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**ARS Agreement #:** 59-0206-0-172

**Research Category:** VDHR-SWW

**Duration of Award:** 1 Year

**Project Title:** Developing FHB-resistant Soft Red Winter Wheat for Texas and the Gulf-Atlantic Region

## PROJECT 2 ABSTRACT

(1 Page Limit)

Texas is one of the largest soft red winter wheat (SRWW) growing states, where 250,000 to 600,000 acres of SRW are grown annually. About 279,000 acres of SRWW were grown in Texas in 2018 (NASS, 2018) in areas prone to *Fusarium* Head Blight (FHB). In 2015 and 2019, Texas reported FHB in the commercial wheat crop, likely due to increase in corn acres. Percentage of SRW following corn is increasing in Texas. This could lead to increasing levels of FHB, and a proactive approach is required to mitigate this threat. Furthermore, SRWW varieties developed in Texas are adapted to other states in the Southern U.S. region and vice versa. Therefore, an acceptable level of FHB resistance is of paramount importance. The use of resistant cultivars is the most economical, sustainable, and long lasting way of controlling FHB. Marker-assisted selection (MAS) is important to complement traditional screening and breeding methods. The overarching goal of this proposal is to use traditional breeding techniques, a misted-nursery, and MAS to develop FHB resistant SRWW cultivars and to share germplasm with other Southern U.S. programs. Our specific objectives are to 1) develop, screen, and release SRWW that combine superior yield and end-use quality with tagged or native FHB resistance, 2) use MAS to complement traditional breeding methods and improve gain from selection, and 3) enter promising FHB-resistant lines into Southeastern University Grains (SunGrains) scab nurseries to facilitate development of resistant cultivars. New FHB-resistant SRWW cultivars with high yield potential, tolerance to other biotic and abiotic stresses, and superior end-use quality will provide effective means of resistance not only in Texas but also in other areas in the Southern U.S. where TAM wheat is adapted and where FHB levels require adequate host plant resistance. This proposal addresses Research Priorities 1) Increase and document cultivars with known improved FHB resistance; 2) Increase efficiency of coordinated project breeding programs and, 3) Evaluate and implement new breeding technologies and germplasm. First two years' efforts will be accomplished within the period of proposed work, and will focus on testing advanced lines represented by the Uniform Southern SRWW Nursery (USSRWWN) and Southern Uniform Winter Wheat Scab Nursery (SUWWSN). Future work will include the above two nurseries and will expand to include screening of Texas Soft Uniform Variety Trial (SUVT), the Soft wheat Elite (SWE), and Gulf-Atlantic Wheat Nursery (GAWN) in addition to a larger number of doubled-haploid lines originating from populations with known tagged and native FHB resistance.