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

PROJECT 2 ABSTRACT

(1 Page Limit)

Durum wheat (*Triticum turgidum* L. ssp. *durum* Desf.) is very susceptible to Fusarium head blight (FHB) caused by the fungus *Fusarium graminearum* Schwabe (telomorph *Gibberella zea* (Schw.) Petch. Fungicides may reduce the disease, but the most environmentally safe and economical way to control the disease is with genetic resistance. Breeding FHB resistance is a major strategy for reducing the impact of FHB on durum wheat. However, lack of good resistance resources in durum wheat has hindered the development of FHB resistant durum wheat cultivars. Our overall goal is to screen the ICARDA material in order to identify good resistant durum wheat and ultimately introgress the resistant genes into the cultivated durum wheat cultivars to reduce the threat of the FHB disease. Therefore, the specific objectives of this project are:

- 1) Screen diverse durum accessions from ICARDA for reaction to FHB in a FHB screening nursery located at the Jiangsu Academy of Agricultural Sciences in Nanjing, China;
- 2) Re-evaluate the accessions exhibiting high levels of resistance in the preliminary screening test in the greenhouse and field screening nurseries in North Dakota and China;
- 3) Determine whether the new sources of resistance carry novel resistant loci by marker haplotyping using the existing markers associated with known resistant QTL's;
- 4) Make crosses using the resistant lines and distribute them to durum wheat breeders.

One thousand accessions of durum wheat from each ICARDA will be planted in the Jiangsu, China for field screening in fall of 2020. Readings will be finished in late May 2021. The accessions exhibiting an overall average of less than 30% infection from the preliminary screening will be evaluated in the field in the summer 2021 and the greenhouse in Fargo in fall 2021. Introgression of FHB resistance into durum wheat will be started in 2021. Haplotyping will be done every year as we identify new sources of resistance. The annual durum wheat production in North Dakota from 2016 to 2018 averaged 1.2 million tons having an average annual value of \$218 million. The new cultivars ND Riveland, ND Grano, Divide, Carpio, and Joppa have better tolerance to FHB than the older cultivars. If breeding for increasing yield and/or FHB resistance would increase production by 2%, it will add approximately 4.3 million dollars to the USWBSI stakeholders/end-users.