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Project Title: Identify Sources of Resistance to Fusarium Head Blight in Durum Wheat.

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. Seventeen accessions were identified to have a moderate level of resistance. These accessions were re-evaluated for Type II resistance in greenhouses in North Dakota. Twelve of these accessions did not maintain their level of resistance and therefore will not be studied further. The remaining five accessions will be re-evaluated to confirm their resistance. If resistance is confirmed in any of these accessions, then we will develop recombinant inbred lines to characterize their resistance. 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 will be re-evaluated in North Dakota. In 2003-04 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 nine populations from crossing and backcrossing durum cultivars to the Tunisian lines for developing FHB resistant germplasm. We also 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 (four doubled haploid and one single seed descent population) will be evaluated for FHB resistance in the 2003-04 greenhouses or field screening nurseries to characterize the resistance in the five Tunisian lines. 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 a good source of resistance to FHB.