ITEMS FROM THE UNITED STATES OF AMERICA

GEORGIA / FLORIDA

GEORGIA EXPERIMENT STATION / UNIVERSITY OF GEORGIA
Griffin, GA 30223-1197, USA.

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The 2008 Georgia winter wheat crop was grown on about 380,000 planted acres. Yields of wheat grown by top producers were around 6,000 kg/ha on resistant cultivars to stripe rust. Average yield for the state was 3,200 kg/ha. The growing season was characterized by drought conditions in the autumn that delayed planting and in the spring by very dry conditions during the grain-filling period.

Breeding.

Two high-yielding, broadly adapted wheat cultivars, GA981621-5E34 and GA981622-5E35, were released by the University of Georgia in 2008 for growers in the Southeast. These two SRWW cultivars are high yielding with excellent test weight and disease and insect resistance and will offer new sources of resistance to both pathogens and insects. GA981621-5E34 and GA981622-5E35 have excellent stripe rust resistance derived from PIO26R61 and Hessian fly. The cultivars are medium-maturing, soft wheats with good resistance to wheat soil-borne mosaic virus.

GA 981621-5E34 (AGS 2485 / PIO 26R61) is a medium-late maturity SRWW that combines high yield, high test weight, and good straw strength. The cultivar has resistance to leaf rust, stripe rust, and soil-borne mosaic virus and is moderately resistance to powdery mildew. GA 981621-5E34 is resistant to Hessian fly. Maturity averages about 4 days later than that of AGS 2000 in Georgia.

GA 981622-5E35 (AGS 2000 / PIO 26R61) is a medium-late maturity SRWW that combines high yield, high test weight, and good straw strength. The cultivar has resistance to leaf rust, stripe rust, and soil-borne mosaic virus, and is moderately resistance to powdery mildew. GA 981622-5E35 is resistant to Hessian fly. Maturity averages similar to that of AGS 2000 in Georgia.

Hessian Fly.

Forty-six elite lines were field evaluated for Hessian fly resistance at Plains and Griffin, GA. Twenty-seven lines had good levels of resistance at both locations. BC_3F_2 and subsequent generation wheat lines of more recent crosses that were segregating for Hessian fly resistance were screened to select progeny with resistance. Lines containing *H13* or *H21* resistance genes have been selected and carried forward into elite lines.

Entries in the Georgia State Wheat Variety trial also were evaluated for Hessian fly resistance at Plains and Griffin, GA. A total of 65 entries, including 24 advanced University of Georgia (UGA) lines, were evaluated. A total of 22 entries were rated as moderately or highly resistant at Plains. About 83% (20/24) of the resistant entries were either released cultivars or advanced lines from the UGA small grain breeding program. Three triticale entries also were evaluated. Infestations at Griffin were lower but also provided useful results. Results of State Wheat Variety trial were published in the 2007/2008 Georgia Small Grain Performance Tests. Results of these evaluations have been critically important in informing Georgia county agents and farmers about which varieties are resistant to Hessian fly.

Samples of Hessian fly populations were collected near Griffin and Plains, GA in January 2007, and shipped to Sue Cambron at Purdue University for biotype determination and gene resistance evaluation. Hessian fly biotype preva-

lence has shifted over the last 20 years. In 1986, the prevalent biotype throughout the state was biotype E. Since then, Hessian fly populations have rapidly shifted to biotype O in southern GA (Fig. 1) and only the *H7H8* gene combination remains effect in southern GA. Currently populations in southern GA about 50% biotype O and L. The population in northern GA has rapidly progressed to 100% Biotype L (Table 1) indicating that none of the older deployed resistance genes are effect. Despite this result, several cultivars from the Georgia breeding program continue to exhibit good levels of field resistance. The virulence of the Griffin population also was assessed for 19 other genes (Table 1). Genes *H12*, *H18*, *H21*, *H24*, and *H26* had high levels of virulence against this population. In similar evaluations, *H13* was virulent at most locations in the southern region but not in the Griffin population. Nevertheless *H13* is now deployed in several commercial cultivars and is in a number of elite lines from the Georgia program. These cultivars show high levels of Hessian fly resistance in the field throughout the state. *H21* shows high levels of virulence to Hessian fly populations throughout the Southeast and also is in several elite lines in the Georgia program.

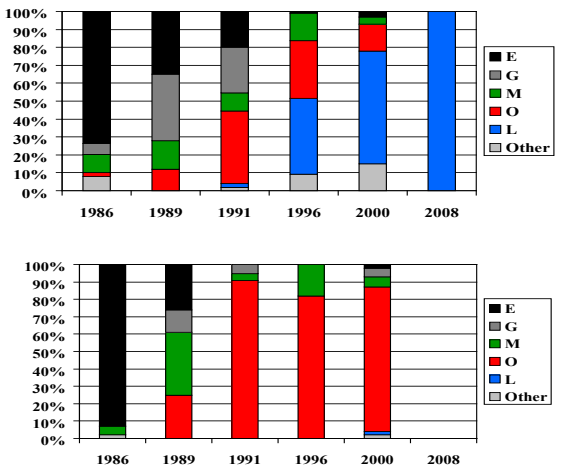

Fig. 1. Proportion of Hessian fly biotypes from 1986–2000 in northern (top) and southern (bottom) Georgia.

Table 1. Hessian fly virulence to a population from Pike County (near Griffin) Georgia, USA, to selected Hessian fly-resistance genes; biotypes are based on the differentials (*H3*, *H5*, *H6*, and *H7H8* highlighted in yellow; R = plants with resistance reaction; S = plants with a susceptible reaction).

Hessian fly gene	Source	Pike County, GA	
		R-S	% R
No gene	Newton	0–20	0
H3	Monon	0–24	0
H5	Magnum	0–18	0
H6	Caldwell	0–18	0
H7H8	Seneca	0–19	0
H9	Iris	13–7	65
H10	Joy	10–9	53
H11	Karen	0–18	0
H12	Lola	19–0	100
H13	Molly	4–18	18
H14	921676A3-5	0–15	0
H15	81602C5-3-3-8-1	0–4	0
H16	921682A4-6	2–13	13
H17	921680D1-7	0–12	0
H18	Marquillo	18–1	95
H19	84702B14-1-3-4-3	0–1	0
H21	Hamlet	23–3	88
H22	KS85WGRC01	15–5	75
H23	KS89WGRC03	4–20	17
H24	KS89WGRC6	19–0	100
H25	PI 592732	12–6	11
H26	KS92WGRC26	14–0	100
H28	PI 59190	3–1	75
H31	P921696A1-15-2-1	19–1	95

Scab.

Fusarium head blight is a potential devastating disease in the Southeast region in the United States where low temperature and misted weather occurs frequently during soft red winter wheat flowering. 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. Populations are 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, and VA 04W-433) and derived lines from Futai8944 and W14 will be crossed with our best yielding lines.

Marker-assisted backcrossing of QTL from Sumai 3 (3BS and 5AS), Goldfield (2BS), and Ernie (5AS, 3BS, and 4BL) will be 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. Derived lines from Futai8944, and W14, VA01W-461 (Roane / W14), and VA FE24 (Ernie *2 // Futai 8944

2* Ernie) will be evaluated and validated for the presence of two major FHB resistance QTL on chromosome 3BS and 5AS among elite lines and backcross populations. Populations of BC_1F_2 and BC_1F_3 plants with AGS 2000 as the recurrent parent will be screened with markers for *Fhb1* (3BS) and *Xbarc117*, *Xgwm156*, *Xbarc100*, and *Xbarc186* for 5AS.

Publications.

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KANSAS

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Overley recaptures number one.

Overley became the leading cultivar of wheat seeded in Kansas for 2009. Jagalene held this position last year. Accounting for 13.7% of the state's wheat, Overley was the most popular cultivar in three of the nine districts. New to the top ten is Fuller, ranking second with 10.9% of the acreage. Santa Fe moved up to third place with 9.5% of the states acreage. Jagalene moved down to fourth place with 9.1% of the acreage. Jagger came in fifth at 8.5% down 6.2 points from last year. TAM 111 moved down to sixth place at 6.8% New to the top ten is Postrock, ranking seventh with 6.0% of the acreage. The KSU-maintained cultivar 2137 down to eighth place at 2.9%; T81 moved down to ninth place at 2.5%. TAM 112, rounded out the top ten at 2.0%. Acres planted with blended cultivars were not included in the rankings by cultivar. Blends accounted for 10.7% of the state's planted acres and were used more extensively in the north-central, northwest, and central areas of the State. Out of the total acres planted with blends, 37.5% included Santa Fe in the blend, and 33.1% had Jagalene in the blend. Hard white cultivars accounted for 1.0% of the state's acreage. Danby was the leading hard white cultivar, accounting for 70% of the state's white wheat. The majority of the white wheat was planted in the western third of the State. This Wheat Variety project is funded by the Kansas Wheat Commission.

Table 1. Top 10 cultivars grown in the state of Kansas in 2009 and their percent of seeded acreage.

#	Cultivar	% of acerage
1.	Overley	13.7
2.	Fuller	10.9
3.	Santa Fe	9.5
4.	Jagalene	9.1
5.	Jagger	8.5
6.	TAM 111	6.8
7.	Postrock	6.0
8.	2137	2.9
9.	T81	2.5
10.	TAM 112	2.0