PI: Elias Elias
PI's E-mail: elias.elias@ndsu.nodak.edu

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PROJECT 1 ABSTRACT
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Durum wheat is one of the major cereal crops in the world and its production in North Dakota accounts for about 75% of the U.S. production. Durum wheat is very susceptible to Fusarium head blight (FHB) caused by the fungus *Fusarium graminearum* Schwabe (telomorph *Gibberella zeae* (Schw.) Petch. Fungicides may reduce the disease, but the most environmentally safe and economical way to control the disease is with genetic resistance. Resistant durum cultivars or lines are not available yet. Our objectives are in line with the US Wheat and Barley Scab Initiative, which are to identify and characterize FHB resistant durum wheat that can be shared with other durum wheat researchers working on durum wheat improvement.

To date we have evaluated a total of 6,000 durum accessions from the world collection at the Academy of Agricultural Sciences, Plant Protection Institute Shanghai, China. None of these accessions were resistant to FHB and therefore no further research will be conducted on them.

In 2002-03 we screened 500 accessions at the Department of Plant Protection, Hangzhou, Zhejiang, China. Of these, 85 accessions had moderate level of resistance. These accessions were re-evaluated in the 2004 field screening nursery at Prosper, ND. Fifty-two accession that had Type II disease severity less than 50% were selected for further evaluations in the Spring 2005 greenhouse. In 2004-05 we will screen 1000 accessions at the same institute in China.

From previous studies we have identified five Tunisian lines that have a moderate level of Type II resistance to FHB. We have developed recombinant inbred lines (RIL) using single seed descent and doubled haploid breeding methods from 10 populations from crossing the Tunisian Lines to durum cultivars for genetic studies. Recombinant inbred lines from five populations will be evaluated for FHB resistance in the Fall 2004 and subsequent greenhouses or field screening nurseries to characterize the resistance in the five Tunisian lines. The segregating pattern for Type II disease severity will be determined by the Chi-square goodness-of-fit to Mendelian ratios of 1:1 and 3:1 for the doubled haploid lines. Data also will be tested for normal distribution to check for multi-genic inheritance. We will utilize simple sequence repeat (SSR) markers to identify the FHB QTL in these populations.

We are working in close collaboration with CIMMYT for germplasm exchange and evaluations. We will also evaluate germplasm from ICARDA starting in 2005-06. Our intent is to screen a wide range of durum germplasm until we find a good source of resistance to FHB.