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Fusarium head blight (FHB) is one of the most destructive fungal diseases of durum wheat (*Triticum turgidum* L. subsp. *durum*) and bread wheat (*T. aestivum* L.). Resistant sources in bread wheat have been identified and used in various breeding programs. However, resistant sources of durum wheat have not been discovered yet and attempts to transfer resistance from hexaploid wheat and wild relative species have met with limited success. In addition to durum wheat, the tetraploid wheat (*T. turgidum* L.) with AABB genomes has six other cultivated subspecies, including Persian wheat (*T. turgidum* subsp. *carthlicum*), cultivated emmer wheat (*T. t. dicoccum*), Polish wheat (*T. t. polonicum*), oriental wheat (*T. t. turanicum*), Georgian emmer wheat (*T. t. paleocolchicum*), and poulard wheat (*T. t. turgidum*). The USDA National Small Grains Collection (NSGC) currently maintains 1369 accessions of these tetraploid wheats, which have not been systematically evaluated for resistance to FHB. The objective of this project is to identify the accessions with a high level of FHB resistance by systematically and extensively evaluating these cultivated tetraploid wheat collections for reactions to FHB and to transfer the resistance to commercial durum wheat cultivars. We have obtained 1230 accessions from NSGC and have evaluated 393 accessions in three greenhouse seasons and identified 52 accessions with Type II FHB resistance. Evaluation of 262 additional accessions in the greenhouse is currently underway. In the proposed study, we will evaluate all the remaining (430 accessions) collections that were not evaluated in 2005. We will perform preliminary screening of the accessions for Type II resistance (resistance to spread in a spike) in the greenhouse in the first season without use of multiple replicates. Then, only the accessions exhibiting an overall average of less than 30% infection will be further evaluated for Type II resistance in the second and third seasons in the greenhouse using three replicates with randomized entries. All the accessions with putative resistance from the greenhouse evaluation will be evaluated for Type I (resistance to primary infection) and Type II resistance in field nurseries at two locations (Fargo and Langdon, ND). In this study, we also initiate introgression of FHB resistance by hybridizing four accessions of Persian wheat and cultivated emmer wheat showing consistent resistance across different environments with the most commonly grown durum wheat cultivars (Lebsock, Mountrail, Ben, and Divide) in North Dakota. The F₁ hybrids will be backcrossed with durum parents or used to develop doubled haploids. The doubled haploid lines with FHB resistance will be used for developing adapted germplasm and cultivars resistant to FHB in durum wheat.