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PROJECT 2 ABSTRACT

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Fusarium head blight (FHB) caused by the fungus *Fusarium graminearum* Schwabe (telomorph *Gibberella zea* (Schwein.) Petch has been seriously attacking durum wheat (*Triticum turgidum* L. var. *durum*) in North Dakota and the surrounding states. There is continuous decline in harvested durum acreage and production in ND because of FHB. Fungicides may reduce the disease but the most environmentally safe and economical way to control the disease is with genetic resistance. Our objective is to develop FHB resistant durum wheat cultivars/germplasm with good agronomic and quality traits.

We have developed several populations from crossing FHB resistant durum lines that have the Sumai 3 and Wangshuibai resistance with new North Dakota released durum cultivars. F_{3,4} lines and subsequent generations from these populations are being evaluated for Type II resistance using the point inoculation method and molecular markers. Selected lines that have less than 30% disease severity from different populations will be evaluated as F_{5,6} lines for agronomic traits, quality, and disease resistance in 2007 yield trials. Selected lines will be evaluated further in 2008 as candidates for possible release.

In previous studies we have identified the Langdon *Triticum dicoccoides* 3A substitution line [LDN(DIC-3A)] to have a moderate level of Type II resistance. We have developed 12 doubled haploids lines that have the LDN(DIC-3A) resistance. However, these lines did not have acceptable agronomic and quality traits to be released as cultivars. They are being used as parents for second cycle of breeding. LDN(DIC-7A) was identified by Dr. James Miller to have some level of resistance to FHB. We have developed populations by crossing the LDN(DIC-7A) with durum cultivars/experimental lines for breeding purposes. Several lines that have disease severity less than 30% have been selected and to be evaluated in preliminary yield trials in 2007.

Fusarium head blight resistant lines that we identify will be evaluated for agronomic and quality traits at various locations in North Dakota. Lines that have good levels of resistance and possess good agronomic and quality traits will be released as cultivars to the producers. Some of the identified resistant lines will be used as parents in crosses to generate a second cycle of breeding.