PI: Elias, Elias **PI's E-mail: elias.elias@ndsu.nodak.edu**

Project ID: FY06-EL-107 **FY05 ARS Agreement #: 59-0790-4-098**

Research Area: **VDUN** **Duration of Award: 1 Year**

Project Title: Development of Durum Wheat Resistant to Fusarium Head Blight.

PROJECT 2 ABSTRACT

(1 Page Limit)

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 the 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 injection method and the microsatellite marker *Xgwm533.* Several lines from different populations will be evaluated as $F_{5:6}$ lines for agronomic traits, quality, and disease resistance in 2006 yield trials. Selected lines will be evaluated further in 2007 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 doubled haploids lines from crossing durum wheat cultivars to the LDN(DIC-3A) line. We have evaluated these lines for Type II resistance using the injection method and the microsatellite marker *Xgwm2* and for agronomic and quality traits in preliminary yield trials grown at Prosper and Langdon, ND. Lines that were selected as resistant to FHB 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 are developing populations by crossing the LDN(DIC-7A) with durum cultivars/experimental lines for breeding purposes.

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.