PI: Prem Jauhar **PI's E-mail: prem.jauhar@ndsu.nodak.edu**

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Project Title: Transfer of Scab Resistance from Wild Relatives into Durum Wheat.

PROJECT 1 ABSTRACT
(1 Page Limit)

Durum wheat or macaroni wheat is an important cereal crop used for human consumption worldwide. It is an important crop of the Northern Great Plains of the United States, especially for the state of North Dakota, which is the number one durum producer. Scab or Fusarium head blight (FHB) is a devastating disease of wheat. Because there is no FHB resistance in current durum cultivars we used wild relatives of wheat, in the secondary gene pool, as donors of resistance. We earlier found diploid *Lophopyrum elongatum* to be an excellent source of resistance to FHB. To transfer this resistance to durum wheat, we crossed two cultivars, Lloyd and Langdon, with this wild grass and produced fertile hybrid derivatives with the full chromosome complement of durum wheat plus a few chromosomes or chromosome segments of *L. elongatum*. We will continue work on the hybrid derivatives with alien chromosome integrations that we produced earlier. By successive backcrossing and selfing we will attempt to stabilize wheat-alien chromosome integrations. We are also using another diploid wild grass, *Thinopyrum bessarabicum*, as a source of FHB resistance. Furthermore, to enhance pairing and improve alien integrations into the durum genome, Langdon 5D(5B) substitution will be used in producing F_1 hybrids and in backcrosses. Fluorescent genomic *in situ* hybridization will be used to characterize alien chromatin integrations into the durum genome. We will produce alien addition lines of durum wheat with *L. elongatum* chromosomes. We have isolated some monosomic and disomic additions. We screened them for scab resistance, and isolated the most promising ones with only 21% infection. We are studying their progeny.

This project fits in the research area of Germplasm Introduction and Enhancement and attempts to utilize novel sources of FHB resistance in the secondary gene pool for producing resistant durum germplasm.