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DECADES OF BREEDING SCAB RESISTANT DURUM WHEAT IN NORTH DAKOTA: CHALLENGES AND SUCCESSES

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Durum wheat (*Triticum durum* Desf.) is one of the major cereal crops in the world and its production in North Dakota accounts for about 60% of the U.S. production. Durum wheat is very susceptible to Fusarium head blight (FHB) caused by the fungus *Fusarium graminearum* Schwabe (telomorph *Gibberella zeae* (Schw.) Petch. Breeding for FHB resistance is a major strategy for reducing the impact of FHB on durum wheat. However, the lack of good resistance sources in durum wheat has hindered the development of FHB resistant durum wheat cultivars. The current level of resistance found in North Dakota durum cultivars is much lower than that found in hexaploid wheat germplasm. Attempts to introduce resistance genes from the FHB resistant hexaploid Sumai 3 have been challenging because of genetic linkage drag of undesirable traits and other complex issues. Finding sources of high level FHB resistance in durum wheat germplasm has become a priority. To date, approximately 8,000 durum accessions from worldwide collections and 6,000 accessions from ICARDA have been screened for FHB reactions, but only a small number of accessions were found to be moderately resistant. Unadapted germplasm, Tunisian lines, other tetraploid relatives such as *T. carthlicum*, *T. dicoccum*, and *T. dicoccoides* (Langdon-*T. dicoccoides* 3A and 7A substitution lines), and hexaploid line PI 277012 have been used in the breeding program as sources of resistance. Similarly to Sumai 3, their use has been challenging because of genetic linkage drag. The limited amount of native resistance in the adapted germplasm has become important in the breeding program. Using native resistance, the recently released ND Riveland (2017) has lower disease severity and DON levels, combined with low cadmium uptake when compared with all other cultivars grown in North Dakota. However, searching for new FHB sources of resistance remains a priority and a continuous process.

ABSTRACT