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Research Area: GIE

Project Title: Identify sources of resistance to Fusarium head blight in durum wheat.

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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 zae* (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. Seventeen accessions were identified to have a moderate level of resistance. These accessions are being reevaluated for Type II resistance in greenhouses in North Dakota. If resistance is confirmed in any of these accessions, then we will develop recombinant inbred lines starting in 2003-04 to characterize their resistance. We are in the process of establishing a collaboration work with professor Bingxin Zhang at the Department of Plant Protection, Hangzhou, Zhejiang, China. Because of space limitation we will be screening only 500 accessions in Hangzhou in the 2002-03 growing season. The remaining accessions will be screened in the 2003 field screening nursery at Prosper, ND. At this point we will complete screening all the accessions from USDA National Small Grain Collection.

In the Fall 1999 we evaluated 115 lines that were obtained from ICARDA and CIMMYT. Five lines were identified as moderately type II resistant after a second evaluation in the Spring 2000. We have successfully increased the five lines for distribution and use in breeding programs. We have developed nine populations from crossing and backcrossing durum cultivars to the Tunisian lines for developing FHB resistant germplasm. We are developing recombinant inbred lines (RI) using single seed descent and doubled haploid breeding methods from 10 populations from crossing the Tunisian Lines to durum cultivars for genetic studies. The recombinant inbred lines will be evaluated for FHB resistance in the 2003-04 greenhouses or field screening nurseries. 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. Our intent is to screen a wide range of durum germplasm until we find good source of resistance to FHB.