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

PROJECT 1 ABSTRACT

(1 Page Limit)

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 screened the entire (8,000 accessions) durum wheat accessions from the world collection. After several evaluations at the Department of Plant Protection, Hangzhou, Zhejiang, China 7,685 accessions were deemed to be susceptible and therefore no further research will be conducted on them. Based on one field evaluation the remaining 315 accessions had less than 30% Type II disease severity. We will re-evaluate these accessions in 2007 and subsequent years to confirm their resistance.

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 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 molecular markers to identify the FHB QTL in these populations.

We have identified two CIMMYT lines that have 14% Type II disease severity. We have received germplasm from ICARDA (International Center for Agricultural Research in the Dry Areas) for FHB evaluations. In 2005-06 we evaluated 500 accessions from ICARDA in China. Ninety-eight accessions had disease severity less than 30%. We will re-evaluate these accessions in 2007 and subsequent years. We also will evaluate 1,000 new accessions in 2007-08 in China. Our intent is to screen a wide range of durum germplasm until we find a good source of resistance to FHB.