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Project Title: Development of durum wheat resistant to Fusarium head blight.

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.

In previous studies we have identified 23 lines that have a moderate level of Type II resistance. Twenty of these lines are from crosses of adapted durum wheat germplasm with Sumai 3 and Wangshuibai and the other three are from durum to durum crosses. We have evaluated these lines for agronomic and quality traits and possible release. We have developed several populations from crossing the best FHB resistant lines that have the Sumai 3 and Wangshuibai resistance with new ND released durum cultivars. $F_{3:4}$ lines and subsequent generations from these populations are being evaluated for Type II resistance using the injection method and the microsatellite marker *Xgwm533*.

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 doubled haploids lines from crossing durum wheat cultivars to the LDN(DIC-3A) line. These lines are being evaluated for Type II resistance using the injection method and the microsatellite marker *Xgwm2*.

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 level 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.