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**Project ID: 0405-KO-020**

**FY03 ARS Agreement #: 59-0790-9-050**

**Research Area: VDUN**

**Duration of Award: 1 Year**

**Project Title: Development of Scab Resistant Soft Red Winter Wheat Varieties.**

PROJECT 1 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. In the 2003 season damage due to scab in several parts of the Eastern soft winter wheat region resulted in significant economic losses to producers and the wheat milling industry. Therefore, there continues to be 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.

We plan to accomplish the following during the upcoming year. Additional crosses will be made involving scab resistant and adapted parents. Numerous crosses have been made with the objective of combining different types of scab resistance from different sources. F<sub>1</sub> plants from some of these crosses will be used in three way crosses to adapted parents. Data will be collected on scab resistance of breeding lines in our program, as well as, lines in the Uniform Scab Nurseries, using needle inoculation in the greenhouse and a misted, inoculated nursery in the field. Putatively scab resistant lines will be selected based on greenhouse and field evaluations. Individual plants will be selected from segregating populations in the field. Breeding lines previously identified as being scab resistant will be evaluated further, and these lines will also be evaluated for numerous other traits. Doubled haploid lines will be evaluated in the mist-irrigated inoculated scab evaluation nursery and in performance trials at four locations. We are also conducting research on the development of an improved index to as an alternative to the commonly used FHB index to improve the ranking of scab resistance among wheat breeding lines.