

**PI: Johnson, Jerry****PI's E-mail: [jjohnson@griffin.uga.edu](mailto:jjohnson@griffin.uga.edu)****Project ID: FY07-JO-038****FY06 ARS Agreement #: 59-0790-4-108****Research Area: VDUN****Duration of Award: 1 Year****Project Title: Enhancement of Scab Resistant Wheat Cultivars Adapted to the Southeast.****PROJECT 1 ABSTRACT**

(1 Page Limit)

Fusarium head blight (FHB) epidemics have occurred in Georgia and the Southeast in recent years which resulted in marketing difficulty of grain due to high DON concentrations. Presently, scab resistant cultivars with resistance to other diseases such as leaf rust and stripe rust are not available in adequate numbers. Several different scab resistant sources are being identified and incorporated in elite lines. Conventional and double-haploid breeding methods are being employed along with marker assisted selection to accelerate the development of adapted FHB resistant cultivars. SSR markers are being used to assist in the selections within populations containing 3BS and 5AS. Wheat breeding lines from the southern uniform scab nurseries are being evaluated for resistance and adaptation under field conditions.

Several wheat sources from diverse origin with FHB resistance have been transferred into elite lines that are adapted to the Southeast. The breeding line, GA941523E21, has been identified with good native scab resistance and is being increased for possible release. About 120 wheat elite lines and the uniform southern FHB nurseries were evaluated for Type II resistance to FHB. Six lines from our elite nursery were identified in 2006 with good FHB resistance. These resistant lines will be further characterized by evaluating also Type I and type III resistance and will be used as parents in our breeding program. Haplotyping of all our potential recurrent parents and resistance donors are being conducted. Marker assisted backcrossing is being continued to pyramid known FHB QTLs into our moderately resistant elite lines. About 11 single crosses, 29 three-way crosses, and 22 backcrosses were made in 2006 involving FHB resistant sources to create F2 populations. F3 populations from 31 single crosses, 32 three-way crosses and 21 backcrosses from diverse sources of FHB resistance (GA 991109 (Ernie derived), GA 031307DH (derivative of Sumai 3) and GA031454DH (derivative of Sumai 3), VA02W-713 (Ning7840 / PIO2691 // Roane), INW 0411, INW 0412, Truman, and derived lines from Futai8944 and W14) are being evaluated in field nursery.

Derived lines from Futai 8944, and W14, VA01W-476 (Roane / W14), VA FE24 (Ernie \*2 // Futai 8944 /3/ 2\* Ernie), will be evaluate for the presence of two major FHB resistant QTLs on chromosome 3BS and 5AS among elite lines and backcross populations. Twenty population of BC1F1 and BC1F2 plants will be screened with molecular markers associated with FHB QTLs located on chromosomes 3BS and 5AS to enhance FHB resistance of AGS2000, which is widely adapted to southeast region of the U.S. with excellent agronomic traits. VA01W-476, with the major QTLs in chromosome 2A, 3B and 5A for FHB resistance was used as donor in our program. Double haploid individuals were generated from backcross F1 plants induced with maize pollens. Screening with SSR markers indicated the integration of novel FHB resistant QTLs on 3BS and 5AS from donor parents and native adaptive gene pool of ASG2000 and its derivatives. Two double haploid plants from back-cross of VA01W-76/GA98186 and 4 double haploid plants from back-cross of VA01W-476/AGS2485 were identified to have VA01W-476/W14 type QTLs on 3BS and 5AS.

