

0203-KO-017 Development of Scab Resistance Soft Red Winter Wheat Varieties.

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Grant #: 59-0790-9-050; \$79,464; 1 Year

Research Area: VDUN

PROJECT ABSTRACT

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Scab or Fusarium head blight (FHB) is a severe disease of wheat and results in significant loss of grain yield and reduced grain quality. Therefore, there is an immense need to develop wheat varieties with high levels of scab resistance. The long-term objective of this project is to develop soft red winter wheat genotypes with excellent resistance to scab combined with resistance to other diseases, high yield potential, and all of the other traits required in a successful variety. This is also one of the central goals of the U.S. Wheat and Barley Scab Initiative. The short-term objectives for our project are: 1) To combine genes for scab resistance from diverse sources, 2) To identify breeding lines with better resistance to scab than any of the parents (transgressive segregants), and 3) To evaluate doubled haploid lines and identify scab resistant lines. Although higher levels of scab resistance are needed, the level of scab resistance currently available must also be introgressed into commercial varieties. Combining scab resistance with the high yield potential (and many other traits) required in commercial varieties is important.

In the upcoming year the following plant breeding research will be conducted. Additional crosses will be made involving different sources of resistance and breeding lines with other desirable traits to combine sources of scab resistance and to combine scab resistance with other traits required in an adapted variety. Numerous crosses have been made with the objective of combining different types of scab resistance from different sources. Some of these crosses will be used in three way crosses to adapted parents. Experimental lines will be evaluated for scab resistance, and lines will be selected using both the greenhouse inoculation methods and a misted, inoculated scab evaluation field nursery. Selection will be applied to populations to identify individuals with the highest level of resistance. In 2001 several hundred heads were selected from populations with scab resistant parents combined with excellent plant type and other desirable agronomic traits. These lines will be evaluated for scab resistance in the greenhouse and the field. Breeding lines previously identified as being scab resistant will be evaluated further. These lines will also be evaluated for numerous agronomic traits and resistance to other diseases, because scab resistance is only one trait required in an adapted variety. We are continuing to evaluate the procedures used in the field and greenhouse to attempt to refine our techniques and increase our efficiency. We are working on implementing marker-assisted selection in a few selected populations. To decrease the time required to develop scab resistant varieties we developed about 250 doubled haploid lines from selected crosses. These doubled haploid lines will be evaluated for scab resistance and other traits using the mist-irrigated inoculated scab evaluation nursery and in inoculated headrows.