North America. Although it has been known to exist on barberries since 1939, it was never found in a commercial wheat field until last summer. It appeared suddenly in 15 states from Texas to Manitoba, and from Idaho to Ohio.

Last year's losses were the first serious damage from stem rust on spring wheat in 15 years, because improved varieties now in commercial use are resistant to all the old races of stem rust. No commercial variety now grown in North America has resistance to 15-B.

Rust spores can survive winters in southern Texas and northern Mexico on the growing grain. In addition, however, they overwinter in a different spore stage on straw and stubble in the northern part of the United States and spread to barberries in the spring. From barberries they go back to grains and grasses, causing local epidemics. Without the barberry they cannot spread. The U.S. Department of Agriculture and most of the wheat states have cooperated for many years to eradicate the common barberry. Large areas have been cleared, but the job is obviously one of huge proportions that will require periodic re-checking until all are eradicated.

An interesting feature of the barberry relationship to rust is that strains of the fungus hybridize while living on barberries, and new races result. Thus, while

man is hybridizing wheats, nature is hybridizing the rust fungus.

Because of the relation between barberries and rust, the 15-B situation is being attacked by renewed efforts to eradicate barberries and by speeding up efforts to develop varieties that combine resistance to 15-B with acceptable agronomic and bread-making qualities.

Wheat breeders from all over North America are methodically testing all lines of breeding material for resistance to the new strain of rust. A coordinated attack on the disease began last fall and is currently going on. At Beltsville, at several state agricultural experiment stations, and in Canada, pathologists and plant breeders are testing thousands of strains from the World Collection of wheats, which numbers approximately 13,500. So far several sources of resistance to 15-B have been found, but none is adaptable to commercial wheat growing.

Among the lines so far tested, some of the introductions from Kenya, Africa, and from Egypt have shown outstanding resistance. Wheat breeders had already crossed some of these strains with commercial wheats adapted in this country. More crosses were made last winter. These are undergoing test throughout the country.

As a precautionary move, about 800 wheats were sent to Brazil, Argentina, Peru, Chile, Ecuador, Colombia, and Mexico last spring. Some of the most virulent races of stem rust so far encountered are known to be present in Latin America. International cooperation in testing of breeding material is now a routine part of present-day plant-breeding operations.

There is little reason to doubt that we shall be able to develop wheats resistant to 15-B with all the other qualities necessary for commercial production. The techniques are well established. The only question is how long it will take. With good luck, we may be able to do this in the relatively near future.

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