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Project Title: Enhancement of Scab Resistant Wheat Cultivars Adapted to the Southeast.

PROJECT 1 ABSTRACT

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The most effective strategy to alleviate yield and quality losses due to FHB is the development of resistant cultivars. Funds from the Scab Initiative have allowed our program to develop lines with a level of scab resistance similar to Ernie. The long term goal is to reach the level of resistance of Sumai 3 but without compromising grain yield. The proposal is relevant to the USWBSI with the development of scab resistance cultivars with superior agronomic and milling and baking quality. 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. Several different scab resistant sources are being incorporated in elite lines. Marker assisted selection is being used to assist in the selections within populations containing FHB QTL.

Several wheat sources from diverse origin with FHB resistance have been transferred into elite lines that are adapted to the Southeast. The level of native resistance within the elite lines of Georgia's program has significantly increased. Elite breeding line, GA941523E21, which has PIO 2643 in its pedigree, was identified with moderate level of FHB resistance similar to Ernie from greenhouse and field evaluation. Several elite breeding lines, GA 991109-6E8, GA 991109-6A7, GA 031307DH, GA031454DH, GA 981621-5E34, and GA991371E12 that have moderately scab resistance will be further evaluated in multi-locations for yield and agronomic performance and FHB resistance. Several diverse native sources of Type II resistance from other breeding programs, (Coker 9511, Truman, Roane, Ernie, OH 02-12686, IL01-11934, and IL 00-8530) are being incorporated into GA scab resistant lines. Breeding for Type-I resistance is also in progress with populations derived from Truman (GA 061209 (Truman / 2*AGS 2000 sib) and Frontana. FHB resistance from derivatives of Sumai 3, (INW 0411 (P97397E1-11), INW 0412, VA02W-713, VA01W-476, VA 04W-433 and derived lines from Futai8944 and W14 are being crossed with our best yielding lines.

Marker assisted backcrossing (MABC) of QTL from Sumai 3 (3BS, 5AS), Goldfield (2BS) and Ernie (5AS, 3BS and 4BL) are being performed using high yielding and moderately resistant lines as recurrent parents. Pyramiding QTL (3BS and 5AS) will greatly facilitate development of cultivars that have more effective FHB resistance from native and exotic sources.