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Alabama Agricultural Experiment Station Auburn University  
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# S tonewall



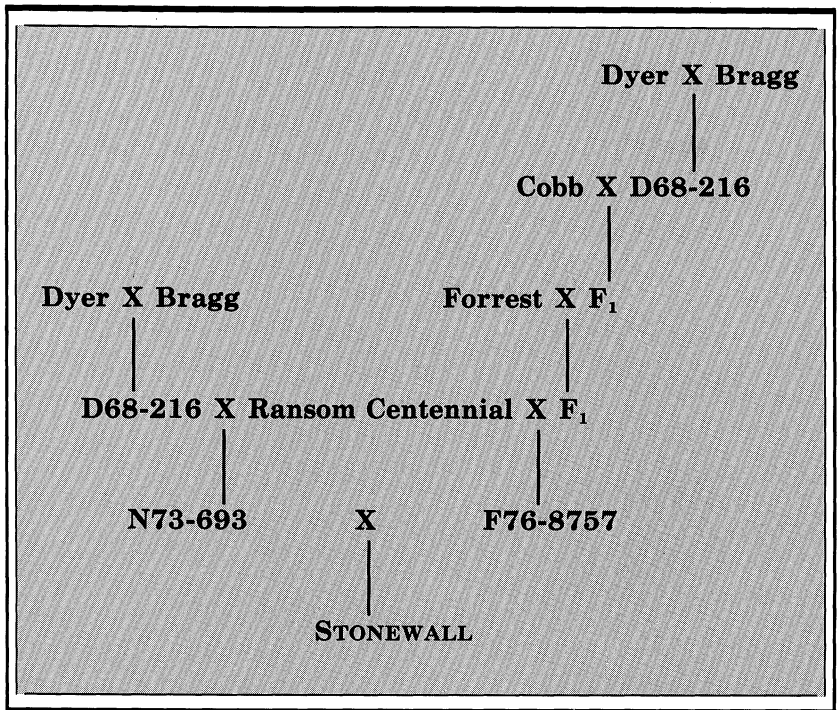
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**A New  
Soybean  
Variety for  
Alabama**

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**Pedigree of Stonewall.**

*Information contained herein is available to all without regard to race, color, sex, or national origin.*

# STONEWALL—

## A New Soybean Variety for Alabama<sup>1</sup>

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**S**STONEWALL IS A NEW soybean [*Glycine max* (L.) Merr.] variety released by the Alabama Agricultural Experiment Station in 1988. It was released primarily to provide Alabama soybean growers a mid-Maturity Group 7 variety that combines high yield with good pest resistance, standability, and seed quality.

Stonewall originated from the cross N73-693 × F76-8757, as indicated in the pedigree reproduced on page 2. N73-693 is an experimental line selected from the cross D68-216 × Ransom, and F76-8757 is an experimental line selected from the same cross as the variety Kirby. The original cross was made at the University of Georgia in 1979. The F<sub>1</sub> generation was grown during the winter of 1979-80 in Puerto Rico, and the F<sub>2</sub> generation was grown in Georgia during the summer of 1980. The F<sub>3</sub> and F<sub>4</sub> generations were advanced from the F<sub>2</sub> by single-seed descent, and were grown in Puerto Rico during the winter of 1980-81. F<sub>5</sub> seed (each tracing back to a different F<sub>2</sub> plant) were planted at the Plant Breeding Unit in Tallassee, Alabama, in the summer of 1981. Approximately 400 F<sub>5</sub> plants were harvested, threshed individually, and grown in F<sub>5</sub>-derived F<sub>6</sub> rows in 1982.

Yield testing was begun on selected F<sub>6</sub> rows in 1983, under the experimental designation Au82-204. Yield tests in Alabama consisted of four-row plots and three replications at the Plant Breeding Unit (PBU) in 1983 (preliminary test). Advanced

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<sup>1</sup>Research supported in part by a grant from Alabama Soybean Producers.

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tests were grown in 1984, 1985, and 1986 at the PBU; Sand Mountain Substation, Crossville, Alabama; and Brewton Experiment Field, Brewton, Alabama. Advanced tests were also grown at the Gulf Coast Substation, Fairhope, Alabama, in 1984 and 1986, and at Prattville Experiment Field, Prattville, Alabama, in 1986, for a total of 12 Alabama test environments during the period 1984 to 1986. Data were collected on seed yield, plant height, lodging, and days to maturity. Plots were judged to be mature when 95 percent of the pods were brown.

Screening in the field for resistance to soybean cyst nematode (*Heterodera glycines* Ichinohe) race 3 was done in infested soil at the E. V. Smith Research Center at Shorter, Alabama. Experimental genotypes were planted in single-row plots with three replications. Numbers of cysts were counted on the roots of five plants from each plot 6 weeks after planting and compared with known susceptible and resistant varieties. Screening for resistance to soybean stem canker (caused by *Diaporthe phaseolorum* (Cke. & Ell.) (Sacc.) var. *caulivora*) was done during the preliminary yield trials at the PBU in 1983, when a natural epiphytotic of the disease caused significant yield loss to susceptible genotypes.

In 1985, Stonewall was entered (as Au82-204) into the Southern Regional Preliminary Group 7 of the USDA Uniform Soybean Tests. It was evaluated for yield and disease and

TABLE 1. AGRONOMIC PERFORMANCE OF STONEWALL AND CHECK VARIETIES IN ALABAMA DURING 1984, 1985, AND 1986 IN A TOTAL OF 12 ENVIRONMENTS

Line	Yield	Maturity date (days after Oct. 1)		Height	Lodging <sup>1</sup>
		Bu.	No.		
Stonewall .....	47.1	14	34	1.8	
Braxton .....	42.5	17	37	1.8	
Centennial .....	41.2	11	36	1.9	
Tracy M .....	39.2	9	34	2.0	
LSD (.05) .....	2.3				

<sup>1</sup>Lodging rated on a scale of 1 to 5, where 1 = all plants erect and 5 = all plants down.

TABLE 2. AGRONOMIC PERFORMANCE OF STONEWALL IN THE USDA PRELIMINARY GROUP VII TESTS AT 9 LOCATIONS DURING 1985

Line	Yield	Maturity date (days after Oct. 1)		Height	Oil	Protein
		Bu.	No.			
Stonewall .....	38.8	18	33	21.4	41.9	
Braxton .....	35.4	21	38	20.3	42.6	
Centennial .....	35.1	16	35	20.5	43.2	
LSD (.05) .....	3.9					

nematode resistance characteristics at nine locations across the Southeast. Stonewall was advanced to the Uniform Group 7 Tests for similar evaluation at 19 locations across the Southeast in 1986 and 23 locations in 1987. Additional evaluation for disease and nematode resistance, seed quality, protein and oil content, and seed size was done during testing in the USDA Uniform Tests. Stonewall has been evaluated in replicated yield trials in a total of 63 environments.

Stonewall yielded 4.6 bushels per acre more than Braxton, the highest-yielding check variety, during 3 years of testing in Alabama, table 1. Maturity was midway between Braxton and Centennial, maturing about October 14 on average. Height was somewhat shorter than Braxton or Centennial and lodging was the same as Braxton. In the first year of testing in the USDA Preliminary Group 7 Tests, in locations from North Carolina to Texas, Stonewall yielded 3.4 bushels per acre more than Braxton, table 2, and 3.7 bushels per acre more than Centennial. Maturity and height data were similar to the Alabama tests in relation to the check varieties.

In the USDA Uniform Group 7 Tests during 1986 and 1987, tables 3 and 4, Stonewall yielded higher than all the check varieties, including Thomas, a new variety released in 1987 by the Georgia Agricultural Experiment Station. Protein and oil percentage of the seed compared favorably with the check

TABLE 3. AGRONOMIC PERFORMANCE OF STONEWALL IN THE USDA UNIFORM GROUP VII TESTS AT 19 LOCATIONS DURING 1986

Line	Yield	Maturity date (days after Oct. 1)		Height	Oil	Protein	Lodging
		<i>Bu.</i>	<i>No.</i>				
Stonewall .....	40.5	21	29	21.8	41.6	1.4	
Thomas .....	39.4	24	31	19.8	41.9	1.5	
Braxton .....	37.0	27	34	20.5	41.4	1.5	
Gordon .....	37.2	19	33	21.5	39.8	1.6	

TABLE 4. AGRONOMIC PERFORMANCE OF STONEWALL IN THE USDA UNIFORM GROUP VII TESTS AT 23 LOCATIONS DURING 1987

Line	Yield	Maturity date (days after Oct. 1)		Height	Oil	Protein	Lodging
		<i>Bu.</i>	<i>No.</i>				
Stonewall .....	37.9	21	31	20.9	41.1	1.4	
Thomas .....	35.2	24	34	18.4	41.8	1.7	
Braxton .....	33.3	22	37	19.1	41.7	1.7	
Gordon .....	33.7	20	35	19.7	40.8	1.7	

varieties all 3 years, whereas lodging and plant height were somewhat lower.

Disease and nematode resistance, as evaluated in the USDA Uniform Group 7 Tests, showed that earlier selection for resistance to soybean cyst nematode race 3 and soybean stem canker had been effective, tables 5, 6, and 7. In addition, Stonewall was found to have good resistance to frogeye leafspot (caused by *Cercospera sojiina* Hara), table 8, and good tolerance to Columbia lance nematode (*Hoplolaimus columbus* Sher), table 9. Under conditions when these diseases and nematodes have had a large effect on yield, performance of Stonewall has been good.

Stonewall has determinate growth habit, white flowers, tawny pubescence, and tan pod walls. Seeds of Stonewall are yellow with black hila and dull seed coats.

Breeder seed of Stonewall will be maintained by the Alabama Agricultural Experiment Station. Seed should be available for commercial plantings beginning in 1990.

TABLE 5. NEMATODE RESISTANCE AND SEED QUALITY RATINGS FOR STONEWALL AND CHECK VARIETIES IN THE USDA UNIFORM GROUP VII TESTS DURING 1986

Line	Resistance ratings, by species <sup>1</sup>				Seed quality rating <sup>2</sup>
	M. i.	M. a.	<i>H. glycines</i>		
			Race 3	Race 4	
Stonewall .....	2.0	4.0	R	S	2.2
Thomas .....	2.0	4.3	R	R	2.5
Braxton .....	1.0	3.0	S	S	2.5
Gordon .....	1.0	2.5	R	S	2.5

<sup>1</sup>M. i. is *Meloidogyne incognita* (Southern root-knot nematode) and M. a. is *Meloidogyne arenaria* (peanut root-knot nematode). Both are rated on a scale of 1 to 5 where 1 = no galling and 5 = severe galling in greenhouse tests. *H. glycines* is soybean cyst nematode and is rated resistant (R) or susceptible (S).

<sup>2</sup>Seed quality is rated on a scale of 1 to 5 where 1 = excellent quality and 5 = very poor quality, based on a visual rating. Seed quality is determined by a variety of disease and environmental factors.

TABLE 6. NEMATODE RESISTANCE CHARACTERISTICS AND SEED QUALITY RATINGS OF STONEWALL AND CHECK VARIETIES IN THE USDA UNIFORM GROUP VII TESTS DURING 1987

Line	Resistance ratings, by species <sup>1</sup>				Seed quality rating <sup>2</sup>
	M. i.	M. a.	<i>H. glycines</i>		
			Race 3	Race 4	
Stonewall .....	3.5	4.0	R	S	1.8
Thomas .....	1.5	4.8	R	S	1.7
Braxton .....	0.8	3.8	S	S	1.9
Gordon .....	1.0	3.0	R	S	1.9

<sup>1</sup>M. i. is *Meloidogyne incognita* (Southern root-knot nematode) and M. a. is *Meloidogyne arenaria* (peanut root-knot nematode). Both are rated on a scale of 1 to 5 where 1 = no galling and 5 = severe galling in greenhouse tests.

<sup>2</sup>Seed quality is rated on a scale of 1 to 5 where 1 = excellent quality and 5 = very poor quality, based on a visual rating. Seed quality is determined by a variety of disease and environmental factors.

TABLE 7. PERFORMANCE OF STONEWALL AND CHECK VARIETIES AT BEAUMONT, TEXAS (SITE OF SEVERE STEM CANKER EPIPHYTIC) DURING 1986<sup>1</sup>

Line	Yield	Disease rating <sup>2</sup>
	<i>Bu.</i>	
Stonewall .....	14.8	1.3
Thomas .....	18.0	0
Braxton .....	9.2	1.0
Gordon .....	.5	5.8
LSD (.05) .....	8.3	

<sup>1</sup>Drought was also a limiting factor at this location.

<sup>2</sup>Stem canker rated on a scale of 0 to 9, where 0 = no disease and 9 = all plants dead.

TABLE 8. PERFORMANCE OF STONEWALL AND CHECK VARIETIES AT TALLASSEE, ALABAMA (SITE OF SEVERE FROGEYE LEAFSPOT EPIPHYTIC) DURING 1987<sup>1</sup>

Line	Yield	Disease rating <sup>2</sup>
	<i>Bu.</i>	
Stonewall .....	51.6	1.0
Thomas .....	33.6	3.7
Braxton .....	34.7	2.7
Gordon .....	35.1	3.0
LSD (.05) .....	6.9	0.7

<sup>1</sup>Frogeye leafspot caused by *Cercospora sojina* of unknown race.

<sup>2</sup>Frogeye leafspot rated on a scale of 1 to 5, where 1 = no disease and 5 = over 50 percent of leaf area covered with lesions.

TABLE 9. PERFORMANCE OF STONEWALL AND CHECK VARIETIES AT HARTSVILLE, SOUTH CAROLINA (SITE OF FIELD INFESTATION OF COLUMBIA LANCE NEMATODE) DURING 1987<sup>1</sup>

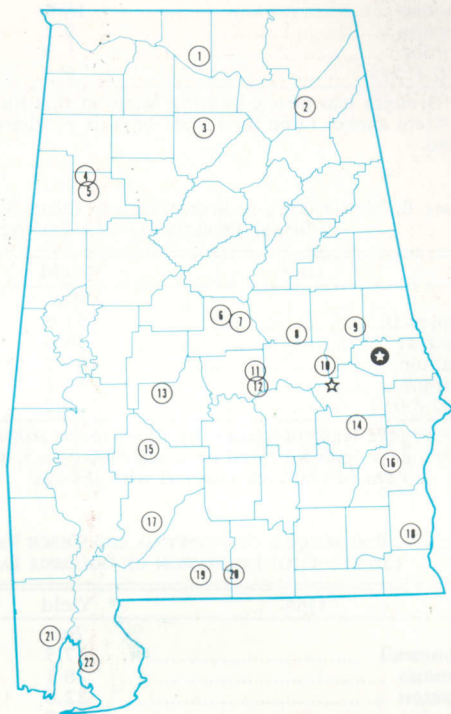
Line	Yield	Nematode rating <sup>2</sup>
	<i>Bu.</i>	
Stonewall .....	37.5	1.0
Thomas .....	28.1	3.2
Braxton .....	22.6	3.3
Gordon .....	28.9	2.0
LSD (.05) .....	5.6	

<sup>1</sup>Columbia lance nematode caused by *Hoplolaimus columbus*.

<sup>2</sup>Lance nematode rated on a scale of 1 to 5, where 1 = no disease and 5 = severe above-ground stunting and root necrosis.

## Alabama's Agricultural Experiment Station System AUBURN UNIVERSITY

With an agricultural research unit in every major soil area, Auburn University serves the needs of field crop, livestock, forestry, and horticultural producers in each region in Alabama. Every citizen of the State has a stake in this research program, since any advantage from new and more economical ways of producing and handling farm products directly benefits the consuming public.



### Research Unit Identification

- ★ Main Agricultural Experiment Station, Auburn.
- ☆ E. V. Smith Research Center, Shorter.

1. Tennessee Valley Substation, Belle Mina.
2. Sand Mountain Substation, Crossville.
3. North Alabama Horticulture Substation, Cullman.
4. Upper Coastal Plain Substation, Winfield.
5. Forestry Unit, Fayette County.
6. Foundation Seed Stocks Farm, Thorsby.
7. Chilton Area Horticulture Substation, Clanton.
8. Forestry Unit, Coosa County.
9. Piedmont Substation, Camp Hill.
10. Plant Breeding Unit, Tallassee.
11. Forestry Unit, Autauga County.
12. Prattville Experiment Field, Prattville.
13. Black Belt Substation, Marion Junction.
14. The Turnipseed-Ikenberry Place, Union Springs.
15. Lower Coastal Plain Substation, Camden.
16. Forestry Unit, Barbour County.
17. Monroeville Experiment Field, Monroeville.
18. Wiregrass Substation, Headland.
19. Brewton Experiment Field, Brewton.
20. Solon Dixon Forestry Education Center, Covington and Escambia counties.
21. Ornamental Horticulture Field Station, Spring Hill.
22. Gulf Coast Substation, Fairhope.