Project Abstract

Project Title:	Mutant Population in Adapted SRW Wheat to Reduce FHB Susceptibility and DON Content	
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Genetic resistance against FHB is quantitative in nature and more than 550 quantitative trait loci with varying effects on FHB severity and DON content have been reported in wheat. However, even after decades of efforts, achieving high levels of FHB resistance in wheat varieties has been a constant challenge, highlighting the need to design alternative strategies to develop FHB resistance in the adapted wheat varieties. Mutagenesis using chemicals or physical mutagens has been used to create artificial mutations in plant genomes, creating rich reservoirs of genetic diversity. There have been few reports of FHB susceptibility factors, suggesting that the by deleting the chromosomal regions carrying susceptibility factors increases the resistance against FHB and reduces DON content. For example, deletions in chromosome 4D and 7A has significantly increased FHB resistance in reference wheat line Chinese Spring. However, these lines carry large deletions and are present in a background that brings in several undesirable traits in the elite crosses. Having such a resource in a susceptible elite soft red winter wheat (SRWW) cultivar adapted to Eastern and Southern USA will allow us to incorporate FHB resistance in SRWW cultivars. The goal of this project is to test this hypothesis and to identify mutant lines showing high resistance in a susceptible but an excellent soft red winter wheat cultivar Shirley.

Specific Goals:

1. Development of an advance generation mutant platform in adapted high-yielding soft red winter wheat cultivar
2. Screening of mutant population to identify mutant lines showing moderate to resistant phenotypes
3. Characterize mutant phenotypes in greenhouse and field tests and sharing the resistant germplasm with soft red winter wheat breeders from eastern and southern VDHR groups.

Screening of M5 plants of the mutant population generated in the adapted SRWW-cultivars to identify phenotypic mutants with increased FHB resistance and reduced DON. Confirmation of the mutants in the green house tests and field screening and sharing the seeds of confirmed mutants with regional breeders for validation.

Expected Outcome Identification of mutants of FHB susceptibility factors and their utilization to improve the FHB resistance.